

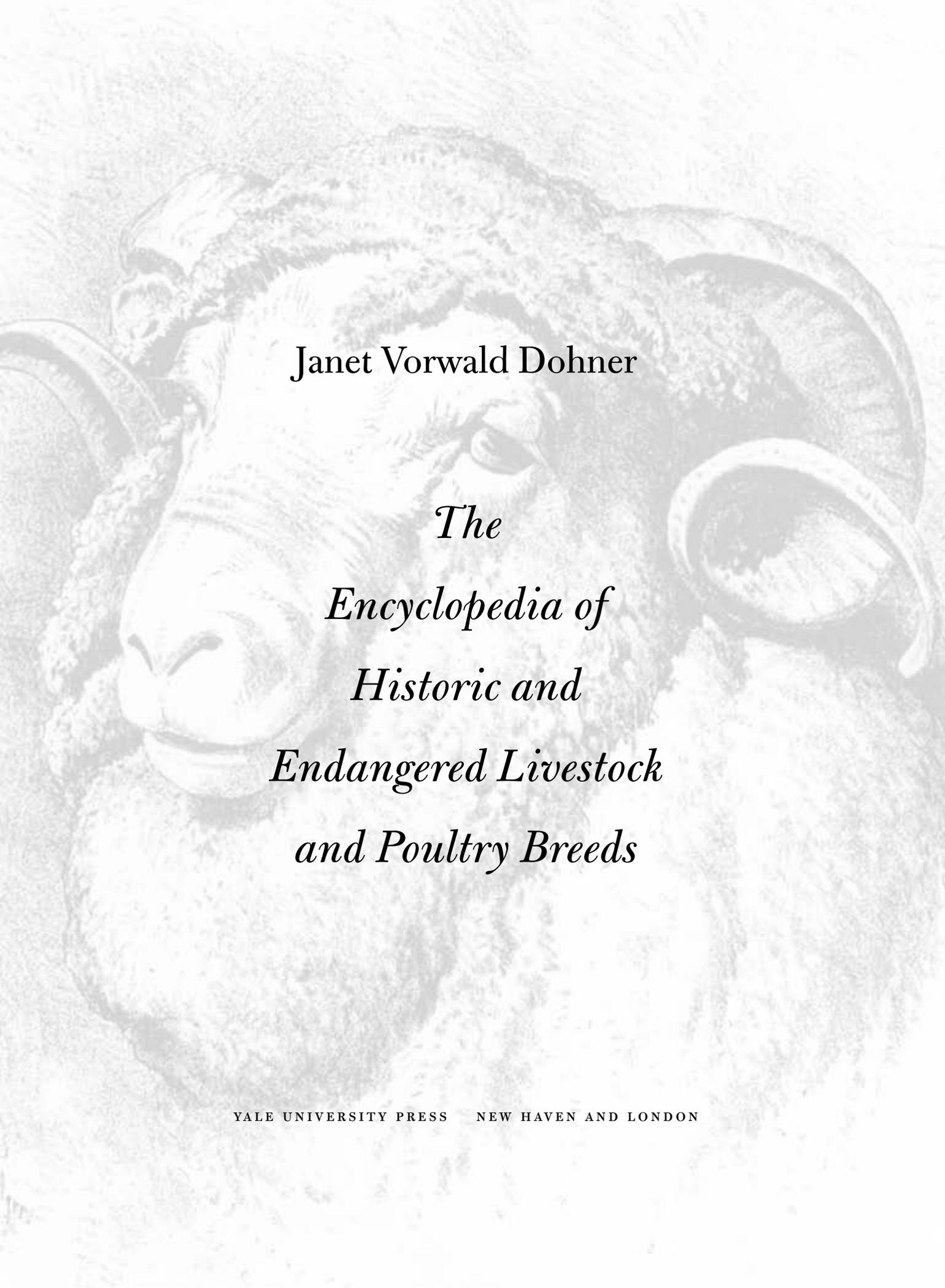
THE ENCYCLOPEDIA OF  
Historic and Endangered  
Livestock and Poultry Breeds



IANET VORWALD DOHNER

Yale Agrarian Studies Series  
*James C. Scott, series editor*





Janet Vorwald Dohner

*The  
Encyclopedia of  
Historic and  
Endangered Livestock  
and Poultry Breeds*

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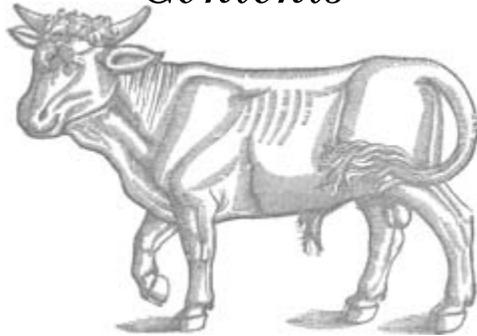
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*My utmost respect to those individuals and families  
who day after day continue to conserve and care for their animals.  
To my family and friends, thank you for your understanding and support.*



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# Preface

**H**ave you ever seen a field of black-and-white spotted sheep with two, four, or even six large, curving horns? A huge, dreadlocked donkey? A curly haired, white pig with big black spots? A fully grown cow no taller than your waist?

Have you ever seen a Dominique chicken? The early colonists probably carried the ancestors of these multi-purpose and hardy birds across the sea to the New World. Later generations of pioneers stuffed them into their saddlebags to help them settle the new land. Too many to count, Dominiques pecked and scratched in farmyards across the countryside. Yet just a few years ago there were fewer than five hundred hens to be found.

Have you ever seen a Cotswold sheep? Full of personality, these wonderful sheep have little ringlets of fine wool that obscure their faces. Not long ago the old, long-wooled sheep breeds ranged throughout Britain and its colonies, bringing great wealth from their wool. Today there may be fewer than a thousand Cotswolds in all of Britain and North America.

The answer to these questions is “Probably not.” Yet some of these breeds and many others were once well known in Canada, the United States, Great Britain, and Ireland. Half a century ago agriculture started down the road to big business, and just as the numbers of small family farms began to shrink, so we rapidly lost the diversity of our farm animals. More than half of our once common livestock breeds are now endangered.

The impetus for this book came in part from Kismet, our Turkish livestock guardian dog. Many breeds of livestock protector dogs have worked with humans since ancient times, although we have only recently rediscovered their value in the New World. In an effort to learn more about how to work with these dogs, I turned to the work of Raymond Coppinger, director of the Livestock Dog Project at Hampshire College, who pioneered the understanding of livestock dogs. In 1983, Coppinger also introduced the concept of the “domestication of evolution” in an article of the same name. Stephen Budiansky, author of *The Covenant of the Wild* (1992), was struck by this concept that animals can “choose” domestication as a means of species survival. Budiansky recognized and explained this human-animal partnership and the responsibility it brings.

This special relationship and the responsibility that accompanies it support the efforts of rare breed conservators, who truly understand the importance of the work they undertake. They have certainly been frustrated in promoting their cause. The general public does not understand the reason or the need to preserve these old breeds. Then, too, the public no longer understands agriculture or the working relationship between farmers and their animal partners.

I began this work in an attempt to draw together these threads—the history of domestication, the human-animal relationship, and the need for the con-

ervation of rare breeds. I have drawn heavily on the pioneering work of the members and staff of livestock conservation groups: the Rare Breeds Survival Trust in Great Britain, the American Livestock Breeds Conservancy, and Rare Breeds Canada. This work would have been impossible without their prior labors in collecting census data, lists of breeders, historical records, and practical knowledge. I also contacted every breed organization, society, or registry possible in the United Kingdom, Canada, and the United States. Most have been extremely generous with materials. In addition, I interviewed or corresponded with many breeders. These individuals and families generously shared their enthusiasm and commitment to their animals with me.

Livestock animals are those breeds that contribute food, fiber, or work to humans, and they are the focus of this book. Uncommon domestic and exotic animals are not covered. The choice of which breeds to describe here was made on the basis of national priority lists, historic importance, or conservation success that might be applicable to others. The breeds are not presented in alphabetical order but rather as part of the discussion on the historical development of these animals, first in the Old World and then in the New World. All interpretations and opinions are my own and do not necessarily represent the national rare breeds organizations or breed associations. Each breed profile is followed by an indication of its degree of rarity or official status with national rare breeds organizations. Because the national organizations use different criteria for making their determinations, these categories are not directly comparable.

Wherever possible, I have left the choice of breed illustrations up to an organization or individual breeder. The illustrations of each breed are not in-

tended to represent any standard because there is necessary variety within each breed. Breed organizations and individual breeders make choices in their selection programs, and they cannot be expected to agree completely. The demands of the show ring also change periodically. At times a suitable illustration for a breed was so hard to find that choice was not a possibility. Unfortunately I could not include illustrations for 36 of the 191 breeds profiled here. In addition, the old utilitarian strains of poultry cannot always be recognized in a photograph. John Tarren's lovely photographs do include exhibition forms of some breeds.

Livestock animals other than horses were not written about extensively until the nineteenth century. Misconceptions or errors are often repeated in the literature, and it remains difficult to resolve discrepancies in the historical records of livestock. Accounts often reflect personal beliefs as well. I have endeavored to eliminate inaccurate information even when it is widely repeated. When I relate stories or legends I identify them as such. Understandably, all breeders and their associations promote the outstanding qualities of their stock.

In the past, livestock animals were often named for their native area or were called by several names. These names also change through the years or become confused when the animals are transplanted. More information about the history of livestock development will be revealed as the genetic relationships among breeds are established with the use of bloodtyping and other DNA technologies.

I invite continued updates from breed associations and individuals, additional historic information, illustrations, and verifiable corrections for use in any future edition of this book.

# *Acknowledgments*

My foremost thanks go to my agent, the late Susan P. Urstadt, for her enthusiastic belief and guidance in this project.

It would be impossible to thank every individual and breed association who assisted me in acquiring photographs, historical information, breed standards, registry requirements, publications, and other research materials. Their generosity has been overwhelming. The enthusiasm that these people have for their stock is testament to their dedication and commitment. The future will thank them.

Certain people were especially helpful. I thank Nils Berglund of the American Livestock Breeds Conservancy for his early encouragement and for his statement that “no breeder is *only* a small breeder. Everyone is important.” Professor Roy Crawford offered early support and suggestions. Bud Kerr, recently retired di-

rector of the United States Department of Agriculture Office for Small-Scale Farming, pointed me in the right direction.

I thank Lawrence Alderson for his concerns and the use of his slides. Richard Ludwycyche was helpful in locating illustrations from the library of the Rare Breeds Survival Trust. Dan Price-Jones of Rare Breeds Canada rounded up hard-to-find breeds from Canada. Carolyn Christman of the American Livestock Breeds Conservancy found the answers to my questions many times over the past several years. Hans Peter Jorgenson unselfishly shared materials from the Institute for Agricultural Biodiversity and allowed the reproduction of illustrations from old American farm magazines, gathered in *Farm Animals in the Making of America* (Johnson 1975) and reprinted by the institute.

# *Abbreviations and Symbols*



American Livestock Breeds Conservancy



Rare Breeds Canada



Rare Breeds Survival Trust

ALBC

American Livestock Breeds Conservancy

BLM

Bureau of Land Management of the  
United States

EEC

European Economic Community

FAO

Food and Agriculture Organization of the  
United Nations

FDA

Food and Drug Administration of the  
United States

IAB

Institute for Agricultural Biodiversity

NPS

National Park Service of the United States

RBC

Rare Breeds Canada

RBI

Rare Breeds International

RBST

Rare Breeds Survival Trust

USDA

United States Department of Agriculture

The Encyclopedia of Historic and  
Endangered Livestock and Poultry Breeds

CHAPTER ONE

# *Rare on the Farm*



When the last individual of a race of living things breathes no more, another  
Heaven and another Earth must pass before such a one can be again.

— William Beebe, naturalist

Change has come so completely and so pervasively to agriculture in the past half-century that it is now hard to imagine the relationship between humans and their animals as it existed in the first half of the twentieth century and for thousands of years past. In order to survive, people once bound their lives intimately with their animals. Food, clothing, transportation—all were provided by animals.

In different geographic areas, farmers developed and raised livestock suited to their ecosystem, husbandry practices, needs, and culture. Hundreds of native types of livestock flourished, each uniquely appropriate to its people and place. Migrations, trade, and warfare introduced new varieties of livestock that were incorporated into the farming systems if they functioned or met needs. With the advent of increased scientific understanding of breeding and genetics in the nineteenth century, farmers began to select which traits to develop with greater ability. Livestock and poultry raisers enjoyed a wealth of variety from which to pick and choose. Not only were there a great number of breeds, but for each breed there existed a great pool of independent breeders who raised their animals on their own farms based on their needs and choices. The genetic diversity was enormous (fig. 1).

Circumstances changed when the Industrial Revolution drew increasing populations to the cities. These townspeople needed large amounts of food that could be raised cheaply and transported to market. Urban dwellers' demands spurred the development of new breeds. In time, the show ring and the promotion efforts of breed societies stimulated breed improvements but also fads or fashions without regard to merit.

In the twentieth century, the pursuit of economical rates of high production came to dominate livestock raising. Standardization or uniformity accompanied the emphasis on high rates of production. Specialists or crossbreed producers replaced adaptable, multipurpose animals. Traditional or native stock was widely crossbred to more popular or productive breeds. The livestock environments became more highly controlled and managed.

Farmers cannot be blamed for adapting to the changes in agriculture, for they need to make a living on

a very low profit margin. These methods of production have also supplied consumers with abundant, inexpensive food. Yet the cost of this food is often supported by massive quantities of cheap water and energy or government financial price supports, subsidies, or protections. High rates of production are also supported by various technologies and sophisticated veterinary science.

In the United States, Canada, and Great Britain only a small percentage of the human population remains on the farm or has contact with the raising of livestock. For thousands of years, most adults and children had to know how to work with their draft animals and care for their food animals. This contact between people and their livestock was intimate and constant. Humans also experienced a sense of partnership in working with their animals. Today a lack of knowledge about agriculture and misconceptions about farm animals abound. The average person has not only lost contact with agriculture but, more dangerously, become convinced that much of the business of raising livestock is somehow politically incorrect (fig. 2).

Today four out of five dairy cows in North America and Europe are the familiar black-and-white Holstein-Friesians. Many people probably believe that all dairy cows are black and white. Moreover, owing to the wonders of artificial insemination, many Holstein-Friesians share the same bloodlines. It may seem hard to believe that just eighty years ago there were three hundred breeds of cattle in Europe and North America.

The farmyard pig has today been transformed into a grain-fed, fast-growing meat producer. Just three breeds or their crossbred offspring supply the majority of the market. They are increasingly raised in huge indoor complexes on contract to one of a handful of processors. In the past, swine were the original recyclers, consuming crop waste.

Almost all eggs and poultry meat today come from a few hybrid chicken strains, and essentially one type of turkey is raised commercially. Owing to the enormous development of desirable breast meat, turkeys are no longer able even to mate naturally. A limited number of company-owned strains of these specialized hybrids supply 95 percent of the North American and Euro-

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pean poultry food source, whereas fifty years ago thousands of individual hatcheries in North America each raised many breeds of poultry.

This new system, where most meat, egg, and dairy products come from a few highly specialized, uniform, commercial breeds or hybrids, has increasingly pushed out the traditional breeds. In the United States alone, about a hundred breeds of livestock exist in only relatively small numbers, are in decline, or are teetering on the edge of extinction. The situation is similar in

Fig. 1 Nineteenth-century American agricultural newspapers and magazines had ornate headings and logos. They also displayed large, handmade engravings of champion livestock. The *Country Gentleman* placed the practical advertisements right on the front page. On June 17, 1886, imported and domestic Berkshires, Short-Horns, Jerseys, Guernseys, Devons, Cleveland Bays, Clydesdales, and English Drafters were all offered for sale on a single page. Courtesy of the IAB and Hans Peter Jorgensen.

Fig. 2 The author's grandfather Caspar Vorwald working with a mixed team of horses and mules on his farm near Granite City, Illinois, in 1912.

Canada and Britain. In Europe, about half of the livestock breeds that existed in 1900 are extinct, and one-third of the remaining breeds are threatened. Although the problem is most severe in developed nations, native breeds in the developing world are now being pressured by imported stock. In 1998, the United Nations Food and Agriculture Organisation's Department of Animal Genetic Resources estimated that seventeen hundred of the world's four or five thousand breeds are at risk of loss.

If these seemingly old-fashioned breeds are less productive or competitive than modern crossbred animals, why is it important to save them?

Most important, if this variety of livestock is lost, so,

*gene* The unit of heredity, a small section of DNA within a chromosome. A gene controls the development of a trait or works in coordination with other genes to define a trait. Offspring receive a different set of genes from each parent. In the offspring the genes may be either *homozygous* and the same or *heterozygous* and different at each pair of alleles. There are usually two or more possible alleles for a gene.

too, will be lost innumerable genetic traits. As Edward O. Wilson, author of *The Diversity of Life*, has written, “We should judge every scrap of biodiversity as priceless while we learn to use it and come to understand what it means to humanity” (Wilson 1992). Just as our awareness of the importance of preserving biodiversity in nature has become apparent, so the need to preserve genetic diversity in domestic livestock is becoming critical. These old-fashioned breeds contain different genetic potentials developed over hundreds, even thousands, of years that are not present in many currently popular breeds.

Following domestication in Asia, Africa, or Europe, livestock animals evolved separately for many reasons. Geographical or political boundaries often created divisions among stock. Natural selection worked on these animals just as it did their wild counterparts, favoring individuals that met the challenges of geography, climate, disease, parasites, food seasonality or supply, and competition from members of their own kind. Humans also placed artificial selection demands on their animals, choosing the traits they favored, for example, those that provided food, fleece, or work. Humans also bred animals for religious purposes and made choices based on purely physical preferences, such as an animal’s color or shape. Naturally occurring mutations increased their possible choices. Native breeds or types fit themselves into specific ecological niches and production systems. All of these choices and selections created a vast genetic potential. These traits served humankind very well for hundreds of years. Many experts believe that these traits could be vital to our agricultural future worldwide.

The practices and requirements of agriculture are not constant, and genetic diversity is essential to further selection, improvement, and adaptation. The cur-

rent intensive production systems may give way to more extensive choices pressured by economic, societal, or biological demands. The costs associated with indoor housing or confinement, such as electrical power and heat, automated machinery, environmental concerns over water pollution, the price of grain and other feed, or chemical fertilizers could prove uneconomical in the future. Farmers who now usually specialize in producing one product may need to return to diversified farming to protect their income.

Alternative systems such as outdoor production, grass-based or organic farming, and sustainable agriculture are all experiencing an increase in attention and practice. Producers are looking for less environmentally damaging means of controlling animal and plant pests, which properly managed livestock or poultry can help combat. Agricultural lands are also being reduced through urban sprawl, forcing livestock onto less favorable land. Livestock traditionally grazed land unsuitable to crop cultivation and converted inedible forages into human food. This ability may again become vital. Even changing weather patterns could affect agriculture in the future.

The modern, highly productive breeds often do not function well when removed from today’s intensive systems of production. The older breeds were often designed and proven for these very alternative systems. These breeds often carry such traits as hardiness, longevity, small size, a docile nature, good mothering qualities, foraging abilities, or the ability to produce on poorer quality foodstuffs. Often the commercial potential of lesser known breeds has not even been explored in the traditional or modern systems.

Animal welfare, animal rights, and consumer concerns over pure and healthy foods are also on the rise. The battery cage housing of egg-layers is being regu-

lated or even prohibited in some European countries. Organic foods are growing in popularity, as is the demand for more flavorful, high-quality foods in contrast to the bland choices often found in supermarkets. Gourmet and specialty markets are increasing.

The threat of disease has grown tremendously as the animal food stock has become concentrated in the hands of a few producers, such as in the poultry industry. It is clearly impossible to predict what future resistance or tolerance will become necessary. The less popular breeds have not been adequately studied to determine what special or unique qualities they might possess.

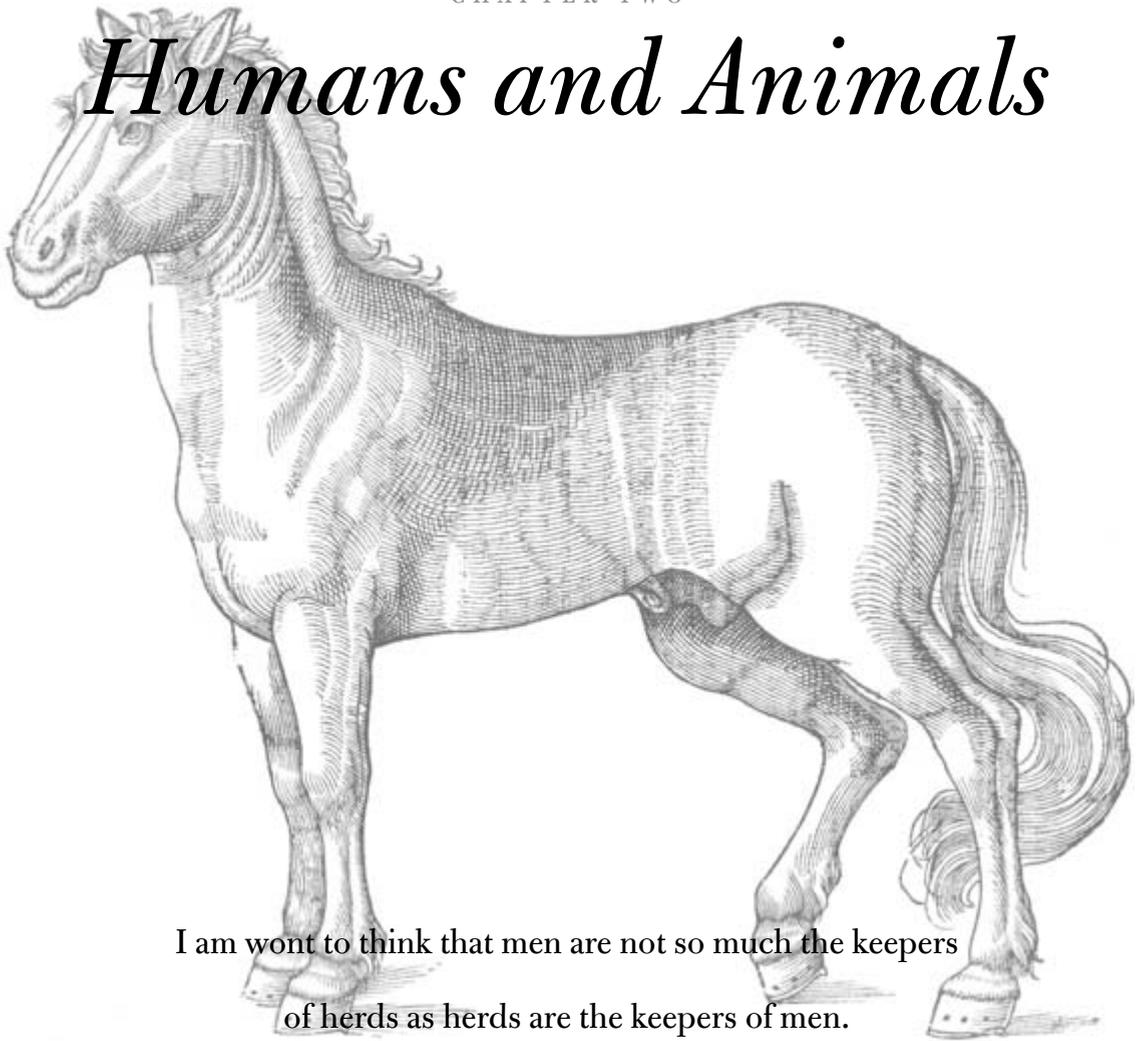
These old farmyard animals may even hold critical keys for human survival. To take one example, for four hundred years, Ossabaw Island hogs have thrived on an island off the coast of Georgia. Marvelously adapted to their harsh home, all Ossabaw swine are diabetic, yet

none of them require insulin to survive. Nonetheless, Ossabaw Island hogs are seriously threatened and are not being protected. As in the wild world, humanity does not truly know what it may lose with each extinction.

Livestock animals should also be preserved for reasons other than economic, biological, ecological, agricultural, or scientific possibilities. These animals are more than a collection of genes. To quote Edward O. Wilson again, the loss of diversity “endangers not just the body but the spirit” (Wilson 1992). Together, humans and animals share a long history of interdependency. To survive, domesticated animals actually chose to throw their fate in with humans. The history and lives of many of the most endangered breeds are woven throughout thousands of years of human civilization. They are an integral part of our history, culture, and aesthetics.

CHAPTER TWO

# *Humans and Animals*



I am wont to think that men are not so much the keepers  
of herds as herds are the keepers of men.

— Henry David Thoreau

People have kept wild animals as pets far back into prehistory. Among aboriginal peoples of today, women often rescue orphaned young animals and nurture them like human babies, and children have them as playmates. They are treated kindly and indulged until they become uncontrollable or dangerous. Religion was also closely connected with animals both as powerful totems or hoped for prey. The images of animals are seen in the earliest prehistoric records on caves and rocks. In addition, some nomadic peoples came to follow the rhythms of migratory herding animals such as the reindeer.

The dates of actual domestication are being continually pushed back by discoveries both in the past world of archaeology and in the inner world of DNA. Because there are no direct historical records, evidence of domestication must be sought in other ways. The presence of bones from hunted animals is usually found at archaeological sites, while the predominance of bones of the same age implies that these animals were raised for food. The study of animal teeth also yields data on age of death and what types of food the animal ate. Agricultural historians can also search for the changes in animal skeletons brought about by carrying burdens. Eventually changes can be seen in the skeletons brought about by selective breeding by human beings over many, many years. More recently, techniques of genetic analysis have allowed scientists to determine when the mitochondrial DNA of the captive population began to diverge from the wild founder animals.

The long-held Western view of domestication reflected humanity's arrogant belief in people's superiority and dominance over nature. In this viewpoint, humans imposed domestication upon animals. If this were actually true, then people should have been able to domesticate any animal they chose. Curiously, after thousands of years, only six mammal species comprise the overwhelming bulk of domesticated animals: dogs, sheep, goats, pigs, cattle, and equines, both ass and horse. The house cat could possibly be included, but many exist in a semiwild state beyond humans' breeding control. Domesticated poultry include the jungle

fowl, the turkey, two species of ducks, and geese. These few species out of the thousands present on earth cannot be a testament to humanity's ability to domesticate.

Domestication is more than captivity or taming, such as is practiced with Asian elephants, but the control of breeding over a long period of time so much so that the animals are significantly changed in both behavior and appearance. A few other species have been partially domesticated or domesticated in relatively small numbers, including camels, llamas, alpacas, reindeer, rabbits, guinea pigs, laboratory rodents, pigeons, guinea fowl, goldfish, and silkworms. Juliet Clutton-Brock (1987) has described these animals, including cats, more accurately as "exploited captives" that are employed by people.

Many attempts have been made, sometimes over sustained periods of time, to domesticate other animals, among them the zebra, addax, oryx, eland, ibex, chamois, other antelopes and gazelles, bison, muskox, deer, elk, bighorn, cheetah, ratites such as ostriches and emus, peccaries, and small fur-bearing mammals such as mink and ermine. Wild animals that are raised in captivity may become tamed to a greater or lesser degree, such as a variety of caged birds, iguanas, snakes, bears, large cats, wolves, kangaroos, monkeys, and many other small mammals. But most exotic animals kept as pets are hard to care for dietarily or medically, do not breed well in captivity, or are temperamentally unreliable.

This high rate of failure is evidence that something else besides domination and captivity is involved in successful domestication. Indeed, domestication is a complex biological process, affecting both physical and behavioral traits. In 1865, the English geneticist Sir Francis Galton recognized the essential requirements of a domesticated species. His conditions included hardiness, the ability to breed freely, an easy-to-tend nature, an inborn liking for humans, the love of comfort, and, of course, a usefulness to humans for food, materials, or work. The species that possessed these traits would then be conducive to relationships with people. Hardiness included the ability of the young to survive without a lengthy juvenile dependency. Ani-

*mitochondrion* An organelle within the cell that captures energy as part of the process of cellular respiration. The mitochondria receive DNA exclusively from the mother; therefore, changes can occur only through mutations. The use of mitochondria in calculating genetic differences is relatively new and not completely accepted by all scientists, yet it promises to reveal more information about domestication and relationships among breeds.

mals that were easy to care for would be content in groups or flocks with a social nature that accepts a dominant leader, such as in herd rank or pecking order. These animals also needed to be versatile in what they could eat or where they could live.

The inborn liking for humans, the ability to breed freely, and the desire for comfort that leads to relaxing the fear of humans are not seen in wild animals. And there was no way for early farmers to predict that these particular animals possessed both these traits and others that would produce a domesticated animal. Both the males and females of the eventual domesticates could still be dangerous animals. This observation leads to a paradox recognized by Stephen Budiansky in *The Covenant of Man*:

The only way to produce an animal with the desirable traits is through captive breeding, yet the only way they could have been captively bred is if they had the desirable traits to start with. . . . The only way out is to recognize that, in an evolutionary sense, domesticated animals chose us as much as we chose them. And that leads to the broader view of nature that sees humans not as the arrogant despoilers and enslavers of the natural world, but as a part of that natural world, and the custodians of a remarkable evolutionary compact among the species. (Budiansky 1992, 24)

The possible domesticate must also contain the potential for change, for true domestication effects a spectrum of changes upon animals. Because mammals change so much in shape as they grow, they have great potential for human-directed differences. Often humans choose to retain juvenile characteristics in domes-

ticated animals, both in body shape and in accompanying behavior. These retained juvenile traits, known as neotony, are a manipulable part of animal evolution.

Physically, in comparison with their wild counterparts, domesticated animals generally have shorter jaws; shorter or flatter skulls; smaller teeth and bones; specialized muscle structure; greater variety in color, coat, horns, tails, and ears; extended or year-round reproductive ability; early maturity; and smaller or lighter brains. Smaller brain size can result in reduced intelligence or self-sufficiency unless humans valued those traits. Fat is also deposited under the skin or in the muscle rather than around the organs.

The innate social behaviors of domesticated animals are also altered. These arrested juvenile behaviors increase docility, which obviously allows people to keep and care for animals with greater ease. Domesticated animals are more submissive and the adults are less paternal or maternal with their offspring than their wild counterparts.

Results from an experiment in domestication clearly illustrate this process. At the Institute of Cytology and Genetics in Novosibirsk, Siberia, the geneticist Dmitry K. Belyaev and his colleagues tested the hypothesis that “selecting for tameness and against aggression means selecting for physiological changes in the systems that govern the body’s hormones and neurochemicals” (Trut 1999, 6). They designed and for forty years conducted a selective-breeding program using the silver fox (*Vulpes vulpes*). Selecting only for friendliness toward humans, the researchers did indeed create a population of tame foxes, but the animals exhibited a startlingly wide range of new characteristics, including a delayed development of the fear response, changes in coat color (depigmentation, brown

mottling, or gray hairs), floppy ears, curled tails, shorter legs, shorter tails, shorter and wider snouts, smaller cranial size, earlier sexual maturity, larger litters, and longer breeding seasons. This experiment suggests that domestication may proceed much more rapidly than previously thought, because selection for tameness alone causes important and profound changes in development.

Domestication is in truth a natural and symbiotic relationship rather than a human invention. The benefits to people are obvious, although the burdens are also tremendous. The advantages to the animals were also major—food, protection, and shelter. The life that one individual animal gave up when it was slaughtered still benefited the group’s survival as a whole. This self-domestication may also be described as the colonization of a new ecological niche provided by humans. The success of this choice has been clearly proven on the evolutionary scale.

A handful of minor species that emerged from scraping together a marginal living at the end of the Ice Age to occupy a position of overwhelming dominance in the biosphere currently account for about 20 percent of the total biomass. Domestic dogs, sheep, goats, cattle, and horses far outnumber their wild counterparts. The global populations of sheep and cattle today each exceed one billion while their wild counterparts teeter on the brink of extinction. . . . Horses, in fact, would very likely be extinct today had it not been for their domestication. . . .

When we begin to appreciate the drama of where dogs, horses, and sheep came from, these “wild things” too attain a value that is all too often taken for granted. When we understand that farm animals are dependent upon us for their very survival by virtue of their genetic nature, by a genetic nature whose die was cast long before we began to practice conscious selective breeding, we develop a sense of obligation that is easy to dismiss if we ascribe their existence merely to man’s conquest. Understanding that

the domestic alliance is an evolutionary strategy of adaptive significance, that animals “chose” us because we were a better deal in an evolutionary sense than life in the wild, inspires a feeling of a bond between species that no amount of sentimental dripping or philosophizing about abstract “rights” can. (Budiansky 1992, 61, 165)

And thus the other sets of reasons for the preservation of the rare or old breeds is bolstered. To cast aside the vast collection of genes shaped by thousands of years of human and animal coevolution becomes unthinkable. The human-animal domestic alliance demands respectful stewardship. Historically and culturally domesticated animals are interwoven with humankind (fig. 3).

Certain breeds have also become symbolic of a national heritage or a local culture or regional identity. Historic breeds are as important to preserve as old buildings or antique objects, and they can be appreciated for the same reasons—the lessons they teach and their beauty. Some older breeds represent a specific step in the development of livestock. And the world would be a lesser place with the loss of other breeds that contribute to our sense of the aesthetic or our recreational pleasure.

Dogs, cattle, and sheep of widely varying appearance are seen in the earliest pictorial representations of domesticated animals in the ancient Near East and Egypt. The recorded observations of the Romans clearly describe recognized native types of poultry, swine, goats, and horses. The development of these different types was the result of artificial selection and geographic isolation upon the local founder animals, or the animals found in that locale. In addition, when several varying populations were present in the same time and place, deliberate breeding was needed to preserve these separate types.

These different types could be considered native, or landrace, breeds. Breeds are somewhat similar to subspecies among wild animal species. A breed is generally defined as a group that is reproductively isolated either geographically or artificially whose members re-

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semble each other and produce offspring that also look the same. A breed shares common behaviors or abilities that can be described as its function. To early breeders, function was generally more important than a specific appearance. Consistency in appearance usually resulted from the selection for function based on the characteristics of the original founder animals. It is important to remember that variety is necessary within a breed but that the members of a breed share a common pool of genetic traits. Natural and artificial selection concentrate both the genes and their particular expression in combinations.

The American Livestock Breed Conservancy has observed that “breed conservation is, therefore, more accurately termed genomic conservation, since it protects both genes *and* gene combinations from loss” (Sponenberg and Christman 1995, 6). It is essential to preserve breeds as separate entities because this is the only way to preserve both the genetic variety and its expression. Crossbreeding two distinct breeds results in a performance increase that is often greater than either

Fig. 3 The story of domestic animals brings together Gabriella Nanci with her Irish Dexter cow Belle and West African Guinea hog Polly at her home in California.  
Courtesy Gabriella Nanci.

parent breed possesses, and it is an important production technique. Livestock geneticists note that the hybrid vigor that results from crossbreeding is highly heritable, but in order for breeders to benefit from this power, the two parent breeds must remain genetically separate.

The definition of a breed as a group native to a geographic area and possessing similarities became more formalized with the development of breed societies and the use of pedigrees. Pedigrees allowed owners to trace the ancestry of their stock within an accepted group of like animals. Breed societies or associations agreed upon a description, or standard, for their animals. This accepted stock was entered in a studbook, herd book, or flock book. Eventually only animals from registered, pedigree parents could themselves be registered in a

closed herd book or considered purebred. This form of artificial selection reduced genetic diversity or variety in a standardized breed, but it enhanced external similarities and performance abilities.

The word *type* or *typiness* also came to mean the idealized picture of that breed. Breeders often talk about type within their breed, but the concept can be hard to explain to an outsider unfamiliar with that breed. D. Phillip Sponenberg has provided an excellent explanation of type:

One definition of type is the conformational peculiarities and character that make each breed distinct from the others. In other words, breed type is the breed's identity. For example, Quarter horses have a "type" and Spanish Mustangs have a "type." Even closely related breeds, such as the Spanish Mustang and Peruvian Paso, have subtle differences that distinguish one from the other. Horses that exhibit all of the conformational elements of the breed are said to be "typier" than those which have fewer. (Sponenberg 1997, 2)

It is also possible to have one or more acceptable types within a breed. The preservation of type or types within the breed is very important, although breeds can change type when breeders begin to select for a different function or appearance. Over time, either function or appearance can be changed completely. Unfortunately, when choices are based on appearance alone, the function of the breed can be lost.

Breeders can also develop different strains or bloodlines, concentrating the genetic potential of a selected individual or group within the breed. The modern industrialized strains or varieties of a breed are now selected for a single specialized ability such as egg-laying.

When breed associations have open herd books and allow the use of outside stock to produce registerable offspring, they reduce the genetic consistency or dilute the genetic pool of their breed and introduce new genetic material into the breed. No matter how often the crossbred animals are bred back to the original breed members, in what is often called upgrading,

they will never be pure or true examples of the breed. Historic breeds that open their herd books to allow outside stock are sometimes described as diluted. Some experts maintain that once outside breeding has been allowed, the historic breed is now something new and different and should be renamed. The question of opening herd books can be controversial, for the practice may be necessary to save a breed when just a few members remain.

Highly crossbred breeds or breeds based solely on color or another physical trait are not significantly valuable from a genetic viewpoint. Crossbred and upgraded animals can, of course, be very valuable and functional.

Breeds that exist without pedigrees or associations are often described as native or landrace. These local populations are more likely to show greater variation in appearance, but they are recognizable as a type. Landrace breeds are often highly adapted to their habitat and very resistant to local diseases or parasites. According to the FAO, this definition describes the animals that people in a certain area often regard as a breed, and most breeds in the developing world can be defined this way, yet landrace breeds are also found in North America. Newfoundland sheep, Sable Island horses, Cracker cattle or horses, and Spanish Mustangs are all landrace breeds. Breed associations have been formed for some of these landrace breeds and others to provide a network of breeders and a measure of recognition. All standard breeds were once considered landrace or native.

Unlike landrace breeds, feral animals are descended from domestic stock that has returned to the wild and reproduced without human interference. When these feral populations are isolated from introductions of outside stock and are present for relatively long periods of time in this undisturbed state, they can be considered feral breeds. Feral breeds have their own genetic consistency and great adaptability to their environment.

The agricultural, ecological, economic, scientific, biological, historical, and cultural reasons for breed preservation are slowly becoming accepted, although the efforts have lagged behind the work to conserve domestic plant genetics. The need for this work must still

*phenotype* The exterior appearance and observable behaviors of an individual. Phenotype cannot be used exclusively to determine breed because such animals will not necessarily perform genetically as purebreds.

*genotype* The total genetic information that an individual possesses. This genetic makeup is the more accurate determiner of breed purity. Within a breed, consistent genotype is revealed in consistent phenotype.

*variety* A group within a breed with one or more special characteristics

*strain, bloodline, or family* A closely related group within a breed that is the product of a deliberate breeding program

*registered* Documented by a breed organization through pedigree (known ancestry and lineage) and/or inspection

*purebred* The offspring of registered or pedigree animals of the same breed

*grade* An unregistered animal of uncertain ancestry

*grading-up or upgrading* Crossing a purebred to a grade animal or a different breed to improve the offspring or make them eligible for registry. The offspring may have to be bred back to purebred animals for one or more generations before acceptance into a registry.

*hybrid* The offspring of two species, such as the mule or hinny from an ass-horse mating. Also the offspring from breeding two purebred animals from different breeds.

*hybrid vigor or heterosis* The improved performance or physical vigor derived from crossbreeding. Present in the first generation only.

be promoted to both the public and the experts, but the actual task of preservation demands immediate action. Fortunately, some individuals saw this need more than twenty-five years ago.

In North America and Great Britain there are no government programs or seed banks to save the livestock heritage. Conservation programs are largely the effort of dedicated individuals. These individuals and their families have historically often single-handedly preserved endangered breeds. Fortunately, breeders, historians, scientists, and other concerned persons have now come together to form privately funded organizations dedicated to conservation. These organizations offer tremendous support to individual breeders.

In Great Britain in 1974, farmer and breeder Joe Henson and other individuals created the Rare Breeds Survival Trust, which has become widely known by its acronym, RBST. An initial working party was organized by the Zoological Society of London and the Royal Agricultural Society of England, including Law-

rence Alderson, Christopher Dadd, Sir Dudley Forwood, Peter Jewell, Idwal Rowlands, Bill Stanley, and Ann Wheatley-Hubbard. The RBST has come to include farmers and breeders along with researchers, conservationists, and animal lovers. The trust has developed a wide range of activities and programs that have been copied in part by other national organizations.

Four years later, in the United States, Joe Henson's daughter Elizabeth Henson assisted a group of agricultural historians who had become alarmed to discover that historically important breeds were hard to locate for display at living history sites such as Old Sturbridge Village, Massachusetts. Farmer-breeders, agricultural scientists, and others joined them to form the American Minor Breeds Conservancy, or AMBC. The name of this organization was later changed to the American Livestock Breeds Conservancy, or ALBC (fig. 4).

In Canada, the Joywind Farm Rare Breeds Conservancy was organized through the commitment of Jy and

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Fig. 4 A costumed interpreter introduces a young visitor to a Merino lamb at Firestone Farm in Greenfield Village. Courtesy Henry Ford Museum and Greenfield Village.

Gail Chiperzak, whose farm became the home of this effort. As the organization grew, it evolved into Rare Breeds Canada, or RBC. Although the RBC is involved in many research and educational programs, it has also established a network of host farms to support the breeding programs for specific priority breeds. The Institute for Agricultural Biodiversity, or IAB, located in Iowa, has begun the work of organizing a preservation breeder's network similar to the program developed by the RBC. Unfortunately, another IAB project, the Farm Park at Luther College, closed due to lack of tourism support. Other educational and preservation efforts have also developed, including the New England Heritage Breeds Conservancy at Hancock Shaker Village in Massachusetts and Kelmscott Farm in Maine.

Although these rare breeds groups are now involved in a multitude of activities, a primary task facing preservationists is the identification of endangered breeds and an assessment of their relative danger. Unfortunately, many populations of the endangered breeds have become quite small. As the potential gene pool shrinks, the genetic variability that remains available also becomes smaller. As the small populations become further separated from each other physically,

the detrimental effects of inbreeding can increase. The members of the breed can become less viable or experience reproductive problems, compounding the problems and producing the eventual threat of extinction. In some breeds very small populations have survived and remained unexpectedly viable whereas larger populations have not tolerated even mild inbreeding. Although viable, small populations do experience a serious loss of genetic variability. Identification of threatened breeds and the assessment of their viability begins with census activities to survey breed populations.

In Britain, the RBST investigates the breed registry to determine if the breed has been in existence for seventy-five years, recorded at least six generations in its herd book, and prevented outside breeds from contributing more than 20 percent to its genetic pool. The numbers of breeding females and the numbers of male bloodlines are surveyed. The current status is also examined for special factors such as the rate of decrease or increase in population, the numbers of stable breeding units, and the geographical distance separating breeding units (table 2.1).

The RBC uses a similar system based on the number of breeding females, but it also considers uniquely Canadian heritage breeds and economic considerations (table 2.2).

The ALBC uses a different method of evaluation by conducting a regular census of annual registrations within each breed or an estimate of purebred population. Both the RBC and the ALBC have a special conservation interest in the landrace breeds, feral populations, and heritage breeds that may lack traditional breed associations, standards, or registries (table 2.3).

The ALBC is also supporting the study and conservation of poultry breeds, with emphasis on varieties with historic or economic importance in the United States, but including recently developed breeds that are suffering rapid genetic erosion. Through censuses, the ALBC estimates the numbers of breeding females as well as the number of breeding flocks with more than a hundred females (table 2.4).

The FAO has employed an evaluation system based on the World Conservation Union (IUCN) categories

Table 2.1 Rare Breeds Survival Trust Guide to Priority List

Category	Cattle	Sheep	Pigs	Goats	Horses
1 Critical	150	300	100	100	200
2 Endangered	250	500	167	167	333
3 Vulnerable	450	900	300	300	600
4 At risk	750	1,500	500	500	1,000
5 Imported breeds					
6 Feral groups and populations					

Native Breeds: Numerically strong but under threat of introgression

Minority Breeds: Still in need of monitoring

*Note:* Figures indicate the number of breeding females

*Source:* Rare Breeds Survival Trust

Table 2.2 Rare Breeds Canada Guide to Priority List

### Swine

Critical Fewer than 100 registered breeding females

Vulnerable Fewer than 250 registered breeding females

### Sheep

Rare Fewer than 300 registered breeding females

Vulnerable

Watch

Internationally Rare Fewer than 100 registered breeding females, not Canadian heritage

Further study needed

### Cattle

Rare Fewer than 300 registered breeding females

Vulnerable

Watch

Success Good recovery

### Horse

Critical Fewer than 200 registered breeding females

Vulnerable

Internationally Rare Fewer than 100 registered breeding females, not Canadian heritage

Success Good recovery

*Source:* Rare Breeds Canada

Table 2.3 American Livestock Breeds Conservancy Guide to Livestock Priority List

Critical	Fewer than 200 annual North American registrations <i>and</i> lower than 2,000 global population
Rare	Fewer than 1,000 annual North American registrations <i>and</i> lower than 5,000 global population
Watch	Fewer than 2,500 annual North American registrations <i>and</i> lower than 10,000 global population
Study	Lack documentation or definition but of genetic interest
Recovering	Breeds once listed on the Priority List that now exceed Watch category numbers but are still in need of monitoring

Source: American Livestock Breeds Conservancy

Table 2.4 American Livestock Breeds Conservancy Guide to Poultry Priority List

Critical	Fewer than 1,000 breeding females <i>and</i> 5 or fewer primary breeding flocks
Rare	Fewer than 2,000 breeding females <i>and</i> 7 or fewer primary breeding flocks
Watch	Fewer than 10,000 breeding females <i>and</i> 10 or fewer primary breeding flocks
Study	Breeds of genetic interest but lack documentation or definition

Source: American Livestock Breeds Conservancy

for endangered wildlife. The umbrella organization for all national livestock conservation groups is known as Rare Breeds International (RBI). To date, these groups have not adopted a universal system for categorizing risk of extinction. The national categories are thus not directly comparable but reflective of each organization’s priorities. Each group uses the information it gathers to create priority lists, which in turn are used to guide local education, promotion, and conservation efforts. These lists are subject to change with the fluctuating populations and changing circumstance that affect each breed. Creating lists based solely on the number of breeding females or number of the annual registrations would be insufficient to determine the risk to a particular breed.

For these reasons, each national organization examines the situation of each breed individually against the measures of vulnerability. Many factors are taken into account, including the founder effect, whether the breed ever experienced a genetic bottleneck when the population was greatly reduced, the presence of damaging recessive traits, the amount of genetic variety remaining, the generation interval of the species, which breeding systems are used in the breed, the ratio of males to females, the number of offspring the female

delivers, the percentage of offspring deriving from different males, and how closely the breeding males are related. The effective population size needed for preservation can be calculated mathematically.

Although endangered and historic breeds of live-

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Fig. 5 At Greenfield Village, visitors meet a Morgan horse. This American breed was a popular choice for riding or driving during the nineteenth century in the Midwest and New England. Courtesy Henry Ford Museum and Greenfield Village.

*blood-typing* An animal's blood cell and blood protein characteristics. Breed organizations use blood-typing to verify parentage, but the procedure can also reveal information about the relationships of breeds to one another.

*population* A group with a common set of genetic characteristics that interbreeds with some regularity. May refer to all the members of a breed or a variety.

*effective population size* or  $N_e$  The size of a population with a predictable rate of inbreeding and decrease of genetic diversity by genetic drift. Can be expressed as a mathematical calculation of the population's genetic size. A specific effective population size can be recommended to maintain a given breed.

*genetic drift* In a small population, genetic drift is the loss, by chance, of some genes in the population, especially those that are present at low frequencies. Other genes can become more frequent.

*founder affect* The genetic makeup of the founding group of animals in a population. The founders of a specific herd or flock may not represent the total genetic variability of the parent breed.

*inbreeding coefficient* The mathematical probability that two genes on the same site of a chromosome are identical because they were inherited from the same ancestor. Indicates the amount of inbreeding percentage.

*introgression* The permissible or illicit introduction of another breed into a breed registry and its genetic pool

*bottleneck* A time in the history of a breed when the population was reduced to a very small number of individuals. May reduce or eliminate genetic variation.

*inbreeding* The breeding together of genetically related animals. Inbreeding can be extremely close or more distant. Inbreeding can reinforce both good and bad traits.

*linebreeding* Breeding offspring back to a common ancestor or its descendants to enhance desired qualities

*linecrossing* The crossing of different bloodlines or strains. The genetic boost the offspring receive is similar to crossing breeds but not as powerful.

*crossbreeding* The crossing of two breeds. The greater the genetic distance between the two breeds, the greater the genetic boost or hybrid vigor delivered to the first-generation offspring. Crossbreeding can produce outstanding performance animals. Crossbreeding can also be one tool in the long process of standardizing a new breed.

*backcrossing* Breeding a crossbred offspring back to one of its parent breeds. Often used in the grading-up process.

*random breeding* Breeding without artificial selection. This differs from multisire or unselected breeding, in which a group of males is selected to run with the herd or flock but allowed to breed freely.

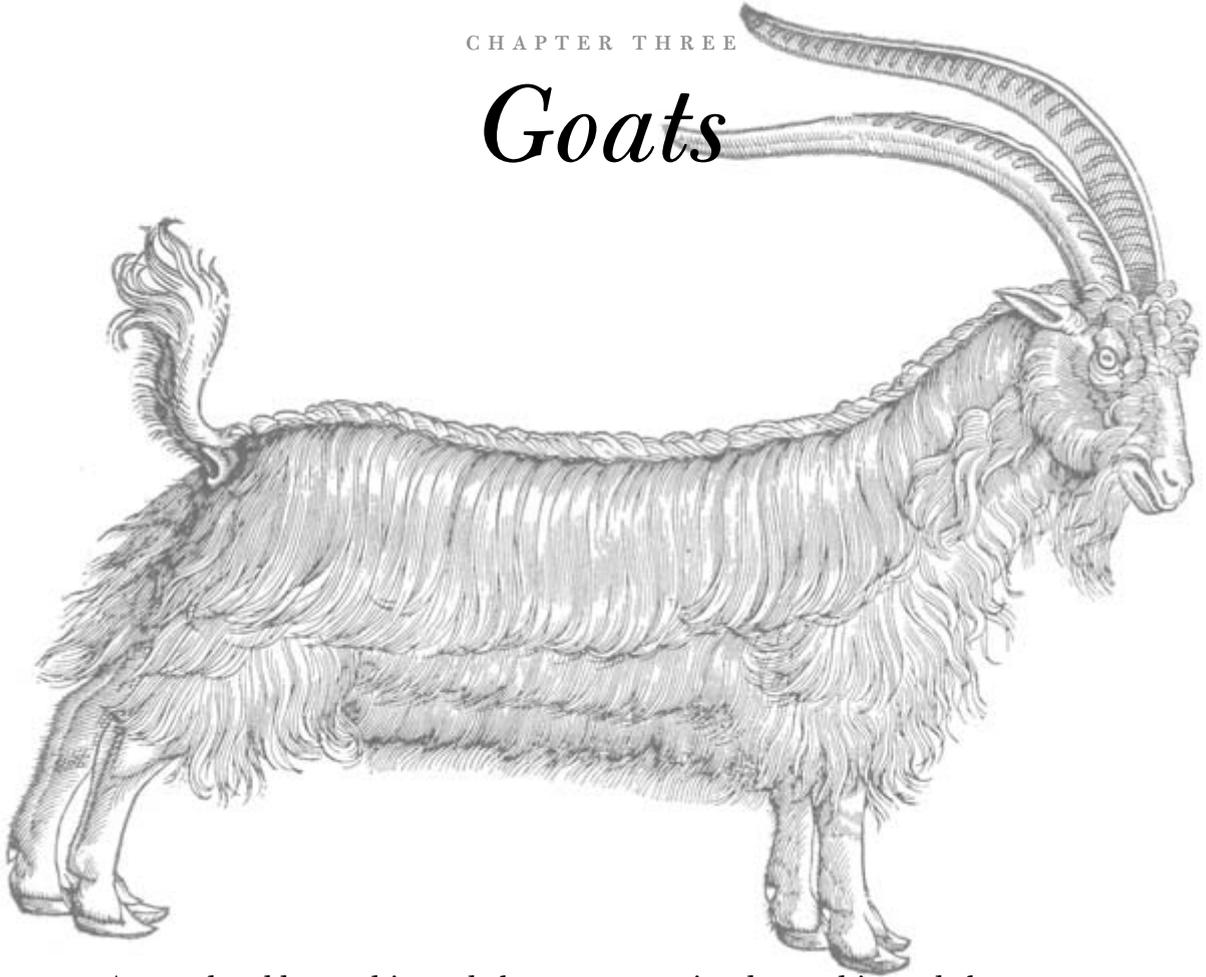
stock have been called both minor breeds and rare breeds, some experts are not too pleased with these labels. The label *minor* can suggest that these breeds are of minor importance today. The word *rare* brings with it an aura of the exotic or rare in terms of monetary value. Both connotations are discouraged by organizations that are concerned with preserving livestock in the context of agriculture, not the exotic animal market. Collecting by hobbyists, who wish to own one or two animals of many breeds, is also discouraged be-

cause this practice often removes valuable stock from the breeding pool.

The work of the rare breeds conservation movement has brought public attention to both these endangered breeds and the need to preserve the genetic diversity they possess. There is much more to know about this subject, however. The story behind each breed reveals another portion of the complex and almost forgotten history between humans and their animals (fig. 5).

CHAPTER THREE

# *Goats*



As goatherd learns his trade by goat, so writer learns his trade by wrote.

— Anonymous

## Natural History

The goat belongs to the order Artiodactyla, the even-toed hoofed mammals, and the family Bovidae, which includes cattle, sheep, goats, and antelopes. All bovids have horns and are ruminants. Goats, sheep, and their confusing relatives belong to the subfamily or tribe Caprini.

Bovids appeared in the early Miocene in the Old World about twenty-five million years ago. This family successfully diversified into some one hundred different types with many amazing horn variations. Roughly half of these types survive today, including those descended from the *Tosunnoria*. Physically resembling the modern European Chamois, the *Tosunnoria* was a large animal very much like a true goat. By the mid-Pleistocene, these early goats had spread outward and migrated to the New World.

Because goats generally occupy rugged habitats, geographic isolation has played a great role in their diversification. From deserts to mountains, the goat family probably resides in the widest ecological range of any domesticated species. Mountain regions have also separated groups that then developed into different subspecies or types.

Several unique goats flourished during the Ice Age. *Myotragus*, the Balearic cave goat, stood about 18 inches tall. This cave goat had large lower incisors that were used for gnawing like a rodent. Remains of *Myotragus* have been found on Majorca, where Neolithic people ate them. *Procamptoceras brivatense* grew elaborate horns that climbed backward, upward, and then curved forward so close together that this goat resembled the mythical unicorn. The largest goat that ever lived was the giant *Soergelia elisabethae*. This stocky goat was the size of a cow.

It can be difficult to distinguish between wild or primitive domestic breeds of sheep, goats, and their cousins. A modern Angora goat or one of the hairless sheep breeds can also be easily confused. Goats and sheep have many similarities but also some important differences.

Bovid horns come in pairs and are used primarily

*caper* Latin for goat; *capra* is a she-goat  
*chevre* From French, *chèvre*, goat, from Old French *chievre*  
*goat* From Middle English *gote*, from Old English *gat*  
*kid* From Middle English *kide*, from Old Norse *kio* or *kith*  
*wether* Old English for ram, from an Indo-European root meaning year; a wether was a yearling

for fighting and protection. These horns begin growing after birth and are never shed. Inside the horn is a living bone material with a blood supply. The outside is covered by keratin, which is a separate layer of protective nonliving material that grows from the outer layer of skin at the base of the horn. A mixture of proteins, keratin is also the material that creates feathers, hooves, nails, claws, fur, hair, wool, beaks, and quills. Although they grow over a lifetime into a variety of sizes and shapes, true horns never form the branches of antlers. Because small, sharp horns would suffice for protection, there must be other reasons for the elaborate configurations of the many bovid horns, such as societal or recognition clues.

The feet of bovids are composed of two separate hooves that were originally the third and fourth toes of their mammal ancestor. Each V-shaped hoof has a tough sole in the center surrounded by hard nail covering. The remnants of the second and fifth toes can be seen just above the foot. Cloven hooves are a marvelous adaptation. They are able to come together to fit in or on a very small space. The two hooves can also spread out to steady the animal or be pinched together to grab a rocky outcropping. The hooves grow continuously and are worn down by rocky or hard ground.

Ruminants such as goats, sheep, and cattle possess unique mouth and tooth structures. The twelve rear molars are heavy and strong, with grinding ridges. Eight incisors, or biting teeth, are found on the bottom front of the mouth. Instead of top teeth, ruminants have

a tough dental pad or plate. Their lips and long tongue work together to grab plants, which are then bitten off by pressing the incisors against the upper dental pad. The teeth can be worn down throughout the animal's lifetime.

This specialized mouth and a multichambered stomach allow the ruminant to digest plants. Cellulose, which is the major component of plants, is a complex carbohydrate with great strength. In order for animals to obtain nutrition from plants, the cellulose covering the cell walls needs to be broken down into glucose. Because plants are much harder to digest than meat, the ruminant digestive system is a marvelous adaptation.

The ruminant rapidly eats and swallows large quantities of forage. This roughage is passed to the rumen, the first and largest stomach. When the rumen is filled, the ruminant can retreat to a safe or comfortable place. In the rumen the roughage is mixed with bacteria and protozoa that produce the necessary cellulose digestive enzymes. The enzymes soften and ferment the plant material. This is a true symbiotic relationship between different organisms, for when the bacteria digest the cellulose in the rumen they produce more digestible volatile fatty acids that they can use for their own multiplication. The ruminant is also able to regurgitate the contents of the rumen at will in small amounts. The cud is ground with the rear grinding teeth, increasing the surface area of the forage for the microorganisms to work on.

The rumen muscles contract regularly, mixing the food material and passing partially digested amounts into the reticulum, where the fermentation by the fatty acids is continued. The excess fatty acids are absorbed through the stomach walls and provide the bulk of the ruminant's energy source. When the plant material has been broken down, it is able to pass through a small opening into the omasum. Depending on the plant material, this may take from two hours to two days. In the final two stomach compartments, the ruminant's gastric juices and enzymes actually digest the symbiotic bacteria that provide the animal with most of its protein needs. Other nutrients are absorbed into the bloodstream here and in the small intestine.

This complicated digestive process may take as long as four days in the goat, but it provides for the goat's nutritional needs from nontillable and highly fibrous plant material that cannot be used by humans. Interestingly, the mother's milk ingested by newborns passes directly into the true stomach, the abomasum, with the rumen enlarging later when the young begin to eat roughage and establish the microbial population.

To dispel all the heat produced by the rumen process, goats have a large number of sweat glands in their skin. Goats very successfully inhabit rough, cold, and windy areas by increasing the indigestible roughage they eat and producing more heat.

The goat is primarily and preferably a browser rather than a grazer like sheep. Goats relish the stems, twigs, and leaves from many common trees and bushes. They will also feast on common weed and shrub pests such as nettles, thistles, dandelions, chickweed, kudzu, wild rose, leafy spurge, greasewood, and poison ivy. They will nibble and taste almost anything but are rarely poisoned while at free range, since they do not generally eat large amounts of any one plant. A small, dextrous muzzle lets the goat delicately choose what to eat. Goats will also eat plants with bitter tastes that other animals disdain. The goat's ability to stand on its hind legs and negotiate high or narrow places greatly extends its browsing range. Goats also use their forelegs and muzzle to bring branches down to browsing level. Browsing limits their contact with parasite eggs on the ground.

Because leaves will ferment more rapidly than a heavier feed of grass, the rumen is generally smaller in goats than in sheep. Since so much of it is difficult to digest, however, goats will eat two or three times more forage in a day than sheep. In domestic confinement, goats can thrive on a good mixed diet of pasture or hay, concentrates or grain, other leafy crops or roots, and agricultural by-products. Heavy grain feeding is actually detrimental to goats because it robs them of their heat source in digestion and can upset the ruminant function. Goats need roughage in their diet for rumen health and will not do well on concentrates alone.

Goats have a narrower head than sheep and a convex forehead. Both sexes are usually bearded and carry

*buck* A male goat used for breeding  
*chevon, cabrito, capretto, chivon* Goat meat  
*chevre* Goat cheese  
*doe* A female goat  
*doeling* A doe until breeding age  
*flock* A wild group of goats  
*herd* or *trip* A domestic group of goats  
*kid* A young goat, meat from a young goat, or kidskin  
*king* The head billy in a flock  
*queen* The head doe in a flock  
*wether* A neutered or castrated male  
*nanny* A female goat, from *nana* or *nanny* for nurse or nursemaid  
*billy* A male goat  
 (Neither *nanny* nor *billy* is preferred by serious breeders)

horns, although the horns of the male are larger. Occasionally goats are born hornless, but most domestic goats that appear hornless actually had their horn buds destroyed as a kid. Among sheep, many ewes and rams are naturally hornless. The horns of goats also grow in a different pattern from those in sheep. Goat horns are closer together at the base, then sweep upward, backward, and outward. Goat horns are also transversely ridged or twisted in corkscrew fashion. The horns of male sheep generally grow out from the side of the head and form a coil-like shape. Male and female goats use their horns in defense but also battle each other by raising up on their hind legs and driving their heads together. Dehorned goats will still butt each other in exuberance or irritation.

Goats and sheep also differ in other ways. Goats carry a short, upturned tail rather than the low tail carried by sheep. Goats may also have wattles, which are little tubular flaps of skin on their necks. Remnants of evolution, wattles are actually the remains of gill slits. Kids sometime suck on each other's wattles, irritating them.

Goats are generally built differently than sheep, lean

rather than rotund. They generally have a straight hair coat, although some have a woolly undercoat known as cashmere. Angora goats have long, white, curly, lustrous fine hair called mohair. Sheep and goats have scent glands located in different areas. Goats have a scent gland behind the horn, whereas sheep have a gland beneath each eye that produces a fluid during mating season. Sheep also have glands on their flanks and between their toes. Some goats occasionally have an interdigital scent gland between the toes on their front feet.

Goats communicate with each other by bleating or calling out greetings to flockmates. Separated flockmates or mothers and kids will call loudly and constantly to locate each other. Goats can also make other nasal sounds, such as groaning in alarm or in courting. Goat companions also rub and groom each other. Goats are appealingly curious and joyful in life. They generally live communally, and they need each other's company. In the absence of another domestic goat or substitute animal, a solitary goat will call for its human companion loudly and incessantly.

The browsing nature of goats affects their behavior. Spreading out to feed, goats feed daily on a larger range than sheep. Goats are also less panicked by disturbances. They will take a few jumps away and then turn to observe or face a danger, whereas sheep have a tendency to flee. If they do run, goats can make good use of rough terrain to escape. These characteristics also make it harder to herd goats as one would sheep or cattle. They will not be driven unwillingly by person or dog.

A wild band or flock can have as many as 30 or 40 members of both sexes and all ages. Most flocks have from 5 to 20 members. The flock tends to have a territorial range that is foraged in a pattern. Some wild goats migrate high into mountains in the spring and retreat to lower areas to winter.

A ranking order develops within the flock. While the king billy protects and fights for his flock, the queen, or dominant female, influences the daily activities of the flock: feeding, resting, and returning to the home base at night. When the king turns to meet a threat, the queen leads the flock to safety. At all other

times the king leads the flock, followed closely by the queen. Although the flock will accept a succession of kings, they will become distraught at the queen's disappearance.

Successful goatherds make use of these behaviors. If the human is recognized as a leader of the domestic herd, the goats will generally follow him or her, although goats are intelligent creatures and will make their own decisions. Goats do not behave with subservience toward humans. They wander further afield from one another, do not bunch, and cannot be chased down; hence their reputation as difficult or stubborn farm animals. Goats in large range herds or smaller groups that are not handled will be as hard to catch as wild goats. Domestic goats can quickly become feral.

Goats generally have a seasonal breeding cycle. The shortening hours of daylight bring about the estrous cycle in the doe. Gestation lasts approximately 150 days, with births occurring as the temperature becomes warmer and food more plentiful. In tropical climates, goats tend to be fertile year-round.

For dairy farmers this seasonal estrous cycle can affect the constant supply of goat's milk. Artificial manipulation of light or hormone therapy is sometimes attempted to facilitate out-of-season breedings. Dairy farmers try to spread out conception among their herd during the breeding season in order to maintain a longer milk supply.

With the onset of the breeding season, the wild flock becomes a less cohesive unit. The king chases and fights with the younger males, including his offspring. With the king preoccupied, the flock tends to forage more on its own and may not return to its nightly sleeping area. The end of the breeding season and the onset of harsher weather bring the flock back together.

Bucks are noted for their noticeable billy goat odor. At its strongest during the breeding season, this odor is caused in part by the scent glands located behind the horns and the minor ones in other locations. Bucks may also have a gland under the tail that produces an odor. The major contributor, however, is the buck's habit, unattractive to humans, of urinating on their front legs and beard in order to attract does.

Bucks are not mean-spirited animals, but they are strong and protective of their does. Much of the buck's negative reputation can be traced to its care in domestication. Bucks are often penned up away from other animals or treated roughly. All domestic goats need to be handled and disciplined from birth.

In wild flocks most of the kids are born in the spring or early summer. The doe may leave the flock for a few days to deliver in privacy. Does can give birth to singletons, although twins or triplets are most common. Goats do not usually have the birthing problems that sometimes occur in other domestic farm animals. Kids are well developed at birth: eyes open, teeth present, and able to coordinate muscles. They are soon able to travel with the flock or climb rocks, and they begin to nibble plants within a week or two. Kids exhibit a tremendous playfulness and exuberance. They may nurse for eight to ten months but soon become independent members of the flock. Both does and bucks are sexually mature by four or five months. In the wild or on the range, young does are often bred by the first fall or winter. The life span of a goat is about ten to twelve years.

The domestic goat (*Capra hircus*) has numerous wild relatives living in high mountainous areas in Europe, Asia, and northern Africa. Nine species of goat are generally recognized, though there is some disagreement. Sadly, most are endangered in their habitats.

The five subspecies of the Ibex (*Capra ibex*) all have powerful and spectacular scimitar-shaped horns on a goatlike head. The unusual ridged or knotted horns of the Ibex are not found in domestic goats, but the Ibex has been observed to breed with domestic goats in captivity. Widely hunted since prehistoric times, the Ibex was revered spiritually in various ancient cultures. The Ibex is often depicted in the prehistoric cave art of western Europe, as well as in the paintings and statuary of ancient Egypt and Scythia.

By the 1800s, the sturdy, beardless Alpine ibex (*Capra ibex*) was driven nearly to extinction due to hunting for meat and medicinal remedies. Several thou-

sand Ibex are found today in small protected groups in the Alps, all descendants of a herd numbering fewer than 100 that was protected by King Victor Emmanuel II of Italy. These goats live in large bands, and the does give birth to only one kid.

The impressive horns of the endangered Spanish ibex (*Capra pyrenaica*) sweep outward and backward. These Ibex were common in Spain and the Pyrenees Mountains until the Middle Ages, but by 1979, their numbers had fallen to fewer than 100 due to overhunting. The Siberian ibex (*Capra sibirica*), native to the high mountain ranges of central Asia, is large and heavy and carries huge, impressive horns. A small band of Siberian ibex has been established in New Mexico by the state game commission.

The smaller Nubian ibex (*Capra nubiana*) of eastern Egypt, northern Sudan, Syria, Yemen, and Oman has long, circular horns and a pointed beard. The Nubian ibex has been widely hunted but was also kept in captivity by the ancient Egyptians. The image of the humble kneeling or crouching Ibex was often used on decorative objects. The endangered Walia ibex (*Capra walie*) of the Simien Mountains in Ethiopia is pressured by farmers, timber harvesters, and poachers.

In the Caucasus Mountains, there are two closely related species of Tur, the West Caucasian Tur (*Capra caucasica*) and the East Caucasian Tur (*Capra cylindricornis*). Trophy hunters have long sought the Tur for its unusual horns, but it is not believed to have contributed to the domestic goat.

The secretive and wary Markhor (*Capra falconeri*), found in five subspecies, ranges the mountains from eastern Pakistan north to Kashmir but may once have been more widespread. The word *markhor* means snake killer. The Markhor buck has a long beard, a cape of hair, and large ridged horns that spiral upward. A majestic animal, the Markhor may have had some influence on domestic goat breeds. Bucks are still occasionally used in crossbreeding with domestic stock to improve hardiness. The Markhor is losing its habitat to herds of domestic goats and is the victim of illegal hunting.

The wild goat known as the Bezoar, Pasan, or Pa-

sang (*Capra hircus*) is believed to be the main ancestor of the domestic goat. Living in groups of 10 to 20 animals, the Bezoar is found from the Balkans across the Middle East to northern India, although it is much rarer today than in the past. With upright ears, the Bezoar stands 36 inches tall; although it is stockier and heavier than the domestic goat, its similarity is easily recognizable. Its coat is brownish gray with white underparts. The billy is bearded and carries high, curved horns up to 40 or 50 inches long, thicker on the front edge and tapering to a thinner, sharper edge on the back. The female has smaller horns than the male.

*Bezoar* is a Persian word meaning “to protect from poison.” It was once widely believed that the bezoar, or small hard mass often found in the stomach or intestines of ruminants, was an antidote for poison. Unfortunately, wild goats are still killed today for their bezoars.

Although the Bezoar is also found today on some Greek islands, researchers believe that these goats may actually be the descendants of early domestic goats. Other groups of “wild” goats in Europe or Asia may also be Bezoar or feral domestic goats, and some of these populations have been conserved even though their ancestry is unclear.

One of these populations is the Agrimi (*Capra hircus cretica*), or Cretan wild goat. A small, dainty goat, the Agrimi has a black beard and long horns. This ancient symbol of Crete was originally found throughout Greece but is now found only on the island. After surviving World War II by retreating to Crete’s inaccessible cliffs, the Agrimi was protected in a wildlife center, where researchers are attempting to identify the effects of crossbreeding by domestic goats.

Two well-known rupicaprids, the Chamois (*Rupicapra rupicapra*) and the Mountain goat (*Oreamnos americanus*), are actually members of the goat-antelope group. Although they look and act like goats, they have horns more like cattle or antelopes, and they have four teats instead of two.

The impressive, shaggy, white Mountain goat once roamed from Montana, Idaho, and northern Oregon into Alaska. The ancestors of the Mountain goat crossed the land bridge from Asia. Still surviving in the

isolated pockets of high country through bitter winters, the Mountain goat has a dense undercoat that is finer than cashmere. This down is shed in clumps, which northwestern Native Americans gathered for use in weaving. Both males and females are heavily built, bearded, and have small, sharp horns. These sharp horns are not used for head-butting; rather, the goats whirl around in an attempt to gore each other in the side. This style of fighting is believed to predate the more ritualized head-butting of true goats. Mountain goats, especially the females, are known for their contentious natures.

Because their habitat is so inhospitable, the goats live in small bands of does and juveniles rather than in large flocks. The adult buck spends most of his life alone, engaging in frequent fighting during mating season. Mountain goats have a high mortality rate because of their difficult life.

Overhunting has taken a serious toll on the Mountain goat population, and although hunting is now better regulated, it remains a threat because roads constructed for timbering and mining have made hunting and poaching easier in habitat that was once remote. And because it is hard to distinguish between females and males, both are shot. Mountain goats' low reproductive rate and the difficulty of conducting an accurate census means that the hunting of these goats needs to be closely monitored. In order to increase populations for big game hunting, Mountain goats have been transplanted to new areas in such states as Colorado, Utah, Nevada, South Dakota, and the Olympic Peninsula of Washington.

The famous Chamois (the name means "rock-goat") once clambered throughout the high rocky slopes of the Pyrenees, Alps, Balkans, Carpathians, and Caucasus. Overhunting has severely reduced their numbers, and some subspecies are critically endangered. Small groups of does and kids live together year-round, whereas the bucks are generally solitary. Smaller than an Ibex, with short, upright horns that hook backward at the tip, the acrobatic Chamois is beardless. The long hairs that run down the neck and back of the buck were once a valued trophy known as the "beard of the Chamois" and were worn in small tufts on men's

hat brims. The Chamois has also lent its name to the soft leather used for polishing and drying, although chamois cloths are often made today from sheep or deer hides, or even of cotton.

Two relatively unknown goat-antelopes are the Goral and the Serow. Both Goral sexes have smallish horns that curve backward. They differ from their relatives in that they have four teats and lack marking glands at the horn base. They inhabit lower mountain Asiatic areas of dense growth and are usually gray to dark brown in color, although a red species (*Naemorhedus baileyi*) has been identified in southeastern Tibet and neighboring areas.

The Serow (*Naemorhedus sumatraensis*) is a rare goat-antelope that once roamed a large area in southeast Asia but now apparently survives only in small numbers primarily high in the volcanic Sumatran mountains. The unusual ruff of black or white hair surrounding its neck gives the Serow's face an almost human or apelike appearance. Because of its previously larger range, the Serow may be related to the belief in the yeti, or abominable snowman. Some yeti relics in Himalayan temples have been identified as sections of the long mane hair from the Serow's neck. The Serow ranges in color from agouti black to red. The unmaned Japanese serow (*Naemorhedus crispus*) is found on Honshu, Shikoku, and Kyushu, and another species (*Naemorhedus swinhoei*) is found on Taiwan.

The beardless, long-maned Tahrs have been described as goat-sheep. Tahrs carry a long-haired mane. The Himalayan tahr (*Hemitragus jemlahicus*) is found in the Himalayas of Nepal and India. The Nilgiri tahr (*Hemitragus hylocrius*) of southern India browses in the cool of early morning and evening and retreats to forest cover during the heat of day. Females guard the large herd while the members feed. Although the Nilgiri tahr is officially protected, poaching is common and hunters have decimated their numbers to fewer than 2,000. The smaller, dainty Arabian tahr (*Hemitragus jayakari*) is found in the southeastern end of the Arabian peninsula, where it is endangered. In 1904, copper-colored Himalayan tahrs were brought to New Zealand's South Island, where they were released to be hunted as game. Lacking a natural predator, the

Tahr population grew rapidly and soon began to affect the environment. The New Zealand tahrs are still hunted for population control and by trophy hunters.

The blue-gray Bharal (*Pseudois nayaur*) is another goat-sheep relative that lives high in mountainous areas of central Asia. The Bharal is also called the blue sheep, although it is more closely related to the goat. Bucks carry very long horns similar to the Tur. The Bharal lives in large herds of all ages except during breeding season.

The sandy brown Aoudad (*Ammotragus lervia*), more commonly known as the Barbary sheep, is native to Saharan Africa. It has been successfully exported to zoos and as a game animal to New Mexico, where the population has grown quite large. The Aoudad is hardy, sturdy, and striking, with a large, long mane that extends down the front legs. The buck's horns are long and broad. The desert-dwelling Aoudad survives on scrub vegetation and behaves in a goatlike manner: jumping, leaping, and butting. Bucks spend most of the year alone. In their small groups, the females give birth to twins or triplets. It is fortunate that the Aoudad has been so adaptable to life in captivity or in new homes, because its future is in jeopardy in its homeland.

Both the Muskox and the lesser known Takin are also believed to be related to goats. The Takin (*Budorcas taxicolor*) is a very heavy and stoutly built animal. Five subspecies of Takin are found in northeastern India, Bhutan, northern Burma, southeastern Tibet, and China. None are seen widely outside their remote homes. The endangered Shaanxi takin (*Budorcas taxicolor bedfordi*) of China is covered in a gorgeous coat that shimmers in colors from metallic gold to gray or black. The Shaanxi may be the source of Jason's mythical Golden Fleece, which came from far beyond the Black Sea.

The Muskox (*Ovibos moschatus*) is an ancient animal originally found from England across Asia and into North America as far east as modern-day Iowa and Kentucky. Eventually Muskox came to inhabit only the remote and harsh lands of the arctic circle in Alaska, Canada, and Greenland. The Muskox is bisonlike in appearance with a large hump on its neck. Its large feet are well adapted to life on the snow. The Eskimo

and Inuit peoples made great use of Muskox hides, meat, bones, and horns. They also gathered the soft and silky wool of the undercoat, known as qiviut, shed each spring by the Muskox.

After Europeans arrived in the New World, the herds in Alaska and Canada were decimated. Muskox do not flee from danger but form a protective circle around their calves. They were no match for hunters with rifles who desired only their huge hides. Although Canada protected its small surviving herds in 1917, the United States was forced to import animals from Greenland to restock a wildlife refuge on Alaska's Nuni-vak Island. In a new attempt at domestication, since the 1950s, Eskimo peoples in Alaska are now involved in cooperative businesses using captive herds of Muskox to provide the raw materials for garments woven from qiviut. Muskox have also been reintroduced in Scandinavia.

## Domestication

After the dog, the next animals believed to have been domesticated were sheep and goats, although recent research suggests that pigs may have been domesticated earlier in some locations. Goats were widely hunted and were eventually kept at the settlement as pets or perhaps to be eaten later. Goats may also have been kept for sport or religious rituals.

Although wild goat species were found in many areas of the world, only the Bezoar became truly domesticated. Some goat species live more solitary lives or inhabit very high altitudes. Some possess more dangerous horns, whereas others are more difficult to hunt or capture. The Bezoar also conveniently inhabited the same range as the home of human agriculture.

The Bezoar has many traits that are conducive to domestication. They strongly prefer to live in family groups or small flocks. They will acquiesce to the leadership of a king or queen. The group establishes its own pecking order, although the goat is not a very submissive animal. Goats are prolific, and the young bond easily and become self-sufficient early. Goats are highly adaptable to a wide variety of foodstuffs, espe-

Among the Egyptians, Greeks, Chinese, and Old Testament peoples, the goat was often a sacrificial animal.

Although the goat has often been linked with devilish or lecherous behavior, it has also been viewed in a more positive light as the celebration or desire for fertility of both land and people. In ancient Egypt, the Goat of Mendes was worshiped as a symbol of procreation. In some cultures men still carry goat amulets symbolizing procreative fertility.

The goat was heavily involved in the lives of the Greek gods. Zeus was suckled by the sacred goat Almalactea, whose name means foster milk. When Almalactea's horn was broken, Zeus transformed it into the horn of plenty, or cornucopia, symbolizing the fertility of the land. Almalactea was also honored in the sky as the constellation Capricorn. When Zeus fought the Titans, he carried *aigis*, his powerful goatskin shield given to him by Athena. The word *aigis* evolved into *aegis*, meaning protection or patronage. Aphrodite rode a goat, and Selene drove a goat-drawn chariot. Goats were the chosen sacrifices to Hera and Artemis. Pan, god of herds, was important to shepherds and hunters. Pan had a human body and head but the legs, horns, ears, and tail of a goat. A huge goat guarded the treasure cave on the island of Lesbos. The Greek word *tragoidia*, meaning tragedy, stems from *tragos*, goat, for the songs sung at goat sacrifices to Dionysus. The Romans also worshiped Dionysus as Bacchus, who often disguised himself as a goat. Bronze goats covered in gold leaf were placed in vineyards to encourage fertility.

The goat symbolized lightning in Greece, China, Tibet, and elsewhere. The Hebrews wove the cloth of the tabernacle out of goat hair to symbolize the lightning that appeared on Mount Sinai at the appearance of God.

In India, the she-goat is the Mother of the World and the bringer of rain. She is depicted in red, white, and black—the colors that symbolize creation. The sun god Pushan, who protects livestock, rides in a goat cart.

In China, the ancient goat god Yang Ching was honored as a protector from wild animals.

Two he-goats, Tooth-gnasher and Gap-tooth, pulled the chariot of Thor, the Norse god of thunder. In southern Germany, *kid's onions* were the rain or droppings that fell from Thor's goats. Further north, the supreme god, Odin, had a goat that gave the gods a never-ending supply of milk. Throughout the Middle Ages, farmers in Europe honored the goat in a wish for bountiful crops.

The goat has long been a national emblem of Wales. A folktale recounts the prince who followed a white goat that then turned into a beautiful young woman. The famed Welsh Guards have a goat for a mascot, as do the U.S. Naval Academy midshipmen.

The unicorn was regarded as the symbol of perfect good or innocence from China and India to Mesopotamia, Greece, and Europe. The medieval unicorn often resembled a long-haired white goat, although modern tales of fantasy now depict a beautiful white horse. A one-horned goat or antelope may have served as the original inspiration for this ancient legendary creature.

cially those inedible by humans or found on nontillable land. Other traits have continued to make life challenging for goat keepers: the goat's tendency to have a seasonal estrus, its great agility, and its resistance to being herded easily like cattle and sheep.

It is difficult to determine whether bones found at

early human settlements belong to wild or domestic goats. It is also hard to distinguish between the bones of sheep and goats unless they can be identified by the differing skulls and horns.

The first evidence that goats were being kept in a captive situation is the presence of large numbers of

bones, especially of young adult males. Because young goats are hard to catch, this is strong evidence that the young males were born in captivity. When goat bones are found in villages in plains or valleys, the inference is that goats were brought there to be used as a meat source. If there are a great number of bones, then the villagers must have had a ready supply.

This type of evidence occurs at sites that date back ten thousand years in modern-day Jordan, Turkey, Afghanistan, Turkmenistan, and Uzbekistan. This region also corresponds to the range of the Bezoar. Large numbers of goat bones belonging to young males have also been identified in Kurdistan and at the archaeological site of Ali Kosh, in present-day Iran, dating from 8050 B.C. to 7900 B.C.

The process of domestication caused physical changes in the goat. The Bezoar's limb bones became shorter and smaller, and the shape of its horn cores changed. This horn change is noticed as early as 7000 B.C. The Bezoar carries large, high horns smoothly curved like a scimitar, with the inward curve sharper than the outside edge. Under domestication, this core shape gradually became oval and finally flattened on the inside, losing its sharpness. This pattern of flattened goat horns has been found dating to 6500 B.C. at Ali Kosh, which indicates many generations of domestication. This flat side eventually became indented or kidney-bean-shaped. By 5000 B.C., goat horns began to take on a corkscrew shape or become twisted. The horns also became much shorter and smaller in other areas.

The reasons for these changes in horn shape are not fully understood, and it is unknown whether they were deliberately desired. Early husbanders may have preferred horns that differentiated their stock from wild goats. They may have simply liked the looks of the horns. Besides being beautiful structures, the different sizes and shapes identify various subspecies and breeds. Goat keepers may also have selected for changes in horns to lessen damage to fences and structures or for easier handling. Domestic goats use their horns to break into and out of places as well as to defend themselves against humans and other livestock. Of course, goats often get stuck by their horns in fences. These are

the same reasons that lead many modern goat keepers to dehorn their goats. It has also been theorized that the changes in horns may be genetically associated with other desired characteristics, such as milking ability, hair coat, or temperament.

Horns serve the goat as useful tools, weapons, protection to the skull when butting, and heat regulators. The annual growth rings of horns record the animal's age and health, where massiveness and deep ridges indicate good nutrition. People have used horns as containers and as material for buttons, combs, and many other utilitarian or decorative objects. Goatherds also use horns as handles to help them control their charges.

By 3000 B.C., hornless or dehorned goats appeared in Egyptian records and then became more common. The Romans, too, were familiar with hornless goats. Although the removal of horns in kids, known as debudding, is commonly practiced today in North America and in Great Britain, in most parts of the world goats are raised with their horns. Hornless goats are the result of a dominant mutation. Linked to the normal gene for growing horns is the dominant factor for normal sexual development; therefore, homozygous hornless goats have a variety of fertility problems. In fact, it is impossible to establish a breed of naturally hornless, or polled, goats because virtually no fertile homozygous polled females exist. Heterozygous hornless does do have increased kidding rates but also an increased rate of intermediate sexual characters and an abnormal male-female ratio in their offspring.

Another characteristic of domestication is changes in ears. The Bezoar has small, erect ears. By contrast, the ears of most domestic breeds are larger, and in some breeds such as the Nubian, which is of Indian and Egyptian origin, they are much longer and droop.

The coats of domestic goats have also changed. The Bezoar is brownish gray in color with white underparts. Although this color is still seen in some breeds of domestic goats, a wide range of colors and color patterns has developed.

Five thousand years ago goat hair was widely used for weaving carpets and clothing. Goats have a double coat consisting of an outer layer of coarse hair and a seasonal fine undercoat known as cashmere. The produc-

tion of cashmere has been increased in some breeds, especially in Asia. Clothing worn by a three-thousand-year-old mummy found in Charchan, China, has been identified as a fine cashmere, indicating that goats were being raised at that time for this fiber.

The Angora breed of goat carries a unique fiber known as mohair that is neither hair nor cashmere. Angora goats have a single-fiber, hairless coat that is much like the fleece of the lustrous, long-wooled sheep breeds. The white Angora coat is much thicker and more profuse than cashmere. Mohair grows 4 to 6 inches in length and does not shed out naturally but is shorn by humans.

Although the Angora goat was probably developed in the Himalayas and then brought into Anatolia by invading tribes, the breed was named for the city of Ankara, now Turkey's capital. Angora goats were clearly in existence more than two thousand years ago in Turkey. Docile, small in size, and with endearing faces, Angora goats were often kept as household animals and their mohair was spun in the home. Interestingly, the word *mohair* comes from the Arabic word *makhayer* or *mukhayyar*, meaning selected or choice.

In addition to meat, horns, hides, and fiber, goats provided labor and milk. Although it is not known when animals were first milked for use in the human diet, the food value of a goat used for meat is less than the value of the milk that the same goat can provide regularly for many months of the year. At one time, goats supplied more milk and dairy products for humans than cattle. In hot climates, fermented milk products such as yogurt were especially valuable, for fresh milk rapidly soured. The ability to make cheese allowed people to preserve food for future use. The work that goats provided was not heavy, but they served as pack animals and pulled small carts or chariots. Goats were also used to tread grain into the ground or out from the ripe heads on the threshing floor.

Because the primary wild progenitor of the domestic goat came from western Asia, along with the idea of domestication it was necessary to move the goat itself into Europe and other areas. By 5500 B.C., goats were present in Italy and other Mediterranean areas, later moving into central Europe. The classical Greeks de-

pended on sheep and goats for meat and for milk, which they consumed mostly as cheese. After 5000 B.C., dairy products became very important in India and Mongolia, though not in China and other Asian cultures.

In Africa, the Sahara was the home of early herding peoples who tended goats and sheep by 6000 B.C. As the climate became increasingly arid, herders moved into mountain oasis areas and southward onto the savanna. In sub-Saharan Africa, herding was established by 4000 B.C. Early farming villages appeared in Egypt from 5000 to 4500 B.C., perhaps adopting herding traditions from both east and west. Scenes depicting large flocks of goats tended by herders are a frequent theme on tomb walls from the Old Kingdom onward.

From the earliest seafaring era, goats were carried on board ships as a source of meat and milk. When they were traded on and off the ships, goats were both introduced to new areas and crossbred with existing populations. Sailors also left goats on uninhabited islands to multiply on their own as a future source of provisions.

Goats were not native to Britain, but they were present by 4000 B.C., probably arriving with immigrant farming peoples from present-day France and Belgium. As these farmers replaced the original hunter-gatherers and cleared more forest land for agriculture, the goat population increased. Goats grazed on common areas near settlements and in the uplands. They were milked along with sheep and cattle, and the milk was used to make butter and a sour milk cheese. Because it was difficult to provide forage for animals throughout the winter, much of the livestock was slaughtered in the late fall. The meat was preserved through drying, salting, and caching in cold running water or under the ice of frozen ponds.

The Roman invasion of Britain introduced different stocks of domestic goats that were crossbred with the native types. The Roman agricultural writer Columella, who wrote extensively on goat keeping in the first century A.D., mentions two separate breeds. He recommended that bucks with toggles on their necks be used for breeding, believing that they would sire does that gave more milk. Columella recorded remedies for goat diseases and advocated that the herd be cared for by a young goatherd, not simply turned loose to forage.

The Greek satyrs and Roman fauns were half man and half goat. The satyrs attended Dionysus, who lived as befitted the god of wine. A *satyr* became a lecher, *satyriasis* an uncontrollable sexual desire in a male.

Although the concept of a scapegoat occurred among the ancient Greeks and Babylonians, the scapegoat of the Old Testament lives on today. The Hebrew Azazel was the wild demon of the desert.

The classical authors of Greece and Rome linked the goat and man in sexuality as related to fertility, but Christianity began the association of real evil with goats. Whereas early Christian depictions of the Devil were often similar to those of angels, by the early Middle Ages, Satan had come to resemble a goat complete with cloven hoofs, tail, and horns. The goat's widespread association with fertility had come to represent lasciviousness or sin promoted by the forces of the Devil. Whereas medieval theologians believed that the nimble wild mountain goats were a symbol of Christ, they saw the hairy, nasty-smelling, bearded billy goats as dangerous promoters of lust.

Christ's admonition that on Judgment Day, God would separate the sheep from the goats contributed to the belief that goats were on the side of evil. Goats were also said to be the familiars of witches, who worshiped the Devil. The representation of demons as goats in morality plays and dances from the Middle Ages in Europe spread to Africa and eventually to Central and South America.

In anti-Semitic prejudice, Christians often compared Jews to goats. The Hebrew beard was described as devilish in appearance. European Jews were punished by the wearing of horned hats or badges and placed backward on goats.

Columella also described for the first time the method of making cheese using rennet, the digestive juice found in the stomach of kids, lambs, and calves.

Throughout northern Europe the goat was never valued as highly as other livestock. In the laws of early European societies, goats were worth only about a third as much as other animals. Goats were common, however, living with sheep and pigs in or about the dwellings of poor people. Indeed, goats have long been described as the poor people's cow. In the Middle Ages, the peasants' diet consisted mainly of grains and vegetables, and so milk and dairy products provided valuable protein. When goats were eaten, they were generally not butchered until at least two years of age.

In Britain, sheep have long been more numerous than goats. From the fifth to seventh centuries A.D., sheep comprised about half of the domestic livestock population, and excavations reveal a sheep-to-goat ratio of forty to one. As recorded in William the Conqueror's Domesday Book of 1086, with a human population of 2 million to 3 million, sheep were numbered at 130,000 and goats at 11,000, although goats did

outnumber cattle. Sheep had a greater value because they supplied wool along with the same products of meat and milk. Ewe's milk was preferred for butter and cheese even though a single goat could give as much milk as 5 or 6 sheep.

The native English goat is the descendant of the animals that were brought to Britain in the pre-Roman era. The Romans brought their stock with them, but the old English type survived relatively unchanged, although it varied slightly in different regions. Stocky, sturdy, and short by modern dairy breed standards, the multipurpose native goat was well adapted to England's forage and climate. The coat was usually brown or gray with white areas, a dark dorsal stripe, and dark markings on legs, neck and flank. The male carried large, impressive horns (fig. 6).

Elsewhere on the British Isles, other breeds developed. The Irish goat was a very old type; the billy sported horns that rose up straighter and more parallel than the old English. Although the Irish goat produced less milk with a lower butterfat content and a shorter lactation period than the English, it was a popu-



Fig. 6 Sixteenth-century woodcut of a ram found in Edward Topsell's *History of Four-Footed Beasts and Serpents*, published in London in 1607. From *Curious Woodcuts of Fanciful and Real Beasts: A Selection of 190 Sixteenth-Century Woodcuts from Gesner's and Topsell's Natural Histories* (Dover, 1971).

lar source of milk in spring. In Scotland, the long-haired native goats were sometimes called Galloway goats. These goats were found in the traditional colors of gray, fawn, brown, and black with white markings or colored patches. In Wales, another recognized breed type was a long-haired goat with a black head and fore-quarters and white elsewhere.

Over the centuries, traders, crusaders, and invaders introduced new goat stock into Britain. Feral flocks of white goats have long been noted in the western coastal

areas of Scotland. It has been suggested that these goats are the descendants of the white Norwegian or Telemark goat carried by the Viking ships to the northern and coastal areas as early as A.D. 1000.

Traditional stories relate that in the late twelfth century, King Richard II gave Sir John Bagot some unusual goats obtained during the Crusades. These bi-colored black-and-white goats were supposedly from the Rhone River valley. This herd was placed on the Bagot estate, where they continued to live in isolation into the twentieth century. The Welsh black-faced goats also bear some likeness to these Bagot goats.

Later in the Middle Ages, goats from Syria and Malta were brought to the Guernsey Islands in the English Channel. Bearing the same strikingly golden coloring as the Guernsey cow and the now extinct

Guernsey donkey, the Golden Guernsey goat lived nowhere else in the world but Britain and the Channel Isles.

In medieval Britain, both young kids and older goats were eaten. Older goats were commonly slaughtered at six or seven years of age, providing meat that was tough. Often salted or dried, haunches of goat were eaten as a substitute for bacon. Goat hams were known as hung venison or rock venison because they were comparable to deer in taste. Goat ham became a specialty of the Welsh area. Goat meat was also soured or pickled. Tender young kid was roasted, stewed, stuffed like a suckling pig, or served in ginger sauce. Later in the Middle Ages, kid became a special dish traditionally served after Lent.

Goatskin and kidskin were valuable leathers. Goatskins were used for carrying wine and water as they had been since ancient times. They were also used to form the airtight bag of the bagpipe.

Skins from goats and sheep were also used to produce parchment, which replaced papyrus as early as the fifth century B.C. To make parchment the skin, instead of being tanned, was stretched, scraped, soaked in limewater, dried, rubbed with chalk, and polished with pumice. The parchment sheets were then cut and bound with leather lacings. Parchment was erasable, usable on both sides, and had a smooth, firm surface. Because paper did not reach Europe until A.D. 1100, parchment was widely used for handmade and illuminated Bibles, religious books, letters, and documents.

During the fourteenth and fifteenth centuries, the most commonly used material for caulking between the wooden planks of ships was goat hair and cashmere. Interestingly, studies of boat excavations in London and Newcastle have revealed this goat hair to be identical to that of the contemporary Scottish feral goat.

Goats were also valued by stockmen. Often 3 or 4 goats were kept in a larger flock of sheep as protection against dogs because the goats would fight a predator. Goats in the herd also helped to control weeds and plant pests in pastures. They sometimes served as lead animals in sheep flocks, and bellwether goats often led the young lambs into the slaughterhouse. Goats were also seen as forecasters of bad weather. There was a

strongly held belief that goats killed snakes, especially venomous Old World adders.

Hundreds of goats lived with the thousands of horses that worked and lived within the major cities. By the seventeenth century it was widely believed that goats protected horses from such diseases as distemper and staggers, a neurological syndrome. One theory proposed that the natural billy goat odor had protective qualities. Goats also ate the poisonous plants sometimes found in hay, again protecting the valuable horses. Additionally, goats have long served as companions to horses, often soothing the lonely or nervous animal. The horseman also depended on goats not to panic in barn fires, thereby helping to lead the horses to safety. For all these reasons many farmers who disliked goats kept one in their barn as a safety device.

Cattlemen trusted in the protective influence of goats, too. It was believed that goats would show symptoms of disease sooner than cattle so that the cattle could be preventively treated by bloodletting or other palliatives. Goats were also thought to prevent abortion in cows, which may be based in truth because goats ate the poisonous plants that could induce abortion.

In the later Middle Ages, the rising value of wool and the resultant land clearances affected the goat population. The ongoing process of enclosing farmland further reduced the common land that had provided browse for goats. Goats remained plentiful in the southwest, the border country, Wales, and Scotland, where they were still a source of milk for cottagers, especially on the moorland and in the mountains. Although goats were economical milk producers, cows had become the main source of milk by the sixteenth century. By the beginning of the eighteenth century, goat meat was also losing favor in most of Britain except Wales.

As the agricultural revolution continued to enclose pasture and cropland, the goat population dropped precipitously. Goats were seen as a nuisance, requiring herding or tethering to prevent damage to crops. Among many farmers this annoyance turned to hatred. In northern England, Scotland, and Wales, the new waves of clearances forced many people to leave their land for urban life or the colonies. Many goats were abandoned to become feral. Both deerstalkers and

sheepmen hunted these feral goats. Subsistence farmers and rural laborers may have maintained a goat or two for their family's use, but it was in this climate of use and attitude that the goat came to the New World with British colonists. The situation was quite different with the colonizers from Spain, where the goat was a popular livestock animal.

In early industrial Britain, goats became more common in urban areas than in rural areas. Before trucking, railroads, and refrigeration, townspeople depended on dairies located in the city. Throughout the nineteenth century approximately 10,000 milk cows were housed within London itself. Although country people believed that cow's milk was better and somehow more upper-class than goat's milk, urban physicians in the city were beginning to preach the healthful aspects of goat's milk for the sick and for young children. Large goat dairies sprung up in the cities, and small groups of fresh does were often taken on routes around the city so that householders could fill their own milk pails, ensuring the milk's absolute freshness. In spring, large herds of freshened Irish does were also driven down to London to provide milk.

Goats were kept in the yards of both middle-class and poorer homes in the city and its surrounding suburbs. Goats wandered on the streets, parks, and commons, foraging in the spilled grain of carriage horses and in the market refuse. Goats were often found in the yards of the wealthy in both city houses and country estates. Besides the fresh healthful milk, goats were kept as pets. Children drove goat carts in imitation of their elders' driving horses, and the image of the goat cart is popularly associated today with the Victorian era. Both the middle class and the wealthy traveled on their holidays to seaside towns, where it was almost mandatory to ride the goat carts on the beach. Depicted in these holiday photographs are mainly old English wethers, along with some white goats and Nubian crosses.

Appropriately the city, not the country, became the center of goat breeding and improvement. The British Goat Society was founded in 1879, and by the 1880s, goat shows were popular in the city, where urban breeders were starting to show a more refined

animal influenced by imported stock. A listing of goat breeds to be found in London by that time spanned the world: Abyssinian, Angora, Asiatic, Babylonian, Berber, Boer, Cape, Cashmere, Egyptian, Hungarian, Indian, Maltese, Nubian, Persian, Pyrenean, Pygmy, Spanish, Surat, and Syrian. Many of these breeds arrived on the steamers from India, Africa, or elsewhere.

The greatest influence on goat improvement came from the Nubian goats from India, Africa, and the Middle East and the various Alpine breeds from Switzerland and Holland. Switzerland was truly the home of specialized dairy goat breeding. The first animal registry in the world was founded in the 1600s for the Swiss Toggenburg goat.

These imported goats were crossed on native English and Irish goats, resulting in uniquely British versions of the most popular breeds. Colored brown with white facial stripes, the British Toggenburg is based on stock from Switzerland. Also Swiss in origin, the British Alpine is colored black with white markings. The white-colored British Saanen was mostly influenced by Saanens imported from Holland, although the breed originated in Switzerland. The large Anglo-Nubian with its distinctive drop ears and Roman nose was influenced by the Indian, Egyptian, Pyrenean, and Abyssinian breeds. The Anglo-Nubian itself has been widely exported.

By virtue of their excellent dairy abilities, these new breeds have almost obliterated the native British breeds. The Irish goat was lost and does not survive today as an organized breed. The old English goat is now the object of an effort to re-create the native breed. Fortunately, a small herd of Welsh goats was kept to supply regimental mascots for the Welsh Guards.

In Scotland, feral flocks lived undisturbed on small islands for many years. These goats do not bear the stamp of the Alpine breeds and may therefore carry older genetics. Other goats became feral when the Scottish chieftains evicted their tenant crofters, who then in turn abandoned their goats. These goats, such as those on the island of Rhum in the Outer Hebrides, have survived despite extremely harsh conditions, Victorian sport hunters, and modern environmentalists.

*caper* To leap about playfully, an escapade  
*capreolate* Having tendrils like a wild goat  
*capric acid, caproic acid* Fatty acids named for their bad smell  
*capricious* Impulsive, unpredictable  
*capriole* An upward leap by a highly trained horse  
*chevron* An inverted V representing the horns of a goat on a heraldic emblem  
*get one's goat* To irritate or annoy someone; probably originated when racing stableboys would steal the companion goat of an opponent in order to upset that horse  
*goat, old goat, goatish* Words used to describe lecherous behavior as far back as ancient Egypt  
*goatee* A small beard on the chin like a goat  
*goatskin* A container for wine made from goatskin  
*kid, kiddie, kiddy, kiddo* A child or young person, a good friend  
*to kid* To tease playfully  
*kidnap* To seize and hold for ransom  
*kid stuff* Something appropriate for children  
*ride the goat, to be goated* To be initiated into a group, often in a secret ceremony  
*treat with kid gloves* To treat gently or with special consideration  
*tragedy* From Greek *tragoidia*, combining *tragos*, goat, and *oide*, song; the *tragoidia* was the chanting that accompanied the sacrifice of a goat to Dionysus

Elsewhere in Scotland there remain large numbers of feral goats, the remnants of the huge numbers of goats raised there for many years. Both of the feral Scottish types carry significant amounts of fine cashmere.

In the cities, the increasing ease of transportation and refrigeration contributed to the eventual decline of goat keeping. From the late nineteenth century until World War II, goat keeping was mostly confined to the north of England: Yorkshire, Durham, Lancashire, Northumberland, Cumberland, and Wales. The goat was still of use to rural farmers and poor working families, but goat keeping elsewhere was generally sparse. Pedigree goats were bred mainly by fanciers and specialized dairy producers, not farmers. There was some renewed interest in goat keeping during the deprivations of the war years and the self-sufficiency movement. In the 1990s, however, the number of registrations of dairy goats went down. It has become difficult for the typical small producer to meet the hygienic requirements of the European Union regulations.

Besides dairying, goats can contribute to meat, mohair, and cashmere production. Raw mohair was exported to Britain as early as 1820. Soon most of the world's mohair was being scoured and combed in Britain. The mills of Bradford, West Yorkshire, are still the world's largest producers of mohair yarn. Although individual animals may have been imported through the years, the Angora industry did not become established in Britain until 1981, with imports from New Zealand, Tasmania, and Texas via Canada.

In Scotland there is great interest in cashmere farming by using the feral herds. To facilitate crossbreeding and upgrading, heavy cashmere-bearing goats and genetics have been imported from Iceland, Tasmania, the former Soviet Union, and New Zealand. Because meat production is an important companion product in cashmere goat raising, efforts are also being made to increase the physical size of these goats.

Cashmere and meat production are viable uses of native stock, but without care, the original breed types

will be lost through this upgrading effort. New uses of old livestock genetics are one important reason to preserve these breeds, yet it is also important to preserve these gene pools for unanticipated future needs.

In 1493, Columbus carried goats and other livestock aboard his ships on his second voyage to modern-day Puerto Rico, Dominica, and Jamaica. Later explorers and colonizers continued to carry shipboard goats to provide milk for the crew and passengers. Beginning in the 1500s, Spanish goats were brought to the New World in large numbers and carefully husbanded on the missions and ranches of the Spanish territories. The Navajo quickly adopted the Spanish goats and sheep. The brown-colored Spanish meat goats did well and soon were widespread across Texas and the Southwest. These range goats came to be called by a variety of names—Spanish, meat, brush, briar, woods, and even ball field.

The Spanish were avid consumers of goat meat and milk products. Following the breeding policies of Spain's long-established Sheepmaster's Guild, several breeds, such as the Malaguena, Murciana, La Blanca Celtibora, and La Castellana Extremena, were well-established and excellent producers. Some Spanish breeds exhibited heavier meat characteristics, whereas others were distinctly dairy types.

The British, French, Dutch, Portuguese, and Spanish all claimed islands in the Caribbean. Ships of the slave trade visited all the islands, transporting many African goats along with the suffering human cargo. These goats from West Africa influenced the genetic stocks in the islands and the American South.

Throughout the New World goats inevitably escaped and became feral. The Spanish and other explorers and traders also left goats on many small islands in the Caribbean, off the coast of California and Mexico, and in the Pacific as sources of provisions on future visits.

Captain James Cook left a ram and 2 does on Hawaii's Niihau Island in 1778. Although this group and their offspring were killed in a dispute between chiefs, more goats were left on the Hawaiian Islands, and they were established twenty years later. Goats were eaten,

the skins were traded, and feral kids were often caught, tamed, and tethered. The feral and domestic population was very fluid.

The Jamestown colonists from England brought goats with them to Virginia in 1607, and an additional 400 milk goats were imported from Wales in 1620. The Pilgrims, who also arrived in 1620, had goats before cows, which did not arrive until four years later. Their original 6 goats increased as goats will, and combined with further imports, their numbers in the colony were estimated at 4,000 by the mid-1630s. All of these imported goats were the traditional old English, Welsh, and Irish types.

The colonists in New England tended to be of English or Scottish origin. They settled on the coast in fishing or shipbuilding towns and further inland in small villages complete with a commons and surrounding farmland. These villagers were very much subsistence farmers and goats were likely to be found here.

The middle colonies of Pennsylvania, Delaware, New Jersey, and New York possessed richer farmland, much of which had already been cleared by the American Indian farming peoples. Cash crops such as corn, wheat, beef, and pork were raised on larger farms. Further inland the land was more rugged, and the farmers had to be more self-sufficient. These immigrants came from many parts of Europe—England, Scotland, Ireland, Germany, Sweden, and the Netherlands. Along with their diverse origins, these farmers had diverse approaches to farming and farm animals.

The southern colonies of Virginia, Maryland, the Carolinas, and Georgia were the home of large plantations near the coast and small family farms in the backcountry. The colonists of this region were mostly English, Scottish, Irish, and German. Their population was enriched by African slaves who brought their culture and eating preferences with them, including goat, which was a popular meat in West Africa.

The Dutch settled in New Amsterdam, which extended up the Hudson River valley from present-day New York City and south into northern New Jersey. The Dutch colonists brought their own livestock with them from the Netherlands. In the Netherlands, the traditional Dutch goats were eventually superseded by the

introduction of the Swiss Saanen, known today as the Dutch White. The old Dutch Landrace and Dutch Pied goats are now considered rare breeds.

The French settlers and their livestock animals colonized New France, which encompassed the western portion of Newfoundland and the eastern coast of present-day Canada. This French influence was also present in Louisiana. The old and endangered breeds of goat in France today include the Catalan, Massif Central, Poitou, Provençal, and the unusual Rove. The French Alpine (which is quite different from the British Alpine), Saanen, and Poitevins are now the most popular breeds.

## Husbandry

Although the earliest colonists needed to bring their livestock with them, the immigrant goats multiplied rapidly enough to supply later colonists. Added to this genetic mix were the goats that made their way aboard the trading ships from literally any part of the world, so the common American goat certainly had many ancestors. Within a short time dairy cows became the primary source of milk in the colonies, though goats remained regionally strong in some areas. Outside of the Southwest and Texas, common goats were mainly kept on small family farmsteads, never becoming an important part of agriculture in either Canada or the United States. There would be no recognized “breeds,” other than the Angora, until the end of the nineteenth century. Livestock journals ignored the goat for decades.

In 1849, 7 Angora goats were brought to the United States from Turkey as a gift to an American cotton expert for his assistance. Because the Angora was zealously protected in its home country, additional goats had to be smuggled out of Turkey. Although Angora herds did not fare well during the Civil War years, more imports totaling 400 to 600 goats occurred after the war. Using repeated crossings on larger common goats, by 1900 there were an estimated 500,000 Angora goats in the country. Missouri was the first center of the Angora population, but herds became well established in the Edwards Plateau of Texas, which now produces

about 90 percent of the national crop. The Angora is still found in small herds in many states, with significant production in Oklahoma, New Mexico, Arizona, and Michigan. The Angora has also become established in Canada, mainly in Ontario and Quebec.

Along with Turkey and South Africa, the United States is now one of the largest producers of mohair worldwide. Production peaked in the 1960s with more than 4 million goats in American herds. By the 1990s somewhat more than 2 million goats were being clipped once or twice yearly. About 90 percent of the raw mohair is exported to Britain for processing, since most American mills are geared toward shorter wool fibers. Lanolin is also extracted from raw mohair and used in facial and hand creams or other products. The skin, complete with its long mohair, is occasionally used for rugs or robes. Angora rabbits also produce a soft, useful fiber, but it should not be called mohair.

Mohair is a unique fiber. In goats, the outer guard hairs are produced by the primary follicles and the seasonal downy undercoat, or cashmere, is produced by the secondary follicles. In Angora goats, both of these follicles produce mohair all year. Mohair is shiny, with a springy curl or wave. Woven into either rough-textured fabrics or fine materials, it is used for both home furnishings and clothing. Mohair fabrics are soft, luxurious, and expensive. These fabrics are also lighter than wool, able to hold rich, bright dye colors, and they have shape memory, which makes them naturally wrinkle-resistant. Mohair fabrics are often used in upholstery, especially in aircraft, because they are naturally fire-resistant. Mohair is also sound absorbent and is used in symphony halls, hotel lobbies, and other public places. It can also be combined with other fibers.

The typical Angora goat ranges in size from 60 to 130 pounds but is a noticeably smaller goat than the dairy breeds. Most Angora goats are not registered, although the herds are kept pure so that the mohair is not devalued. The average goat produces annually at least 7 pounds of mohair with excellent production in the 10-to-12-pound range. Mohair fleeces are graded on many characteristics: density, curl end finish, separation, lack of guard hairs, crimp, luster, length, and fineness. Because mohair is not shed, it must be shorn.

The largest goat ever recorded was a Saanen buck that weighed 400 pounds.

The longest-lived goat was a Golden Guernsey–Anglo Nubian cross that lived to age eighteen. Aphrodite raised 26 kids, including one set of quads and five sets of triplets.

The highest milk yield from a goat was 7,714 pounds in 365 days. A doe named Snowball lactated continuously for twelve years and ten months.

The highest price paid for a goat was \$140,000 for an Angora buck in 1985 in New Zealand.

The smallest breed of goat is the Terai from Nepal, which weighs 17.5 to 26.5 pounds. This breed is found in the southern lowlands, where it kids year-round and often has twins. Also very small is the Black Bengal (also known as the Teddy or Bangladesh Dwarf) from eastern India and Pakistan. This breed lives in humid areas and is used for meat and leather production. The Black Bengal is very prolific and fast growing.

The largest breeds include the meat imports such as the Boer, although individual dairy animals can also grow quite large.

Fleeces from kids, yearlings, and adults are sold separately. Colored hair, kempy (short, coarse, and brittle) fleeces from crossbreeding, or excessive dirt or foreign matter discount the fleece value. Small producers may choose to sell fleece, rovings (the cleaned fibers before they are spun into yarn), or yarn directly to craftspeople.

Most Angora goats are raised under range conditions. The range producer's expenses include immunizations, parasite control, predator control, stock dogs, fencing, and shearing. Angoras produce better with good nutrition, with does requiring supplementary protein during pregnancy and lactation. Angora does are less prolific than most other goats.

Angora and other goats are very helpful in range management. In the Upper Plains, goat herds can control the invading leafy spurge, which crowds out the native grasses. Accidentally imported from eastern Europe, leafy spurge has become a serious problem in some areas. Chemical controls will not kill its roots, but repeated grazing by goats significantly reduces its spread. In Texas, goats control regrowth cedar, which increases the amounts of ground water storage. Good range management can make use of rotational or common grazing of goats, sheep, and cattle. In the Midwest, the goats eat the multiflora wild rose, which can overrun pastureland. Repeated browsing for five years will eliminate the pest.

In 1993, the U.S. Congress decided to phase out the wool and mohair subsidy that had been established by the National Wool Act of 1954. Although the incentive payment was phased out over two years, this loss was expected to hit stockmen very hard. The first response was a liquidation of up to 20 percent of the Angora herds in some areas. This was accomplished through the domestic meat market and by shipments to Mexico. Overstocking of rangelands in an attempt to increase cash flow was another response to this situation. A shift to goat meat production has occurred in some areas but this has been coupled with an increase in mohair demand from the fashion industry. The mohair industry will probably be living with unstable markets for some time.

In North America, specialized European dairy goat breeds began to be imported at the turn of the twentieth century. Beginning in 1893 with 4 goats, a total of 161 Toggenburgs were eventually imported into Canada and the United States from Switzerland and England. The Toggenburg was at one time the dominant American dairy breed. The Saanen was imported to the United States beginning in 1904. Although there were additional imports, the foundation for the breed in North America came from one group imported in 1906. The Saanen became very popular in early dairy herd books. Because not all Saanen kids are born the required white color, a separate association for Sable

goats has been created to promote Sables as a separate breed. *Sable* means very dark or black, but Sable goats may carry many colors and patterns. The first 3 Anglo-Nubian goats were imported from Britain to California in 1909. This breed, known as the Nubian in North America, is the most popular registered dairy breed in the United States. Originally dual in purpose, the Nubian is definitely becoming more dairy in conformation. The Alpine, now the second most numerous breed in the United States, was imported to California from Paris in 1922. Most of the Alpine goats in North America trace back to 4 French Alpine does.

The least well known dairy breed in the United States is the Oberhasli, a very old breed from Switzerland. It was first imported in 1906, but these particular goats were not maintained as a pure breed. In 1936, Dr. H. O. Pence of Missouri imported 5 Oberhasli. All purebred Oberhasli in North America, which until 1978 were called Swiss Alpine, are descended from these 5 goats.

Perhaps the most distinctive breed is the LaMancha, which has either no external ears or tiny “elf” ears. Although short-eared goats are mentioned in ancient Persian records, earless goats were first displayed at a world’s fair in Paris from LaMancha, Spain. Many decades earlier LaMancha goats had been brought to the Spanish missions in California, but their fate is unknown. There was a recognized herd of LaMancha goats as early as the 1920s in the United States. In 1936, a group of Oregon breeders crossbred short-eared goats with Nubian–French Alpine crosses and the Spanish dairy breed the Murciana. This new breed was first registered in 1951 and has exploded in popularity.

The American Milch Goat Record Association was organized in 1905 and published its first herd book in 1914. In 1965, the name was changed to the American Dairy Goat Association. The association preferred that recorded goats be descended from European imports, but upgraded goats were also registered. In addition to the existing breeds, the association recorded other breeds that no longer exist in North America, such as the British Alpine, Calcutta Llama, Indian, Maltese, Murcien or Murciene, Norska and other Nor-

wegian types, Rock Alpine, Rome, Royal Murciana, and Schwartzberg-Guggisberger. Today no new goat breeds can be imported to the United States without first undergoing the expensive process of quarantine in a disease-free country such as Canada or New Zealand. Accordingly, only the valuable meat or cashmere breeds have been imported in significant numbers. Imports of semen and embryos may change this situation in the future.

Tennessee Fainting or Wooden Leg goats appeared in the early 1880s in Marshall County, Tennessee. These normal-sized goats exhibit the symptoms of a neuromuscular disorder known as myotonia. When fainting goats are frightened, their muscles contract and stiffen, preventing them from moving or causing them to fall down. Although they were called by various names, these dual-purpose goats survived in areas of Tennessee, Kentucky, Alabama, and Mississippi. A breeding herd of the original type, known as Wooden Leg, was also maintained in Texas. Smaller fainting goats have begun to become popular as pets. Some of these fainting goats definitely appear to have been crossbred with smaller Pygmy goats.

Although West African goats were undoubtedly brought to the New World earlier, Pygmy goats were not officially imported until the 1930s. Although Pygmy goat fanciers have a registry and hold goat shows, many Pygmies lack pedigrees and may carry the colors of the Swiss breeds or the “airplane ears” that reveal a Nubian ancestor. The Pygmy is common as a pet and at zoos.

By the mid-1970s, North American breeders of dwarf goats began to recognize that they were seeing two distinct types. One was the stocky little Pygmy, and the other was a more refined, dairy-type animal of West African origin. By the early 1980s, goat registries had accepted the Nigerian Dwarf as a separate breed. In Britain, however, both types are interbred and registered in a single association.

Since 1988, breeders have worked on a Pygmy-Nubian cross with the goal of creating a goat of smaller size but a heavy milk producer mainly for the homestead. The result is the newly created breed called the Kinder. The Kinder carries a heavier muscle mass than

Goats of all sizes are kept as pets, and until recent times, when zoning restrictions were enacted, goats often lived in city backyards. Pet goats lived at the White House with the families of several American presidents, including Abraham Lincoln, Rutherford B. Hayes, and William Henry Harrison. Today many rural homes have a goat or two in the barn along with the family horses and chickens. Goats have long been the companions of solitary horses and were often used to calm high-strung racing Thoroughbreds by living with them in their stalls. Pet goats usually lack pedigrees and are generally purchased at a local farm or livestock auction or simply given away.

A pet goat cannot be expected to behave exactly like a pet dog. If kids are allowed to jump up on people, they will still try to do that when they weigh 100 pounds or more. Goats will follow their owners on walks and can be taught to pull a cart. They respond strongly to their owner's voice and will call out for attention. Goats are the original escape artists. They definitely need strong, reliable fencing or they will eat many of their owner's ornamental plants. Most important, every goat owner needs to learn about proper goat care, including regular foot trimming and other health requirements.

Standard-size goats are very strong, and they can be hard for a child to handle. Pygmy goats have become very popular in Europe and North America as pets. They are delightful animals, both animated and adorable. Even full-grown males are generally no taller than 24 inches. Feeding and housing requirements are also reduced. Pygmy goats are available in almost any color, and except in black goats, the muzzle, forehead, ears, and eye area are highlighted in a lighter tone of the body color. The grizzled agouti pattern is the most common. Although genetically horned, these goats are often disbudded at an early age for safety around people.

Essentially companion animals, Pygmy goats are also useful browsers. Elsewhere in the world, equally small breeds are used for milk, meat, and leather, so there is no reason why the Pygmy cannot be a useful goat.

The Pygmy Goat Club in Britain was founded in 1902. Pygmies were imported to North America in the 1930s from German zoos, and an association was organized in the 1970s. Both grade and registered Pygmies are readily available in the United Kingdom and North America.

the Pygmy, giving the kids a higher meat market value. With its appealing Nubian ears, the Kinder also makes an attractive pet.

There has recently been an effort to develop variable-colored Angora fiber, and a registry was established in 1999. Hand spinners are especially interested in this possibility. Both individual breeders and small groups across the country are experimenting with various crosses and color genetics found within the breed. Colored Angora breeds are works in progress, but mohair is so highly inheritable that it should be possible to achieve. The two crosses that show the most potential are the Pygora, or Pygmy-Angora cross, and the

Angora-Spanish cross, sometimes called the Navajo goat (fig. 7).

The Angora-Spanish cross has been called surprisingly successful. The first generation produces cashgora, but succeeding generations show excellent mohair-type fleece. Cashgora is the result of crossing Angora to cashmere-bearing goats. There are still questions about how to grade and classify cashgora. Some experts question the use of the term itself since there is a continuous range between cashmere and mohair and differences can be due to animal age and other factors. Continued upgrading should result in a good Angora-type mohair. The Spanish goat brings a color variation

[To view this image, refer to the print version of this title.]

Fig. 7 This Grey pygora carries a fine cashmere-type fleece with coarse guard hairs. Photograph by Katharine B. Jorgensen.

that seems to be retained, and it is prolific, hardy, and meaty, which adds value to the rancher. The undesirable traits that need to be improved include hair and kemp, upright or airplane ears, hornlessness, and atypical horn growth.

The Pygora fleece consists of a cashmere-type undercoat and a mohair-type outer coat, and it is available in many more colors than white mohair. The fleece can range in type from mohair grade to cashgora to cashmere. Dollmakers especially enjoy this cashgora fleece. In this cross, the Angora contributes mohair and docility, the Pygmy size, cashmere, and spunkiness. The Pygora can also produce milk and meat, making it an all-purpose goat for homesteads. Because the larger Pygmy goat has been used in the cross, the Pygora is a medium-sized goat. There is now an established population and a registry for the Pygora.

The word *cashmere* derives from Kashmir, a region on the border of Pakistan and India. Cashmere

was an auxiliary product from dual-purpose milk and meat breeds such as the Kashmiri. Until 1980, most of the world's raw cashmere came from Afghanistan, Iran, China, Mongolia, and India. About this time, the supply of raw cashmere from Afghanistan and Iran was severely reduced because of political conflicts, and China began to process its own raw cashmere in order to produce more valuable garments. As a result, cashmere goat raising has boomed in such countries as Australia, New Zealand, and the United States.

Cashmere, also known as pashmina, is found under the coarse guard hairs of most goats, although in varying degrees of quantity and quality. Technically, cashmere must have a diameter of 19 microns or less. A micron is one-millionth of a meter, so cashmere is finer and softer than mohair, which is found in the range of 20–24 microns. Because cashmere fabric is composed of thinner fibers woven more densely, cashmere is also warmer than wool. Cashmere is valuable for its rarity, softness, warmth without weight, and luxurious feel. It is used to produce knitwear, men's hosiery, dress and coat fabric, scarves, shawls, and woven goods. It is also blended with other fibers. Most goats only produce 8 to 10 ounces of cashmere yearly, which accounts for its value of thirty-five to forty-two dollars a pound. Cashmere may be white or colored. Often a very small percentage of cashmere is blended with other animal fiber and falsely labeled cashmere.

One of the greatest challenges facing the cashmere industry is the harvesting of the fiber. Cashmere begins to grow around the time of the summer solstice and stops by the winter solstice. The shedding or molt then takes place over several weeks at any time between February and May. Some producers comb the cashmere out, while others shear the goats. Sheared fleeces must be mechanically dehaired, but combing is tedious and impractical in large herds. Small producers usually pool their fiber to achieve a required minimum amount for the dehairing companies. Research is continuing on how to synchronize the shedding by manipulating light and hormones. This would delay shedding until weather conditions would permit shearing or until the optimal time for combing.

The growth of cashmere is dependent on the

[To view this image, refer to the print version of this title.]

Fig. 8 A native cashmere buck in Scotland. Courtesy Cashmere Breeders Ltd., Scotland.

weather and on the animal's age, feeding, and genetics. Cashmere is very fine in young goats but gradually becomes coarser with time. Many breeders feel that too much protein in the diet results in coarser cashmere. Although the cashmere of many dairy breeds is also too short to be processed easily, feral goats and landrace breeds tend to carry a longer cashmere.

The Australians have used their bush or feral goats of mixed types to develop cashmere herds that now number some 3 to 5 million goats. Australia now exports more than 120 tons of cashmere yearly.

The Scottish feral goat carries good quantities of high-quality cashmere. This resource could become an excellent source of agricultural income, for Scotland is located near good markets for goat meat, which can provide secondary income from the culls, and because for many years Scotland has been a major producer of cashmere garments from imported fiber. One handicap to the burgeoning Scottish industry is that, in contrast to other European countries, cashmere is not subsidized in the United Kingdom. Scotland has established a cashmere goat registry and is supporting cashmere research. An upgrading of Scottish and Irish does is being accomplished with stock, semen, and embryos imported from Siberia, Iceland, Tasmania, and New Zealand (fig. 8).

The cashmere goat is still being developed in North

America. Cashmere goat registries and associations are being organized in the United States, using purebred goats from recognized cashmere breeds or upgraded offspring. Various cashmere breeds are recognized internationally, including Siberia's Altai Mountain, Chinese Liaoning, Icelandic, Tasmanian, and New Zealand goats.

In the United States, cashmere raising now involves hundreds of producers, some small but others very large. Colorado, Texas, and Montana have the largest numbers of flocks. There are also some herds in Canada, mainly in Alberta and British Columbia. Cashmere herds are extremely hardy and low-maintenance; they are not subject to fly strike and, unlike most wool sheep, do not require crutching or tail docking.

Some breeders have invested heavily in imported cashmere stock and are selling cashmere foundation stocks at a premium. Cashmere goats, both imported and native, do not always breed true, which should caution the beginning farmer from investing too heavily in cashmere foundation stock. Many experts and breeders feel that the existing domestic and feral stocks can be selected carefully for cashmere and are the most economical way to produce cashmere herds. This increases the potential value of all unregistered or native goats.

In North America goat meat goes by several names: *chevon*, *chivon*, *cabrito*, or *capretto*. Wild goat meat has a mild venison taste, but domestic goat meat is likened to lamb or mutton, although roast or barbecued goat is similar to pork in texture and taste. Goat meat is not marbled, so it is a leaner product with lower fat and cholesterol than beef. Its low fat content means that it can toughen quickly when cooked. Excellent results are obtained when it is braised or stewed.

The meat goat has the highest reproductive rate of any domestic ruminant and reproduces well on feedstuffs that are inedible by other livestock or humans. Goat meat production is now attracting more academic and scientific study. Texas is the largest goat-producing state, with significant production in Oklahoma and Missouri as well.

The average American eats a miniscule 2.2 ounces of goat meat a year. The market for goat meat in North

America is generally limited to specific ethnic groups, regional areas, or immigrant populations that enjoy goat or kid. In general, the largest markets are located in major metropolitan areas in Florida, Texas, California, and the Southwest. These consumers will pay a premium price for goat meat when goat or kid is part of a holiday menu. And goat meat is being introduced as gourmet product in the wider American market. The current domestic supply cannot fulfill this demand, so goat meat is being imported. For its part, Canada imports about 2 million pounds of goat meat annually. Total world demand for goat meat is believed to exceed production.

One barrier to developing the goat meat market has been the lack of distinct, standardized, and superior meat goat breeds. Producers have begun to import large goat types into North America to increase the size and muscle of American meat goats. Because the USDA quarantine requirements have demanded large investments of money and time, these goats have been very expensive. The Boer goat has been the primary object of these import efforts, which began in 1993 after a five-year hold in New Zealand and Australia.

The Boer is a modern breed developed in South Africa from indigenous goats and foreign imports. Boer goats weigh 170 to 280 pounds and have a distinctive appearance. A short-haired goat, the Boer is mostly white with a dark reddish brown neck and head. Some Boers have a white blaze on the face, and completely red or white individuals are acceptable. The Boer's Roman nose and floppy ears are reminiscent of the Nubian goat. It has small, low horns and an upright tail, with a blocky and heavily muscled overall appearance. Breed advantages include a fast rate of weight gain and large carcass size, making the Boer an excellent meat breed.

Other imported, exotic goat breeds have not yet been subject to objective studies in North America. A newly created breed, the Kiko, has been developed from English goats originally brought to New Zealand. With large outspread horns, Kiko bucks can weigh up to 300 pounds and does up to 200 pounds. The Scandinavian Ridgeback Mountain goat appears to be a huge, heavy goat weighing up to 350 to 400 pounds

with a fringe of hair down the back. Reputed to be of Norwegian and wild goat stock, these goats were developed and imported to America by a single family in 1920. They have also been used as a trophy animal. Other popular meat breeds around the world include the Assam Hill and Gaddi of India, the Anatolian Black of Turkey, and the Bengal of Pakistan.

Some investors have made a great deal of money through the sale of imported and crossbred goats, semen, and embryos. The initially high market prices for Boer goats were based on rarity and investment strategies. There have been previous booms in exotic animals, such as potbellied pigs, ratites, fainting goats, and many pets such as ferrets, hedgehogs, sugar gliders, and kangaroos—yet most of these markets have proven unstable over time. Generally only those producers who get in on the ground floor make the big money.

It remains to be seen if the Boer and Boer crosses will be profitable on the rangeland conditions to be found in North America. To achieve its growth potential, the Boer goat needs a higher level of nutrition than many breeds, including supplementary grain or complete feeds. The Boer also seems to have a lower resistance to internal parasites than Spanish or native brush goats. The Boer may be most useful as a terminal sire, crossed on hardy native does.

Some authorities question the enthusiastic meat-market predictions while dairy herd owners in some areas are still forced literally to give away kids. American ranchers also have to compete with such large goat meat-producing countries as New Zealand and Australia, which are the major exporters into the United States. In addition, the American goat meat market is still about 70 percent direct farm sales as opposed to having an organized marketing structure. Among the challenges for the producer are increasing productivity and quality and providing year-round production. Free trade has also opened up the large Mexican market to American producers who are able to take advantage of it.

The Spanish goat remains the meat animal of choice for the range situation. No other breed or type can equal its well-established adaptation to the environment and

production conditions on the range. Selection within the Spanish population could further improve the carcass quality and reproductive and growth rates. Some bucks have already recorded nearly identical weight gains as the Boer.

Nubians, Virginia Brush or Scrub, Wooden Leg, and other large-frame goats could be used to increase the size and meatiness of the meat animal. The Pygmy can also contribute to meat goat improvement, passing along blocky conformation, prolific qualities, and aseasonal reproduction.

Although dairy breeds could add milking ability and frame size, in general they bring along some problems that the meat goat producer might not want to handle. Dairy goats and dairy goat crosses seem to require more assistance at birthings. The size and shape of the udder can make it difficult for the kid to nurse the first few days, and the large udder is frequently injured in rough pastures. Dairy goats are susceptible to mastitis under these range conditions. Also, dairy goat culls do not dress out as well as do meatier breeds.

The smaller Angora goats seem to have more problems with good mothering and fertility, but they do provide additional income from mohair. The culls do not sell as well at meat markets owing to the deposit of exterior fat along the brisket. Many consumers from foreign cultures also like to singe the skin before cooking the meat, which is not easily done with the Angora fleece.

The major problems associated with keeping range goats are effective fencing and predator control. Barbed wire fencing does not deter goats, and woven wire fencing entraps goats by the horns. Most successful is multiple-strand, high-tension electric fencing.

Although goats handle such predators as coyotes and wild dogs better than sheep, predator control is still necessary. Some ranchers follow the Middle Eastern and Asian precedent of employing livestock guard dogs. Burros and llamas have also been used successfully as guards. Controls like this are often more acceptable to the public than either poisoning or shooting predators.

In contrast to Angora and meat goats, dairy goats are not kept on native ranges. Dairy herds are usually

kept on pasture or in goat yards with loose housing. Dairy goats are generally fed supplementary grain or pellets along with hay or silage when forage is unavailable. Occasionally they are fed field crop leavings or cultivated crops such as alfalfa, rape, kale, clover, and sunflower.

There are a number of commercial dairies in North America, but most goats are milked for home use or for direct sales. Purebred dairy goats are also exhibited and bred for sale. Dairy goat breeders are actively striving to develop a more dairy-type goat and fully test or document their goats' milking abilities.

Goats are milked twice a day either by hand or with the use of mechanical milkers with the vacuum pulsation adjusted for goats rather than dairy cows. On average a doe will give about half a gallon of milk per day, although this varies according to the individual goat, her age, and whether she has just freshened or is near the end of her lactation. The doe will maintain lactation for about seven months, when she is usually bred again. Her production will then drop. Goats are usually seasonal breeders, which makes it hard for dairies to maintain a constant milk supply.

After a five-month gestation, the doe gives birth. Twins are common among the dairy breeds, and triplets and quadruplets are not unusual. The kids are removed from dairy does either immediately or within a few days. They are fed milk from a bottle or a self-feeder, with grain and roughage added when the kids are weaned at six weeks to four months of age, depending on the farm system. Kids can be raised on cow's milk or goat or sheep milk replacer.

Dairy goat owners generally prefer hornless goats. This is most easily done when the kid is four to ten days old, when the tiny horn buds can be felt. Debudding can be done by electric cauterization or caustic paste, and a local anesthetic can be applied first. In Britain, a veterinarian must perform this procedure. Dehorning at a later age is much more difficult and harmful to the goat.

Kids are also inoculated and tattooed in the ear with numbers or letters corresponding to their registration information and year of birth. Male kids can be castrated as early as three days of age. If they are not cas-

trated, male kids will begin to exhibit sexual behavior as early as one month. If there is no outlet for the sale of goat meat, male kids are humanely destroyed. Many small dairy operations keep the kids for their own table use.

Owners of a few does may not choose to keep a buck for breeding purposes, relying instead on a nearby service or artificial insemination. If a buck is kept, he should be trained and handled from an early age. Although the buck can be smelly, he deserves better than to be shut away in a shed or pen. The male smell must be kept away from dairy production and milk handling areas, however. Most handlers change their clothing and scrub carefully after handling the male. In an attempt to reduce the male's odor, some veterinarians cauterize the gland area behind the horn, although that does not eliminate the problem of urine spray on hair. Clipping the chest and underside hair can help. Regular bathing is necessary for the buck, especially the front legs, beard, and head. He also needs room to exercise, sturdy fencing, and regular health care.

Goat's milk is white and can be made into many dairy products. At times goat's milk has been regarded as medicinal or prescribed for infants that cannot tolerate cow's milk or other human milk supplements. The reason for this digestive ease is that goat's milk forms small, light, flakelike protein curds in the stomach similar to human milk and very different from cow's milk. In addition to the smaller fat globules, goat's milk is naturally homogenized. Goat's milk is also used to feed orphaned puppies, foals, and calves.

Worldwide more people drink goat's milk than cow's milk. Goat's milk is a very important source of protein in countries where meat consumption is low. Most Americans, however, have never tasted goat's milk even though national production is estimated at 25 to 30 million pounds annually. Many people have a poor image of "stinky" goat's milk, based on their perception of goats in general.

Health regulations have also stymied the sale of goat's milk. Grade A milk for drinking purposes must follow stringent production and facility regulation. Grade B milk for the production of cheese, butter, or ice cream does not have to meet the same requirements.

This is one reason why so much goat's milk is channeled into cheese making. Cheese can also be a product of high economic value for the individual producer.

Traditionally many goat's milk producers have not pasteurized their product because they and their customers have preferred it unpasteurized for health reasons. With the modern knowledge of sanitary procedures and animal health, the only objections to unpasteurized milk are the possible transmittal of certain diseases. Goat's milk can be tested for the presence of tuberculosis and mastitis or infection just as cow's milk is tested.

In the United States, health regulations regarding milk vary from state to state, some of which effectively prevent the commercial sale of milk from small producers. There is continuing controversy over raw milk sales, and raw milk cannot be shipped across state lines. In some states, legislation to allow the sales of raw milk has been defeated even though opponents have not presented any confirmed cases of human illness caused by the consumption of raw milk.

Goat's milk has long been used in cultured milk products. The relatively simple process of making yogurt has long been popular because it extends the storage life of milk. Harmless bacteria such as *Lactobacillus bulgaricus* cause fermentation. The lactic acid that is created gives yogurt its tangy flavor and soft consistency. Other cultured goat's milk products include buttermilk, sour cream, kefir, and acidophilus buttermilk. Cream, ice cream, and butter can also be made from goat's milk. Widespread commercial markets are not yet readily available for these goat's milk products.

Goat cheese, called *chevre* from the French word for goat, is the most popular commercial use of goat's milk. France is the capital of goat cheese making, producing more than two-thirds of the world's goat cheese in a great many varieties both young and aged. By selecting dairy goats for increased protein content in their milk, French dairy producers have achieved a goat's milk that yields more cheese.

Goat cheese remains a luxury and gourmet item even in France. Although goat cheeses look like curious, little geometrically shaped cream cheeses, *chevre* has a distinctive sour tang in the youngest cheese and

a strong flavor in older cheeses. Early in the 1800s the *Encyclopedia Britannica* had this to say about goat's cheese: "That from the milk of goats digests sooner than either sheep or cows, but in general it is a kind of food fit only for the laborious, or those whose organs of digestion are strong." A taste for the older, hearty goat cheeses definitely needs to be developed.

The most popular imported goat's cheeses are Greek Feta, Italian Fontina, and Norwegian Gjetost. Young, fresh, and mild French chevre is also available in the United States, but not in the wide variety to be found in France. The most common French chevre to be found in America includes the pyramid-shaped Valençay, the little round Le Banon, the larger round St. Marcellin, and the cylindrically shaped Chabichou. Chevre is often rolled in herbs or peppercorns to create a variety of flavors.

The domestic production of goat cheese is growing rapidly to fill the demand for new and interesting foods. There are now more than a hundred specialty goat cheese makers in the United States. The American Dairy Goat Products Association is actively promoting this growing business, which is producing versions of French chevre, other traditional cheeses, and newer types.

Besides meat, milk, and cashmere, goats produce other products. Goat- and kidskins provide many specialty leathers with excellent strength, softness, and pliability. Authentic kidskin made from goats younger than six months is often used for gloves. Fine, soft Morocco is a specially finished leather made from goatskins tanned with sumac. Glacé kid is a type of fine shoe leather with a glazed or glossy surface. Goatskins are also used for clothing and purses. The best goatskins come from goats who live outdoors and are not fat, such as feral or range animals. Regular, long goat hair is also a commercial product used for weaving carpets or rugs. In the United States, products are no longer created from goat horn other than by individual craftspeople.

Goats are still used as harness animals. Goat driving is an activity available to people who lack the room or the physical ability to care for horses or oxen. Many short lessons and much patience are needed, but goats can become delightful and enjoyable working animals.

Either sex of any breed can pull a cart, but this is an excellent job for the large wether. Modern, well-designed carts can allow a goat to pull adults comfortably.

Angora goats were used in Alaska as draft and pack animals during the Gold Rush years. Goats are still well suited as pack animals because they are sure-footed, self-sufficient on the trail, and require less water than other animals. A goat can carry 20 to 30 percent of its body weight. Goats are not allowed on some federal or state lands due to ecological considerations.

Goats are now being used extensively for brush and weed control in the western United States where wild-fire danger is increased when undergrowth becomes too dense. Brush control goats are owned by park services or more often leased out for the season. Goats are also used for brush management on pasturelands in the Southwest and Texas. Mechanical brush control is not always possible on rugged or rolling land, and the use of goats can reduce the expense and need for herbicides. Multispecies grazing also enhances grassland productivity and ecological management.

Goats have been widely used in genetic research. The first experiments occurred as early as 1982 with the creation of the geep. This sheep-goat cross was the result of cell fusion or the combination of the cells of sperm and egg from two species. The horned geep wore a coat of sheep's wool mixed in with goat's hair. Geeps were fertile, but the offspring were either sheep or goats, depending on which genetic material the offspring received.

Cell fusion led to genetic engineering, in which genetic material is actually reprogrammed. Small sections of DNA that carry particular traits are isolated, cut out by restriction enzymes, joined with a carrier vector called a plasmid, and inserted or spliced into the DNA of another species, where they initiate the desired action. Recombinant engineering is creating transgenic sheep, pigs, plant crops, and goats.

Current transgenic research is genetically altering the milk of dairy goats to produce proteins that fight diseases including hemophiliac bleeding, cystic fibrosis, malaria, multiple sclerosis, and certain cancers and cardiovascular treatments such as clot-busting TPA, or

tissue plasminogen activator. These proteins can be extracted from milk more cheaply and in larger quantities than from lab-produced cultures, human blood extracts, or cadavers. Because the mammary glands and milk are separate from the other systems of the animal's body, this protein production should not endanger the animal and the new ability should be passed on to its offspring. Human drugs from animal milk will require extensive safety testing as well as assurances of the transgenic animal's well-being.

Besides therapeutic treatments, the milk of dairy animals may someday produce diagnostic products and monoclonal antibodies. Transgenic animals could grow organs for transplants. They could also be used for medicinal and pharmaceutical testing. Another possibility is the altering of goat's milk to become a perfect match for human needs via the addition of the missing vitamins and amino acids. This new transgenic animal industry has earned the name biopharming or pharming.

Several challenges face the various goat industries, including the lack of breed registration, production studies, medical research, drug approval, development of markets, and removal of price supports.

The need for research about goats is great. Most old farm animal texts ignored goats entirely, and many modern texts include only passing references to these hardy animals. Goat feed was often merely relabeled sheep or cattle feed. More nutritional studies are needed to determine the goat's unique requirements. Specific nutritional studies could increase the efficiency of the dairy, meat, and fiber industries. The dairy goat producers could also benefit from nutritional studies of goat's milk and its storage and usage.

Meat production is now becoming the object of study at universities in the goat production areas of North Carolina, Texas, Missouri, Virginia, Florida, and Oklahoma and at the E. (Kika) de la Garza Institute for Goat Research at Langston University in Langston, Oklahoma. Researchers are seeking to determine both nutritional requirements and energy needs. Brush management guidelines are being created for stocking rates and supplemental costs.

There are no vaccines specifically formulated for

goats for some serious diseases such as rabies. Because the goat population is so small, many medications are also not tested on goats. Because costly testing is necessary to obtain FDA approval for drugs and the goat population is so small, it has been economically unfeasible to get this approval. Many products used on goats are not technically approved for use, including most wormers and antibiotics.

Some states are now requiring rabies vaccination of all animals that come in contact with the public. Because there is no approved vaccine for goats, they can be prohibited from shows, fairs, exhibitions, or other public displays such as petting zoos. According to the FAO, rabies vaccination in goats is recognized in twenty other countries.

Consumer awareness and marketing techniques are the main problems facing the dairy and meat goat producers and their associations. Most Americans have not tasted goat's milk or meat, although goat's cheese is becoming more popular. General knowledge of these products needs to be increased and both producers need to develop marketing structures. For the most part, milk and meat sales are cottage industries. And although cashmere production is just being established in the United States, the mohair producers will have to learn how to survive without incentive payments.

Most North American goats are not registered, and there is a large spread in prices between common and pedigree goats. About 40,000 goats in the United States and 3,000 goats in Canada are registered yearly, mostly in the dairy breeds. Estimates of the total North American goat population vary from 2 million to 10 million. Goats are still not considered important enough to survey or census by federal or state agricultural agencies and land-grant universities. Census and registration are important for documenting the goat population. There is a great need to locate the members of the unique landrace and other rare breeds. There is also considerable crossbreeding occurring between the four types—fiber, meat, dairy, and miniature.

The British population of 90,000 goats and the few million in North America compare to an estimated worldwide population of 530 million goats, which is

increasing at a rate higher than sheep or cattle. Eighty-nine percent of these goats are to be found in Asia and Africa.

The goat population is losing numbers throughout Europe except in Norway and the Mediterranean nations of Spain, Portugal, Italy, and Greece. Europe was once the home of many national and regional landrace breeds, but the dairy industry is now dominated by the Swiss breeds—the Saanen, Toggenburg, and chamois-colored breeds.

It is unfortunate that the goat was not more widely favored in Britain and North America, since it is a much better user of resources and provider of products than the cow. Goats can exist on forage unfit for cows, and they provide a milk that is easily digestible by humans. The milk production of the goat relative to size is two or three times the yield of a cow. Goat meat is a healthy alternative to fattier beef types. Mohair and cashmere are renewable materials. These products are created through the use of foodstuffs often inedible by any other domestic animal.

Goat raising allows marginal land to be used in a profitable manner for food or fiber while providing important brush control. Much of the land in the southeastern and southwestern United States is better suited to goats and sheep than agricultural cultivation.

The goat is generally prolific and matures early. The goat is an ecological weeder and improver of pastureland. The goat is a hardy animal that requires less veterinary care and human intervention than other domestic livestock. Small, friendly, and easy to handle, it is hard to understand why much of Western culture cannot overcome its prejudices to better employ the goat.

## Breed Profiles

### *English (pl. 1)*

Goats arrived in Britain along with Neolithic farming peoples around 5000 B.C. The stocky, sturdy English goat is the descendant of the dual-purpose animals that have existed throughout the country ever since, grazing and browsing on common land and the hill country. Varying somewhat in different regions of the coun-

try, the native goat existed relatively undisturbed for thousands of years, until the agricultural revolution and its accompanying societal changes greatly reduced the population of subsistence-farming families.

Toward the end of the nineteenth century, Nubian-type goats from India or the Middle East and various Alpine breeds from Switzerland were introduced to improve the dairy characteristics of native goats. Very soon the native breeds of English, Irish, Scottish, and Welsh goats were nearly lost.

The native English goat was hardy and shaggy, standing shorter than introduced breeds. The male was impressive, with large horns rising up, back, and outward. Although the English goat was a multipurpose animal rather than a dairy breed, English does did have a long lactation period and each day yielded up to 4 pints of milk with a very high and valuable butterfat content. English does also required far less careful management because they were well adapted to the climate and native forage. By the early nineteenth century this native type was recognized and described in agricultural literature.

The English goat, appearing so small and rough, held little chance against the specialist dairy breeds as they were imported into Britain. The native goat was now viewed as old-fashioned and unimproved. As the widespread upgrading of the native herds took place, within twenty years it was difficult to locate true specimens of the old English type other than in feral herds or in the north of England, where they were still of use to rural farmers and poor industrial families.

In the 1920s, the first English Goat Breeders Association was formed as an attempt to save the native goat. Unfortunately, this movement was swimming upstream, for by the mid-1930s, the modern dairy trend had utterly overwhelmed the organization.

In 1978, a second group of English goat keepers in Dorset, Lancashire, and Somerset reorganized the current English Goat Breeders Association with the same aim of preserving the traditional English type. To that end, all the goats approved for the herd book are examined to ensure that they meet the breed standard. The organization seeks to breed selectively for these traditional and very useful English goat characteristics.

The breed standard today describes foremost a small and sound animal no taller than 27 inches and healthy in every way. The English goat serves both milk and meat needs, and it will do so on a wide range of forage. The breed is hardy in the British climate, requiring no overly specialized care. The body is sturdy and square, not angular like a dairy breed, although does will milk throughout a long lactation, up to two years. Naturally horned, the male carries the traditional sweep upward and outward. The ears are neither upright nor pendulous but are carried forward and horizontal.

Both sexes are bearded and carry a usually short yet dense coat with fringes and tufts of longer hair. The goats grow a finer, inner soft undercoat, or cashmere, in fall and winter. The coat color is usually brown or gray but may include white areas. Specific markings include a dark or black dorsal stripe and dark markings on legs, neck, and flanks. Swiss face markings and tassels should be absent. The head is straight or slightly dished, not Roman-nosed.

This native type deserves the attention it is now receiving. The English goat is the only true dual-purpose goat in Britain. Most important, the breed is naturally well suited to outdoor production in the British climate, whereas the dairy breeds require specialized housing and feed. The English goat also carries much more cashmere than the dairy breeds, adding another valuable product to goat raising. In Britain, as elsewhere, there is an increased interest in meat and cashmere production.

The English goat is not officially recognized on the priority listing of the RBST, which views it as a re-constituted or re-created breed. It is impossible at this time to determine how much "Swiss" dairy genetics are present in today's English goat; however, the effort by the English goat breeders to revive and save this native breed does not differ greatly from early work done by other breed associations that faced similar situations.

The exact number of English goats is unknown, but the association has now inspected and included about 1,200 goats in its herd book since 1978. It is possible that this old English type may exist in feral herds as well. In the past, when historical parks sought to depict the traditional English goat in their displays, they

were forced to obtain them from secluded islands, such as Arapawa in New Zealand. Perhaps the English goat will again be seen not only as a historical representative of the goat family but as a viable livestock breed.

### *Bagot (pl. 2)*

The Bagot goat has been part of the lore of the Bagot family at Blithfield Hall, Staffordshire, since 1380. In that year, young King Richard II, grateful for the good hunting he had found in the Blithfield woods and parkland, gave Sir John Bagot a herd of black-and-white goats. These goats were said to have been brought back by returning crusaders from Switzerland's Rhone valley. These black-and-white goats became the Blithfield mascot and have long appeared on the Bagot family crest and coat of arms. It was said that the Bagot family would survive as long as the goats thrived.

The goats at Blithfield may certainly have returned with the crusaders in preceding centuries and been kept elsewhere until this gift. King Richard's father, Edward Plantagenet (the Black Prince), and his grandfather Edward III could also have imported these distinctive goats from Europe when they returned with loads of booty after conquering lands in France earlier in the fourteenth century. Or the goats could have arrived much earlier, at the time of the Norman Conquest in the late eleventh century.

The Rhone River valley lies in the canton of Valais in Switzerland, just north of Italy. The Bagot goat greatly resembles the Schwarzhal goat that is still found in Valais. Today it is often called the Valais Blackneck or the Walliser Schwarzhal. Schwarzhal breed history includes the influence of African goats reputedly brought to the area about 900 B.C. Livestock improvement efforts early in the twentieth century resulted in a clearly marked black-and-white goat with long hair. The head, neck, and forequarters are completely black, and the rest of the body is white. Before this color pattern was so definitely fixed, the Schwarzhal may have resembled the less distinct coloration found in today's Bagot. The Schwarzhal itself neared extinction by the 1980s, and although the population has increased somewhat, it remains rare.

The Bagot also resembles the long-haired Black-necked Welsh goat. It is not known how the two breeds may have been related in centuries past, but several groups of Bagots were definitely released to feral herds in Wales during the twentieth century, the latest in 1954.

Curiously, this same black-and-white pattern occasionally occurs in other feral goat herds. A strain of this color pattern is found in the Tennessee Fainting goat, and in fact, the original founding goat stock of that breed was said to have this coloration.

Whatever their origin, when the goats came to Blithfield, they came under the care of a distinguished family at its large manor hall and surrounding estate. The goats were released in the 1380s to roam some 2,000 acres of the Bagot Woods and another 1,000 acres of Bagot Park. They were left in a semiwild state and were used for hunting in the early centuries; their numbers were probably never large.

The Bagot family has protected its unique, small goat herd from all efforts to eliminate it through the centuries. In 1710, the herd was significantly culled to lessen its impact on local agriculture. In 1938, when the herd numbered about 100, the goats faced the first of two serious threats to their existence. Because of the shortages of agricultural products during World War II, the herd was ordered exterminated to end its damage to crops. The fifth Lord Bagot pleaded his case for preserving the goats, and an agreement was reached to reduce and maintain the herd at 60 animals. After the war, however, the size of the herd was again allowed to drift upward.

In the 1950s the estate lands were sold for a government water project to dam the River Blythe. Because the forestry commission felt that the herd was damaging young trees in the Bagot Woods, the goats were collected and moved off Blithfield's park and woodlands for the first time in almost six hundred years. Just 15 to 20 goats were kept at Blithfield Hall, which was now opened to the public. Others were sold to other estates, animal parks, and zoos. Sadly, some of them probably went to slaughter.

The herd that remained at Blithfield alternated winters at the hall and summers in small, enclosed areas of

the parklands. The small herd became severely inbred. In the late 1970s, Nancy, Lady Bagot, donated the surviving goats to the RBST for safekeeping. The RBST dispersed the 12 goats to several farm parks for use in breeding groups. A total of 33 females and 28 males were located at various institutions.

Because the survivors were so few and so inbred, the RBST decided to employ an upgrading program to save the breed. First-generation Bagot crosses with domestic goats were rebred back to Bagot bloodlines, continuing until the fifth generation, when female progeny were considered virtually purebred. Part of the success of this program may be attributed to the large proportion of pure, unneutered males in the population. Attempts were also made to verify and include Bagot goats that may have descended from earlier herd dispersals and sales. The RBST maintains the Bagot goat registration along with the cooperation and input of the Bagot Goat Study Group.

Originally the breed standard was necessarily broad and somewhat unspecific. Bagots were a semiferal breed for the bulk of their existence, and they were not selected for any commercial purpose such as meat or milk. The only characteristic that may have been monitored in any way was the distinctive black-and-white coloration. Old photographs do show spotted goats in the herd. At times in the past, keepers culled Bagots that carried black spots on the white portions of their bodies. Today this spotted fault as well as a white blaze on the face is common but not desirable. Ideally the long-haired coat should be black on the head, neck, shoulders, and front legs. The black should not be brown, gray, or bluish in color. The remainder of the goat should be white. The goat should also be free from conformational faults. Small extra teats, or supernumeraries, are an additional fault that may be the result of inbreeding and are considered unacceptable on the male.

The accepted breed guidelines describe a small to medium-sized goat that carries large, curving horns. Horns that are much larger and more outspread than those found on Bagots today hang on the walls of the great hall at Blithfield, a sign that the goats may have

suffered a decrease in horn size or shape through the years.

It may now be important that a more definitive breed standard be developed. Bagot breeders also need to remain vigilant against pressure to modernize the breed. The use of an upgrading program should be continually evaluated, because it does introduce different genetic materials. The Bagot Goat Study Group continues its documentation of the breed through a computerized database that incorporates information on blood typing, surveys, historical research, and the location of unregistered stock.

Today many farm parks, estates, and individuals own Bagot goats. Although Bagots have no commercial application, there is no reason why these lovely, historic goats cannot survive as an ornamental breed. All goats are valuable as browsers who keep down troublesome brush. The breed retains the wary characteristics of its semiwild ancestors and is therefore a hearty breed for such outdoor purposes.

The Bagot remains critically rare in its only home, Great Britain. Although its numbers have never been large, in 1998, there were fewer than 200 breeding females and slightly more than 250 registered goats.



Critical

### *Golden Guernsey (pl. 3)*

Although the Channel Islands lie off the northwest coast of France, about 80 miles south of England, they have belonged to Great Britain since 1066, when William the Conqueror of Normandy became king of England. With a population of about 135,000, the islands still retain a French aura. A mild climate and lovely scenery make them a popular tourist destination, although agriculture remains a viable part of the economy. The larger islands of Jersey, Guernsey, Alderney, and Sark and the smaller islands of Herm, Jethou, Lilou, Brecqhou, Les Minquiers, and the Ecrehou rocks are governed by their own constitution and laws. During World War II, the Channel Islands were occupied by German troops. Near the end of their stay, the

starving Germans were desperate for livestock to eat, and the Golden Guernsey goats survived only because some were hidden away.

On Guernsey the skeletons of fine-boned goats have been found near Megalithic burial grounds dating to 2000 B.C. Freely browsing on the cliffs or commons, most goats were used for family milk needs. The golden-colored Guernsey goats were first documented in island guidebooks in the early 1800s. Goats of the Golden Guernsey type were entered in the records of the Guernsey Goat Society in 1922. At that time older residents referred to the Golden Guernsey as the typical island goat, although goats of other colors were also present.

The origin of the Golden Guernsey has been debated. The breed bears great similarity to very old Syrian and Maltese goat types. Herodotus, the famed Greek traveler and historian of the fifth century B.C., described the goats of Syria whose “wondrous ears turn upwards and outwards at the tips in tribute to Apollo who gave them their golden coats.”

From Syria on the eastern end of the Mediterranean to Malta off the coast of Sicily, waves of traders and conquerors carried livestock with them—Phoenician, Greek, Roman, Arab, and Norman. Syrian goats very likely made their way to Malta and then to the Channel Islands. Maltese goats still have the same orange-red skin coloring as the Golden Guernsey.

Because of a similarity in coat color, the theory has also been advanced that the Guernsey is related to the French Alpine Chamoisée dairy breed. When a Chamoisée is crossed with a Saanen, the kid resembles a Guernsey. This theory posits that both Saanen and Chamoisée breed types were present on the islands hundreds of years ago. It is actually a simpler answer to accept the movement of goats and people through the Mediterranean, although European breeds were brought into the islands in the past hundred years and have undoubtedly crossbred to some extent. Official sources have refuted the suggestion that the goats were imported from France during the German occupation.

The Guernsey’s more recent history is better documented and an interesting story. Miriam Amy Mil-

bourne on the Isle of Guernsey at L'Ancrese is credited with saving and promoting the Guernsey through World War II and afterward. Milbourne did not keep goats until 1937, when she acquired a few golden-colored goats from Guernsey and Sark. Through the years of occupation, she kept the Germans at bay at first by charming a young officer and later by hiding her goats in her house.

Soon after the war, Milbourne took it upon herself to save and improve the Guernsey breed, which was nearly extinct. Few Golden Guernsey herds and individuals were left on the island in the late 1940s as a result of the occupation. Some outside blood, such as Saanen and Anglo-Nubian, was introduced into Milbourne's herd, but the genetic base remained narrow. Although she was a woman of modest means and was often accused of eccentricity, by the time of her death in 1972 Milbourne could rest assured that her beloved Goldens had been saved from extinction.

That same year the Golden Guernsey Goat Association was formed with the goals of preserving the breed's purity and improving its milk yield and conformation. Besides the L'Ancrese goats, other Goldens on the island were identified. After the revival of the breed, the herd book was closed. A census in 1975 identified 104 females and 25 males in 42 island herds.

Although the numbers had increased by 1980, the male lines were all closely related. The RBST has encouraged a careful monitoring of the genetic structure of the breed. There are currently about 500 breeding females. Off-island interest in saving and owning the Guernsey goat continues to grow, and island stock is occasionally offered for sale. Because Guernsey is a small island of just 24.5 square miles, it could easily be developed to the extent that keeping goats will become very difficult. In the future, even dedicated breeders may find it necessary to import fresh stock from the mainland.

The Golden Guernsey is a robust and hardy goat but is also fine-boned and generally small in size at about 29 inches, although height does vary. Males weigh 190 to 200 pounds and females 120 to 130 pounds. The golden coat can range in color from pale

to a reddish bronze. The skin, including the udder, is always colored orange-red. There is disagreement about whether small white markings should be allowed, although Swiss-type markings are strictly unacceptable. The hair coat can be short, shaggy, or long and silky. Almost three-quarters of the goats are born with horns, and the rest are naturally polled. The ears are erect, with a distinctive upturn at the tips. Slightly floppy ears are sometimes seen as a result of an early outbreeding to a Anglo-Nubian. The face is straight or slightly dished, and there should be no tassels on the neck.

Because the breeding pool is so small, it is important that owners and judges not place more value on coat length or color but accept the natural variation in healthy, sound Goldens. It would be too easy for the breed to become a silky ornament rather than an excellent, useful goat. The society encourages the culling of goats with obvious faults yet remains strongly aware of the dangers of a narrow genetic base.

The heritage of the distinctive Golden Guernsey goat differs from the British and Alpine breed types, making it of great genetic value. The Golden is also a good household milker with a very pleasant temperament—friendly, affectionate, and even placid. Although it produces less milk than the highly dairy breeds, the Golden also requires fewer concentrates and forages; as a result, it is an excellent dairy goat for households or less intensive production systems.

Closely related to the Golden Guernsey is the English Guernsey. The first Goldens were exported to mainland England in 1965. Sometime later an upgrading registry plan was established that would allow for outbreeding. The result has been a larger goat that is also a heavier milker. At this time it seems that the two breeds, the Golden Guernsey and the English Guernsey, are on somewhat different courses for the future.

A few individuals have imported Golden Guernsey semen from Britain to the United States for crossing on Saanen or similar purebred goats. There has also been some experimentation with embryo imports.



Vulnerable

*San Clemente (pl. 4)*

The eight islands that form California's Channel Islands stretch along the Pacific coast from Santa Barbara to San Diego. The northern five islands are part of Channel Islands National Park, but two of the islands, San Clemente and Santa Catalina, are held privately. In the past, the islands were important rookeries for marine birds and mammals, which shared their home with native Indians.

Juan Cabrillo was the first European explorer to visit the islands, claiming them for Spain in 1542. While traveling between missions and presidios in California, Spanish ships often sought harbor in the Channel Islands but did not colonize them. Centuries later, the intense, often violent competition of American and Russian fur traders for sea otter pelts eventually destroyed the native islanders' way of life and decimated the sea otter's population. Small groups of island survivors sought refuge at the missions in California in the 1820s and 1830s.

Although sheep were ranched on San Clemente for a few years, the United States government has owned the island since 1848. The U.S. Navy trains both on San Clemente and on neighboring San Nicolas as part of the Pacific Missile Test Center. Because San Clemente is subject to weekly bombardment, it is off-limits to visitors but is not an undisturbed and pristine nature site. Santa Catalina was home to small numbers of miners and ranchers until the 1800s, when the resort town of Avalon and a ranch owned by the Wrigley chewing gum family were developed. Avalon still exists today, although the Santa Catalina Island Conservancy now owns about 86 percent of the island, which it maintains in a relatively undisturbed condition.

California sea lions and Elephant seals still breed on San Clemente's rocky shores. The endangered California Brown pelican, Black-footed albatross, and other birds such as the San Clemente Island Sage sparrow live on this arid island. Several native plants are not found elsewhere, including *Stipa*, a type of grass that once was the main groundcover but now is severely reduced. Santa Catalina provides habitat for the Brown

pelican and other migratory birds and is home to many other imported animals, among them feral pigs, Mule deer, horses, and a herd of several hundred Bison.

The feral goats of the Channel Islands are descended from small, brown Spanish goats left by early Spanish explorers as a meat supply. It has been suggested that these goats were mainly Blanca Celtibora and Castellana Extremena. Later the colonists and missionaries imported more of the common dairy and meat goats of Spain, including such breeds as the Malaguena and Murciana, in addition to the Blanca Celtibora and Castellana Extremena. None of these historic types exist as they did four hundred years ago, so the surviving feral island herds may be a valuable link to the past. Their isolation gives them importance both genetically and historically.

Running free for many years in the temperate climate and not confronted with large predators, the goats flourished on the rugged islands. Although the feral goats were hunted as game animals, their numbers continued to increase.

In the national park, the feral goat population of Santa Cruz was eliminated in the 1970s. On San Clemente, the U.S. Navy began an extermination program in 1972, when it was estimated that 11,000 goats inhabited the island. In 1980, with some 4,000 goats still eluding the navy, the military planned a helicopter shooting program. The resultant public uproar, led by the animal rights group the Fund for Animals, stopped this action, and subsequently the fund volunteered to remove all the goats from San Clemente. Through a netting program, the fund was able to rescue about 3,000 goats in 1985 and 1986. From August 1972 to April 1991, 29,381 goats were taken from the island, according to official documents.

On Santa Catalina, some goats remain, and they are frequently spotted by hikers. Conservationist groups wish to see the goats eliminated as a destructive and nonnative animal, and the island conservancy has used hunting as a means to accomplish this. Sports hunters who visit the island can participate in feral pig and goat hunts.

The native San Clemente goat was a small, deli-

cate animal, although the bucks could carry large horn spreads. Bucks weighed about 100 pounds and does about 65 pounds. Island goats were not tasseled and were not alpine or dwarf in appearance. They were not polled, and their ears were carried laterally, not drooping like those of goats with Nubian influence. There was no freckling on the nose.

Their coats were most commonly red or light brown with black or dark brown markings. Many individuals were red or tan with a black cape and markings on the head, legs, and tail. This black color could also fade to brown from the sun. The dark markings could be small, giving the goat an almost solid red appearance, or heavy to almost solid black. Two recessive mutation color patterns were also observed: a diluted red or tan that was expressed as a cream or beige and a second pattern that produced a white patch on the flank or elsewhere. Spotted or pure white goats were not seen on the island. The goats, especially the males, were shaggy in appearance.

These physical observations are important in the attempt to identify and maintain pure island genetics on the mainland. Unfortunately, there have been some unintentional crosses with other breeds after the goat removal project. Pygmy crosses seem possible in some of the current mainland herd, as evidenced by freckling or other dwarf characteristics. Some Alpine or other crosses also appear to have occurred.

When the Fund for Animals rescued the goats from San Clemente, adoptive homes were found for the goats, but breeding situations were not organized, and most of these animals have been lost to preservation efforts. The Fund for Animals has actively discouraged breeding by adoptive families and will not allow breeding of the stock it still holds. It is believed that about 46 island-bred goats are still held on three fund sanctuaries in California, Texas, and Georgia. Most of the males have been neutered.

A few small San Clemente herds are in the care of animal parks or individuals in the United States and Canada. Others, however, are being raised and sold at auction as exotic animals, destined ultimately for hunters at game ranches.

Although the San Clemente goat does not hold specific commercial values other than hardiness or resistance to some common problems, the breed is of great historic and genetic importance. In addition, the founding stock no longer exists in Spain. The National Research Council, the National Academy of Sciences, the FAO, and the ALBC all recognize the San Clemente goat as one of the most valuable goat genetic resources in the Americas. It is true that feral animals endanger other plants and animals, but the goats themselves should be preserved in breeding populations and the semen from island-born and first-generation mainland bucks should be collected and saved. Wildlife conservationists need to understand that domestic animal diversity also deserves protection and preservation. In addition, the Fund for Animals should reexamine its responsibility to the survival of the breed.

At present, the goats on Santa Catalina are in sufficient numbers to be preserved; however, they are under threat of extermination. On San Clemente only a small flock of fewer than 100 individuals remains, and they are under a kill order. Only small numbers of goats are available for breeding in Canada and the United States, with about 100 individuals registered with the International Dairy Goat Registry. The current pure population has been estimated to be as low as 110 by some experts. The ALBC is hopeful that there may be a few hundred.

Further documentation, examination as to phenotype, genetic research, and the establishment of more breeding populations are desperately needed. There is no organized breed association or network.



Critical



Rare

### *Spanish (pl. 5)*

The name “Spanish” does not refer to the original breeds brought by the conquistadors and colonizers from Spain but rather to the free-range meat goats traditionally raised in Texas and other southern and southwestern U.S. states. They are also known as brush, briar, meat, or common goats. This minor agricultural sideline is poised to become a major business.

Although goats of the old Spanish breeds populated the Southwest, the relatively pure old-type Spanish goat is now found exclusively on the Channel Islands off California and on Mona Island in Puerto Rico. Strong Spanish characteristics are more pronounced in Texas and the southwestern states. However, the modern Spanish meat goat also contains the contributions of the common English goats from New England and the eastern seaboard, where shipboard goats were received from just about everywhere. With some regional differences, this mixture has selected itself toward the hardy and self-sufficient breed now called the Spanish goat. These goats can be found from Virginia to Florida, throughout Texas and the Southwest, and up through Oklahoma into Missouri. Texas is the leading goat-producing state, with a population estimated at 400,000 to 500,000 goats located heavily in the state's central, southern, and western regions.

Goats in the South are more often described as Brush or Scrub goats, and there is some movement toward delineating their differences from Spanish goats. Virginia State University maintains separate breeding herds of Brush and Spanish goats. Research on these two herds has shown higher rates of aseasonal breeding and kidding as well as greater resistance to internal parasites in the Brush goats as compared to the Spanish goats. Native Brush goats have displayed greater potential for meat production in states such as Virginia and South Carolina, confirming their adaptation to the local environment.

Spanish goat raisers claim that there isn't a color or color combination they haven't seen. A good meat goat is long-legged and large; some adults can reach 200 pounds or more. Spanish goats require minimal management. Traditionally left to fend for themselves with ample browse and water on large ranges or rugged pastures, the herds were gathered only twice a year for routine care. Some farmers or ranchers kept Spanish goats primarily as brush control for cattle pasture and sold the surplus kids. As a result, Spanish goats can be more skittish and harder to handle than other goats.

Spanish goats are exceptionally healthy through

years of natural self-selection. They require no special housing or assistance with breeding or birthing. Spanish goats mature much earlier than dairy breeds, and Texas range research has confirmed that does are fertile from August to January. Spanish goats are also prolific; twins and triplets are common. Under extensive range conditions the kidding rate is 130 percent, and this rate improves to 170 percent with greater attention. The udder of the doe is much smaller than that of a dairy goat, which greatly reduces the incidence of udder injuries and mastitis.

Even though they are left armed with their horns, Spanish goats are still subject to predator problems from coyotes, wolves, and wild dogs. The large herds of goats in the Near East, which were kept under similar management for thousands of years, were fortunate to have the protection of ancient livestock guard dog breeds. These breeds are now growing in popularity in North America.

Herd management trends have included breeding to Nubian or other large dairy bucks to increase height and milking ability. Greater milk yields result in larger weaning-weight kids. Wooden Leg goats, with their increased muscling, also are useful. Because Spanish goats tend to carry a very fine cashmere fiber, excellent results have been obtained using bucks with outstanding cashmere traits. Selected strains of heavier meat-producers among true Spanish goats have been identified, among them the Baylis, Kensing, Valera, and Willingham.

The greatest threat to the native Spanish goat lies in the import of the Boer goat from South Africa. Beginning in 1987, Boer embryos were imported from Africa to New Zealand and Australia, where they were transferred into host mothers. Repeated transfers and multiple ovulation technology rapidly increased the size of the herd. Imported into Canada and the United States after meeting quarantine requirements, these Boer bucks and their descendants quickly made a significant impact on the meat goat herds. Within a few years most of the meat goats in the United States may be crossbred with Boer genetics. Boer numbers are now estimated at more than 10,000.

Boer genetics are attracting huge amounts of investment money, and seed herds have been established in Australia, Canada, and the United States. Both the USDA and Ag Canada are under considerable pressure to reduce or eliminate many of the quarantine protocols to allow for the rapid importation of more Boer goats. Only time will tell if these investments or decisions were wisely made or if the Boer goat was an expensive fad.

Serious research is now taking place on goat meat production, with interesting results. The larger females are not necessarily the most productive. These bigger does produce larger kids with increased growth potential, but their requirements for diet and maintenance are also greater. The meat goat industry may realize higher profits from emphasizing productivity, not larger frame size. Lower stocking rates and an increased need for supplementation can reduce overall productivity. It may also be more beneficial to use the Boer as a crossing sire on pure Spanish does.

The development of meat goat markets is of great value to the diversifying or sustainable farmer whose desire to improve meat qualities is understandable. Breeders are rapidly breeding Boer bucks on their Spanish does. At the same time, unless protective steps are taken now to protect a “pure” gene pool of the Spanish goat, this well-adapted, native goat breed will be lost, and the highly productive Boer crossbred type will become the ubiquitous Holstein of the meat goat farmer.



Watch

*Tennessee Fainting, Myotonic,  
and Wooden Leg (pl. 6)*

Fainting goats are known by many names: Tennessee Fainting, Wooden Leg, stiff-leg, scared-stiff, myotonic, nervous, fall down, Tennessee Mountain, and epileptic goats. The symptoms they exhibit belong to the condition known as congenital myotonia. Myotonia is an inherited neuromuscular disorder caused by a mutation in a recessive gene. When a goat with myotonia is startled or frightened, its heart rate increases and

its muscles contract and become rigid. Because these muscles are then unable to relax immediately, the legs stiffen and the goat may stand rigidly or fall over. The goat does not lose consciousness, and its eyes remain open and fixed. The goat recovers quickly, within a few moments to a minute, but it may move stiffly for a short while, especially in the hind end. Although there is no evidence that the goat feels pain or suffers, it may appear anxious. Kids may begin to exhibit symptoms soon after birth, and these symptoms can improve or worsen as the goat ages (fig. 9).

Myotonia seems to prevent goats from jumping well, such as over fences or ditches, and it obviously makes them highly vulnerable to attacks by predators. In the past, some livestock raisers practiced the placement of a fainting goat in a sheep flock as a sacrificial decoy to protect the more valuable sheep. Yet animal behaviorists note that predators often ignore animals that faint or appear dead and that this behavior can be a survival mechanism rather than a sacrifice.

The origins of the fainting goat are recorded in an account written by Dr. H. H. Mayberry of Marshall County, Tennessee. He recounted how an older man named John Tinsley arrived in the area in the early 1880s, coming to stay with a farmer named J. M. Porter. Tinsley spoke with a brogue or accent and was believed to be from Nova Scotia. Accompanying him were a billy goat, 3 nanny goats, and a “sacred” cow that may have been a zebu. All 4 goats exhibited the behavior of fainting. Mayberry offered to buy the goats, and after initially turning him down, Tinsley sold him the 4 goats for thirty-six dollars. Tinsley worked at Mayberry’s farm for about three weeks but then left to marry an older woman named Barnhill at Lick Creek, Tennessee. After the next year’s corn crop was harvested, Tinsley and his sacred cow disappeared one night, and he was never heard from again.

Mayberry bred and sold these fainting goats, then also called nervous goats, throughout Tennessee and Kentucky. The first academic study of these goats was conducted in 1904. Other medical studies have followed, but the condition is still not clearly and completely understood.

[To view this image, refer to the print version of this title.]

In the early 1920s, R. J. Goode purchased some fainting goats in Alabama and began to research their history. At this time Goode stated that all the herds he had located in Tennessee, Kentucky, and Alabama traced back to Mayberry's original 4 goats. The fainting goats were of normal size and appearance, with varied color markings. By the 1930s, herds were found in Mississippi. The trait was also observed in feral goat herds in the Tennessee mountains. In the late 1940s, a Texan named Heep purchased goats from Tennessee to create a breeding herd that was maintained for the next twenty years. Most of the fainting goats in Texas trace to this herd and have generally gone by the name Wooden Leg.

Today's Wooden Leg goats most resemble the de-

Fig. 9 This Fainting goat displays the distinctive rigidity of muscles and limbs. Courtesy Pam Santorelli.

scriptions of the original fainting goats. They are of normal size and weight and are a stocky rather than dairy goat type. Does are at least 25 inches tall and bucks 27 inches tall, with weights of 75 to 130 pounds up to 250 pounds. Wooden Legs can be horned or polled, and they generally have a relatively short, smooth coat of any solid color or combination of two or three colors. They have a straight to slightly dished face, with lateral ears preferred to upright ears. They also have normal, nonbulging eyes. Myotonia is considered to give them a heavily muscled loin and rear quarter, making them excellent meat producers, though it is not known exactly

how myotonia and muscularity are related. Myotonic goats are either aseasional or have an extended breeding season with a 197 percent kidding rate. Research has shown them to be more resistant to internal parasites than either dairy or Spanish goats.

The goats registered by other fainting goat organizations exhibit some differences from this type. The American Tennessee Fainting goat is slightly smaller, with a maximum height of 27 inches and a weight of 40 to 75 pounds. They also have definite pop or bulging eyes. This association recognizes that the original goat was not miniature or small, and they do not wish to radically change the breed. International Fainting Goat Association animals also have bulging eyes and can be even smaller, ranging from 17 to 23 inches in height. They have a wide muzzle and straight facial profile.

Some fainters have been selectively bred to become smaller pet goats or may have at one time been crossed with Pygmy goats. Breeders have also selected for extreme symptoms of myotonia or stiffness. At times, goats of this type have been sold as Sacrificial Pygmies, Pygmy Fainters, or Fainting Pygmies.

Owners of fainting goats have been criticized for harassing or provoking goats to faint for entertainment. The legitimate registries are promoting public education about this breed and hold shows that judge animals solely on conformation, not on fainting ability. They do require photographic evidence of a fainting episode in order to register a goat.

The original fainting goat was a meat rather than dairy animal, and the larger members of the breed still have excellent possibilities in this area because they exhibit very heavy muscling and prolificacy. Fainting goats have also been used in the research of a human affliction with similar symptoms known as Thomsen's disease, afflicting one in 25,000 people. Some fainting goats also produce a nice quality of cashmere in the range of 15 to 19 microns. Small research herds exist at Vanderbilt University, Virginia State University, and the University of Cincinnati.

Fainting goats are a unique historical breed. The ALBC is continuing to research the breed's history and genetic parameters. It believes that the crossbreeding

of fainting goats will make it harder to document and preserve this breed.

The most recent figures for Wooden Leg goats list fewer than 300 registered animals. Collectively, in the different registries, approximately 1,000 Tennessee Fainting goats are registered annually. It is estimated that the total population is about 3,000 goats, largely in the United States, with a few goats in Canada. A Boer-Wooden Leg cross is being marketed as the Tennessee Meat goat, although extensive crossbreeding will also threaten the future of the traditional Wooden Leg type.



### *Nigerian Dwarf (pl. 7)*

Africa is home to about a fourth of the world's goats. A variety of types flourish throughout the continent. Small or dwarf goats are common from Senegal, Nigeria, and Angola in the west through central Africa to southern Sudan. Although much has been made of regional differences in native West African Dwarf goats, some authorities believe that this type is remarkably uniform throughout this large western area. Other local experts believe that there are separate types or native breeds. These goats do exhibit a wide variety of colors and patterns from the most common agouti pattern to white, black, brown and pied. These color differences can be regional. The West African Dwarf is also known as the Djallon, Dirdi, Cameroon Dwarf, and Nigerian Dwarf. Further inland, there are many different local breeds and the Sudanese Dwarf, which is smaller than the West African and produces little milk.

Because Nigeria was a funnel for the slave trade, it has generally been assumed that this country was the source of the small pygmy or dwarf goats that found their way to Europe and North America. Carried as provisions aboard ship, these West African goats were not recognized as a valuable breed, and therefore most would have entered the crossbred goat pool of the New World or Europe. Much later, these small goats were also kept at zoos or parks.

When the Pygmy Goat Club was founded in Britain

in 1902, the decision was made to discard several names that had been used to describe this small imported goat: Nigerian, Cameroon, Nilotic, Sudanese, and West African. Although the club chose the name Pygmy, it was believed that the breed was founded mainly on goats from West Africa rather than Sudan. Confusingly and perhaps mistakenly, Sudanese goats were believed to be more slender and normally proportioned, rather than disproportionate dwarfs. Contemporary photographs from Africa reveal a North American pygmy-type goat in Ghana and in nearby Cameroon a goat much more like the modern Nigerian Dwarf.

In Europe, the dwarf goat was imported as a pet and curio for zoos, petting parks, and backyards. Whether or not dwarf goats made their way to North America with the slave traders, they were documented as an import only in the early 1930s, when some were shipped from German zoos. Through the early 1960s these small goats remained rare and were found mainly in research centers and zoos.

In the mid-1970s, as the first Pygmy association was organized, some breeders of these dwarf goats began to believe that there were two different types of West African goats. Bonnie Abrahamson of Utah, Frances Ogden of Washington, Mr. and Mrs. Heabert Wood of Indiana, Robert L. Johnson of Georgia, Pat Freeman of Ontario, and Anne Tucker of England were all pioneer breeders of the type that would become the Nigerian Dwarf. Some direct imports were also located that displayed the desired characteristics. In addition, a few herds were identified that had remained relatively closed and unidentified with the National Pygmy Goat Association.

In North America, the goat registries began formally to acknowledge the two separate breeds in the early 1980s. The International Dairy Goat Registry, the American Goat Society, and the Canadian Goat Society all opened herd books, although they have developed different standards. The British Goat Society continues to recognize a single breed, the Pygmy, and sees the two types as representing the extremes, with intermediate types also occurring. Adding to the confusion, in countries such as The Netherlands, the registry for the

Dutch Pygmy is promoting a breed that resembles the Nigerian Dwarf.

The Nigerian Dwarf is described as a dairy breed of West African heritage. As an achondroplastic dwarf goat, the Pygmy has a body that is larger in proportion to its leg length; the Nigerian, by contrast, is refined rather than blocky in appearance. The head should resemble the French Alpine in appearance, with a flat or slightly dished face and erect ears. The Pygmy has a dished face and a blocky, compact, and heavily muscled structure. Because the Nigerian is a dairy breed, the udder and its attachment are very important. Breeders are striving for the good qualities of a dairy animal.

Coloring also highlights the differences between the Nigerian Dwarf and the Pygmy. Three color lines have been identified in the Nigerian: black or black and white, brown or brown and white, and gold or buckskin and gold and white. Some breeders would like to see these color lines maintained separately, although any combination of these colors is allowed. The desirable coat is soft and short but heavier in colder climates. Any coloring that resembles the Pygmy is faulted. The preferred color for the Pygmy is uniform gray or silver agouti, light or dark, with black socks, cape, martingale (neck or chest band), and mane. It is suspected that agouti coloring in a Nigerian Dwarf may reveal Pygmy heritage.

At present, the maximum height allowed varies with the different registries, as do the breed standards. The ideal range for does is 16 to 19 inches and 17 to 20 inches for rams. In Canada, these numbers are 22 and 23 inches, respectively. Although slightly larger animals are allowed, they are discouraged because the Dwarf should be smaller than the Pygmy breed.

The Nigerian Dwarf is a hardy, active, and companionable goat. As a dairy animal it can yield 1 to 2 quarts of milk daily, just the right amount for a small family. Its small size and gentle nature make it very easy to handle, house, and feed. The Nigerian is also very prolific. Twins are the norm, and does can be bred twice a year since, like the Pygmy, they are aseasonal breeders.

The Nigerian Dwarf is raised by about eighty breeders and registers some 1,500 kids yearly in the United

States and 50 in Canada. Because there was much unknowing crossbreeding with the Pygmy type, the Nigerian is still not purebred in the same sense as other breeds are. In the International Dairy Goat Registry, they are placed in the different categories of purebred (a two-generation pedigree and conformation to standard), American (one registered parent and conformation to standard), and grade (conformation to standard).

Small goats have become very popular in petting zoos and as family pets. Many of these goats are not registered or carefully bred, and most are simply called pygmy goats. This situation confuses the public and gives breeders of the Nigerian Dwarf a big challenge for the future.

Many Nigerian Dwarf breeders are working hard to refine a true miniature dairy breed. The Nigerian is evaluated by dairy goat judges, and that ideal remains their goal. Nigerian breeders want their goat to be different in appearance from the Pygmy and for that difference to be easily recognizable. Unfortunately, the existence of three separate breed standards and multiple associations is not an asset for this breed. Potential owners need to research breeders to ensure that they are purchasing dairy stock, not exotic pets.

Whether the Nigerian Dwarf represents a distinct African type or breed has not been determined. It has been bred separately for some time now, however, and is an attractive, hardy, and productive breed that is well suited for a particular need.



Rare

### *Oberhasli (pl. 8)*

The Oberhasli is the least well known of the standard dairy breeds in the United States. Also known as the Oberhasli-Brienzer, the Oberhasli is a member of the Alpine goat family developed in the area around Bern, Switzerland. The Alpine dairy breeds are descended primarily from Swiss chamois-colored goats. The Oberhasli clearly bears this color pattern, which is somewhat similar to the wild Chamois. At times this

breed is called the Chamoisee for the name of its color pattern.

The first livestock registry in the world was created in Switzerland for goats. Records were established for several very old breeds, including the Oberhasli. Oberhasli goats were imported into the United States in 1906 and 1920, but they were not maintained as a pure breed. In 1936, the owner of a commercial goat dairy, Dr. H. O. Pence from Kansas City, Missouri, imported an Oberhasli breeding group of 1 buck and 4 does from different herds. Three of the does were already bred to unrelated bucks. All purebred Oberhasli in the United States are descended from this original importation.

Until 1977, the breed was registered under the name Swiss Alpine in the American Dairy Goat Registry and was occasionally referred to as the Chamoisee variety of the Alpine or French Alpine. The Alpine herd book included these goats and their offspring. When Oberhasli breeders decided to form their own herd book, their registration records were separated from the Alpines although Oberhasli goats had contributed genetically to the Alpine breed. Currently the breed registers about 1,200 kids yearly.

Adaptable to different environments, Oberhasli are active and hardy goats. Oberhasli owners report that their goats are friendly, yet also calm and steady in comparison with some other dairy breeds. Wethers of the breed, because of this personality and their strength, are useful as pack animals.

Medium in size, does average 28 inches tall and 120 pounds. Bucks are slightly taller at 30 inches and 150 pounds. The preferred color is chamoisee, defined as a light to deep red bay. The black forehead is very specifically marked, with two black stripes down the straight face from above each eye down to a black muzzle. Black stripes also begin under the upright ears, meet at the back of the head, and continue down the neck and back to the tail. The Oberhasli also has a black belly and legs. Does are allowed to be completely black in color. Bucks frequently carry more black on the shoulders and chest but cannot be totally black. A few white hairs sprinkled in the coat are permissible. The udder may be light gray to black.

Oberhasli registrations are climbing steadily. Because the global population is under 10,000, the Oberhasli is still vulnerable and has been placed on the watch list.



*Feral, Including Isle of Man, Irish, Scottish, Hawaiian, Arapawa, Saturna Island, and Mona Island*

The feral goat herds in Britain may represent old native types and should be examined for possible value.

The Isle of Man, a self-governing Crown possession of the United Kingdom, lies midway between England and Northern Ireland in the Irish Sea. This island of just 221 square miles has been populated since pre-historic times, and 64,000 inhabitants live there today. The Isle of Man is known for its distinctive native breeds, among them the tailless Manx cats and Manx Logtan sheep. Goats were useful because they ate plants along rocky ledges, thus preventing valuable sheep from being lured to these dangerous places. Most of these goats were of the traditional English type, although black-and-white animals were also seen.

Feral numbers increased during the years when the Manx lost the right to use common grazing lands. There was considerable mingling of the domestic native stock and their feral counterparts because islanders routinely tethered their does out to be bred by feral bucks. Most of the feral stock was exterminated in the twentieth century, and only two established groups have survived to the present. Efforts should be made to cull any recently released animals or representatives of modern breeds to preserve the traditional native Manx goat stock.

The Irish goat, a very old and popular native type, still survives in western Ireland, as well as in feral herds in the rest of Britain. Most Irish goats, however, have been lost due to upgrading, and they do not survive today as an organized breed.

All-white herds of feral goats have long been noted in the western coastal areas of Scotland. It has been sug-

gested that these goats are the descendants of the white Telemark Norwegian goats carried on Viking ships as early as A.D. 1000. Breeds such as the Telemark do not bear the stamp of the Alpine breeds; therefore, these feral groups in Scotland may also carry older, purer genetics. Feral flocks on small islands have survived fairly undisturbed for many years. Other goats became feral when the Scottish chieftains evicted their tenant crofters, who then abandoned their stock. These goats, such as those on the islands of Rhum in the Outer Hebrides, have survived despite extremely harsh conditions, Victorian sport hunters, and modern environmentalists. These goats carry great qualities of hardiness and independence, as well as very old genetic stocks.

Elsewhere in Scotland there are large numbers of feral goats, the remnants of the huge numbers that were raised there for hundreds of years. These long-haired goats are also known as Galloway goats. Found in the traditional colors of gray, fawn, brown, and black with white markings or colored patches, these feral goats carry significant amounts of fine cashmere.

Welsh goats are white and distinctively marked with a black head and forequarters. The Welsh is a long-haired breed that was kept mainly as a meat animal. Its numbers today are small, although a herd is kept to provide regimental mascots for the Welsh Guards.

On the Cheviot Hills, in North Devon, there is a group of feral goats probably released in the last half of the nineteenth century in the belief that they would kill snakes in the area.

In the New World significant groups of feral goats were documented in the past, but they have generally been removed by governmental agencies in the United States. The Spanish type is still seen in Arizona and New Mexico in small numbers.

In Canada, Saturna Island, part of a long chain of islands forming the inside passage off British Columbia, is home to a feral goat population that resembles the old English goat. The island is accessible only by water. These goats have lived on private property for the past sixty to one hundred years and are under the protection of the property owners, though occasionally

hunted. Their numbers are estimated between 75 and 125.

Off the western coast of Puerto Rico, arid Mona Island and smaller Desecheo Island are home to a long-isolated population of Spanish origin. The goats do not threaten any native plant life and have been fenced off from iguana and sea turtle nesting sites near the shore. The Puerto Rico Department of Natural Resources maintains these goats as game animals and collects field data on them because of their historic and genetic value. Overpopulation is controlled naturally by the desert-like climate.

In Hawaii, feral goats are plentiful and extremely destructive of native flora, which has in turn affected endemic birds and animals. The feral goats of Hawaii are descended from the gifts of Captain James Cook and Captain George Vancouver, for no successful imports of improved dairy goats have occurred until recent years. The original goats spread and by 1793 were well known. By 1850, goats were abundant in the wild and have been hunted as a game animal ever since. Goats were tethered for domestic use, but they intermingled freely with the feral population. The Hawaiian name for goat is *kao*, the result of a misapplication of the English word for cow. Goats are also called *kunana*, which means "stand look." *Kunana* is sometimes shortened to *nana*.

Feral Hawaiian goats are usually colored black, black and brown, or brown. Most have short hair, but many have a full mane and beard. Two types of horns are seen, both those that curve up and backward and more exotic flattened and outward twisting horns up to 26 inches in length. The males weigh 80 to 120 pounds and does 50 to 90 pounds. Some goats have white flank patches, and on the dormant volcano Hualalai on the Big Island, the flock is mostly silver, pale, or spotted.

With no predators and a favorable climate, the introduced goat population exploded. A conflict continues between those who favor goats for hunting and those who are concerned about the grave damage that they cause as an alien species in a fragile and rapidly disappearing ecosystem. The feral goats were so numerous in the forests and on grazing lands by 1922 that

a single drive in one area of the Big Island gathered 7,000 animals for extermination. The goats on Niihau had been exterminated somewhat earlier.

Feral goats have remained a serious problem on the island of Hawaii, where they were estimated to number about 75,000 in 1930. A tremendous effort eliminated huge numbers and has resulted in their almost total eradication from Volcanoes National Park. On Maui, the goats continue to cause serious damage to plant life. They are able to retreat to almost impenetrable terrain but are subject to continued eradication efforts. On Kauai, feral goats are subject to regulated hunting but seem to be thriving on the Napali coast. On Molokai, the goats seem to be uncontrollable. The population on Lanai has fluctuated, but now they have been largely eliminated to allow for increased sport hunting of Mouflon and Axis deer. Feral goats on Oahu are believed to be scarce today.

In New Zealand, the goats on Arapawa Island are probably the descendants of those left by Captain Cook more than two hundred years ago. Cook recorded two releases of goats in 1773 and 1777. The first recorded sighting of the goats was made in 1839.

The Arapawa goat closely resembles the old English breed. Relatively long-haired, the small Arapawa carries long, twisted horns. It has a somewhat different coloration from the modern English goat and can be black or brown but is usually pied. The Arapawa may most closely preserve the genetic makeup of the old English goat of two centuries past, which no longer exists undisturbed today in Britain. Strikingly, the Arapawa continues to breed on a northern hemisphere cycle (see pl. 9).

Arapawa Island, which is covered by original native coastal forest, lies in New Zealand's Marlborough Sound. Because it is a protected area, the New Zealand government continues efforts to eradicate the goats through trapping and shooting from helicopters. The private Arapawa Wildlife Sanctuary protects a breeding population of fewer than 60 goats. Some other goats are held by individuals but are not necessarily being preserved in a pure gene pool. The total global population of this breed may be fewer than 200. The Arapawa

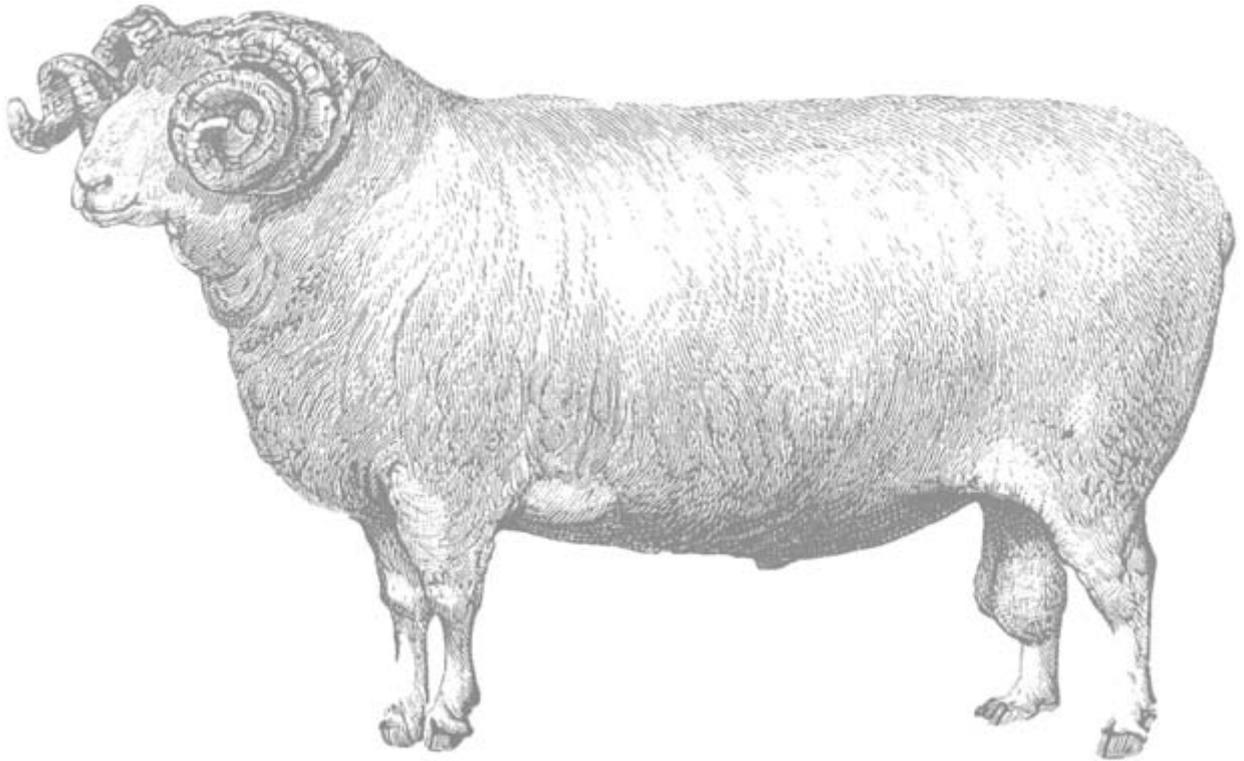
is on the critical list of the FAO and the Rare Breeds Conservation Society of New Zealand.

A small breeding group of 6 Arapawa goats, including 3 bucks and 3 does, was imported by Plimoth Plantation in Massachusetts in 1993. The historic planta-

tion museum chose the Arapawa as the most accurate representative of the old English goat brought over with the Pilgrims in 1627. The Plimoth herd has increased to 22 animals.

CHAPTER FOUR

# *Sheep*



People, like sheep, tend to follow a leader — occasionally in the right direction.

— Alexander Chase

More than a billion domesticated sheep inhabit the world today, and they are found in hundreds of breeds. The greatest numbers are in Asia, especially in the cradle of their domestication. Australia, New Zealand, Africa, Europe, and the former Soviet Union are all rich in sheep. There are some 31 million sheep in England and Wales, 10 million in Scotland, and 2.5 million in Ireland. The United States and Canada bring up the tail end of this list with 9 million and 1 million sheep, respectively.

Australia dominates the world's wool market, followed by the former Soviet Union, New Zealand, China, and Argentina. The United Kingdom produces a wide variety of wool types and has a strong domestic market that supports meat production. Wool is a minor portion of the sheep raiser's income in North America. Americans also eat far less lamb than the British, less than a pound a year per capita.

Boasting a dazzling array of color, coat length, size, and horns, domestic sheep have tremendous variety. Wool sheep yield fine, medium, long, crimped, curled, or coarse fleeces. Sheep are adapted to homes high in the mountains and hills, lush pastures, and arid desert climes. Some sheep have no fleece and are raised strictly for meat or milk production. Appearances can also be naturally primitive or highly ornamental, and many breeds now possess large, fat tails.

Throughout history, sheep have been protected for their gifts of meat, milk, fiber, and pelts and for their spiritual significance. At different times and places, entire cultures have revolved around flocks of sheep; the sheep and the shepherd, for example, are integral symbols of the Judeo-Christian tradition.

## Natural History

Sheep (*Ovis aries*) are even-toed ruminants of the family Bovidae that do not shed their horns. Sheep and goats belong to the same subfamily or tribe, Caprini, which evolved in the Pleistocene ten million to twenty million years ago in the mountains of central Asia. Sheep are not recorded in the cave art of the Paleolithic Era in western Europe, although the goatlike ibex was

frequently depicted. Over time some sheep migrated from their central Asian home, and humans transported others. Eventually sheep came to inhabit dry, upland areas of every mountain range in Asia, Africa, Europe, and North America.

Unlike goats, most sheep do not have beards, and they often have stockier bodies. Sheep have scent glands, known as tear pits or tear bags, beneath the inner corner of the eyes and above the interdigital space between the hooves. With the exception of multihorned sheep, the horns of sheep tend to grow outward in transversely ribbed spirals from each side of the face, not from the top of the head as they do in goats. The short tails of sheep do not stand up like those of goats.

The European Mouflon (*Ovis musimon*) of southern Europe was long believed to be descended from the original wild sheep of Europe and Asia Minor, and it is possible that the Mouflon of the Mediterranean islands are descended from the first domesticated sheep. No fossil evidence has been unearthed to support the existence of wild sheep on the islands where they are now found. Many experts believe that the Mouflon was probably brought into the Mediterranean area by farming peoples between 6000 and 7000 B.C. As a result of hunting pressures, by the early modern era, these sheep were reduced to a few small herds surviving on poor forage on Cyprus, Sardinia, and Corsica. In the eighteenth century, the Mouflon was reintroduced to continental Europe to run wild in parks or forests. The Mouflon prefers rocky mountain slopes but can adapt to tree-covered hills.

The Mouflon has a hair coat and a naturally shedding seasonal undercoat. It stands less than 3 feet tall and may weigh as little as 70 to 100 pounds. It has a short tail, long legs, and a small body. Mouflon ewes deliver one or two lambs. The horns, carried by both sexes, are coiled, ringed, and dark and can grow to 3 feet in length. Polled ewes have been observed on Cyprus and Sardinia, and the ewes on Corsica have small horns. Mouflon rams on Cyprus carry horns that appear more goatlike, sweeping back toward the neck. Transplanted European populations may reflect their source or can be mixed.

The Mouflon is dark brown or reddish brown in

*Aries* Latin for ram

*sheep* From Old English *sceap*, related to German *schaf* and Dutch *schaap*

*lamb* Middle English, from Old English, related to German *lamm* and Dutch *lam*

*wool* From Middle English *wolle*, from Old English *wull*, from prehistoric German *wullo*, from Indo-European *wina*; *wina* also became the Latin *lana*, which led to *lanolin*

*ewe* From Old English *eowu*

*ram* From Old English *ramm*, related to German *ramme* and Old Norse *ramr*, meaning strong

color with white or light underparts, rump, legs, neck, and muzzle. It often has white saddle patches on its sides, and black marks are also seen. The Mouflon wears a throat ruff. In color and coat it can appear very similar to the primitive Soay sheep.

Whether a relic breed descended from the primitive domestic population or the wild ancestor of the domestic sheep, the European Mouflon is certainly deserving of preservation. It is the national emblem of Cyprus, and under Cyprian conservation policies the population now numbers several thousand, rebounding from a low of about 15 sheep in 1938.

The Asian Mouflon (*Ovis orientalis*) is also called the Red or Cyprian sheep and is found in Asia Minor. Redder in color, the Asian Mouflon is an endangered stock.

The Argali (*Ovis ammon*), or Arkhar sheep, is the largest wild sheep, standing about 4 feet tall and weighing 350 pounds. Its scientific name comes from the Egyptian god Amon. The Argali's massive, heavy horns sweep around in a wide, open spiral that extends out to the side. It has a short, coarse coat of grizzled gray-brown, darker on the upper body, with white underparts. Its tail is longer and its horns are lighter colored than the Mouflon. In high Asian mountain regions from Iran through the Himalayas to northern Manchuria, the Argali survives on mountain plateaus, steppes, treeless ridges, and open valleys. Argali live in small herds of up to several dozen, and ewes usually have one lamb.

Several varieties of the Argali are found across its range, including the largest, the Siberian Argali, or Altai. The rare Marco Polo Argali of The Pamirs has the

longest horns, which it carries in a wide, open sweep to a record 72 inches in length. Marco Polo sheep have a thick cape of black hair on the neck in winter. The explorer Marco Polo was indeed the first European to report the existence of these massive sheep.

The Urial (*Ovis vignei*), or Sha, is a reddish brown, upland sheep found on Cyprus and from Afghanistan and northeastern Iran to northern India. Rams have a white ruff down the neck to the chest. The Urial has large ringed or ridged horns that curve around and then point downward. It is larger than the Mouflon but not as big as the Argali. In Iran, the Urial is known to interbreed with the Asian Mouflon. Among the varieties of the Urial are the Elburz Urial of northern Iran, which live on protected land. The endangered Cyprus Urial of that island is small and primitive in appearance. The reddish Punjab Urial is found in small numbers in northern Pakistan.

Farther east live the stocky, short-legged snow sheep, or Kamchatka (*Ovis nivocola*), in Siberia. Snow sheep have broad chests and shoulders and broad, dark tails. Their light horns are slender and sharp at the ends. These shaggy sheep are related to the sheep that long ago traveled across the land bridge to the New World.

The New World snow sheep comprise the Dall sheep (*Ovis dalli*), or White sheep, also known as Thin horns, of Alaska and northern British Columbia, and the Bighorn sheep. Dall sheep are stunning—snow white with black noses and lips and amber-colored horns and hoofs. The Dall is also found in two color variations, or races, the gray to blue-black Stone sheep

of northwestern Canada and the intermediate-colored Fannin sheep.

Bighorn sheep (*Ovis canadensis*), comprising five subspecies, are found throughout the West from Alaska to Mexico and are related to the Argali. Although they often live in the same regions as Mountain goats, Bighorns are more likely to be found on open areas instead of cliffs and will move down to lower elevations in search of forage. Typically dark brown to buff or gray in color, Rocky Mountain Bighorns have a deer-like coat with a white rump patch. The ram's majestic horns are heavy, strong, and closely curving to the head. The horns can grow to 4 feet in length with an 18-inch circumference at the base. Rocky Mountain rams can stand 4 feet tall and weigh up to 350 pounds. Ewes are not as big and have smaller curving horns. Large flocks of about 50 sheep live in rough, inaccessible areas. Bighorns are as nimble and sure-footed as Mountain goats.

Outside the Rockies, the Nelson Bighorn and California Bighorn live in the arid Southwest. The southwestern Desert Bighorn is smaller and lighter in color than the Rocky Mountain Bighorn, with larger hoofs for negotiating rock faces and cliffs. Desert Bighorn rams carry horns that weigh up to 25 pounds, but the ewes have short, thin, noncurving horns. Adapted to their dry climate, these Bighorns can survive without water for a few days at a time. Living on sparse grasses and thorny shrubs, Desert Bighorns have been known to use their horns to slice open a barrel cactus to reach the juicy pulp inside or to dig up roots and bulbs. Ewes and rams spend most of the year in separate bands but within the flock's range of about 10 square miles.

Peninsular Bighorns range from southern California's San Jacinto Mountains into Baja California. This subspecies has been reduced to about 280 sheep and is listed as endangered by the federal government.

Bighorn sheep once numbered in the millions throughout their range but are now usually seen only in sparsely inhabited areas and national parks. Hunted by white settlers for meat and to eliminate their supposed competition with domestic sheep herds, Bighorns were reduced to scattered groups by 1900. Only 2 percent of the original population is estimated to survive today.

At present, Bighorns and Thinhorns are hunted legally in some areas, but poaching continues to be a problem because hunters find the head and horns of the sheep desirable.

Development has made it difficult for the sheep to travel between their summer and winter ranges. Bighorns learn traditional migration routes from their elders, which makes it hard to transplant populations. Lacking a migration route, groups of Bighorns often remain in one area that soon suffers from overpopulation and overgrazing. Existing migratory flocks need to be preserved in their ranges.

Of all the wild sheep of Europe and western Asia, only the Argali, Mouflon, and Urial may have contributed to the domesticated sheep. The Mouflon shares the same number of chromosomes as the domestic sheep, making it the logical source. There is some evidence in horn shape, size, and throat ruffs that the Urial and Argali have contributed to some breeds of domestic sheep, but the most likely main ancestor is the Mouflon, with introductions from the other two species. The Argali and Urial have two and four more chromosomes, respectively, but they are interfertile because they share the same amount of chromosomal material. In the New World, Bighorns and Thinhorns have never been domesticated, although they have the same number of chromosomes as the Mouflon and domestic sheep.

The Mouflon, Aoudad, and Argali have been exported to North America, where they are found in zoos, crossbreeding experiments, and game ranches. Crossbreeding with either western range sheep or hair sheep has not been commercially successful, although it has been attempted since the late nineteenth century and continues today. The Mouflon-domestic sheep hybrids do not meet meat market standards, the meat flavor is strong, the wool has poor quality and is multi-colored, and the sheep are harder to handle in confinement. Susceptibility to disease has been a serious drawback in all wild sheep crosses.

Many Mouflons sold as trophy animals have actually been crossbred with other sheep but are inaccurately represented as wild Mouflons. At other times crosses between the Mouflon, Argali, hair sheep, and

wool sheep have been made to create an impressive-looking trophy animal that is given an exotic-sounding name. Bighorns and Thinorns are also used in these trophy-breeding crosses.

The behavior of wild sheep is highly conducive to domestication. Sheep live in flocks that graze on a home range. Each flock is made up primarily of ewes and their offspring. Generally foraging not far apart, the members of the flock call to each other if separated. Lambs and their mothers bleat loudly to identify and find each other. Individual sheep can become panic-stricken if separated from the flock. Sheep also whistle and stamp to alert the flock if they detect a threat. In wild sheep the sense of sight is more highly developed than hearing or smell. Domestic sheep can have problems seeing when wool on their foreheads obstructs their vision. Shepherds feel that domestic sheep depend more upon their senses of smell and hearing than do wild sheep.

Generally the flock seems to act in consensus while moving, feeding, chewing cud, and resting. The flock itself and its group behavior is the sheep's main protection against predators. Their hollow horns are generally used in battling other sheep for dominance, not for self-defense. Rams develop large spiraled horns, while ewes have smaller and slightly curved horns.

The flock's attunement to its members' actions can be positive or negative. When frightened, sheep may bolt, which can place the flock in greater danger. People have used this tendency of sheep to crowd or cluster together when alarmed to advantage in herding them with the aid of a dog. This flocking instinct is weaker in more primitive breeds but has become very strong in many other breeds. It has been observed that the flocking instinct in a domestic breed will fall somewhere on an imaginary line between the fine-wooled breeds, which are strongly gregarious, and the meat breeds, which have a more solitary nature.

Rams do not have their own harems of ewes, but bands of bachelors join the flock in the fall to breed. Before joining the ewes, rams usually establish dominance through fighting. After kicking out with a front leg or rearing high on their hind legs, two rams run and crash into each other. Rocky Mountain Bighorn

rams actually have a double-layered skull. The porous space between the bone layers acts as a shock absorber in these matches, although the force of impact can daze the rams and leave them with scarred faces. Younger rams will defer to a ram with impressive horns. Rams also mark rocks and trees with their face glands but do not defend territories.

Sheep live within a home range, sometimes migrating between summer and winter ranges on an established sheep trail. Among some domesticated breeds this loyalty to a home, called hefting, can be so strong that it is hard to relocate the sheep without having them travel back home. This trait aided people in their early contacts with wild sheep because flocks would favor allowing humans in their area over leaving permanently. Young sheep could also become hefted to a pasture of a person's choosing.

Sheep spend much of their day grazing close to the ground, alternating feeding with chewing their cud and resting. Like goats, sheep have eight incisors on the bottom jaw with a gum or dental pad on the top and a four-chambered ruminant digestive system. Lambs are born with milk teeth that begin to be replaced by permanent teeth by eighteen months. A four-year-old is considered full mouthed. By eight or nine years of age a sheep has generally lost some teeth and eventually can be left with broken teeth or stubs. The tough horn on the hooves enables sheep to grip rocky ground. The hoof is naturally worn down by travel on hard surfaces.

After mating in the fall (in the northern hemisphere), ewes are pregnant for 140 to 160 days. In the wild, a ewe gives birth in seclusion and may not rejoin the flock for a few days, although the lamb is up and able to walk within half an hour. During this time the mother and her lamb or twins will become closely bonded by smell and voice. The lamb remains with the mother until shortly before the new sibling is born a year later. Lambs play at leaping, jumping, running, and fighting in preparation for adulthood. In the wild, a Mouflon lives seven or eight years, although in domestication sheep can live thirteen or fourteen years. Older sheep are rare.

## Domestication

Because wild sheep will come to accept people in their home range, early farmers could have easily begun to use and herd local flocks. People would have safeguarded these flocks to protect their resource, and there is no doubt that humans give sheep greater protection from predators. Hand-raised, young tame sheep would have become habituated to their new home and would have accepted human leadership. Bonded to their companions and comfort loving, sheep welcome shelter and food. With good nutrition and management, sheep remain prolific breeders in captivity.

Humans did not domesticate sheep for wool because wool did not yet exist. The hair-coated Mouflon and other wild sheep shed their fine seasonal undercoat in clumps in spring. Native Americans used this soft fiber as a stuffing or lining for footwear and as an absorbent in baby wrappings. The brown, woolly clumps of fiber were naturally waterproof and may have been felted together into cloth by heat, pressure, and moisture. Felted materials were made before woven fabric. Fiber may have been twisted into rope by hand or spindle, as can be done with plant fibers. In early domestication, sheep were mainly providers of meat, milk, fat, pelts, hides, horns, bones, and other organs such as the stomach or intestine.

The presence of unusual numbers of bones of young sheep at a prehistoric site or the discovery of sheep bones in areas where wild sheep were not normally present are likely evidence of domestication. The earliest known site for the domestication of sheep, in northeastern Iraq at Zawi Chemi Shanidar, dates to about eleven thousand years ago. Domestication may have occurred earlier among nomadic peoples who then transferred sheepherding skills to settled peoples. Sheep bone evidence dating to about the same time period has also been found at Jericho. In Greece, sheep bones have been found dating to 7200 B.C., revealing that humans introduced sheep to the area. These sheep were probably the Asian Mouflon.

Physical changes in sheep caused by domestication begin to be seen by 6000 to 5000 B.C. Leg bones be-

come shorter, and polled skulls are seen in females. The development of fleeces and changes in coat color are dramatic evidence of human selection for desirable characteristics. A small statue of a sheep with a woolly fleece, dating to about 6000 B.C., has been found in Iran. By 4000 B.C., Babylonians were wearing woolen clothes that carried inscribed seals indicating their commercial manufacture. Babylonia actually means “land of wool.”

Sheep were present in Egypt by the early part of the fifth millennium B.C. From 3000 to 2000 B.C. in Egypt, sheep with corkscrew-shaped horns, long, thin tails, hair or shorn coats, neck and chest fringes, and colors of white, dark, and spotted are seen in paintings and on pottery decorations. By 2000 to 1500 B.C., sheep with spiral horns, fat tails, and wool fleeces are depicted, and eventually they became the dominant type.

Wool use increased later in the Greco-Roman period in Egypt, although sheep continued to be raised primarily for meat. Sheep also performed labor, treading seed grain into the ground. More important, rams were prominent symbols in Egyptian religion. Large numbers of sheep were mummified in baskets. The heads and horns were attached to the baskets, and often the baskets were covered in linen and painted in the colors of the sheep—dark, yellow or tan, white, and even a white body with a black head reminiscent of the modern Sudanese sheep of Africa.

The story of the development of wool, its impact upon societies, and the great wealth it brought has been the subject of many books. Wool is water-repellent, absorbent, insulating, durable, resilient, and even fire-resistant. The variety of wool types and colors is the result of human selection for desirable traits, both naturally occurring and the result of beneficial mutations.

Wild sheep grow both a coarse hair and a seasonal, finer underwool. Both of these materials are nonliving keratin, which also make up horns and hooves. The keratin shaft grows out of a follicle. The outer layer, the epidermis or cuticle, is made of scales that point down toward the tip. These scales allow the fibers to interlock. The epidermis covers the cortex, or main body, of the fiber. The center is called the medulla and is a honeycomb of air spaces. Coarse hair fibers have large

In ancient Egypt, the ram was the symbol of several gods: Ammon-Ra, Osiris, Qeb, and Shu. The supreme sun god, Ammon-Ra, also called Amon or Amun, represented power and fertility. He was depicted with a ram's head and spiral horns. King Tutankhamun (c. 1370–1352 B.C.) added Amun to his name in an effort to encourage renewed worship of the ram god. The more ancient god Khnum was depicted with corkscrew-shaped horns growing out of the side of his head. Also worshiped by Egyptians was the ram god Harsaphes. And the Ram of Mendes protected the souls of Osiris and Ra. Because of these many religious associations, the ram was an important sacrificial animal and was often mummified.

Other ancient cultures used sheep as scapegoats. In Babylonia, a sacrificed sheep was placed against the temple walls to absorb any impurities and was then thrown into the river to be carried away.

In Greek mythology, Jason pursued the Golden Fleece, the hide of the winged ram. The ram had rescued the grandson and granddaughter of the wind from their evil stepmother. Although the girl fell into the sea, the boy arrived safely. He then sacrificed the ram to the gods and hung its golden fleece in a tree, where Jason later found it. It is possible that Jason's quest might have indicated a search for real gold, because fleece was sometimes used to catch gold in rivers.

Both Greeks and Romans sacrificed lambs and rams. *Aries*, Latin for ram, is the first sign of the Zodiac. The constellation Aries is named for the sacrificed winged ram, and at its head is the star Alpha Arietis, once known as Hamel, which is Arabic for lamb.

Sheep knucklebones (the metatarsus and metacarpus) were used in classical times to divine the will of the gods. Centuries later, these bones were used in a child's game similar to jacks.

The Bible contains more references to lambs and sheep than any other animal. Isaiah's words recall these many references, for the Lord "shall feed his flock like a shepherd; he shall gather his lambs with his arm, and carry them in his bosom, and shall gently lead those that are with young." The sheep was regarded as self-sacrificing, for it gave both wool and milk of itself. Tanned rams' hides decorated the Tabernacle, and the first and finest fleece of a lamb was given to the priests.

Lambs and rams were long used as sacrificial animals by the Hebrews. Abraham sacrificed a ram instead of his son, Isaac. According to tradition, this particular ram was the source of several important articles: the strings were used in King David's harp, the hide was fashioned into the leather belt of Elijah, the left horn became the shofar of Moses, and the right horn will someday be used by Elijah to herald the arrival of the Messiah. A shofar is the ram's-horn trumpet blown by the ancient Hebrews in battle and in the synagogue at Rosh Hashanah. The blood of the lamb also protected the homes of the Jews during the first Passover, and they later sacrificed lambs to celebrate their freedom from enslavement in Egypt. Roast lamb, unleavened bread, and bitter herbs are prepared in commemoration.

In the New Testament, the lamb is a symbol of Christ, his followers, and the saints. For Christians, the Lord is their shepherd, and because of his sacrifice, Jesus is often called the Lamb of God. Since the beginnings of Christianity, religious people have worn fleece or simple woolen clothing as a sign of their humility. The lamb is also associated with innocence, and so a lamb is often carved on the tombstones of children. The lamb is also a symbol of spring and Easter.

The Vegetable Lamb of Tartary, a legendary creature during the Middle Ages, was believed to be a plant that produced a fleece. Also called Barometz, the Vegetable Lamb was described as a mossy cross between a plant and animal, growing from four rooty legs. If picked, it was said to scream in pain and bleed. Wolves supposedly fed on it.

air-filled cells, while fine wools have no medulla, with a wide variety in between the two. The different sizes of medulla cells also give the wool varied dyeing and light-reflecting properties. The scales on the epidermis may be fine or coarse just as the diameter of the fiber varies in size.

During the process of selection, wool-bearing sheep came to have three types of fibers in their coats. Kemp is coarser, shorter, and more brittle than hair. It has a large, hollow central core, grows quickly, and is constantly shed. Kemp is too brittle and too short to be spun easily and does not take dye, but it is valued in certain homespun yarns and fabrics such as tweed. Considered a fault in the fleece, kemp has been completely selected out of some breeds. When kemp fibers were selected for narrowness they became medium and fine wool fibers, and when they were selected for coarseness they became longwool.

The hair fibers grow continuously and become thicker or thinner depending on such factors as the season or the sheep's nutrition. Hair fibers do not shed as often as kemp and on some breeds grow very long as protection against rain.

The wool fibers themselves vary in fineness and length. They also possess a characteristic degree of waviness known as crimp. Crimp varies from tight waves to twists or spirals. The wool fibers hang in staples, and their tip ends are straight. The staples found in lamb's wool are pointed until the first shearing. The surface of the wool fibers possesses different amounts of shininess or luster.

All of these factors, combinations, and proportions in kemp, hair, and wool create the vast array of fleece types and their inherent spinability for hand or machine processes. Fleeces are graded by measurements of staple length, fiber diameter, strength or tenacity, and characteristic crimp. Sheep have also been selected for shearing heavy fleece weights. Color and its many variations increase this diversity. Nutrition, health, and heredity all affect the fleece of an individual sheep. Although very primitive breeds still shed naturally, humans have selected against shedding in wool breeds so that all of the fleece can be collected at one time with little waste.

Sheep can be roughly divided into groups by fleece type. Primitive sheep may have more hairy or more woolly fleeces. Mountain sheep have coarse long hairs and a dense undercoat that is called carpet wool. Medium-wool and shortwool sheep have a wool that can range between fine and coarse but has great durability. Longwool sheep have long, narrow, curly staples of non-hairy but coarse wool. Down sheep have a medium wool with a short staple that has a lofty feel. Sheep breeds based on the Merino have extremely fine and soft wool.

Sheep are also classified according to use. Many medium-wool and shortwool breeds are considered dual-purpose breeds—supplying both meat and wool. Some wool sheep and hair sheep are raised primarily for meat production. The wool of some dual-purpose breeds has been improved by crossing with fine or longwool sheep. Specialization has also caused some breeds to become mainly dairy animals. In tropical areas of high heat and humidity, such as parts of Africa or the Caribbean, heavy wool was not advantageous, and so the development hair breeds has been emphasized. Indeed, the haired Blackhead Persian is one of the most numerous breeds in the world.

All wild sheep have short tails, but either through selection or because this trait was linked to other desirable traits, the tails of most domestic sheep have become considerably longer and in some cases much fatter. Only about 3 percent of the world's domesticated sheep, generally the most primitive breeds, still possess short tails. Interestingly, some short-tailed breeds, such as the Finnsheep and Romanov, are very prolific. In some cultures, long or fat tails are considered desirable for eating. In some climates, the tails are left long as a protection against the cold and wet. In arid regions, fat is stored in the tail and used for energy when forage is scarce. Because sheep can have difficulty mating with long or fat tails and because heavily woolled tails tend to become matted with feces, the tails of many sheep are docked or removed soon after birth.

Many fat-tailed sheep are used primarily for milk production, and their wool is coarse and long. Fat-tailed sheep are found mainly in arid areas of Africa, the Middle East, and Asia. Persia has long been the

*ram* Male sheep

*ewe* Female sheep; in Britain, a *gimmer ewe* is not in lamb

*lamb* Young sheep until weaning

*bummer lamb* Orphan lamb

*club lamb* Raised by young people to be shown at 4-H or lamb club

*market* or *locker lamb* Raised for meat

*wether* Castrated male

The British have a wealth of other terms for sheep:

*hurtle* Flock

*tup lamb*, *ram lamb*, *pur lamb*, *heeder*

Intact male lamb

*hogg*, *wether* or *wedder lamb* Castrated male lamb

*ewe lamb*, *gimmer lamb*, *chilver* Female lamb

*hogget* or *hogg* Lamb from weaning to shearing

*shearing* or *shearling* From first to second shear

*yearling* or *theave* Year-old ewe

*tupping* or *joining* The mating of rams to ewes

Other terms that describe sheep include:

*two-toothed* From fifteen months

*four-toothed* From two years old

*eight-toothed*, *full*, or *solid-mouthed* At four years or older

*one-shear*, *two-shear*, etc., and *one-winter*, *two-winter*, etc.

*aged* After the fourth year

*broken-mouthed* Between 7 to 10 years of age, when many have lost some teeth

*gummers* Sheep that have lost all their front teeth

*open-faced* Sheep with short hair on their face

*closed-faced* or *wool-blind* Sheep with wool on the face that must be clipped or eyed out

home of such fat-tailed breeds as the Karakul, Awassi, or Karamon. *Alya*, the oil made from the tail fat, was traditionally used as a cooking oil in most dishes. The fat tails were carried to such lengths that some Persian sheep were said to have been outfitted with boards or little carts to support their enormous tails.

The development of color variations in the coat is a complicated story of selection and genetics. A wide variety of colors and shades were encouraged to provide naturally colored wool. Sheep raisers may have favored white or light colors because the sheep were easier to locate at a distance or because white wool is more easily dyed. After wool raising became an industry, sheep raisers were paid less for colored wool. The rapid decline of naturally colored sheep halted when people again became interested in hand spinning, weaving, and naturally colored fabrics.

Besides hunting and companionship, humans' domesticated partner the dog was used for moving and guarding sheep, goats, and cattle. Different breeds of dog were developed to meet the chores of protection from predators, herding, and droving, or moving the livestock long distances. Highly trainable herding dogs abound in the collie and sheepdog breeds. Guardian dogs were bonded to the flocks as young puppies. More independent in nature, the livestock guardian dogs remained with the flocks or shepherds day and night. Modern shepherds still rely on sheepdogs to help them move their flocks. In North America, where sheep are still subject to predation in many areas by coyotes, mountain lions, and wolves and as public opposition to trapping, shooting, and poisoning has increased, livestock guard dogs have enjoyed increasing popularity. Many breeds have been imported from Europe or central Asia.

The nomadic movement of flocks in search of pasture shaped the way of life for nomadic peoples in Asia. In Europe, the tracks between pastures in Italy and Spain are of ancient origin. By the seventh century in Spain, the large-scale transhumance, or seasonal movement to pasture, was guaranteed on specific passageways. Twice a year, millions of sheep traveled these tracks between winter and summer pastures. As witness to this heritage, the name Merino derives from the

The Old Testament commands that wool and linen not be mixed together in woven fabric. The contaminated material, known as *shatnes*, is not kosher. Garments inspected and found to contain this blend receive a non-shatnes label.

In spite of the relatively modern insinuation of illicit affairs between sheep and their shepherds, sheep were not the focus of the medieval Christian fear of bestiality. Although the devil could appear in the guise of almost anything, theologians believed that only the lamb and the ox were safe from his acts.

Islam dictates that sheep used for food must be sexually whole and that rams must be horned.

The black sheep is more than another stupid sheep. The black sheep is a disgrace or embarrassment to the family. In the flock, a black sheep might be worth less because its wool could not be dyed.

Spanish *merinas*, the officials who governed the pasture rights of sheepmen. The shepherd organization *musta* was founded in 1273, and it remains a political force today. Forms of transhumance were also seen in Croatia, Switzerland, France, and Scandinavia.

In Britain, sheep were also moved between pastures, but not for such extensive distances. In the Penines, place-names ending in *-sett* reveal this seasonal movement from the rich lowland pasture in winter to the higher permanent homes. Sheep also spend the winter on lower ground in Cumbria. In Wales, the reverse was true, for in summer the sheep went to higher ground, called *hafod*, and in winter returned to the permanent home, the *hendre*. In Scotland, the summer mountain pasture was called *shieling*. In the northwest coastal areas, sheep were often taken by boat to offshore islands for the summer, making the return trip before winter. In Ireland, the movement of cattle and sheep to common summer grazing was called *booleying*. Young women accompanied the animals in summer and lived in huts where they milked the animals and made butter or cheese.

In addition to meat and fat or oil, ewes provided much of the milk for many nomadic peoples. Because milk ferments so rapidly in the heat, ewe's milk was generally consumed in sour or fermented form. Curdling led to yogurt then cheeses. Butter made from ewe's milk was more likely a product of cooler climates.

Sheep-raising peoples did not waste a butchered animal. Almost all the parts of a sheep or a lamb were eaten: heads, tongue, brains, feet, tail, and internal

organs. Although many of these cuisine selections may seem unappetizing to Westerners, food aversions are culturally based, not logical. Minced sheep heart, lungs, and kidneys mixed with spices and oatmeal and then baked in the stomach is the traditional Scottish dish haggis, served to celebrate Robert Burn's birthday and on New Year's Eve.

While modern Westerners usually associate wool with woven or knitted garments, wool felt has been extremely important to many traditional cultures. The nomads of Mongolia dwelled in their portable felt yurts, and the nomadic shepherds of Turkey almost lived in their stiff, waterproof, felt *kepeneks*, or hooded cloaks. In the fourth century B.C., the Chinese referred to the vast lands roamed by the nomadic shepherds as "the land of felt." Felt was formed into hats, boots, sandals, blankets, rugs, and even war shields. The Greeks lined their helmets with felt, and the Romans wore felt breastplates. Felt is still used for many items from pen tips to industrial products.

As in Egypt, sheep were used to tread grain into the ground and thresh the grainheads. Occasionally they were used as draft or pack animals.

Sheep were integral to life among the Hebrew, North African, and Arab peoples. Wool and woollen goods were important items of trade. And so the domestication of sheep spread from Greece, to Rome, up into Europe, and then into Britain. Sheep were not native to the British Isles but were brought there with early Neolithic farming peoples.

Compared with other livestock in the British Isles,

sheep were not especially numerous. They became more popular, especially on grasslands and in coastal areas, as land was cleared. These sheep were originally of a type similar to today's Soay, producing small amounts of soft colored wool. Spinning and weaving were already accomplished arts. Ewes were milked, and cheese making was practiced.

The excavation of a cooking site in County Cork, Ireland, dating to 2000 B.C., has revealed two methods of cooking mutton in this era. In one method, a leg of mutton was wrapped in straw and straw rope and then placed in a trough of boiling water. Hot rocks were added to continue the boiling. The meat was also roasted in ovens by hot rocks.

The primitive short-tailed sheep of northern Europe resembled the various colored sheep still present on the islands of Scotland. A tan-faced, horned type that developed from these primitive sheep was found in Scotland, Wales, and southwestern England.

When the Romans invaded Britain, sheep were common on the uplands. Although it cannot be proven, the Romans probably brought their own sheep into Britain, just as they did in North Africa and western Europe. Roman garrisons enjoyed sheep's milk and meat, although mutton was not as popular as beef or pork, except among the Syrian units. Wool was an important commercial product for the Romans. They built the first wool-processing factory in Britain in Winchester about A.D. 50 and exported British-raised wool to Rome.

The Romans wrote extensively on the care and breeding of sheep. Roman writers promoted better care of livestock and their improvement through judicious selection of breeding stock. Pliny also recommended the best jackets for sheep to wear to protect their wool from dirt.

Distinct breeds seem to have been available to the Romans. Two types are suggested based on archaeological evidence—a white shortwool and a type of horned, medium-wool sheep that may have actually been a primitive longwool. Roman mosaics depict the white shortwool sheep with a long tail. Rams are shown horned and females are polled. Roman sheep were not slender like primitive sheep but well built. If the

Romans did indeed bring these two types of sheep to Britain, these imports would explain the presence of early shortwool and longwool sheep where previously only short-tailed and primitive types had existed. At some later date, the horned, black-faced type of sheep came to Britain. This exotic Asian influence is seen in spiraled horns and long, coarse fleeces.

In the early Middle Ages, the Roman preference for olive oil left Britain with the troops and the Saxon fondness for sheep and butter took over, especially in the east of England. Ewes supplied much of the butter and cheese, which people salted for preservation. From the fifth through seventh centuries, sheep bones found in refuse areas tend to be from young animals, evidence that meat and milk were more important than wool. By the eighth and ninth centuries, the bones are mainly from mature animals, reflecting the value of sheep kept for wool and the eating of culls, old animals, or even recently deceased sheep. Older mutton did not salt well, so only younger mutton was salted and preserved. Lambs were roasted whole, often with the head intact.

Sheep supplied wool, milk, meat, fat for cooking, tallow for lighting, and skins for writing and parchment. Until the production of cotton and manmade fabrics, wool, fur, and skins were the only source of clothing for most of the population. Linen, cambric, and damask made from flax were also available in western Europe, but they were generally luxury fabrics.

Large, thatched wooden or stone sheds, folds, or cotes often protected the flocks. The shepherd or shepherdess went with the flocks to the pastures during the day, accompanied by a mastiff or other guard dog to protect the flock. Sheepdogs followed behind, herding the sheep, which often wore bells. Sheep were bedded down or folded over fields to provide fertilizer. At times, sheep were also tethered. By the later Middle Ages, sheep ownership was indicated with ocher dye or clipped ear markings. Women were responsible for washing the sheep, shearing them, and then carding and spinning the wool—not only their own sheep but also those belonging to the landowner.

By the tenth century, the genetic pool of sheep in Britain comprised the original primitive and short-

*raw wool* Uncleaned fleece

*Bradford count* The higher the number, the finer the quality; this number is based on the number of hanks of yarn that could be spun from one pound of clean wool

*hank* 560 yards of spun yarn

*micron* Wool fiber diameter measured by a micrometer

*blood system* Based on the fine-wooled Merino or Rambouillet being full-blooded. Fractions of fine blood are expressed as  $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{8}$ , and  $\frac{3}{8}$

*carding* Process by which the fibers of clean wool are untangled and brushed into somewhat parallel strands

*top* Wool that is combed but not twisted

*roving* Slightly twisted, continuous loose strand of wool

*spun yarn* Roving that is pulled and twisted into yarn by hand or machine

*woolen* Yarn from shorter wool fibers not combed to lie flat so that they are bulkier or fuzzier; woolen fabrics include homespun, tweed, and flannel

*tweed* Bulky, kempy yarn with short wool fibers woven into thicker fabric with a fuzzy surface; originated from the area of the River Tweed between England and Scotland

*worsted* Long combed fibers made into a smooth, firm fabric; named for a village in Norfolk

*knitted* One long yarn that is looped into stitches; may be thick and bulky or fine for hosiery

*worsted knit* Smooth interlocking series of loops

*jersey* Knitted pattern once produced for export on the Isle of Jersey

*fulling* Pounding or pressing to shrink fabric

*pulled wool* Wool from dead animals removed from the hide by chemicals or decomposition and used for blankets, felts, and flannels

*lamb's wool* Especially fine and soft, from the first shearing of lambs seven to eight months old

tailed groups, the white-faced shortwool and longwool types, and the multihorned Scandinavian sheep brought by the Vikings. Evidence for a variety of types is numerous. Monastery records record dun- and black-faced breeds. The presence of long-tailed white sheep is documented on illustrations in the British Museum. Rams are shown horned and ewes either horned or polled. Paintings of the Middle Ages usually show polled white-faced sheep with short wool. Only occasionally are colored sheep depicted. Even rarer is the shorn appearance of a longwool fleece such as that of the Cotswold. Paintings do not depict short-tailed, black-faced, or hairy fleeced sheep. Perhaps sheep of these types were considered less valuable or desirable. Until the sixteenth century most sheep bones are from the slender type, although some larger bones are also

found. Sheep remains indicate the presence of both polled and horned sheep. Most textile remains are of medium or hairy medium fleece and the Shetland Island fine type (fig. 10).

Separate geographical types suited to the mountains, hills, and downs were evolving in the British Isles. In the mid-sixteenth century, Thomas Moufet wrote: "The best mutton is not above four years old, or rather not much above three; that which is taken from a short, hilly and dry feeding is more sweet, short and wholesome than that which is either fed in rank grounds or with pease-straw (as we perceive by the taste); great, fat, and rank fed sheep, such as Somersetshire and Lincolnshire sendeth up to London, are nothing so short and pleasant in eating as the Norfolk, Wiltshire, and Welch mutton; which being very young, are best

roasted; the elder sort are not so ill being sodden with bugloss, borage and parsley roots” (Wilson 1991).

In the southwest, the Kerry was a short, fine-wooled breed found in colors of black, brown, or white. The rams had very small, crooked horns, and the ewes were polled. In Galway, there was a breed called the Cotagh about which little is known. Cladagh sheep were found on the Aran Islands and nearby areas. Cladagh means “shore sheep,” and the breed ate seaweed like the present-day Orkney Island sheep of Scotland. Cladagh sheep came in black, gray, brown, and white. Ireland also had native breeds of sheep, and colored sheep in particular seemed to be numerous. As early as the twelfth century, a Welshman visiting Ireland wrote that Irish sheep were black in color.

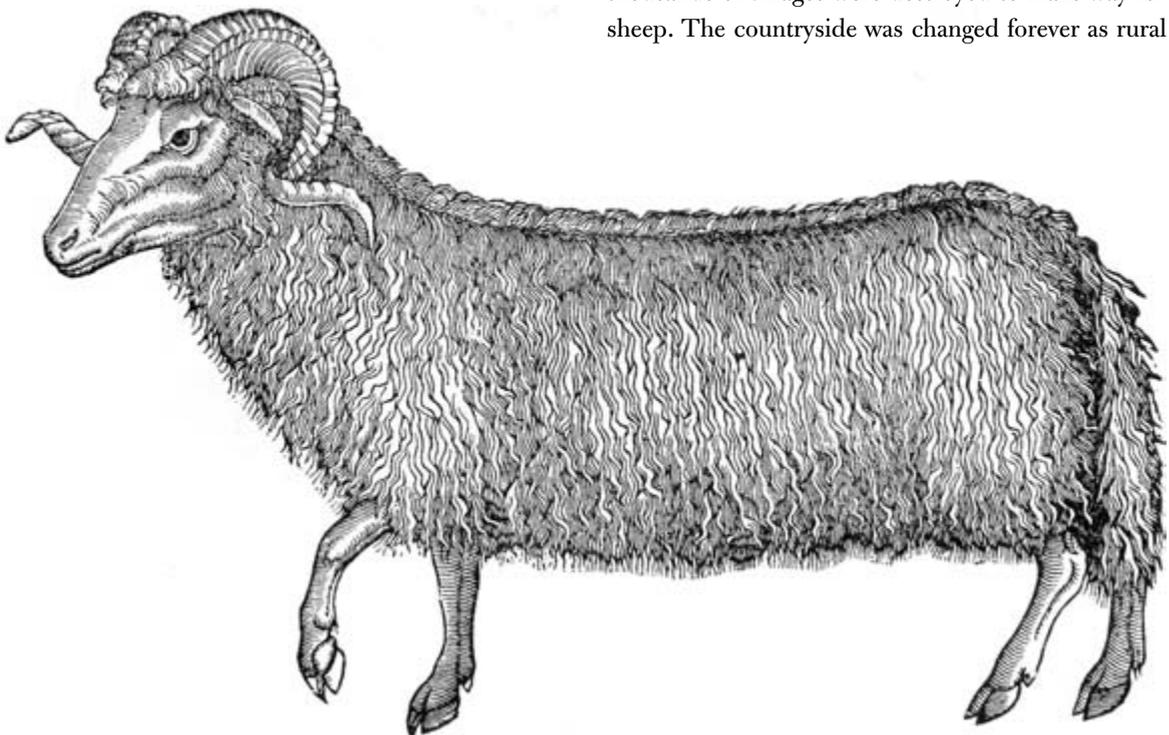
In the same century, raw wool shipped to Flanders’s cloth making industry had become the leading export commodity of Britain. This demand created an agricul-

tural boom. During the next century, monastic communities developed huge systems of far-reaching grange farms that brought them great wealth. At one time, for example, the Cistercians owned 350 granges for grazing their huge flocks of sheep. The numbers of sheep exploded to supply the wool trade. By the fourteenth century, it was estimated that there were 8 million sheep in England, or triple the number of people.

In the early years of that century, the wool trade slumped but was gradually replaced by the marketing of English cloth to the Continent. This woolen cloth was supplied largely by the rural cottage industries of spinning, weaving, fulling, and dyeing. Large production centers were also located in several areas, where water-powered fulling mills scoured raw wool and shrunk felt or cloth. Finished cloth brought greater profits to the merchants than raw wool.

The unfortunate result of this tremendous economic power of wool was the infamous clearances and enclosures whereby the peasants lost the land and houses they had occupied but not owned. In addition, farmers often lost access to large common grazing lands. During the fourteenth and fifteenth centuries, thousands of villages were destroyed to make way for sheep. The countryside was changed forever as rural

Fig. 10 Sixteenth-century woodcut of a ram (Topsell 1607).  
From *Curious Woodcuts of Fanciful and Real Beasts*  
(Dover, 1971).



[To view this image, refer to the print version of this title.]

villages were turned into large estates of hedged sheep pastures.

In recognition of the great power of wool, judges and even the lord chancellor sat on wool-filled sacks in their official chambers. English nobles knelt on a woosack when they swore allegiance to the throne. By the fifteenth century the demand for wool had increased and with it the price. Wool farmers and merchants made their fortunes. Wool money built many magnificent Gothic churches, such as those at Circencester in Gloucestershire and Long Melford and Lavenham in Suffolk (fig. 11).

The clearances continued into the sixteenth century, and they provoked a societal debate as more arable land was converted to sheep pasture. The textile industry now supplied woolen cloth, specialty fabrics, and hosiery knitted goods. Hand knitting was revolutionized by the invention of the knitting frame by the Rev. William Lee, who unfortunately died in poverty.

By the thirteenth and fourteenth centuries, the preference for cow's milk was growing. In addition, wool raisers believed that milking took strength away from

Fig. 11 One year's growth of Leicester Longwool fleece.  
Courtesy Colonial Williamsburg Foundation.

their sheep. The sweet taste of ewe's milk was still preferred by others and would persist the longest in Wales, northern England, Northumberland, and Scotland, where open grazing land remained. Sheep were milked in Ireland, generally for making cheese, up until the 1800s.

It was certainly easier to keep sheep than cows on rough pastures, and it was harder for cottagers or laborers to feed a cow than a sheep or goat. Ewes continued to be milked for the specialty cheeses of Yorkshire and Essex. Twenty ewes were said to produce enough milk each week to provide a half-gallon of butter and 14 pounds of cheese. Even sheep raised for milk production, however, gave only 7 to 12 gallons per year, about one-tenth of the production of a cow of the times. By 1800, the cow had established its dominance in providing milk.

Strong-flavored mutton was still eaten from three- or four-year-old sheep. Up to eighteen months of age

the meat was considered lamb. "House lamb," often hand-raised, was the very young, tender lamb relished at Christmastide.

In the eighteenth century, better winter feeding was promoted with crops such as turnips, sedes, mangels, and cabbages, either in the field or chopped. New and better forages were introduced from Europe. Instead of sheep sheds, shelters of trees planted in circular or cross formations gave the flocks protection from the wind. Stone stells and circular pens were also built to discourage snow from collecting in the middle of the fold. Until the introduction of sheep dip, protection against external parasites came in the form of tar, butter, and grease mixtures or medicinal mercurial ointments were smeared or dressed onto the skin beneath the wool.

Many regional sheep types or breeds were developing by this time. In Scotland and western Britain, there were white- or tan-faced sheep whose ewes were polled but whose rams were horned. White-faced longwools, originally found in the Midlands, had moved into Leicester, Lincoln, Teeswater, and Wensleydale. Hairy, black-faced horned sheep inhabited the Pennines and were taken into Scotland, where they would eventually become the dominant British wool breeds.

By the eighteenth century, the mission of farmers was changing. Britain's greatest need was the economical feeding of its rapidly increasing industrial population. Drovers walked large numbers of sheep into the heavily populated areas of southeast England. Driven by that demand, men interested in livestock improvement would foster stunning changes in British livestock. The serious and scientific improvement of livestock had begun and would continue into the next century.

The British sheep industry at this time organized into a unique, stratified system that continues today. The hardy mountain and hill ewes of Scotland, Wales, and northern England give birth to purebred daughters that remain on the hills. The ram lambs are marketed young, sometimes after finishing on lowland farms. As the older mountain ewes find life too hard on the hills, they are moved down to better pasture, where they are

crossed with longwool rams to create the recognized halfbreeds: Mashams, Mules, Welsh, and Scottish halfbreeds. The ram lambs are again sold to market, but the halfbred ewes are crossed with rams from the downland breeds. Fed on the rich lowland pastures, they produce prime lambs for market.

This marvelously adaptable system makes wonderful ecological use of Britain's farm and grazing land. The sheep raisers also profit from the hybrid vigor that results when very different breeds are crossbred. Most of the sheep of Great Britain can be classified into this system and are indeed described as mountain, hill, longwool, down, halfbred, or primitive breeds. As a result of this system, a small country possesses an incredible richness of sheep breeds.

The changes in agriculture after World War II and the rapid adoption of Continental meat breeds have threatened this richness. The list of British breeds that are already extinct includes the Bampton Nott, the mysterious Berkshire Nott, the primitive Mendip, the longwool Nottingham, the Old Lincoln, the White St. Rona's Hill, the Limestone or Silverdale, the black-faced Longmynd, the Cannock Chase, the Wicklow, the Wiltshire Down, and the unusually marked Rhiw, which had a dark cross on its back. Beyond England, the Irish Kerry or Kerry Korfe, the Roscommon, the Cottagh, and the Scottish Cladagh have all disappeared. The Channel Islands also had native sheep in black, white, and piebald coloration. These small sheep gave the islanders wool that was knitted into Jersey and Guernsey patterned garments. The sheep are gone, though the names of the knitwear remain.

Wool from the fine-wooled Merino and its descendants would become a major challenge to the British wool industry. The Merino is distinctly different from other sheep breeds. Credit for establishing this powerful genetic type has been given both to the Roman agricultural writer Columella and to the Spanish for refining the sheep brought to Iberia by the Arabs from Africa. Until the late eighteenth century, the Spanish strictly forbade the export of Merinos under penalty of death. Only royalty could give gifts of Merino sheep, such as those sent to Saxony and England. The im-

*bellwether* Leader of a group; the wether that led the flock wore a bell on his collar

*dyed in the wool* Genuine or honest

*dead as mutton* British slang for absolutely dead

*ewe neck* A thin or concave neck, such as in a horse

*to fleece* To swindle or take something from a person as fleece was taken from a sheep

*a lamb* Sweet, gentle, timid, innocent person or one who can be fooled, cheated, or “fleece”

*mutton dressed as lamb* British expression for someone trying to look younger than he or she is

*pull the wool over one’s eyes* To hoodwink (one cannot see and can thus be fooled)

*ram* Something that drops, drives, hits, batters, stikes, or drives; also the sharp prow on the front of a ship used to hit another ship; contributed to *rambunctious*, *ramdriver*, *ramjet*, *ramrod*, *rampage*, and *rampant*

*battering ram* Log or beam of wood on a ship or the plunger in a press or pump; also the weighted striker in a pile driver

*ramble* From Middle Dutch *rammen*, to copulate with, as a ram in spring wanders looking for ewes to breed

*a sheep* Someone who is meek, submissive, or can be led

*sheepish* Embarrassed by a fault or stupidity

*sheepcote*, *sheepfold* Pen

*sheep’s eyes* Glances of love

*sheep’s head* British slang for a fool

*sheepskin* Diploma, originally written on parchment or vellum

*shoddy* Reclaimed wool made of materials that are not felted; or material of inferior quality made from such wool; shoddy was given to soldiers in the Civil War and was never as strong as other wools

*two shakes or three shakes of a lamb’s tail* Short amount of time

*wild and woolly* Like a wild sheep

*woolgathering* Idle daydreaming, from the practice of wandering around gathering shed wool

*woolly thinking* Fuzzy, not clear

*woollies* Australian slang for sheep

proved French Merino, the Rambouillet, left France for the far corners of the world and in many countries eventually replaced the Merino.

By the nineteenth century, Britain’s colonies in New Zealand, Australia, and South Africa, along with Argentina, surpassed the wool production of Britain. Purebred British sheep became a valuable product for export to Argentina, Australia, and New Zealand.

In a sense, Merino wool was responsible for the discovery of America. It was the wealth earned by the Merino that enabled the Spanish crown to finance the

voyages of Christopher Columbus. Francisco Vázquez de Coronado probably brought the first sheep to the North American mainland in 1540. Spanish sheep, both the coarser Churro and the finer Merino, were brought to New Spain, where they multiplied in vast numbers in the *ranchos* and missions of the Southwest (fig. 12).

In the East, the first sheep arrived in Jamestown, Virginia, with England’s major resupplying expedition of 1609. In 1620, the Pilgrims established the first permanent settlement in New England at Plymouth Colony via Holland. The Pilgrims at first kept sheep

[To view this image, refer to the print version of this title.]

Fig. 12 A Merino ram as depicted in 1891 in the *American Agriculturist*. Courtesy of the IAB and Hans Peter Jorgensen.

mostly for food, for they owned no spinning wheels and wore clothing they had brought from England. In 1630, a larger Puritan group came to the Massachusetts Bay Colony from the English port of Southampton. Two of the early breeds brought to North America with these colonists are from southern England, the Wiltshire Horn and the Dorset Horn.

In 1633, 34 Dutch sheep were imported to Boston, and another import of 88 sheep from Texel, a Dutch island in the North Sea, followed in 1635. The Dutch grazed their flocks of sheep on Manhattan Island in their colony of New Amsterdam.

Three other breed types were also brought into New England in this era: the Romney Marsh, the Old Leicester, and, in Rhode Island, the Southdown. Because much of the land in New England was hilly and stony, sheep became increasingly important as a cash crop for farmers. Sheep were pastured or turned loose to fare for themselves in the natural meadows, coastal salt marshes, and woods. The sheep did need protection from wild predators, dogs, and the Native Americans who perhaps justifiably did not understand why, if

[To view this image, refer to the print version of this title.]

Fig. 13 American Site sheep at the Museum of American Frontier Culture, Staunton, Virginia. The museum crossed Dorset and Hog Island sheep to re-create the unimproved, short-fleeced meat sheep of a typical early nineteenth-century farm in Virginia. Courtesy Museum of American Frontier Culture.

the colonists ate their sheep and pigs, the Indians could not take the colonists' animals.

In the Middle Colonies, sheep farming was conducted much as in lowland England. Sheep were grazed intensively over farmland both to enrich the soil and to feed on planted crops. Legumes, root crops, and hays were raised for livestock feed. As cities became established, farmers supplied meat to town markets (fig. 13).

The southern colonies did not adopt the sheep with the relish of their northern neighbors. Mutton was eaten less frequently, and the hotter, humid climate was hard on many breeds. The states bordering the Gulf Coast would become the home to hardy types based on Spanish, French, and British imports and known variously as the Florida Native, the Louisiana Native, and the Georgia Native. In Louisiana, an eighteenth-century cross between the Tunis and British breeds survived until recent years. Named the Imperial for its locale, Imperial Calasieu Parish, this local breed was a medium-sized, medium-wool sheep with a white or tan face and legs. Rams were horned, and ewes were

polled. The Imperial had an extended breeding season and was well adapted for its environment, providing both meat and wool.

Although England banned the export of sheep to the colonies, records indicate that there were 1,000 sheep in Massachusetts by 1643. Earmarking was soon required to indicate ownership of sheep kept in common areas. In 1660, King Charles II and Parliament enacted the Navigation Acts, which forbade both trade with the colonies except in British ships and the export of a number of commodities from the colonies except to England. In 1699, the Wool Act extended this ban to textiles manufactured in the colonies. The Hat Act of 1732 covered felt and fur-made hats. These regulations would eventually be added to the colonists' list of grievances before the American Revolution. The Wool Act did not prevent the colonists from manufacturing woolen cloth for their own use, but what they did make was generally limited to homespun, a rough, homemade cloth. Out of sympathy for the beleaguered sheepmen, both George Washington and Thomas Jefferson made a point of wearing American wool suits at their inaugurations.

Although the first woolen mill in the colonies was built in 1760, the colonists remained dependent on British cloth until after the Revolution, when they began to pursue the industry vigorously, even offering immediate American citizenship to English wool workers. John and Arthur Schofield immigrated from Yorkshire and built the first water-powered woolen mill in Massachusetts in 1793. Carding mills and power looms soon met the demand for cloth that was unattainable from England under the wartime embargo of the War of 1812. The cotton and woolen mill industries would become vital to the economy of New England. Boston became the center of the American wool market, though the United States would never become a major wool or cloth producer to the world.

What the new nation needed most was an improvement in its wool sheep population, despite Benjamin Franklin's defense of the honor of his country's sheep in a London newspaper. There Franklin bragged that the American sheep grew so much wool on their tails

that they needed little carts to trail behind them and carry the weight.

In 1793, American statesman Robert Livingston obtained a Merino ram and 2 ewes for his Hudson River valley estate. The French immigrant and industrialist Irénée Du Pont obtained a Merino ram named Don Pedro, who became quite famous. George Washington, a careful sheepman and owner of Virginia native sheep and Leicesters, also managed to obtain some Spanish Merinos. Washington's flock at Mount Vernon gave him an average of 5.5 pounds of wool fleece when the national average was still closer to only 3 or 4 pounds.

Washington inspired Thomas Jefferson's interest in sheep raising. Eventually Jefferson commented that he preferred his sheep above all the animals he raised except horses. Jefferson received a smuggled Merino ram in the late 1790s. He was also given 2 Barbary or Tunis rams in 1806. After adding a multihorned Icelandic and a haired Senegal, Jefferson began an ambitious breeding program at Monticello. During his presidency many of his sheep accompanied him to the White House, where they pastured on the grounds. (While walking through Lafayette Park one day, a gentleman named William Keough was attacked by the Icelandic multihorned ram. Understandably, this did not please him, and he wrote the president a note to that effect.) Although Jefferson had his flock of some 40 sheep driven home to Monticello after his second term expired, sheep continued to graze the White House lawns through the term of President James Polk and were brought back during World War I to save the labor needed to cut the grass.

In the early 1800s, George Washington's friend David Humpreys returned from serving as a secret agent for the American government in Portugal and Spain. Bringing his flock of Merinos back to Connecticut, he built textile mills in Derby. By 1810, Merinos from Humpreys's flock were fetching prices of up to an astronomical \$2,000 a head. In 1808, William Jarvis, who was serving as President Jefferson's consul in Lisbon, exported several thousand Merinos to the United States after Napoléon Bonaparte conquered Spain and entered Portugal. Motivated by patriotism, Jarvis saw

to the dispersal of 4,000 Merinos throughout Massachusetts, New York, and other states.

Jefferson was appalled by the outrageous prices being offered for Merinos and the resultant difficulty of their coming into the hands of common farmers to improve their flocks. He suggested that his homebred Merino rams be given to each county for use in a cooperative breeding program. Yet Jefferson was not entirely happy with his Merinos. He complained often that they had brought "scab," or scabies, to his farm. He remained proudest of his Tunisian sheep and was especially happy with their crossbred offspring. He also asked his friends the marquis de Lafayette and Irénée Du Pont to send him sheepdogs from France.

Within a few years, some 29,000 more Merinos were imported. The Merino craze contributed to great prosperity in New England and the growth of the wool industry throughout the country. After Merinos existed in sufficient numbers to bring the price down, a second craze for Saxony Merino, or Rambouillet, sheep developed. Other breeds such as the Leicester and Lincoln made comebacks and were reimported from England. Although the Merino had a large impact upon the breeds now raised for wool in North America, today Merino sheep are not raised in very large numbers.

By 1840, there were more than 2 million sheep in New Hampshire and Vermont, but sheep farming was moving into the Midwest. For a time the Merino was extremely popular in the Great Lakes region. Soon the demand for a better meat sheep had farmers looking to other English breeds. Southdowns, Cheviots, Oxfords, and Shropshires were imported and found homes in the small flocks of sheep found on most farms along with pigs and cattle. In the 1880s, the Dorset and Suffolk were imported. The Suffolk, Hampshire, and Polled Dorset would eventually become the dominant meat breeds.

The Southwest was already home to the Spanish descendants of the Churro and Merino sheep brought to New Spain. Eastern wool sheep were also carried westward to mix with the range-bred sheep. Both the Rambouillet and the Merino contributed to the creation of successful new breeds such as the Debouillet,

Columbia, Polypay, and Targhee. Eventually most of the raw wool was coming from the West, mainly from Colorado, Nebraska, Wyoming, and Texas. The Rambouillet became the most common range breed and crossbred sheep flocks were very numerous. Cattlemen did not like the sheep invading their ranges, complaining that the sheep ate the grass too close to the ground and destroyed the plants with their hooves. This controversy continues even today.

The American sheep industry underwent a transformation in the twentieth century. In the Midwest, sheep raising declined with the increasing use of tractors and other powered equipment. Farmers removed fences to allow for larger fields, but the lack of fences also meant that livestock could not graze the crop residues or fallow fields. Agriculture became more specialized, with farmers concentrating their efforts on one or two cash crops, such as corn or soybeans and hogs, beef or dairy. The American market has never supported lamb and mutton as it has pork, poultry, and beef. Although a small market remained for lamb, on many small farms sheep became an unprofitable burden.

## Husbandry

The large sheep flocks of the American West have persisted, although the current loss of wool incentive payments may have a large impact on western sheep raising in the future. Historically, sheep raisers have been subject to fluctuating prices and markets for wool and lamb. The Depression years brought the lowest prices for wool in American history at 30 cents a pound. Conversely, by the 1950s, wool was receiving record high prices. Production peaked in 1942, with 56 million breeding ewes. Since then, however, much of the American textile manufacturing capacity has been lost to cheaper overseas imports. The introduction of man-made fibers has also reduced the demand for wool. Today the United States imports about 10 to 20 percent of the lamb sold to market, much of its wool, and almost all sheep cheeses.

Production varies with small hobby and farm flocks,

Sheepskin and lambskin are used in clothing, rugs, and coat and glove linings. Shearling wool is left on the skin and used to make coats, boots, and slippers. Leather is used to make shoe uppers, bookbindings, upholstery, and chamois cloths. Kid gloves are usually made from young lambskin. Parchment is made from specially treated sheepskin or lambskin. The tallow or fat rendered from the carcass is used in soap, candles, and lubricants.

Raw wool contains an oily substance called the yolk, which is a combination of wool fat and suint mixed with debris. Suint is the dried perspiration of the sheep; it is rich in potassium salts. Wool fat, or grease, is the sticky wax secreted by the sebaceous glands that coats the fleece fibers and conveniently lubricates the shearing blades. Wool wax kills bacteria and is easily absorbed by human skin; it has long been known and used as a skin softener. Wool grease is also an effective sunscreen to protect newly shorn sheep. In New Zealand, wool grease has even served as fuel. When the grease is extracted from the wool, the remainder, called cake, is used as fertilizer.

Lanolin is a purified wool wax used extensively in pharmaceuticals and cosmetics, including shampoos, lipsticks, shaving creams, deodorants, soaps, ointments, face creams, body lotions, and suntan lotions. Lanolin is an excellent natural moisturizer. Further purification of lanolin yields such valuable products as cholesterol and hormones.

Sheep are used in medical research. Lambs are the standard test animal for heart valve surgery, and early pacemaker research was performed on sheep. Sheep glands also contribute medicines, including insulin. Material made from sheep intestines is routinely used for surgical sutures.

Other by-products include instrument strings, or catgut, which is made from the intestines of sheep (and goats). Lamb gut is the most desirable gut because of its strength and pliancy. Some gut strings are covered with spun wire made of silver or copper. Intestines are also used for sausage casings. Rennet for cheese making is available from the stomach.

Sheep and lamb by-products contribute both to industrial materials, including insulation, paint additives, fertilizer, wallpaper paste, and biodegradable detergent, and to consumer goods, including chewing gum, ski wax, crayons, cellophane, buttons, dice, and piano keys.

some intensive lamb systems, and the large range flocks of the West. The major sheep-raising states are Texas, California, Wyoming, and Colorado. Most sheep in these states are kept in large flocks of 1,000 or more, sometimes finished in short-term feedlots. Elsewhere, farm flocks average about 50 sheep. More than a century ago, the *People's Farm and Stock Cyclopedia* stated, "The English breeds are the sheep for the small farm, and the Merino for the poor farm." Although the Merino breeds have given way to their descendants, this statement remains largely true today.

Predator problems from coyotes and mountain lions continue in the western states and have increased

in the Midwest as coyote populations rebound. The coyote is now present in every state in the mainland United States and in Canada. Farmers must also deal with wild dogs and free-running pets from rural subdivisions and homes in the country. The use of guard dogs, protective llamas, and donkeys is growing.

A slow but steady decline in the number of sheep-raising operations has characterized the industry in recent years. Fortunately, interest in purebred sheep, specialty wool and meat, and dairy production is on the rise. There is continued interest in raising 4-H or other club lambs both as a hobby and as an educational project. The demands of the show ring in the past

The highest price paid for a sheep was \$358,750 for an Australian ram in 1989.

The largest sheep was a Suffolk ram from Oregon that weighed 545 pounds. A Merino wether that had been unshorn for five years while lost in a state forest in Australia had a 54-pound fleece that was 18 inches long.

The smallest British and North American breed is the Soay at 56 to 60 pounds. The French breed the Ouessant stands just 18 to 20 inches tall and weighs only 29 to 35 pounds. In Portugal, the wool-bearing Entre Douro e Minho ewes weigh 33 to 40 pounds. The Galician of Spain weighs about 40 pounds. Babydoll Southdown, Miniature Cheviot, and American Miniature sheep are various breeds selected for small size mainly to be ornamental or hobby sheep. Small Southdowns have also been used as orchard sheep.

The peculiar Ancon was created from a very short-legged ram born in 1791 near Dover, Massachusetts. Also called Otters or Creepers, these sheep were perpetuated by local farmers who felt that the breed would be less likely to escape pasture fences. The Ancon was extinct by the end of the nineteenth century. Sheep of similar appearance have been noted in Norway in 1919 and Texas in 1968.

often exerted a negative influence by promoting characteristics that were unsuitable for commercial or practical needs. Today, however, the show ring promotes the lean meat carcass and conformational qualities that should benefit the industry.

Suffolk sires, followed by Polled Dorset and Hampshire sires, dominate the meat industry. These sires are often used on Rambouillet-type ewes as a terminal cross. The Rambouillet and its crosses dominate wool production. The Polypay, Columbia, Southdown, Corriedale, Shropshire, Montadale, Targhee, Cheviot, and Romney each capture 1 to 6 percent of the market. The remainder of the country's thirty or more breeds are represented by very small populations.

The sheep industry in Canada, which has shared most breeds with the United States, has a similar overall pattern. By 1916, there were about 2 million sheep in Canada, with about 4 percent of those sheep registered as purebreds. Income from sheep was divided equally between wool and mutton. The Shropshire made up 37 percent of the registered population, the Oxford Down 21 percent, and the Leicester 20 percent. Other English breeds were present, though in small numbers. After World War II, lamb and mutton became more important than wool. Today the dominant breeds are the Suffolk, with 27 percent of the population, the Polled

Dorset with 21 percent, and the Hampshire with 6 percent. Lamb enjoys a domestic market that includes significant, specialized ethnic preferences for lightweight lambs. Canadian wool is promoted as a brand name, especially in Japan.

The Canadian sheep population sunk to a low of about 500,000 in the mid-1970s but has experienced an increase in specialty wools and purebred sheep breeding. East Friesians, a dairy breed, have been imported from New Zealand. New production breeds have also been created, among them the Rideau Arcott, Canadian Arcott, and Outaonais Arcott. Some imported English breeds, such as the Scottish Blackface, Ryeland, and Kerry Hill, have disappeared. The Border Leicester population fell quite dramatically but has recently begun to rebound.

Sheep raising in Canada is concentrated in three areas. In the Maritime Provinces, sheep are raised intensively in mixed farming situations. Southern Ontario is the home of sheep raised on prepared pastures. Further west, in Alberta and Saskatchewan, range flocks are maintained on rougher pastures and in more extreme weather. These flocks are generally sheltered in winter.

In North America, some British breeds never caught on, and others have survived only in small num-

bers. North American breeds such as the Arlington, the Improved Kentucky, the intriguing Bell Multi-Nippled, and the Nova Scotia Multi-Nippled became extinct. New breeds were developed: the Columbia, Targhee, Polypay, Panama, Morelamb, Notail, Montadale, California Red, and California Variegated Mutant. Interesting and exotic breeds such as the Icelandic, Romanov from Russia, and prolific Finnsheep have been introduced into North America. Imported sheep that bear fine wool from Australia include the Cormo and Booroola Merino. The Corriedale, Perendale, and Coopworth have also found their way to North America from New Zealand. Texels have been reimported from the Netherlands and most recently Dorper sheep have been brought in from South Africa. Canada has served as the way station for many breeds in order to meet American health quarantine requirements.

Americans eat about a pound of lamb a year. Unfortunately, the trend has been clearly downward in the past twenty-five years. Americans generally think of lamb as an expensive treat or a restaurant meal. Many do not eat lamb at all, and mutton is a product only in some ethnic markets. However, with the interest in varied ethnic foods on the rise, dishes such as mousaka and braised lamb shanks have become more popular. Even with this low rate of consumption, the United States still imports lamb.

Part of the American resistance to lamb lies in the past when lamb was served older, almost on the verge of turning into mutton, with its accompanying strong flavor. During World War II, American soldiers in the South Pacific were fed old mutton from Australia and New Zealand and so developed an aversion to what they thought was lamb. Modern lamb is light-colored, younger, and milder. Farm-raised lamb is best in the fall and winter. Baby lamb, at three to five months, is especially tender and sweet. Hothouse lambs are born in fall or winter and raised indoors.

North American producers strive to market lamb at weights of 125 to 150 pounds with 0.2 inches of fat. Some market watchers predict that the future demand will be for smaller and leaner carcasses. Seventy percent of market lambs are sent to four packers, with just

two packers responsible for 50 percent of the market. The packers either own or control about 70 percent of these lambs. About 800,000 older sheep, mostly ewes, are marketed to Mexico each year.

On range production Rambouillet or Rambouillet-cross ewes are often bred to meat rams such as the Suffolk or Hampshire. Dorset, Columbia, or Polypay ewes are also used in crossbreeding. Flock owners frequently develop their own cross, using two, three, or even more breeds, and then run a closed flock to limit health problems. Some farms concentrate on raising purebred seed stock.

Ewes are generally bred from August to September, although some flock owners may choose different timings. When lambs are born in February, they require shelter and supplementary feeding. Later lambing dates benefit from springtime grass and warmer weather. Range or pasture sheep often give birth outdoors, so lamb survival is better in the milder weather of spring.

Sheepmen often flush ewes before breeding them by placing them on good, fresh pasture or feeding them a supplement. The ewe is bred naturally by a ram that is turned out to run with the flock. If weather conditions are poor, ewes may be separated from the flock into small pens called jugs or jails shortly before giving birth. Ewes exhibit less stress, have a shorter labor, and bond better with their lambs when they are given privacy for two or three days. Ewes that breed in confined situations often have more problems with disease.

Ewes are often sheared, crutched, or tagged around the rear and udder before breeding and lambing if they have not been recently shorn. Domestic sheep are often very complacent when placed in an unusual position, such as sitting up on their dock. This helps the shepherd in shearing or foot-trimming, but sheep can also become "cast" on their backs and unable to upright themselves if they have a heavy fleece.

Early lambs are usually sold at higher prices, but late or unassisted lambs may have lower production costs. Range-born lambs can have high rates of mortality, which may be reduced in shed lambing. Although it is harder to accomplish, fall lambing can

give the farmer good prices. There is a great deal of interest in accelerated lambing to provide three lamb crops in two years or fewer. This can sometimes be accomplished through hormone treatments, feed additives, artificial lighting, or other stimulants. Some possible treatments are not yet approved for use in the United States. Certain breeds are more likely to naturally achieve out-of-season breeding, among them the Dorset, Barbados Blackbelly, and St. Croix.

Lambing time can bring many problems: difficult births requiring human assistance; lambs that fail to stand, nurse, or thrive; lambs that need to be warmed under lights or with coats; and ewes that reject or cannot nurse one or more lambs or suffer postpartum medical problems. Some shepherds put an enormous amount of work into saving their lambs, while others cull ewes that require intensive human intervention.

Before the ewe and her lambs are turned out of the jug, the lambs are tagged for identification and their tails are usually docked by one of several methods. Different methods bring different risks such as tetanus, fly-strike (an infestation of the skin by fly maggots), or a tendency to rectal prolapse if the tail is cut too short. Long tails, too, can be health hazards, as they accumulate manure, which can bring on the threat of a miserable fly-strike. Another possible procedure for male lambs is castration, which may not be necessary if lambs are sold very young.

In the United Kingdom, regulations forbid extremely short tail docking, docking or castration after three months of age without an anesthetic, and rubber-band docking without an anesthetic after one week of age. Tooth grinding and freeze dagging are also illegal in Britain.

Sheep require regular foot trimmings to remove excess hoof growth and checks for problems such as foot rot, which is highly contagious. Preventive vaccinations are now available, and footbaths are also used to treat the foot rot bacterium, which thrives in wet and warm conditions. Flock sheep on farms generally need more attention than range sheep that are kept on rough, rocky terrain. It has been observed that black hooves are harder and grow more slowly than white hooves.

Sheep and lambs are more susceptible than other livestock to internal parasites and require regular worming. Larger flocks are run through a tank or vat of sheep dip or sprayed to combat sheep ticks, or keds, sheep lice, and others. The blood sucking of ticks damages the sheep's skin and causes poor health. Sheep will rub to relieve the irritation and will damage their wool or even eat it in frustration.

The fatal disease of the nervous system known as scrapie has no cure or prevention except the destruction of all sheep or goats from an infected flock. The Voluntary Scrapie Flock Certification Program in the United States gives flock owners the opportunity to verify the health and economic value of their sheep as breeding stock. Regulations for the prevention of scrapie and other serious diseases make the importation of livestock into the United States very difficult. Canada and the United States remain free of most devastating sheep diseases.

Another highly infectious ailment, foot and mouth disease, can affect sheep, goats, cattle, and pigs. There is no treatment, and although it rarely causes death, foot and mouth can cause weight loss and lower milk yield. The disastrous epidemic of foot-and-mouth disease in Britain of 2001 resulted in the destruction of over two million cattle and sheep. There have been outbreaks of foot and mouth in the United States, but the last occurred in 1929. Outbreaks have occurred in Mexico in 1946 and Canada in 1952. Cooperative efforts, including strict quarantine and destruction, have succeeded in eradicating this disease from North America. Because foot and mouth is still present in Europe, Asia, Africa, and South America, constant vigilance is necessary. Imports of animals, products, and by-products from countries where foot and mouth is present are restricted.

Sheepfarmers in Britain work under a far different economic situation than their American counterparts. British sheep raisers benefit from subsidy payments. Quota rules are complex and there are problems, but the support systems are very helpful in retaining farming in the hill and upland areas. Sheep are raised on rugged land with poor soil, mainly in the Pennines, the southwest, and the Lake District. In the south, the

Downs and nearby lowlands are also used for pasturing. Pedigree flocks, spring lamb production, and traditional ewe flocks are common. There is an increasing use of housing for sheep, especially at lambing time. The British sheep flock averages about 225 ewes.

Lamb producers are paid a premium for meatiness and leanness. Suffolk, Charolais, and Texel sheep are being used to improve meat conformation. Charolais-cross lambs are born with much less wool covering their undersides, which is a disadvantage in windy and damp conditions. The extreme muscling of the Texel can also cause birthing difficulties.

Leg of lamb and lamb shoulder are favored joints or cuts for special meals in Britain, whose residents consume about 12 pounds annually per capita. Almost all lamb is produced on grass and marketed at 85 to 95 pounds. Live lamb is exported to Europe, where France is the largest market. Problems producers face include the higher cost of lamb to consumers compared with other meats and complaints about overfat and undermuscling. The export of live lambs is also under increasing animal welfare pressure.

For many years American wool growers enjoyed an incentive payment through the National Wool Act, which was funded by tariffs charged on meat or wool imported into the country. This program was originally designed to reward high-quality wool and thereby promote wool improvement. American wool growers have lost this government incentive payment and are now extremely vulnerable. A consequent serious decline in flock numbers may stabilize as farmers diversify into other markets.

In the United Kingdom, the British Wool Marketing Board was organized in 1950 to collect, grade, and auction all the nation's wool. The Wool Marketing Board has granted certain rare breeds specific exemptions that allow the direct marketing and processing of raw wool.

The renewed interest in handspinning and weaving has been a boon to sheep raisers. Spinners and weavers today enjoy the multitudes of fine, longwool, medium, and coarse wool and their many varieties of color and crimp. Although white wool has traditionally been more valuable for its possibilities in dyeing,

colored wool now generates higher market prices. The British Coloured Sheep Breeder's Association and the National Colored Wool Growers Association in the United States promote the breeding of sheep with colored wool. The World Congress on Colored Sheep convenes regularly to discuss the genetics, development, and use of colored wools. Obviously, the rare breeds contain much of the color genetics available to breeders.

Sheep are usually shorn in late spring or early summer. Lambs may be shorn at weaning time, at about two or three months of age. Show and longwool sheep may be sheared twice a year or more. Professional shearers tackle most sheep, but in some areas finding a shearer can be difficult. Some small flock owners still shear with hand shears, an Iron Age invention. Sheared fleeces, called grease or raw wool, are bagged individually for hand spinners or in large bales of about 300 pounds.

Researchers are working on methods that would cause the fleece to loosen on its own. In one method, the sheep are injected with epidermal growth factor and wrapped in a protective coating. This drug causes the fiber to weaken at the base so that the fleece can be pulled off in a single sheet. The sheep must be gathered again at a later time to remove the fleece.

After grease and dirt has been removed from the fleece, wool is sorted by buyers as to type, quality, grade, and yield. Wool washing, or scouring, is followed by carding to disentangle the wool. Wools can also be blended or dyed at different stages of processing.

Woolen fabrics are made from shorter fibers or a combination of shorter and longer fibers that are carded and then gently twisted into ropelike strands called rovings. These rovings are rolled into soft balls and then spun into yarn. Worsted fabrics are made from longer fibers that are combed after carding; combing straightens the fibers and creates a thinner, smoother yarn. Yarns are knitted or woven in a variety of patterns. Some woven fabrics are compressed by shrinkage, napped into a soft, fuzzy finish, or sheared into a clear finish. Manufacturers can also add finishes to prevent additional shrinkage, increase moth and stain resistance, and enhance machine washability.

Felt is made from matted wool processed by heat, pressure, and moisture. Pulled or fellmongered wool from dead animals is often used in blankets, felts, and flannels. In the United States, products containing wool must be labeled showing the percentage of wool both new and recycled or reused. The labels virgin wool, all wool, or 100 percent wool all mean new wool. Recycled wool is reprocessed from garment manufacturers' woven, knitted, or felted fabric cuttings.

Dairy production is an exciting development in North American sheep farming. In Mediterranean countries, sheep still provide more than half of the total milk production. There are almost one hundred varieties of sheep cheeses, generally made fresh and often available in Europe only during the months following the lambing season. Other sheep cheeses are salted, pickled, or aged into hard grating forms.

Each year North American markets import up to 40 million pounds of cheeses made from sheep's milk. Perhaps the most prevalent is the pungent, crumbly, blue-veined Roquefort of France. The grating cheese Pecorino Romano and the salty Feta are also well known. About half of Italy's yearly production of Pecorino Romano is exported for purchase in the United States, but this cheese should not be confused with the cow's milk Romano made domestically. A visit to a cheese shop or specialty counter will yield Greek Kasseri and Kefalotyri, Spanish Manchego, and such cheeses as Kashkaval and Brynza from the Mediterranean and eastern Europe. Ethnic markets stock other cheeses, such as the Portuguese Quejo de Serra and the Italian Ricotta Pecorina.

Roquefort and Pecorino Romano must be made in their country of origin and by the traditional methods in order to be labeled as such, but American sheep cheese makers are experimenting with their own versions of many traditional and new types of cheeses and yogurt.

With its sweet and mild taste, sheep's milk is especially well suited for making cheese. Sheep's milk is almost twice as high in fat as cow's milk and has 70 percent more protein, so that less fluid milk is needed to produce a rich-tasting cheese. Four pounds of sheep's

milk are needed to produce a pound of cheese, whereas it takes almost 8 pounds of cow's milk to make that same pound of cheese. The smaller milk fat globules allow the cheese-making enzymes to act faster and the increased protein coagulates or clabbers faster into firmer curds. Sheep's milk also contains less lactose than cow's milk, which aids digestion in some people. The calcium level in sheep's milk is 71 milligrams per ounce of milk, compared with 40 milligrams in goat's milk and 36 milligrams in cow's milk. Sheep's milk cheeses are usually snowy white in color. Even the aged cheeses are less yellow than cow's milk varieties.

Many breeds of sheep in Europe and the Middle East have been selected for milk production. Perhaps the best known is the East Friesian or Friesland from Holland. East Friesian sheep can have an extended lactation of up to three hundred days and produce 5 to 7 pounds of milk per day. Other breeds include the German milk sheep, or Oldenburg, the French milk sheep, or Lacaune, the Asaf and Awassi from Palestine, the Churra, Castellana, and Manchega from Spain, the Chios from Greece, the Comisana or Cormiso from Italy, and the Sarda from Sardinia.

Lawrence Alderson developed the British Milk-sheep from native stocks to provide a dairy ewe that was also successful at lamb production. Imported stock has also established the British Friesland and the British Oldenburg in the United Kingdom. In Canada, the Rideau Arcott and Outaouais Arcott were developed to acquire greater milkiness with the use of European breeds.

The average European milk ewe gives 2 to 3 quarts of milk daily during lactation. In North America, where sheep have not been selected for dairy ability, the average ewe gives only about 1 quart daily. Some European milk breeds such as the East Friesian have been imported in small numbers to Canada to be used in upgrading programs throughout North America. However, careful selection of ewes within native breeds could prove as successful. Several of the rare breeds are very well suited for fostering dairy production, among them the Tunis, Cotswold, Shropshire, Horned Dorset, Southdown, Clun Forest, and Lley. Three of

Although lambs are undeniably adorable, sheep are not house pets. Sheep are strongly flock oriented and will cry or panic if separated from other sheep. An orphaned or bottle-raised lamb will become affectionately bonded to its human so that it can be kept as a pet, but it will demand a great deal of attention. Some rams can become aggressive, so ewes or wethers make better pets.

People with rural property often keep small flocks of a few sheep. Hobby flocks can be a great source of enjoyment. Owners need to follow the same routine health care as other shepherds: shearing, foot-trimming, parasite control, and protection from free-running dogs.

Many of the small to medium-sized breeds of sheep are suitable for hobby flocks. In the United States, Babydoll Southdowns, Brecknock Hill Cheviots, and others are bred down to “miniature size” and sold specifically as pets or for family flocks. Potential purchasers need to be very cautious in choosing hobby or pet sheep. An understanding of physical defects, sheep health, and the limitations of the current market is essential.

the hair breeds—the Katahdin, St. Croix, and Wiltshire Horn—bring the added benefit of easy care.

Besides milkiness, good dairy sheep are very docile and easy to handle because they must stand for milking twice a day. They also need to be good foragers and easy keepers to produce milk without expensive supplementation. A long breeding season is also important to extend the availability of milk. Sheep’s milk does have the valuable quality of freezing without affecting its cheese-making qualities, which extends seasonal production. Most sheep only lactate about one hundred days after lambing. The improved dairy breeds are able to sustain a longer lactation, but frequent breedings and short lactations may actually be more profitable in milk production.

Although many sheep are still hand milked, machine milking systems equipped with the proper vacuum level and pulsation rate for sheep are now available. Some milk producers allow lambs to suckle for up to four weeks before weaning them and then milking the ewe. Others transfer lambs to an artificial feeding system after one day, as is common with dairy calves or kids. The lambs are then marketed.

Sheep can also play a useful role in agroforestry, the combination of forestry and agriculture. Sheep are useful in fruit or nut orchards for keeping down plant growth and for eating the fallen fruits that harbor pests

and disease. They also leave behind valuable manure. Experiments have shown that sheep will not browse on fruit or nut trees when there is enough forage. Access to a free-choice mineral mix is helpful in preventing damage to tree bark.

Grazing sheep can be beneficial in maintaining open areas because they can eliminate the need for spraying with herbicides. Sheep are grazed in areas devoted to public recreation and power line right-of-ways. Ski resorts graze sheep to prevent grasses and woody shrubs from destroying the smooth hill surfaces. Sheep can also be useful in forestry; when underbrush is controlled in young timber, the growth rate doubles. Farmers often contract with governmental agencies or private owners to run their sheep in forestland from spring to fall. On the downside, seeds may contaminate fleeces and heavily fleeced sheep can become entangled in briars.

On rangelands that have been overgrazed in the past, woody plants gain hold and are hard to eradicate. Sheep will graze such pest plants as Sagebrush, Gorse, Leafy spurge, Spotted knapweed, Tall larkspur, and Tansy ragwort. Wherever sheep graze they add valuable manure, which they conveniently trample into the ground. Sheep have long been improvers of the land if they are carefully managed.

Sheep are also marvelously suited to grass or forage-

based farming because they are less dependent on grain supplementation than cattle, pigs, and poultry. Forage-based farmers rotate their flocks rapidly through small pastures to prevent overuse. Fresh air and sunshine help prevent disease, and the lack of wool contamination from seeds and chaff from hay improves its quality. The lambs can be marketed as grass-fed or organic at added value.

The centuries-old farming technique of growing turnips and other feed crops is also suited to sheep. Turnips are cheap to plant, they grow rapidly, and the fields can be resown more than once in a growing season. The sheep will graze the tops and most of the turnip itself.

The most significant recent import of a new breed to North America may be the Dorper sheep from South Africa. Seeking an acceptable meat sheep that suited the arid areas of the northwestern Cape, Dr. Dawid Engela developed the Dorper by crossing the fat-tailed Blackhead Persian with the Dorset Horn. The Dorper is a blocky, meaty sheep with a white body. In South Africa, three-quarters of the Dorsers have a distinctive black head, while the others are all white. The Dorper has a lambing percentage of 150 percent and an extended breeding season that allows three lambings in two years. The high birth-weight lambs grow rapidly and produce an excellent meat carcass. There are two types of Dorper, a woolly Dorper that naturally sheds its kempy fleece and a hair type.

Purebred sheep, recipients carrying Dorper embryos, and Dorper semen have recently been imported through Canada to accommodate USDA regulations. The Dorper has become a valuable investment venture, with corresponding high prices. It is anticipated that Dorper genetics will be used for crossbreeding on both range flocks and more intensive operations. Because income from the meat market is most important to North American sheep raisers, Dorper genetics will probably be introduced into many native and rare breed flocks.

The new laboratory techniques that allow embryo transfer have also led to the cloning of sheep and research into transgenic sheep. In Australia, transgenic research has explored gene transfers that would speed either body or wool growth; the ability to secrete in-

sect repellent against blowflies or, even later, to prevent moth damage in the fabric made from wool; and the production of milk for lactose-intolerant consumers. Human genes have been inserted into sheep embryos in the hopes of creating the hemophilic treatment Factor IX. Researchers are also working on creating sheep's milk that would carry the human protein that prevents emphysema. Ironically, in hopes of reducing shearing expense, some Australian genetic research has involved the re-creation of the hormone that would allow sheep once again to shed their fleeces naturally.

The wool and lamb industries face several challenges for the future. In the United States, sheep raising is a small industry in comparison to beef, pork, and poultry. Therefore, as with the even smaller goat industry, the market potential often does not justify the expensive testing process needed to gain approval of new drugs or technologies, even though some of these products are available for sheep producers elsewhere in the world.

The use of ruminant remains in animal feed has been banned in Britain, and since 1989, the American rendering industry has voluntarily kept adult sheep remains out of animal feed because of the possible link between scrapie and bovine spongiform encephalopathy, or BSE. The cause of BSE, popularly known as mad cow disease, is fully characterized. Sheep, goat, and cattle parts unfit for human consumption were rendered into a high-protein meal that was used to boost meat and milk production in cattle. Cattle may have received the disease from eating the protein in the feed supplement. Although the mechanisms are not completely clear, the eating of BSE cattle has been linked to a variant form of Creutzfeldt-Jakob disease, or CJD, in humans. The USDA has imposed a ban on the import of live ruminants or their products from countries where BSE has been found. The FDA prohibited the feeding of most mammalian proteins to ruminants in 1997. The USDA has also tested imported sheep for scrapie or BSE indicators and has ordered the destruction of sheep that might harbor a form of the disease even though sheep themselves have not affected by BSE, or mad cow disease. The problems with

BSE could affect the sheep industry, which must assure the public that lamb and sheep offal is scrupulously handled. American consumers are justifiably concerned about purity in their food. It is important that lamb and sheep cheeses be seen as pure products.

There is a great need to promote lamb as a clean and ecological choice for meat. Feed additives and growth promoters are not widely available to the sheep industry, which may give lamb a more favorable reputation. To this end, sheep raisers need to seek greater leanness. Consumers need exposure to the sweeter taste of modern American lamb. Cost remains a problem when other meat alternatives are less expensive.

Expensive importations of specialized sheep breeds may continue. The modern meaty Texel was reimported in 1990. The East Friesian will probably be used to increase lambing rates and milkiness. The highly prolific short-tailed Finnsheep has been in North America about twenty-five years and is being used to increase lambing rates.

In 1983, a mutation appeared in a sheep flock in Oklahoma that causes an extreme enlargement, or hypertrophy, of the muscles in the hind legs and loin. Named Callipyge, which is Greek for "beautiful buttocks," this condition has been the focus of much research because the meat produced is very tough and unacceptable to marketers. If methods are developed to eliminate this problem, the Callipyge trait may affect breeding choices in meat production.

The loss of the wool incentive program in the United States will probably result in a decrease in numbers of western range flocks. The loss of income may be furthered by an increase in the cost for grazing on federal lands. Small farm flock production may increase to meet the demand for meat.

However, the availability of lamb-processing plants has declined. A few major packers dominate the industry, and the closing of small, local slaughtering facilities makes the direct marketing of custom freezer lamb more difficult.

Economics will also dictate that intensive costs are reduced as far as possible. Increased lambing rates and lower lamb mortality will become more desirable. Closed flocks will lower health costs. It is difficult to

determine if intensive or confinement systems will be profitable in the future.

Hardy, easy-care sheep will become more important. With very little income available from wool, many producers may shift to hair sheep. Hair sheep are exceptionally resistant to heat stress and internal parasites. They are extended-season breeders and efficient feeders adapted to tropical forage. If they grow a small winter coat, it is naturally shed out in spring or summer. Up to 85 percent of sheep-raising costs are estimated to be attributable to wool. Wool sheep require shearing, crutching, tail docking, and dipping, and there is the possibility that the sheep will become cast or stuck in brush or brambles. With hair sheep there are no worries about fly-strike or fleece contamination.

Sheep as a part of sustainable agriculture, grass farming, rotational grazing, and agroforestry will probably become more important. Sheep manure is a valuable natural fertilizer, twice as high in nitrogen as cow manure and higher in potassium, too. Less messy, easier to spread, and less aromatic, sheep manure makes a wonderful, rich product.

Meat for specialty markets, especially organic and grass-fed lamb products, should continue. Dairying also has the potential for valuable income products. Specialty, high-quality wool and direct marketing to craftspeople will continue to be more profitable than bulk wool sales.

Animal welfare issues may influence sheep management and shipping practices. Anesthesia and analgesic pain relief may become required for such routine practices as docking and castration. Sheep that do not require docking may be more desirable in some management situations.

The raising of purebred stock for such valuable qualities as meat conformation, fertility, accelerated lambing, prolificacy, good mothering, abundant milk, hardiness, easy care, and specialty wools will be important. Many of the old or rare breeds clearly provide one or more of these qualities. In fact, the rare breeds represent the greatest variety available to sheep breeders to develop special adaptations to specific conditions. The potential for the transmission of disease may prevent the future exchange of sheep breeds between countries.

The genetic potential available from the minor breeds will then become extremely valuable.

## Breed Profiles

### *Soay (pl. 10)*

Beyond the Scottish coast, beyond the Outer Hebrides, out in the Atlantic Ocean some 40 miles, lie the tiny islands of St. Kilda. Unsheltered and exposed to the harsh northern sea weather, for centuries these islands have also been far removed from many of the events and fancies of the mainland. The largest island, Hirta, is little more than 1,500 acres in size. Two smaller islands, Soay and Boreray, are about 200 acres in size. Uninhabited Soay is particularly rugged, its steep, high cliffs rising from the sea. A dangerous channel separates Soay and Hirta. Named by the Vikings, Soay means “sheep island.”

By 2000 B.C., farming peoples and their livestock were living on some of the St. Kilda islands. Just when the Soay sheep arrived is a mystery with long-ago origins. What is known is that the elfin Soay is the most primitive domesticated sheep breed in Europe. The Soay is truly a relic of an ancient breed. Although it bears the mark of humans in its color and fleece, it behaves much as a wild sheep does. The males and females live apart except during mating season. But where the Mouflon-like sheep of the Neolithic farmer had no fleece, the Soay possesses a fleece known as hairy medium, varying between more woolly and more hairy. Wool cloth fragments from the Bronze Age are almost identical to this type of fleece.

These little primitive sheep probably survived on Soay because they were so far removed from mainland Scotland. Visitors in the fourteenth century described them as “wild” and the object of hunters. Writing in the sixteenth century, Hector Boece agreed, commenting that the Soay sheep “bear fleeces intermediate between sheep and goats, neither soft like sheep’s wool nor coarse like that of goats.” Boece also described the domestic sheep raised by the farmers on Hirta as good sized, with impressive horns and long tails, obviously a different breed.

At the close of the nineteenth century, Richard Kearton wrote in detail about the sheep to be found on “Soa” island. He described a flock of 200 to 300 small brown sheep that seemed to reproduce prolifically. Paying the island’s owner for the privilege, St. Kildans caught the little wild sheep, which had a reputation for providing a superior, sweet mutton. This same owner had prevented the St. Kildans from introducing Scottish Blackface sheep to crossbreed the native Soay sheep.

Beginning in 1910, small groups of Soay sheep were brought to the mainland mainly for use as an ornamental breed on country estates and parklands. Some of these flocks live on today, although they may now differ slightly from the island sheep. In 1944, a small flock of Soay sheep was placed on the 40 acres of rocky Cardigan Island off the west coast of Wales. This uninhabited island is managed by the Dyfed Wildlife Trust, which has found that the sheep have done well here in company with nesting birds and seals.

In 1930, the 30 remaining crofters and their livestock were moved from Hirta to the mainland. Two years later the island’s owner, the marquess of Bute, moved a flock of 107 sheep from Soay to Hirta. This group comprised 20 rams, 44 ewes, 22 ram lambs, and 21 ewe lambs. In 1963, more Hirta Soays were exported to the mainland. The mainland Soay sheep form the basis of the registry, which is kept in about 70 flocks with about 500 ewes. Small groups of mainly unregistered sheep are also in North America.

The feral sheep on Hirta and Soay number about 1,500 but are not included in the registry. The Soays on Hirta have been studied by biologists, who have observed a natural cyclic rise and fall in population. The sheep seek the shelter of the abandoned stone homes and cleits in which the villagers dried and stored sea-birds. These sheep are zealously protected by Scottish Natural Heritage which prevents any exports.

Soays exhibit variation in fleece, color, and horns. Individual fleeces may be more or less hairy or woolly. They measure about 2 inches in length and weigh 1 to 2 pounds. Although the naturally shed fleece is a combination of coarser guard hairs and finer wool fibers, the wool fibers of the Soay are twice as fine as the Mouf-

lon, hand spinnable, and a lovely brown. Rams carry a hairy mane on the top of the neck and shoulders and more kempy britch fibers.

Often described as deerlike in appearance, the nimble Soay has a primitive short tail, stands 18 to 24 inches tall, and weighs about 50 to 60 pounds in adulthood. Single lambs are most common, but twins also occur. On both the island and the mainland the rams have long, smooth, curling horns, although an occasional scurred (horny tissue) ram can be found. On the mainland almost 100 percent of the ewes have more delicate horns, although island ewes are almost 50 percent polled. This is believed to be a result of selection for horns by owners who raised ornamental sheep.

This primitive hardy sheep is immune to foot rot, requires no lambing assistance, and produces a lean carcass with a distinctive flavor. In Britain, the Soay is being used in areas that need grazing management and in crossbred meat production. Purebred Soay lambs are also a specialty restaurant item. Serum from Soay blood is used in the detection of steroid use in humans and racehorses.

In 1974, the RBST began to register the Soay and nine other rare breeds in the Combined Flock Book. Fortunately, the trust welcomed the whole range of colors that the Soay exhibits. The most primitive and dominant color pattern is brown with a white belly. About 90 percent of the Soay population on Hirta exhibits this pattern, with light markings over the eyes, on the bottom of the jaw, a patch on the rump, and on the belly. Most Soays are chocolate with others colored fawn, although varying shades of these colors are visible. Some others are self-colored brown (unpatterned), and a small number are colored black or have more white markings (piebald). A few animals appear mostly white with a few small dark markings.

Combining the variety in color with the range in fleece type and horned or polled animals, the Soay remains a living example of the genetic variation available to early sheep breeders. Several flocks descended from the exports of Soays early in the twentieth century have been kept separate and selected for particular traits. It has been suggested that the breed has diverged into two types: Park Soays and the native island Hirta Soays.

Although Soay sheep follow a flock leader, owners report that the sheep are independent thinkers, self-sufficient, and not especially herdable, for they scatter rather than bunch together. Because of this “wild” nature and their propensity to flight or panic, Soays require calm handling. Yet they are also nonaggressive and form strong family groups.

Soay sheep have been exported to North America in small numbers mainly to zoos, universities, and a few individuals. Imports to Canada may have occurred as early as the 1940s but are recorded in 1974 from Scotland and in 1990 from England. In 1985, Scottish imports were brought into the United States. North American Soay numbers are now estimated at fewer than 300, spread among a few owners in Canada and the United States. Val Dambacher and Kathie Miller of Southern Oregon Soay Farms purchased 2 ewes and 3 rams from the 1990 English importation. These sheep and their offspring carry registration through the RBST Combined Flock Book, as do some Canadian Soays. Although it seems impossible to document the purity of many of the other Soays in North America, there should be a conscientious cooperation to safeguard them and coordinate breeding efforts to avoid deleterious levels of inbreeding. Several individuals are sincerely interested in preserving the Soay, but newcomers to the breed should be aware that many sheep advertised for sale as Soay contain outside blood, such as from the Barbados Blackbelly.

The unique little Soay remains a link to the past and represents an important step in the domestication of sheep. The Friends of the Soay are interested in conducting serious genetic research. The Soay also possesses several valuable traits of hardiness and has found a useful niche helping people in ecological grazing and reclamation projects. Soays certainly are easy-care sheep with no lambing problems or shearing needs.



Vulnerable

### *Shetland (pl. 11)*

More than a hundred small islands and islets lie far out in the cold North Sea between Scotland and Nor-

way. The Romans called these Shetland Islands “ultima Thule,” the farthest land. But the Celts and Vikings came there, and the people who made their homes on these harsh, windy, and rainy islands were strong. The animals that survived were tough and small. The islands are famous for their distinctive breeds: Shetland ponies, Shetland cattle, Shetland sheepdogs, and Shetland sheep. Shetland sheep are recognized to have existed for at least a thousand years on both the Shetland and Orkney Islands.

Shetland sheep are often called primitive, and they do retain some primitive characteristics, such as shedding. But they also reflect intelligent selection by long-ago farmers who developed a wool that is finer and softer than any other native British breed. Fleeces come in a wide range of colors and shades that are known by Old Norse names.

Shetland sheep belong to the Northern Short-tailed group. This group, which also includes Icelandic, North Ronaldsay, and Romanov sheep, is distinct from many other breeds. Until the nineteenth century, the Shetland Islanders resisted the changes in sheep types that were occurring in the rest of Britain. They farmed potatoes, oats, and barley, fished, and raised their livestock. From their famed Shetland wool, the cottagers also produced highly desirable knitted goods, as evidenced by the very high prices that finished goods brought in London in the 1700s. Shetland wool was said to be so fine and strong that a shawl could be drawn through a wedding band.

Naturally colored Shetland and Fair Isle sweaters are still famous, but today most of the wool and knitted goods that are labeled as Shetland are not made from island wool but are simply representative of that type or feel. Garments can be labeled real, pure, genuine, or 100 percent Shetland wool only if they have their origin in the Shetland Islands. Unfortunately, the sheep who grow the wool for garments today are seldom purebred Shetland but rather have been crossbred with larger sheep from Britain.

The reason for this crossbreeding lies in economics. By the nineteenth century, sheep raisers on the islands desired to increase the size of the sheep sold as mutton as well as the weight of their fleeces. Sev-

eral breeds, especially the Cheviot and Scottish Black-face, were used in an attempt to increase the Shetland’s size. Unfortunately, the crossbred wool was of a lesser quality and was scratchy, not soft.

White wool was also more desirable because it could be dyed. The British Wool Marketing Board paid growers less for colored wool, and so they logically bred more white sheep, often crossbreeding Shetlands with white breeds. It became less desirable to maintain flocks that expressed all the traditional Shetland color variations. The danger to the breed was recognized as early as 1927, when the Shetland Flock Book Society was formed. The society was able to encourage wool quality and continues to safeguard the island sheep.

The Shetland Islands moved into the modern world, and sheep raising soon paid far less than working on the North Sea oil rigs. By the late 1970s, the RBST and concerned individuals realized that although there were still thousands of sheep on the islands, most were not purebred, and that among the Shetland flocks, most of the sheep were now white. The RBST began to register Shetlands on the mainland in 1974 and classified them as endangered three years later. The Shetland Sheep Breeder’s Group (SSBG) was established in 1985 primarily to preserve the rare colors and markings. Soon afterward, the RBST convinced the Wool Board to allow the direct sales of certain rare breed wool to hand spinners.

Shetland sheep are a small, fine-boned breed, with ewes weighing 75 to 100 pounds and rams 90 to 125 pounds. The ears are carried a little above the horizontal. Although the ewes are usually polled, the rams have light and rounded spiral horns. Shetlands are extremely hardy, long lived, and known to be good browsers.

Purebred Shetland sheep possess a unique fluke tail, which is very short and ends in a fine point that is barely covered in hair. Many owners report that their friendly Shetlands wag their little tails like a dog when they receive attention. Shetlands, even rams, are known to be calm and docile when handled, yet active and nimble. Ewes lamb once a year, frequently having twins. They are good mothers and good milkers (fig. 14).

[To view this image, refer to the print version of this title.]

Fig. 14 The characteristic fluke tail of Shetland sheep. Courtesy of the North American Shetland Sheep Breeder's Association. Photograph by Shetland Sheep Breeder's Group, U.K.

Shetland sheep traditionally were not sheared; instead, the wool was rooed or rued. Over many days the fine underwool gradually becomes loose in different areas. The soft, shedding wool is gently pulled out, leaving the strong outer coat to protect the sheep from the cold or rain. Because hair and wool shed at different times, the soft wool is almost hairfree. This process, however, is very labor intensive, and today Shetlands are usually sheared. Fleeces can weigh from 2 to 5 pounds and are about 4 inches long. Fine wools, such as Shetland, trap more air and therefore are warmer than coarser wools when made into garments.

Shetland wool comes in eleven main colors: pure white, light gray, gray, *emsket* (dusky bluish gray), *shaela* (dark steely gray, almost a black frost), jet black, dark brown, *moorit* (fawn to dark reddish brown), *mio-*

*get* (light golden brown), fawn, and *musket* (pale grayish brown). Each color may also vary from light to dark. Individual sheep can also be described by thirty specific markings from *bersugget* to *yuglet*. As an example, a *katmoget* Shetland has a light-colored body with darker belly and legs and a patterned face known as *moget*. *Bielset* sheep have a colored band around the neck, and *brandet* sheep have stripes across the body. The many possible combinations of colors, shades, and markings are exciting to wool enthusiasts. Unfortunately, many colors or markings are very rare.

The numbers of Shetland sheep being raised on mainland Britain has grown steadily, and there are several thousands of purebreds on the islands. Shetland sheep were removed from the Priority List of the RBST in 1991, yet the breed still faces serious challenges. Crossbreeding still occurs on the islands, with visible evidence in horns, wool quality, wool on the legs, and larger tails. There are no accurate figures of pure Shetlands on the islands or among the 4,000 sheep owned by members of the SSBG, although both inspections and card grading seek to promote wool quality and true Shetland conformation.

On the mainland, a majority of the flocks consist of 20 sheep or fewer, and 40 percent of the flocks have no ram. Nine of the rarest colors totaled just 214 sheep in 1994. In 1995, there were only one or two rams in such colors as *mioget*, *musket*, *emsket*, or *shaela*. The combination of so few colored sheep and their separation in small flocks is still very dangerous.

A controversy exists concerning the purity of four-horned Shetlands. Multihorned sheep, variously called Rona's Hill, St. Rona's Hill, Ronan sheep, Older Shetland sheep, and Yell Shetland, have been known for more than a hundred years. The Castlemilk Moorit was created with "four-horned Shetlands." These sheep may have been a different type of Shetland or a cross perhaps related to the Manx Loghtan, Hebridean, or Jacob. Many four-horned sheep have not been registered in the flock book because of atypical wool quality, tail shape, or tail length.

Sheep from the Shetlands were exported to North America (Thomas Jefferson kept a small group at Monticello), but they did not survive as a breed. The current

population of North American Shetland sheep arrived in two later importations. The first occurred in 1948, when 3 ewes and a ram were shipped from Orkney to Saskatchewan. Although this flock and its descendants were not organized in an official registry, they do exhibit many Shetland traits and so have been provisionally registered, subject to future progeny testing and approval. This flock is still owned by the Flett family, who received the sheep from John Flett of Orkney. The Flett flock is completely moorit in color.

With assistance from the RBST, a well-documented import of 28 ewes and 4 rams was made to Canada in 1980. Colonel G. D. Dailley of African Lion Safari in Ontario maintained this flock in quarantine for five years in Canada and was finally allowed to sell offspring in 1986. That same year the first Shetlands were brought to Vermont. The North American Shetland Sheep Registry was established in 1991, and the promotional branch, the North American Shetland Sheepbreeder's Association, was formed in 1994. The North American Shetland Sheep Registry is coordinated with the SSBG and uses the same breed standards. In ten years, the breed has exploded to almost 200 flocks across the United States and several in Canada. Shetlands have become popular for several reasons: the lovely fleeces, the ability to raise a flock on a very small farm, their friendly nature, and their small size.

Because of the expense and regulations, it seemed unlikely that more Shetlands would be imported to North America. In 1997, an exciting development occurred when semen from 6 Shetland rams was exported from Britain. A committee formed from the SSBG selected the rams carefully and included at least one ram with a color pattern rarely found in North America. Many breeders purchased the semen and are awaiting the results of these artificial insemination breedings. There are now about 2,500 Shetlands in North America, where they appeal strongly to handcrafters and others. The largest populations are found in New England, the Midwest, and the Pacific Northwest. Registered Shetlands are also now found in France, Holland, and Finland.

Although the Shetland demonstrates success in rare breed conservation, it also highlights the problems in-

involved. It is important to maintain primitive breeds of sheep without the use of too many modern medical and nutritional practices in order to preserve their hardiness. Maintaining wide variety while selecting for true Shetland characteristics has proved to be difficult and sometimes controversial. The balance between conserving and improving is hard to determine. Some breeders have felt that many of the registered mainland Shetlands were "atypical" or showed evidence of crossbreeding. In an effort to guide the breed slowly back to its roots, the SSBG proposed to examine rams before registering them. Some breeders then protested that it was impossible to define a specific breed standard. In North America, acceptance of the Flett flock has also been controversial.



Recovering



Insecure



Minor

### *North Ronaldsay or Orkney*

Off the northeast coast of Scotland lies a group of seventy almost treeless islands called the Orkneys, the fabled Orcades of classical times. Although the islands are subject to North Sea and Atlantic storms, warm ocean currents bring a mild climate that allowed farming even in the prehistoric past. And it is there that a direct descendant of Iron Age sheep has been recognized on the furthestmost Orkney island of North Ronaldsay.

Far from the Roman and European invasions of livestock, these primitive, short-tailed sheep survived in relative isolation. Following the Soay, Orkney sheep illustrate a subsequent step in humans' development of the domesticated sheep, especially in their range of new colors. The Orkney is closely related to the Shetland and the Gotland as well as to other Norwegian, Finnish, and Icelandic breeds. This link is not surprising, for the Orkneys and Shetlands were occupied and colonized by the Vikings in the ninth century. These islands did not become part of Scotland until 1472.

Less than a third of the Orkneys are inhabited. And the small, tough Orkney sheep, though found on other Orkney islands, are famous for their long association with North Ronaldsay. Here the residents built a 12-mile-long seawall around the island, separating the

beach land from the sheep, grass, and farmland in order to protect the valuable seaweed found on the shore. The kelp was gathered, dried, and burned to extract iodine from the ashes. Kelp and other seaweeds were also the source of fertilizer and other products.

When these efforts were no longer economically viable and as farming became more important, land-use patterns changed. By 1832, the sheep were banished to the shore for most of the year. With no shelter and almost no grass available to them, the sheep adapted to living on kelp, dulse, and other edible marine algae. The sheep waded into the water to eat and foraged on the seaweed deposited on the rocky beaches during winter storms. Although other livestock will also eat seaweed, North Ronaldsay sheep are forced to survive almost entirely on it. As a result, the breed now digests seaweed more efficiently than other sheep.

This seaweed diet results in incredibly high iodine levels in the body and in ewe's milk. And because seaweed contains a substance that makes the absorption of copper difficult, North Ronaldsay sheep now use their available copper much more efficiently. In fact, when they are removed from their normal diet, they can experience problems with copper toxicity.

Picking and choosing among the seaweeds, the sheep divide themselves into groups known as *clow-gangs* in different areas of the shore land. The islanders traditionally round up the sheep into higher stone enclosures called *punds* or pounds. The owners count the sheep in February, the summer brings shearing, and in winter the animals are culled for slaughter. At present the ewes and their young lambs are brought inland for two months or so. Sheep are slaughtered only during the winter when they are the fattest and the island needs the meat. The one-hundred-year-old Sheep Court is responsible for managing the sheep on North Ronaldsay and for recording ownership. Each family who owns sheep has its own earmark, or *aithken*. As a result of European Union legislation, the court is to be reorganized into a Grazing Committee, with new regulations to be decided.

Weighing only 50 to 60 pounds, the fine-boned North Ronaldsay sheep yield a small carcass, although their unique diet gives the meat an unusual tangy fla-

vor. The sheep have naturally short tails and dished facial profiles. Orkney rams have distinctive horns that are ridged, spiraled, and often attractively banded with light and dark color. Islanders do not favor rams with heavy horns. All of the rams and about 20 percent of the ewes are horned.

Orkney sheep are a medium-wool breed ranging from hairy to woolly, with a fine inner fiber and an outer hair coat. Orkney sheep yield a 2-to-3-pound fleece with a 2-to-3-inch staple. The wool can create a dense matted layer next to the skin as protection against the weather. This is not shorn off. Orkney sheep do not tend to shed naturally now, although in the past they were rooded rather than clipped.

The sheep are usually gray or white but also exhibit black, brown, tan or moorit, and mixed-color fleeces in a range of shades. The white and off-white colors are nearly as fine as Shetland wool. The color in the gray, brown, and tan fleeces results from the mixture of hairy fibers in the white wool, which makes the wool coarser in texture. In true black and pure white fleeces, the wool and hair are the same color. The hair seems to be much softer in the fleeces from young sheep and so would spin well. The rams grow a dark hair fringe on the underside of the neck and chest.

In 1973, the RBST entered this unique breed into the Combined Flock Book in order to identify pure-bred animals and assist in preventing potential genetic problems in this small population, such as inbreeding, loss of recessive colors, monorchidism (only one normal testicle), and cryptorchidism (both testicles retained in the body, causing infertility). On the island today a full range of colors is seen, with the shepherds at the north end of the island actively working toward increasing the black, gray, and brown colors. The islanders have observed over the years that gray and white sheep tend to be stronger. Moorit-colored sheep, or *tannies*, are thought to be smaller and less hardy. Black sheep are believed to be smaller, thrifty, and slow to gain weight.

The RBST also recognized the vulnerability of the Orkney sheep in the 1970s. Besides the threat of disease or natural disaster in a single population, the Orkney Islands are involved in the North Sea oil ventures,

which brings the danger of an oil spill. The human population of North Ronaldsay has also fallen from 546 people in 1881 to fewer than 100 residents today. The RBST took a major step toward safeguarding the sheep by purchasing the island of Linga Holm south of North Ronaldsay.

Cheviot sheep formerly grazed Linga Holm's 40 acres. In 1974, 178 sheep from North Ronaldsay were moved to the island, where they would have natural shelter and more grass but would still have access to seaweed. Linga Holm is visited yearly by a volunteer group that shears, worms, dips, and culls the flock. These volunteers have found that the sheep are quite difficult to gather up after living free all year. About 200 culls are sold to market each year. Breeding stock is also available to purchasers.

For many years, the goal of this project was to maintain about 25 rams and 175 ewes plus their yearly lamb crop. In the late 1990s, the RBST reassessed this effort. Taking into account both the trust's financial resources and new animal welfare regulations, the RBST decided to reduce the flock on Linga Holm by creating new flocks on the British mainland.

Linga Holm has provided the RBST and researchers with a laboratory for studying the breed's color variations. By far most sheep have lost the wild or Mouflon white-bellied pattern and are therefore self-colored. About 26 percent of the ewes and 16 percent of the rams are white, with the largest numbers in the shades of light to dark gray. There are very small numbers of piebald, roan, black or moorit sheep. Because black and moorit are recessive, more rams of these colors are kept in order to retain these colors in the breed. It is interesting that the analysis of fabric remnants from the Iron Age found in England near Hadrian's Wall show nearly the same proportion of color, 40 percent white, 50 percent gray, and the rest black or brown.

The studies on Linga Holm also revealed a greater level of monorchidism and cryptorchidism. Efforts are being made to reduce this fault, which may have resulted from inbreeding. In the past, ewes have been allowed to lamb in their first year and to raise more than one lamb. This may be affecting their adult size. Excel-

lent areas of future research include the North Ronaldsay's unique traits of efficient digestion, high levels of iodine, and copper absorption and toxicity.

At the time Linga Holm was established, the RBST also sent 10 small groups to farms elsewhere. Differences are now being seen between these early mainland sheep and island sheep. The island sheep are longer legged with good bone. The lambs seem more robust, but this may be attributed to the island practice of allowing the ewe to raise only one lamb. Some mainland sheep have developed problems with cow hock (inward-turning hocks), and Orkney keepers favor heavier, curled horns. On the mainland, the flocks are generally given seaweed supplements and mineral mixes but must be watched for copper toxicity. The sheep are now kept in about 40 flocks, and the number of registered ewes is slowly rising. Experiences off North Ronaldsay have shown the challenges of keeping highly adapted animals in different environmental and management conditions.

Fortunately, the breed has three secure homes in its natural environment and hopeful, dedicated "Ronnie" breeders in Britain. About 600 to 700 sheep are still living on North Ronaldsay, 300 are on Auskerry, and another 200 are on or from Linga Holm. The North Ronaldsay islanders are working together to establish a profitable wool or yarn marketing scheme. There is also an attempt to market mutton off the island for the first time.



Vulnerable

### *Hebridean*

Because of their isolation, the islands of Scotland have been responsible for saving many breeds of old livestock. The Hebrides were the last surviving homeland of a breed whose history is lost in the mists of the past of the fabled Western Isles. A tough and thrifty animal, the Hebridean sheep is believed to descend from the primitive island type and the multihorned, primitive sheep brought to Scotland by the Vikings.

In addition to the Hebridean's small size and dramatically dark coloration, the presence of four-horned

and even six-horned individuals in flocks made these little sheep especially exotic and appealing to nineteenth-century fanciers, and small groups were taken off the islands to grace country parks. Confusingly, until the RBST entered the Hebridean in the Combined Flock Book in 1974, the breed was generally known as the St. Kilda, which is the home of the Soay. The Hebridean had become extremely rare as the Scottish Blackface has come to dominate the Highlands and islands.

The Hebridean and its close relative, the Manx Loghtan, probably trace their trait of multiple horns to their common ancestry in the Viking lands. Multiple horns are created when the horn bud is split in response to an inheritable genetic trait. Polycornute sheep are found in widely separated populations around the world, pointing to the self-generating nature of this trait.

Although four horns are the most desirable from the fancier's standpoint, this gene can also cause three- or five-horned animals. Because the horn buds are easily damaged in lambs, several irregularities may arise. Horns may fuse or grow erratically. Horns are also occasionally broken off, and injury to the horns can damage the skull bones. The multihorned gene may also be related to a defect known as split eyelid. Culling for split eyelid seems to have reduced the frequency of four horns.

When properly developed, the horns on the top of the head grow upward and may tip forward slightly. The lower pair of horns grow out from the side and curl around. If the top horns tip too far forward, they can interfere with eating or become caught in fencing or mangers. Care must also be taken that the side pair do not grow into the face. Most desirable is symmetry in the horns, especially the pattern known as the Celtic cross.

If only four-horned ewes and rams are used in a breeding program, problems seem to increase. Because two-horned Hebrideans are completely acceptable and normal, they should also be included in breeding programs. Some Hebridean ewes, though naturally polled, still carry the multihorned gene. Polled ewes grow a tuft of wool on the forehead.

The Hebridean also grows a lustrous black fleece that is in demand by hand spinners. Bleaching by the sun may turn the fleece brown, and age can gray it. Because black coloration is recessive in the Hebridean, white offspring are due to outbreeding and are therefore not included in the Combined Flock Book. A separate breed association has been formed for white Hebridean-type sheep called Seann Innse'gall. When the Hebridean is used in crossbreeding programs the lambs are usually white.

Hebrideans produce a medium wool with good staple length, which is known for its lustrous character and produces lovely undyed woolens and the traditional fabric Harris tweed. Some hair and kemp are present. The gray that comes with age can add a lovely silver shading. The Hebridean's face and legs are clean of wool.

Although the Hebridean is a small sheep, at around 80 pounds it is somewhat larger than other primitive sheep. The tail is a little longer than the Soay or Shetland but does not reach the hock. The Hebridean is noted for its longevity.

Unlike some other primitive breeds, the Hebridean is finding good homes in modern agricultural systems. Hebrideans are valued for profitable crossbreeding with a meat sire, especially on mountain pastures. The ewes are excellent milkers and produce big, lean lambs with a distinctive flavor. The Hebridean has also been proven to flourish in intensive raising conditions.

The hardy Hebridean seems to have found a role in conservation grazing and browsing. Besides their hardiness and tolerance for wet conditions, this breed will eat several pest plants that other sheep ignore. On threatened heath land, the Hebridean encourages the growth of the desirable heather by consuming young birch growth, purple moor grass, and other wood or scrub invasion. Hebrideans will also control coarse grasses and the invasive thorny shrub the Sea buckthorn. This is most useful in sand dune, coastal areas, and limestone or chalk grasslands. With both ewe and wether flocks, the Hebridean is rapidly gaining a positive reputation and is being used in many locales.

Today the Hebridean is more likely found elsewhere in Britain than in the Hebrides. The lovely fleece

and ornamental character of this breed have found it many homes. This success has led the Hebridean Sheep Breeders Group to leave the Combined Flock Book. There are about 1,000 registered breeding females today, and this thrifty breed's future appears promising. Breeders need to continue to balance the preservation of a historic type with commercial success.



Minor

### *Manx Loghtan (pl. 12)*

The Isle of Man lies in the Irish Sea between England and Northern Ireland. Although the island is ringed with tall cliffs, the mild climate favors agriculture. Its many prehistoric monuments and ancient buildings are evidence of long settlement, originally by Celts, and the island and its inhabitants have been ruled by Norwegians, Scots, and the English. Today the Manx enjoy self-government as a crown possession and use the dual languages of Manx and English. The Isle of Man remains outside the European Union.

The primitive mountain sheep of the Scottish Highlands once populated this island. With the passage in 1855 of the Disafforestation Acts, many people were prevented from using traditional common lands. Without this land, they could no longer keep livestock, and as a result, many of the traditional Manx breeds began slowly to be lost.

At this time the Manx sheep displayed a variety of colors, including white, gray, black, and a lovely brown. But the woolen mills were demanding higher-quality white wool, which favored the introduction of more modern breeds to the island. One independent Manx farmer, Robert Quirk, stubbornly kept his old breed, which later came into the hands of John Caesar Bacon. In the 1890s, Bacon started a planned breeding program to save the Loghtan, as the sheep had come to be called. In Manx, *lugh* is mouse and *dhoan* is brown. Bacon chose to breed for the attractive moorit, or brown, color. Because moorit is a recessive trait, once this color is fixed it breeds true. Bacon was not completely successful in eliminating white patches or markings, which remain a problem for today's breed-

ers. He did retain the Loghtan's primitive, leggy, and lean body, its thriftiness, and the multihorned trait. Bacon's sheep had two, four, and sometimes six horns or were polled. Bacon did use some Shetland sheep in his breeding program.

Various enthusiasts and friends of Bacon continued to own Loghtans. Unfortunately, the numbers grew smaller. A Castlemilk Moorit ram was brought to the island in 1938, and crossings were done for several years. In 1956, a Soay ram was also used, unfortunately introducing the Mouflon color pattern into the breed.

The survival of the Loghtan was precarious until the Manx Museum became involved in 1953. In 1974, the Manx Loghtan was placed in the RBST Combined Flock Book. The goal was to perpetuate the breed as Bacon defined it some ninety years earlier. The modern Loghtan can indeed trace its ancestry back to the flocks chosen by Bacon by 1910.

Like most primitive breeds, Loghtans are fine boned, slow growing, and small, with ewes averaging just under 90 pounds. The tail is somewhat longer than that of a Soay or Shetland but not long enough to reach the hock. Most Loghtans are horned. Some ewes are polled but the RBST regards this as undesirable, believing that this is a horned breed. Many breeders prefer the four-horned ram, although two horns are also historically correct. Other breeders strongly favor two horns. At present about 35 percent of the flock is four-horned. Horn irregularities and split eyelids are problems that trouble all multihorn breeds, including the Loghtan.

The word *moorit* derives from an Old Norse word for peat or reddish brown, which describes perfectly the rich color of young lambs before the sun or age fades their wool. The legs and face are clean and colored fawn to dark brown. The tail is hairy. Mouflon markings continue to appear, but white markings make a Loghtan ineligible for registration. The breed also discourages light coloring around the eyes, which also comes from the Soay or Castlemilk infusion. As with some other primitive breeds, Loghtans are shown in the natural state: not clipped, trimmed, washed, or even brushed.

Loghtans shed naturally, so the medium-fine fleece

must be clipped earlier if it is desired for spinning. The lovely moorit wool is very desirable and used for natural-colored yarns and woolens. Wool quality varies, and some kemp is present. Loghtans can grow a 4-pound fleece with a 3-to-4-inch staple. Some hand spinners enjoy fleeces with fawn, gray, or other shadings, even though they are not the traditional Loghtan color.

The Loghtan is thrifty and a good milker, so the ewe is useful for crossbreeding, raising a lean and vigorous lamb. Loghtans average a 140 to 150 percent lambing rate. The breed is agile, active, and long-lived. Sheep raisers have noticed that the breed can grow larger off the island.

The Manx Museum maintains three conservation flocks at Maughold, Cregneash, and the rocky islet off the southern coast called the Calf of Man. About a third of the registered ewes are on the island of Man. The breed has grown steadily, and ewes now number about 800.

The breed has now attracted a large and loyal following in England, Scotland, and Wales. The brown wool is desirable, and Loghtans are attractive ornamental sheep. There is a danger that breeders will change the breed too much toward modern commercial needs, but the traditional stock on the Isle of Man insures a genetic reservoir if the stock continues to be managed responsibly.



At Risk

### *Jacob (pl. 13)*

Although Jacobs were originally called Piebald, Spotted, or Spanish sheep, this old breed was eventually named for the Old Testament figure Jacob. According to the biblical account, as payment for his many years of work, Jacob received from his father-in-law, Laban, “every speckled or spotted sheep.”

Piebald coloration can occur in other breeds, but spotted sheep that resemble the modern Jacob in body type, horns, and wool coat were documented in Britain as early as the mid-1750s. Lovely piebald sheep are seen in paintings of families and their estates. It has been sug-

gested that Jacob sheep were present in England from the 1500s.

Family legends often relate that these flocks descended from sheep from Spain, Portugal, Africa, or the Middle East. Unusual or exotic sheep and other livestock were brought to Britain for parks and country homes and maintained for many generations. By the early 1900s, there were more than 50 flocks of spotted sheep at different locations. The name Jacob was first recorded in 1913 to describe the flock at Hampton Court.

Although families often could not trace the ancestry of their flocks, researchers began to speculate on their origin. At the beginning of the nineteenth century, a specific breed that might be related to the Jacob could not be readily found, most likely because so many of the older, more primitive European sheep breeds were already severely threatened by the overwhelming dominance of the Merino. A Spanish Churro descendant, the Navajo-Churro, is also four-horned like the Jacob. Four-horned or polycerate sheep are also found in Mexico and South America, most descended from the colonizing Spanish sheep.

British families may have selected for spotted fleeces and four horns, appreciating their decorative appeal in a breed that was essentially a park or ornamental sheep. The tendency to develop four horns may have also come from other primitive breeds found in Britain, such as the Manx Loghtan, Orkney, Hebridean, or Soay. It is certainly conceivable that outside rams were introduced into flocks to prevent excessive inbreeding. But the Jacob differs from other four-horned breeds in that it has a medium-wool fleece, not the double coat of coarse outer fiber and fine inner fiber. It is also a longer-tailed breed.

Small numbers of Jacob importations were made into North America in the early 1900s, but these sheep were shown at zoos or parks and not used as an agricultural breed. In the 1950s and 1970s, imports totaling about 30 sheep established the breed mainly in the flocks of hand spinners and weavers, who enjoy the colors and texture of Jacob wool.

By the early 1970s, Jacob sheep in Britain were reduced to small numbers, but they were rescued by the

British Jacob Sheep Society, founded in 1969. Jacob numbers increased rapidly, and the breed is no longer on the Priority List of the RBST. In North America, Jacob sheep registrations have grown from 100 in 1985 to almost 700 yearly. There are two registries in North America: the Jacob Sheep Breeder's Association and the Jacob Sheep Conservancy. In an effort to eliminate crossbred sheep, both organizations practice certification and progeny testing.

Although some breeders are developing a deeper bodied sheep, the Jacob is generally a small, fine boned, primitive breed with a lean and narrow carcass. Ewes weigh 80 to 130 pounds, while rams can weigh 140 to 180 pounds. The tail is medium in length when not docked. The hooves are black or striped. Breed organizations do not allow the split upper eyelid deformity that has been linked to polycerate traits. The ears are erect and small.

Color is an important Jacob trait. The Jacob is a white sheep with black or lilac spots. Lilac is defined as a gray to brownish hue. In lilac sheep there may be light-colored hair around the eyes. Some breeders strive for an ideal mix of 60 percent white and 40 percent dark. The skin is pink beneath the white wool and dark under the colored spots. The color differences are sharp not fuzzy. The legs are white, often with black spots, especially in North America. Most Jacobs have a large white blaze on their face with dark patches around the eyes and on the muzzle called badger markings. The black spots often fade to brown from sun bleaching, although the original dark color can be seen by parting the fleece to look next to the skin. True brown-and-white Jacobs are seen in Britain. Old sheep may also gray with age just as in other breeds. Jacob sheep carry a dominant black gene so that their crossbred offspring are usually black, except when they are crossed with pink-nosed breeds.

The face is clean of wool, as are the legs. The fleece weighs 3 to 7 pounds and is easily parted and open. The staple length is 3 to 7 inches, and the wool is medium fine and springy. Weavers appreciate the kempy fibers that are present for their tweed effect. Hand spinners enjoy the diverse possibilities for blend-

ing undyed wool into different shades of yarn. Tanned skins with fleeces are especially attractive.

Both ewes and rams have two or four horns. Ewes may only have scurs or smaller, more delicate horns. Two-horned rams should have wide, sweeping curls, sometimes double curled. In four-horned rams the upper horns are large and the lower horns grow from the side of the head into single curls. The horns should be black or striped with white. The upper horns should not tip forward so as to interfere with grazing and the lower horns should not grow into the face. Malformed horns, fused horns, or odd numbers of horns are not acceptable. Horns are more or less attractive based on balance, separation, and direction.

There is a great range of diversity in Jacobs today. Jacobs in Britain may look very different from those in North America, and individual breeders choose to select for various qualities of fleece, color, and size. Generally, British Jacobs are now larger with a more commercial conformation than North American Jacobs, which have so far remained more true to the original type.

Jacob sheep are distinctive and attractive. They should be selected to retain their primitive traits of loose flocking, hardiness, resistance to parasites and foot problems, and good mothering toward their single lambs. Although the modern world may no longer have a place for ornamental sheep that decoratively crop the grass, the Jacob has found a significant number of admirers who enjoy a friendly, little family sheep. Their popularity with handcrafters has certainly aided their recovery. The success of the Jacob has been good news in the story of rare breeds.



### *Boreray (pl. 14)*

Another island survivor is found far beyond the Scottish coast in the Atlantic Ocean on the tiny island of Boreray. Near the home of the Soay on the St. Kilda islands, these sheep were left behind when the islanders departed in the 1930s.

In the eighteenth century, the somewhat exotic Blackface sheep made their way north into Scotland, interbreeding and making inroads into native short-wool and primitive sheep breeds such as the Old Scottish Dunface. Eventually the Scottish Blackface would become the most popular breed in Britain. It took the Blackface longer to reach the St. Kildas, where they would have come in contact with the primitive Hebridean sheep. Their descendants were abandoned when the islanders departed.

The Boreray, sometimes described as the Hebridean Blackface, is today mainly a feral breed that preserves the genetic pool of the nineteenth-century island sheep. There has been no outside influence, and the only selection has been through survival of the fittest.

In 1971, a small flock of Borerays was captured and taken to Edinburgh to the Animal Breeding Research Organization. It is from this group that the handful of small mainland flocks is descended. Fifty ewes are kept in about 5 flocks. The free-running island population fluctuates from about 350 to 450 ewes.

The island Boreray is a small, short-tailed sheep, with ewes weighing about 60 pounds and standing 22 to 25 inches tall. The influence of the Scottish Blackface is seen in the Boreray's face and legs, which are either black and white or gray and white. Fleeces tend to be gray to cream in color and shed naturally. The wool is suitable for carpet weaving and tweeds. The belly and neck may be dark in color. Both ewes and rams are horned, with the males able to grow impressive spiral horns.

Because the attractive Boreray carries genetic material from nineteenth-century Scottish island sheep, it is worthy of preservation and study.



Critical

### *Castlemilk Moorit (pl. 15)*

Although it sounds implausible, the Castlemilk Moorit is both a primitive sheep and a relatively new breed.

Sir John Buchanan-Jardine, who owned the Castlemilk estate near Lockerbie, Scotland, was fascinated

with the development and improvement of domestic animals, especially in shades of brown. Besides his Guernseys and Ayrshires, Sir John developed the colors of tan in his Dumfriesshire foxhounds and dun in his Galloways. Early in his management of the family estate, he became interested in a flock of brown-colored sheep owned by the Ballinloch estate in northern Scotland.

After obtaining 14 ewe lambs from the flock in 1928, Sir John immediately tried to locate more of these "Shetlands," as he always called them. Sir John was involved in crossbreeding experiments with other sheep breeds, including the use of a wild Mouflon ram. It is believed that this Mouflon ram was used with the small flock of "Shetlands" about 1930. Today the Castlemilk clearly shows Mouflon color and pattern, with light markings on the face, legs, belly, and rump.

In 1936, Sir John exchanged a ram from his flock with a Manx Loghtan ram from the Isle of Man. No other crossbreeding additions are known, and it is believed that the flock remained closed from that point.

Sir John remained active and involved with the continued selection process within his flock. The flock was generally kept small, with 2 or 3 rams and about 60 ewes. Photographs of the flock in the 1930s show a range of light to dark fleece color, with a few white patches on faces. Photography from the 1960s depicts a more uniform flock that produced a brown wool.

The original flock was dispersed in 1970, with most of the sheep going to slaughter. Cotswold Farm Park and its founder, Joe Henson, were able to locate 10 ewes and 2 rams from two sources. The present population descends from this group of survivors. There are now 200 to 300 breeding ewes within a population totaling fewer than 500 sheep.

After the minimum seventy-five years of existence and research of records, the RBST recognized the breed in 1983 and recorded it in the Combined Flock Book. Originally called the Moorit Shetland, the breed was renamed to better reflect its heritage. The Castlemilk Moorit was named for its home and the traditional Old Norse word for brown.

Both Castlemilk Moorit rams and ewes are horned.

The breed is short-tailed, long-legged, and larger than the tiny Soay. The medium wool has found great favor with hand spinners, although care needs to be taken that the wool remains of high quality and is not too kempy or hairy. Breeders are reporting that the size of the sheep seems to be increasing, which would make it more commercially successful. Others feel that the breed should be preserved as Buchanan-Jardine left it. This situation needs to be resolved by the Castlemilk Moorit Sheep Society. There are some 40 flocks, with a growing number of ewes. Breeders working with such a small population must be vigilant in preventing problems such as defects in the mouth, jaw, and horn.

Although the numbers remain very small, the Castlemilk Moorit has been adopted by a dedicated group of breeders who formed a society in 1983. This “new” breed preserves primitive sheep qualities along with an interesting history. Small numbers of exports have been made to Holland and Germany.



Critical

### *Welsh Mountain*

Often isolated or inhabiting harsh homelands, the hairy-wooled native sheep of Wales have remained distinct and different from those in England. In the early 1600s, critics wrote, “The Welsh sheep are of all the worst, for they are both brittle and of the worst staple and indeed are praised only in the dish for they are the sweetest mutton.”

But the Welsh breeds have strong traits in common. Descended from the native short-tailed sheep but no longer tan-faced, these sheep are either white from the Roman white-faced, polled sheep influence or black-faced from other crossings. Generally only having one lamb, Welsh ewes are good mothers. Their purebred ram lambs are fattened for market. Welsh sheep usually wear their tails long to protect their udders from the cold. Hardy in the worst weather, the self-sufficient sheep travel over long distances and remain loyal to their home pastures. Older ewes are often moved down to the hills and crossbred on Longwools.

The small Welsh Mountain sheep, in both pedigree and hill flocks, is not endangered. Some of the color varieties or geographic types that have become established as breeds, however, are now few in number.

### *Black Welsh Mountain*

In the Middle Ages, Welsh writers praised the black hill sheep for their rich mutton. Although occasional black sheep appear as recessives in the white flocks, the Black Welsh Mountain carries black as a dominant gene. The Black Welsh has been selectively bred for about one hundred years, with a breed society formed in 1920.

The sun will bleach black wool to a reddish brown near the tips. In Welsh, this color is called *cochddu*. This naturally shaded wool was much in demand by hand spinners in the past and is still enjoyed today. It is also commercially mixed with white wool to produce Welsh tweeds. The black wool is short, curly, dense, and mostly free of kemp. The fleece has a staple length of 3 to 4 inches and a weight of 3 to 4 pounds. Fleecy skins are used as rugs and coverings.

The tail is worn long and is covered by fine wool. An open-faced breed, Black Welsh sheep are known for being self-reliant and intelligent. Rams have fairly strong, curved horns, while the ewes are polled. These tough little sheep are highly resistant to foot rot and fly-strike. Ewes weigh 75 to 100 pounds and rams up to 140 pounds. In the hills, ewes lamb at 175 percent, but when taken to lowland areas, the rate can rise to 200 percent. The Black Welsh also provides a popular joint of lamb.

The Black Welsh is no longer on the RBST Priority List in Britain. The breed has a dedicated following with over 200 flocks. The Black Welsh Mountain Sheep Breeders’ Association in Wales maintains its own registry in which the rams are specifically registered together with the farm flock.

The striking Black Welsh Mountain is the only variety of Welsh Mountain sheep now found in significant numbers in North America, where they are much appreciated by hand spinners. The breed was first imported into the United States in 1972. There

were 100 registrations each year by 1985 and 200 annually by 1990. The American Black Welsh Mountain Sheep Club was organized to assist members in registration, promotion, and marketing.

In Canada, the RBC has initiated Operation Black Welsh Mountain to import new bloodlines into its Host Farm flocks and is attempting to organize registration through the Canadian Livestock Records Association.

 Rare  Recovering

### *Torddu and Torwen*

The Torddu and Torwen represent two striking color patterns of Welsh Mountain sheep.

*Torddu* is Welsh for black belly. This breed is also known as Defaid Idloes, or Badger-Faced. Torddu markings have been common as far back as the 1600s and perhaps occurred much earlier. Because the trait is recessive, this color was a definite selection choice. By the seventeenth century, badger-marked sheep were well known in Wales, although with the increasing demand for white wool their numbers became rare. They have remained in small numbers, mainly in the Powys-Dyfed area.

Torddu sheep have a white face with specific black markings on the head and face. The ears are dark, and the sheep have dark stripes over the eyes. The wool from the underside of the long tail to the rump patch to the throat is black, while the rest of the wool is pure white to creamy tan. The Torddu has a dense medium fleece weighing up to 4.5 pounds with a 4-inch staple. The wool was formerly used for carpet making, but the natural shades have found favor with hand spinners.

Torddu sheep are compact, active, and good foragers. The hardy ewes frequently twin and are useful in crossbreeding programs. Rams carry dark, well-curved horns. The breed society was formed in 1976 to preserve and improve the breed. By the early 1990s, there were about 1,000 ewes and 150 rams.

The Torwen shares the Welsh Mountain conformation and wool qualities with the Torddu, but it exhibits the reverse coloring of the Torddu. The Torwen

is a black sheep with a white, tan, or pale gray belly and underparts. This resembles the color pattern of the Soay and Mouflon and may reflect a common ancient heritage. The Torwen enjoys its own breed society.

### *Balwen (pl. 16)*

The upper Tywi River valley of Wales is so isolated that it was without paved roads until the late 1950s. This area of about 50 square miles was the home of an unusually colored variety of Welsh Mountain sheep that came to be known as the Balwen.

Although usually selected for white fleece, colored sheep are still found among the Welsh Mountain sheep. Colored sheep can be useful to the herder, who can more easily spot them on a hillside. Sheep raisers may also prefer a distinctive color or pattern in their flocks.

Geneticists call the distinctive color pattern of the Balwen H. S. T., for head, socks, and tail. This pattern is unique among British sheep breeds, although it is occasionally found elsewhere in the world. It is unknown how these sheep came to carry this color so dominantly in this remote area, but a romantic tale is told of the largest family in the upper Tywi who were descendants of Irish pirates. It is possible that the Balwen received its unusual color pattern from Dutch sheep, because the H. S. T. pattern is found today in the Dutch Texel.

The Balwen's body color is black, dark brown, or dark gray, with the black preferred. The tail is left long and is colored white for half to two-thirds of the bottom length. At least two feet, but preferably four, are also white but not higher than the hock or knee. A white blaze runs up the face from nose to poll. A small amount of white is often found on the lower jaw and throat, but the nose is black. The ewes are polled, but the rams are horned.

The Balwen is a small sheep and produces lambs that are known to be sweet in flavor. Ewes usually have one lamb, though twins do occur, and they make excellent mothers. Balwens are notably healthy and hardy as well as lively and quick. Ewes generally weigh 88 to 110 pounds, with rams weighing 99 to 132 pounds.

Balwens need very little grain or concentrates. Interestingly, breeders report that their little Balwens prefer their own company to intermingling in flocks of white sheep.

The wool itself is somewhat hard in texture and kempy, but the dark color is very popular with hand spinners for creating naturally colored sweaters and other garments.

As forests claimed more and more of central Wales, the little Balwens began to lose numbers. A near disaster occurred in 1947. That winter was rough on many sheep breeds in Wales, but the Balwen was hit especially hard. Today most Balwen sheep descend from the Davies family Hafdre flock that grazed the Trawnant sheepwalk. During the years when numbers were very low, there were some outcrosses, which the breed society is now attempting to remove.

The Balwen Welsh Mountain Sheep Society, or Cymdeithas y Defaid Mynydd Balwen Cymreig, was established in 1985. All breeding stock is inspected before registration. Rams cannot receive any penalty points, though ewes are allowed a small number. Larger numbers mean that ewes are assigned to “grading up” status. This actually means that they are not properly marked. Rams may not be registered by upgrading ewes. The breeding standards were tightened up even further in 1998. The greatest difficulty has been mis-marked sheep.

For many years the Balwen was unknown beyond its home. Support for the breed grew slowly but steadily. Now the Balwen has spread beyond Wales into England and Scotland, where it has found favor as a small, easy-care, colored-wool sheep. It is especially popular with women and junior handlers. The Balwen was placed on the RBST Priority List in 1993, with fewer than 1,000 ewes found in about 100 flocks.



Vulnerable

### *Hill Radnor (pl. 17)*

Early agricultural writers called the Radnor Tanface one of the oldest types of Welsh hill sheep. For many years this type was found along both sides of the Welsh-

English border hills from Radnor through Hereford and Brecon to Monmouth. By the late eighteenth century, writers noted that these native sheep were especially hardy and excellent mothers that produced good, fat lambs. The Radnor was also known as quieter and easier to manage than most Welsh Mountain sheep.

Usually grazing on difficult pastures, the Hill Radnor was exceptionally well suited to its environment. It has been suggested that some of the indigenous hill breeds were actually finely adapted to different levels of trace minerals in their home pastures. There was a strong local belief that they would reproduce well only in their native red sandstone grazings. Although that belief has now been discounted, it probably prevented the Radnor from spreading much beyond its native region. The adaptable and versatile Hill Radnor was used to produce high-quality lambs either purebred or crossbred. The ewes were often moved to lower land as they aged.

For a long while the Hill Radnor attracted no attention from the serious breed enthusiasts who set standards and compile flock books. Instead, it was a working sheep and is still regarded as such by the owners of the large Radnor-type flocks. Most of these Radnorshire sheep appear to have uncertain pedigrees and have been crossed with the related Clun Forest and Kerry Hill as well as the Shropshire.

In the twentieth century, local sheep raisers noticed that the true Radnor type was becoming scarcer each year. Although efforts were made in 1926, the first viable support did not come until 1949, when the Hill Radnor Flock Book Society was established and issued a flock book. The continuing decline brought the numbers of ewes to below 1,000, and so the Hill Radnor was added to the RBST Priority List. There are now about 14 flocks of registered sheep. The society maintains a strict breed standard.

The medium-sized, robust Hill Radnor is what sheep people call biddable, or docile and easy to handle, notable in an upland sheep. Rams weigh about 165 pounds and ewes 110 pounds. The Radnor ewe lambs at 155 percent and takes good care of her lambs on the hills. The Hill Radnor is also an active breed and a good forager. The breed's feet and legs are tough. Flock

owners note that the breed thrives on better pastures and in milder weather than its homeland.

The Hill Radnor has a curved or aquiline nose. The face and legs are a gray to grayish tan color and clean of wool. Ewes are polled and the rams are horned, but the horns tend to be small. The Radnor's dense, white fleece is somewhat coarse, with kemp in the britch and dock to protect the sheep from the cold and wet. The fleece is exceptionally weather resistant and able to shed water. The Radnor is also known for holding its fleece well. The annual 4 to 6 pounds of wool have been traditionally used for flannel and fine tweed manufacture in Wales. Spinners and weavers also produce goods marketed under the Radnor name.



At Risk

### *Lleyn*

The polled LLeyn or Llyn was originally found on the Lleyn peninsula in northwest Wales in County Gwynedd. The Lleyn was an economical lowland breed that produced market lambs, was milked for cheese making, and provided a kemp-free wool. In the absence of petroleum products, Lleyn milk was churned into a butter that was used as grease for the wheels of carts.

After World War II, the Lleyn population went into serious decline. A few dedicated breeders built a conservation success story by concentrating on the Lleyn's outstanding traits and selecting for the breed's strengths. The group achieved this by working together to plan breedings and keep accurate records. The inspection panel continues to reject sheep that do not meet the breed description.

The Lleyn is a remarkably prolific, medium-sized sheep. The ewes lamb early and average more than 200 percent, producing triplets, quads, and even quintts. Lleyn ewes are good mothers, are able to care for their multiple lambs because of their high milking ability. The head is white, with a black nose and black spots on the ears. The Lleyn bears a medium-fine white wool. The fleece weighs 4.5 to 6.5 pounds, with a staple length of 3 to 5 inches.

The Lleyn Sheep Society was formed in 1970, and through their efforts the breed was removed from the Priority List. The success continues. In the decade since 1980, when the flock numbers had grown to 154, the number of flocks increased to 565. The Lleyn has been used in the creation of new breeds to increase prolificacy and milkiness. The breed is also used to produce prime lamb in crossbreeding with the British Bleu du Maine to create the Welsh Blue and with the Romney to create the Kent Halfbred.

### *Portland (pl. 18)*

The stone circles and other archaeological remains in the south of England reveal the prehistoric presence of humans at places like Avebury, Silbury Hill, and Stonehenge. And the Portland sheep of this region is the descendant of the very old, tan-faced sheep of Britain. The Portland also reveals an interesting mixture of primitive and exotic traits.

Portland mutton has long been regarded as a specialty, and it was a particular favorite of King George III. The breed is known for its delicate flavor. The ability to produce "Christmas lamb" before other sheep have even given birth was another valuable commercial consideration.

Grazing on the chalk lands near important port cities, native sheep could have been easily influenced by imported breeds. Romantic stories have long been told of a ship from the Spanish Armada sinking off the coast and the brave sheep swimming ashore. And in fact, the Merino may have played a part in the Portland history, though the details are unclear. The Portland's ability to breed out of season, its long tail, the rams' spiraled horns, and fineness of its fleece may have all come from the Merino.

The Portland was a popular breed in Dorset, especially on the hooklike island known as the Bill of Portland. It was from the Bill that Sir George Crewe took some stock back north to his home at Calke Abby in Derbyshire in the early 1800s. Sir George wrote in his journal that these new sheep were to be added to the Portland flock already established by his grandfather at Calke. He noted that the Calke flock was already larger

and healthier than these new Portlands and attributed this to their better diet.

Through the years there were some outcrossings with Hampshire, Scottish Halfbred, and Suffolk, but not specifically for breed improvement. The Portlands were also used in crosses on other breeds. After the death of the last family member in 1989 and the passing of the Calke estate to the National Trust, the sheep were all registered in the Combined Flock Book with other surviving Portlands.

This portly little sheep generally weighs less than 100 pounds. Both sexes are horned. The ram carries large spiral horns with an extra turn at the end and an interesting thin black stripe. Unlike its short-tailed ancestors, the Portland has a long tail. The Portland ewe is not prolific, usually having only one lamb. Some ewes are still able to breed out of season, a trait the Portland has passed on to the Dorset Horn.

The Portland has a tan face and skin that may be sandy to brown or reddish. Lambs are born a distinctive “foxy” brown color. The wool begins to turn white or gray, although reddish kemp is found in the britch area. There should be no black marks on the skin or black wool, which is a sign of outbreeding and is therefore not registrable. The fleece is medium closewool but with a fine quality and a length of 3 to 4 inches. The wool yields a good knitting yarn.

The differences between the Calke Portlands and the other registered stock have provoked some controversy. The Calke Abby (also called Harper-Crewe) sheep are larger and stronger than the Portlands raised elsewhere. Although they are above average, the larger size and weight are not unheard of in Portlands. The Calke Portlands are also a little woollier in the face and legs, but not outside the range of acceptability. They are much darker brown in the face and legs and not as pale around the muzzle and eyes. The fleeces are white or creamy yellow, and there is a range in fleece character from tight down to open and long. Red kemp is present. Polled animals have also been noted, but they are not registered. The flock essentially retains the Portland character, and the differences are probably due mainly to selection in a closed flock over time. The Calke flock

is also very healthy and free of serious defects. It must be noted that the “outside” Portlands were also subject to a limited improvement effort themselves, so neither group can be accurately described as pure old Portland.

By the 1970s, the Portland had become very scarce. Only about 100 ewes were located in just 6 flocks in 1973. Under the fostering of the RBST and the Combined Flock Book, along with the addition of the Calke Abby flock, there are now about 800 ewes and almost 100 rams registered in about 70 flocks. The Portland is still found in Dorset and in other flocks around Britain, especially in the south. This lovely little sheep has some unusual and attractive characteristics and an interesting history. It is also the best representative of the old tan-faced breeds that once were popular across Britain.



Vulnerable

### *Dorset Horn (pl. 19)*

An old British breed, the Dorset Horn shares much of its ancestry with its close relative the Portland. This native tan-faced sheep was probably altered by the introduction of the Spanish Merino, with its long tail, spiral horns, and out-of-season breeding ability. By the 1750s, Dorset house lamb was a Christmas treat. In the eighteenth and nineteenth centuries, attempts were made to improve the Dorset Horn by crossings with the Southdown, and yet the breed retains a strong identification with the old Wiltshire Horn and Exmoor Horn. Selection may have played a more important role than crossbreeding in fixing the Dorset Horn breed.

Good conformation and out-of-season breeding helped the breed become very successful, eventually surpassing the Portland. The Dorset Horn not only produced Christmas lambs but twinned more often and was able to lamb three times in two years. Dorset ewes also matured early and could lamb at one or one and a half years old. As early as the mid-1700s, Dorset Horn ewes were known for “being especially more careful of their young than any other.”

In Britain, the Dorset Horn has the teddy bear appearance of the Southdown with Portland horns, making the breed very attractive and appealing. The

[To view this image, refer to the print version of this title.]

fleece is a fine shortwool, 4 to 5 inches in length and 5 to 9 pounds in weight. The upper legs and head are covered with wool, although not quite as much as the Down breeds. The fleece is dense, white, and extremely attractive, providing wool for fine fabrics. The skins are also valuable for boot and coat linings.

The Dorset Horn is a medium-sized breed, with rams 210 to 250 pounds and ewes 140 to 180 pounds. Dorsets are long-lived, hardy, and able to live outdoors. The ewe's horns are small but nicely curved forward and downward. Rams grow heavier horns that curve spirally downward and forward.

The Dorset Horn is used in crossbreeding market lambs. Formerly, it was also kept in sheep dairies in southwest England. The Dorset is widely regarded as one of the finest milkers, which certainly contributes to the ewes' deserved reputation as excellent mothers. The Dorset Horn is also known for its appetite, needing to be well fed. Fortunately, the breed turns this appetite to advantage, raising high-quality lambs out of season at good prices. Early lambs escape problems

Fig. 15 A prize-winning Dorset Horn ram from the late 1880s. Courtesy of the IAB and Hans Peter Jorgensen.

from pasture parasites and have a jump on development on lambs born later. Ewes average a 125 to 170 percent lambing rate.

The breed has found homes far from Dorset in other parts of the United Kingdom, North and South America, South Africa, Australia, and New Zealand, where it has enjoyed tremendous success.

The first Dorset Horn sheep in North America were shipped into the Oregon Territory by the Hudson's Bay Company in 1860. An English firm exhibited the Horned Dorset or simply Dorset, as it came to be known in North America, in 1885 at a livestock show in Chicago. More imports soon followed into Canada and the Northeast. In 1891, the formation of a flock book united the breeders from the East and West. Although the breed grew steadily, a chance mutation in the 1950s has resulted not only in a great increase in numbers but also in a major change for the breed (fig. 15).

North Carolina State College was maintaining a purebred flock of Dorset Horn when a polled mutation occurred. Selection for polled Dorset was fostered, and the Continental Dorset Club registered Polled Dorsets in 1956. The Polled Dorset has quickly surpassed the old Horned Dorset and has been exported elsewhere. The gene for polledness is not a simple dominant, so careful breeding is necessary to overcome the horned tendency. Both sheep raisers and butchers seem to favor polled sheep. The Polled Dorset is clearly not endangered in Britain, Australia, or North America.

Polled Dorsets have also been created in Australia through crossings with the Ryeland and back-breeding to the Dorset using polled animals. Polled Dorsets are now bred in Britain using Australian rams.

Researchers have continued to study genetic traits such as high growth rate, size, physical soundness, and muscular development. In the early 1990s, a gene was discovered in the Dorset that increases size in the leg muscle. Named *calopeige*, which is French for fancy or big buttocks, this gene is of interest to the lamb meat trade.

Meanwhile, the old, beautiful, and majestic Horned Dorset has become endangered, now representing only about 5 percent of yearly registrations. The Horned Dorset is not discriminated against in the registry, and yet the Horned Dorset has rapidly fallen out of favor in North America. Breeders claim that the horned sheep are not harder to handle or fence than the polled variety because they “know how to handle their horns.”

Because the gene for polledness is not a simple dominant but more complex, the elimination of horned sheep diminishes the genetic variety of the breed. The differences that accompany horns may prove to be valuable in the future. The Dorset has also become a slightly larger breed in North America, where it is selected and shown for meat conformation.

Out-of-season breeding is useful and also used in crossbreeding. There is great interest in intensive, accelerated year-round production using the Dorset, but some breeders complain that the selection for other traits may have diminished the Dorset’s ability to breed out of season. The Horned Dorset’s exceptionally

heavy milking ability may be valuable as interest in sheep dairying increases.



Watch



Insecure

### *Wiltshire Horn (pl. 20)*

The Wiltshire Horn is Britain’s only native breed of woolless sheep. It also has an entirely different ancestry than the hair sheep breeds found in North America. These strong and unique traits have been used to advantage in developing other breeds of hair sheep in many countries.

Hair sheep have long lived on the chalk downs of the Salisbury Plain in Wiltshire. With the Neolithic monument Stonehenge standing guard, sheep have grazed here for many centuries. Sheep bones recovered from two-thousand-year-old excavations reveal few differences from the Wiltshire sheep of today. The Wiltshire’s origin is lost in the past, but it is believed to be related to the short-wooled, white-faced, horned breeds of southwest England.

By the seventeenth century, observers commented on the widespread presence of the breed type, which numbered more than 500,000 on the chalk downs. Just before the turn of that century, the Old Wiltshire Horn or Western breed was described as a lean sheep that could travel far on its long legs, did very well on rough provisions, and tolerated the heat of summer without shelter.

Wiltshire fleece was described as very light, even bare on the underline. The process of domestication in sheep included selecting animals that retained their fleeces as opposed to those that shed or “cast” their fleece. This selection was not complete in some breeds even in the nineteenth century. Whereas other breeds were guided in the direction of fleece retention, efforts were made in the case of the Wiltshire to lessen the fleece and increase the shedding because the breeders’ focus was to produce mutton and lamb. Two hundred years ago, the Wiltshire carried a fleece that weighed about 2 pounds; today its fleece is virtually nonexistent.

By the eighteenth century, the Southdown became

the breed of choice for many sheep farmers. In Britain, the Merino craze began in 1800, when King George distributed some 1,500 imported ewes and rams throughout Wiltshire. The Merinos were intended to increase wool production and develop sheep that were more suited to living within the fences that were enclosing the downs. These changes in sheep production and other attempts to “improve” the Wiltshire slid the breed into decline even in its homeland. By the early twentieth century, the breed was forgotten by many and believed to be nearly extinct.

Curiously, the breed survived mainly on the island of Anglesey in the Irish Sea off northwest Wales and in Northamptonshire and its surrounding areas, which lie northeast of Wiltshire some distance away. What these two disparate areas have in common is that they were on the old livestock drover’s road to London. Many of the Wiltshire sheep who survived were in long-held family flocks, where the rams were often used to sire market lambs raised on pasture or other forages. Those sheepmen who kept and used the Wiltshire Horn formed the Wiltshire Horn Sheep Society in 1923.

The Owen family on Anglesey has raised Wiltshire Horn sheep since 1911. In addition to raising many of the championship representatives of the breed, Iolo Owen has crossbred the Wiltshire onto Welsh Mountain sheep to produce Easy Care sheep. This new breed does not require shearing, produces high lamb percentages, and has good growth rates. The Owens’ Gedwydd Flock has also exported more than 200 Wiltshire Horn sheep to several countries, where they have been used to improve other hair sheep breeds. The Wiltshire population has remained at about 1,500 ewes for many years now, mainly in Anglesey and the Midlands.

Although the Wiltshire is a large breed, it has a wedgelike shape rather than the boxy shape of the popular meat breeds. Wiltshire cross lambs continue to do exceptionally well at carcass competitions because of this large frame. Rams can mature at 260 to 300 pounds and ewes at 150 to 170 pounds. Ewes are good mothers and average at least 150 percent lamb rates, with the lambs growing rapidly. Lambs are born in a

warm hair covering and have small heads and shoulders to aid birthing.

The Wiltshire coat itself is unique, differing from both wild sheep and the African or Caribbean Hair sheep. The underwool fibers are coarser and the 2-inch-long outer hair is really a fine kemp that is not pigmented. The number of wool fibers present is less than in wild sheep. The winter coat becomes matted and molts in clumps starting at the head and points and working up toward the spine. Lambs may not shed out their entire fleece their first year. Wiltshires do not have to be clipped in any way, nor are they susceptible to skin parasites or fly-strike. The woolless tail does not require docking. The Wiltshire is colored white, with a black nose and feet.

Wiltshire sheep retain their characteristic long legs and active nature, which makes them vigorous foragers. They do not need as much shade in hot weather as woolled sheep. Ewes have small horns, but the horns of the rams grow large and spiraled out to the side like those of the Merino.

The Wiltshire is so large and so genetically different from the other hair sheep breeds that it brings great value to crossbreeding for hardy, prime market lamb. Interestingly, there is very little wool shedding in the first cross, with further crosses showing a range of complete to little shedding. One problem reported by some sheep raisers is that the Wiltshire ewe can produce too much milk if she has just one lamb. This milking ability would be extremely useful for the sheep dairy producer.

The first Wiltshire Horns came to North America soon after the Pilgrims settled at Plymouth. These early Wiltshire Horn sheep and subsequent imports were successful in New England for a time but eventually disappeared into America’s livestock melting pot. More recent imports were made in the early 1970s. In an effort to re-create the historical sheep of the early days, Wiltshire Horns have been crossed with Dorset Horns to populate some living history parks. Michael Piel used Wiltshire genetics in refining his breed, the Katahdin. His base breeding flock of Wiltshires was donated to Plimoth Plantation, which maintains the breed.

A mere handful of dedicated breeders keep Wiltshire Horn sheep in the United States. The numbers are very small, perhaps fewer than 100 animals. The narrow genetic base in the United States may be responsible for the smaller size reported by breeders. Rams weigh about 250 pounds and ewes 150 to 175 pounds. These breeders could use a new influx of Wiltshire stock or genetic material. They have been stymied by the prohibitively high cost of importing animals and meeting quarantine regulations, although they are hoping eventually to import semen from Australia.

Although the breed had made its way to Australia, it had not flourished over the years. In the 1970s, the Harwood family of Victoria rescued a small flock of Wiltshire sheep. These sheep have grown to several hundred and have started many breeding flocks. The Australian Wiltshire Horn Sheepbreeders Association is active and growing. Australian Wiltshires have now been exported to many countries and do very well in tropical or humid climates.

In Zimbabwe, the Wiltshire has been crossed on the Blackhead Persian and Sabi sheep to create a hair meat breed known as the Wiltiper. The Wiltshire ewe population is now about 3,000. Hair sheep are an advantage in the veld, where a particularly vicious burr catches in wool and then works its way into the skin of woolled sheep.

Although the Wiltshire enjoys popularity for crossbreeding, the actual purebred population is small and separated by disease-control barriers and import restrictions. The breed should be carefully husbanded but would benefit from genetic exchanges between the United States and Australia. British breeders have a closed flock book and cannot accept nonregistered sheep.



Rare



Minor

### *Whitefaced Woodland (pl. 21)*

Running south to north, the Pennines stretch from Derbyshire almost to Scotland. High peaks and upland moors have long been the home of sheep whose names are taken from the old villages or perhaps the

other way around. Among these sheep is the old Penistone, now known as the Whitefaced Woodland. The Penistone was closely related to the now extinct Silverdale or Limestone breed. These breeds descend from the old white-faced, horned, shortwool sheep.

The sheep were named after the small village of Penistone, Yorkshire, which held classes for the breed at the village sheep fair from 1699. When King George III obtained Spanish Merino sheep in the late eighteenth century, the duke of Devonshire used some Merino rams on the flocks of Penistone sheep at his estates in the Woodland Dale valley in northern Derbyshire. It is likely that Scottish Blackface and Cheviot crossings later that century also changed the old breed in several ways.

In the early nineteenth century, the Whitefaced Woodland was a major wool supplier. The breed provides up to 6.5 pounds of wool, with a staple length of about 6 inches. The wool varies from fine to coarse and is used for hand yarns, blankets, and carpets. The sheep are clean of wool on the head and legs.

With its broad white face and pink nose, the Whitefaced Woodland stands apart from black-faced hill sheep. They are also larger and their wool is finer and softer. The tail is longer and thicker, but hairy. Both sexes are horned, and the ram's horns are ridged and can grow heavy and spiraled. The horns can grow so close to the face that they need to be trimmed.

The Whitefaced Woodland's hardiness, combined with its large size and frame, can be profitable when rams are crossed on smaller hill ewes. Breeders describe their sheep as robust and hardwearing. The ewes weigh about 140 pounds, and rams are large, at up to 200 pounds. The legs are strong-boned, and the body is long. The tails of the Whitefaced Woodland are distinctive and muscular. The rams wear their tails traditionally full-length, whereas the tails of the ewes are docked long. On the hills, the ewes generally have single lambs, but they often twin on the lowlands.

Pressured by the black-faced breeds and lacking a breed association, the Whitefaced Woodland was nearly extinct by the mid-1970s, when it was included in the original Combined Flock Book of the RBST. In 1980, there were just 14 flocks, but this number

has since increased. The Whitefaced Woodland Sheep Breeders Group was established in 1986. Today there are about 50 flocks and 400 to 500 breeding ewes. It has been necessary to pay attention to the careful use of ram lines to preserve the genetic pool because most flocks have only one ram.

The breed is still found mainly in the Pennines and Yorkshire, although some flocks have now been established elsewhere in Britain. It is sometimes still called by its old name, the Penistone. The total population may be as high as 3,000 because there are many unregistered sheep in their traditional grazing areas.

 Endangered

### *Lincoln (pl. 22)*

Although Julius Caesar had made an earlier foray in Britain, the Romans' serious conquest began in A.D. 43. With its location on the eastern coast, Lincolnshire was soon part of the empire. Lincoln, or Lindum as it was called, was the site of a fortress around which grew a city. In their cities, the Romans built temples, baths, offices, amphitheaters, barracks, and workshops, including a facility for processing raw wool into fabric that was exported as blankets and cloaks. Farms and villas surrounded the Roman cities. An extensive trade flourished via the many roads that connected farms and towns. Wool and mutton were important agricultural products. The Romans studied the subject of agriculture, practiced the improvement of livestock, and described different breeds of livestock.

At the time of the Roman occupation, the British farmer was raising primitive short-tailed breeds. As revealed through textile remains and artistic depictions, the Romans had at least two types of white-faced sheep—a medium-wool breed that was probably a primitive longwool and a white shortwool breed with a long tail and horned rams. These sheep were not slender and fine-boned but rather more substantial. Although written records do not prove that the Romans imported these two separate sheep types, the physical record tends to support this explanation.

Another example of different sheep types was un-

earthed in the Cambridgeshire grave of a Roman child of the second century A.D., wherein three clay sheep figures were found. These sheep clearly show two kinds of fleece—the shorn short curls of a longwool and a medium hairy fleece. All three sheep were short-legged, deep, and sturdy, not slender, long-legged, and primitive. The sheep also had long tails and horns.

In Britain most sheep bones recovered through the sixteenth century are slender, although some larger bones are also found. Sheep remains contain a mixture of horned and polled skulls. Most textile remains are medium, hairy medium, or a fine Shetland type. However, paintings from the Middle Ages in Britain usually show polled, white-faced sheep with white fleeces and horned rams or wethers. This type of sheep may have been the most desirable. Sheep with short tails, black faces, or hairy fleeces are not seen. Occasionally the shorn longwool appearance is seen.

In the sixteenth century, Gervais Markham wrote that the Lincolns were the “largest sheep.” Intact wool staples dating to the mid-seventeenth century have been recovered in Cumbria. About 10 inches long, these fibers are a medium longwool. Coarse longwool was available in Lincolnshire, Leicestershire, and further north in the bordering counties. Some researchers believe that the Lincoln was the foundation stock for all the longwool breeds and still represents the Old Longwool in its purest form. Others suggest five separate types: Cotswold, Leicester, Lincoln, Romney Marsh, and Teeswater.

In the eighteenth century, the Lincoln was a prime supplier of heavy wool. Later in the century farmers faced a growing demand for meat, which was not the Lincoln's specialty. Beginning in 1760, Robert Bakewell had used Lincoln rams and others on his Old Leicester sheep to produce the Dishy, or New Leicester. In return, improved Leicester rams were brought back to Lincolnshire and used to “improve” the old stock for meat production. Some breeders felt that an adverse effect was a deterioration in the wool quality.

The first society of Lincoln breeders was established in 1796. The influence of the Leicester was not universal, and various types of Lincolns were observed through the mid-nineteenth century. The first class for

Lincolns was not held at the Royal Show until 1870, when a breed standard was becoming established. The Lincoln Longwool Breeder's Association was organized in 1892, and it continues today. In the early years of the twentieth century, there were an estimated 500,000 Lincolns in England. Yet the Lincoln would find it difficult to compete with the modern forms of sheep farming in the second half of the twentieth century.

The Lincoln was first imported into Canada in the early 1800s and into the United States in 1825. By the time the breeder's association was created in 1891, the Lincoln, Leicester, and Cotswold were well-known longwool breeds in North America. The Lincoln was also exported to much of the world, including Europe, South America, Australia, and New Zealand, where they were maintained as purebreds and used to create such new breeds as the Columbia, Corriedale, Panama, Polwarth, and Targhee.

In crossbred meat operations, the value of the longwool breeds such as the Lincoln is important. Because Lincoln rams and ewes are a genetically different breed, they produce crossbred lambs with great hybrid vigor, large size, and a greater wool clip than their non-Lincoln parent.

The Lincoln's home is lowland, where they are raised on abundant feed. Lincolns do best on good pasture for they are not extremely vigorous foragers. Lincolns and other longwools can have problems in cold, wet climates if their heavy fleece parts down the middle, exposing their backs to the cold. Despite this, Lincolns are now being raised successfully in many climates.

The polled Lincoln has remained the largest native breed of sheep in Britain, although in North America the modern meat breeds, such as the Suffolk, Oxford, and Hampshire, are now larger. Lincoln rams weigh 200 to 300 pounds, with ewes ranging from 175 to 250 pounds. The Lincoln is a large-framed, sturdy sheep with strong legs and black feet. The Lincoln of a hundred years ago may have had a heavier and broader front and shoulders. The contribution of the Leicester along with careful selection has improved the meat carcass, with its deep body and wide loin.

Because they are so large, the ewes are well suited to

give birth to big lambs, perhaps better than some popular commercial crosses. In Britain, ewes average 150 percent lambing rates, with North American owners averaging twins. Lincoln ewes are good milkers and mothers. Lambs grow slowly and mature later than other breeds. Although sexually mature at one year, rams do not reach full size until three years of age. Lincoln rams are noted for their calm dispositions. These sheep are especially long-lived and productive into old age. Although Lincolns are a docile breed, owners enjoy their interesting personalities.

White Lincolns have a bluish white face, with black spots on the back of their forward pointing ears. The Lincoln is fully wooled, with a prominent forelock, bare only on the lower front legs. The famous Lincoln wool is longer, heavier, and more lustrous than any other breed of sheep in the world. The fleece can grow 8 to 15 inches a year, with a shearing weight of 12 to 16 pounds. The record Lincoln fleece was 46 pounds with a length of about 37 inches. The wavy, lustrous wool is in high demand by fiber artists, hand spinners, and the commercial carpet industry. Sheepskin rugs are another valuable product.

Colored Lincolns range from an unusual and desirable silver-gray to black. Colored sheep also tend to have darker wool on the shoulders and legs. Although the British association is not registering colored sheep at present, in North America colored sheep and their offspring are kept in a separate flock book in the registry. The colored Lincoln has developed a dedicated following among hand spinners and fiber artists (see pl. 23).

In Britain, Lincolns are still found mainly in Lincolnshire and the east of England, although they have made fans elsewhere. In 1971, there were only 15 flocks with a total of 500 ewes. Lincoln numbers are steadily increasing, and now number about 1,500 breeding ewes. The number of flocks has increased greatly, but they tend to be small.

In North America, there are about 1,000 registrations each year. In the United States, Lincoln numbers are growing, while the Canadian population has remained steady. There are about 1,500 breeding ewes in the United States. Canada is home to a group of espe-

cially “true” Lincolns that are popular with hand spinners and weavers. Black fleeces are in high demand.

Lincolns are also found in Australia, New Zealand, and South America, which may allow for the future availability of a larger genetic pool, although the Lincoln has come to differ from its original form in these various homes.

 Rare  Watch  At Risk

### *Teeswater (pl. 24)*

This breed is descended from Old Longwool sheep in the Teeswater area of eastern Durham and Northumberland Counties. By 1794, the Teeswater was described as extremely prolific and one of the largest breeds in Britain. Although the breed was well established, a flock book was not issued until 1949.

Although the Teeswater was exported to Tasmania in 1804, it remained rare in Britain outside its local home until the 1920s, when Teeswater rams began to be bred to Dalesbred or Swaledale ewes in order to produce the very successful crossbred ewe known as the Masham. Although the Wensleydale ram was the original sire of the Masham, it lost out to the Teeswater in the years between the two world wars. Strangely, much of this rejection was based on looks. The Teeswater Masham ewes inherited an attractive black-and-white face, whereas the Wensleydale Mashams had a brown-and-white face.

This mountain ewe and longwool ram cross became very popular in the United Kingdom. Masham ewes are large, hardy, and prolific. Ewes nearly always deliver twins, and they do so for up to ten years. They raise excellent, prime meat lambs, especially when crossed with a Down breed. The male Masham lamb is also sold for meat. In addition, the Masham ewe produces a good fleece.

The Teeswater is a large polled sheep with a deep rib cage but is not coarse in any way. Strong in appearance, the Teeswater has a medium-long head with a broad muzzle and large ears. Ewes weigh about 180 pounds and rams about 220 pounds.

The light-colored fleece contrasts with the dark

brown or black nose and markings around the eyes. The face can have light blue-gray markings. The Teeswater has black feet, and the coloring of the clean legs matches the face. Teeswaters are covered in a fleece that falls in separate locks or ringlets without matting, and the wool is lustrous and fine without kemp. Fleeces cannot contain dark color and should be uniform in texture over the entire sheep. Ringlets fall over the forehead. Wool yield averages 12 to 18 pounds.

The breed is very prolific, averaging over 180 percent lambing rates. Mature ewes average 250 percent, and the Teeswater Sheep Breeders' Association often records quads and quintes. The Teeswater is noted as a docile and easy-to-handle breed. Ewes are good mothers, with plenty of milk for their lambs.

The main function of the long-lived Teeswater is not as a commercial purebred but in the Masham sheep production system. The best stocks are kept for the purebred flocks to protect their excellent qualities. Rams are generally used for pure breeding only after they have proven themselves as good crossbred sheep producers. The association also conducts progeny testing.

The Teeswater Sheep Breeders' Association has 70 to 80 members who register about 350 lambs yearly. Unfortunately, commercial sheep producers have recently turned away from the heavier fleece of the Masham, which has affected the popularity of the Teeswater. The RBST changed the Teeswater's status from Minority to Endangered when the registered ewe breeding flock numbered about 700. The association believes that the outdoor hardiness of both the Teeswater and Masham will be valued in the future. Teeswater rams are also being crossed on Scottish Blackface ewes with good results.

The purebred Teeswater is not found in North America, although it was reported in 2000 that American breeders were importing Teeswater semen for upgrading efforts on Cotswold, Lincoln, and Leicester Longwool ewes. The ALBC has issued strong comments against this effort on several grounds. First, the three foundation breeds are all more critically endangered globally than is the Teeswater. When these ewes bear crossbred offspring, it will prevent them from

bearing purebred lambs that could aid the conservation effort of breeds with a long history in North America. Second, market studies have discovered that these crossbred Teeswater sheep will replace purebred longwool sheep on American farms, which will also harm their conservation. Last, these upgraded Teeswater sheep will not be recognized as purebred by their parent registries and so will not help preservation in any way.



Endangered

### *Wensleydale (pl. 25)*

To many North Americans, the lovely Dales countryside is the mental image of rural England, the land of James Herriot and the Yorkshire farmer. North Yorkshire is also the home of the Wensleydale sheep.

The Wensleydale can trace its ancestry back to a prepotent sire. In the early 1800s in East Yorkshire, a farmer named Sonley bred Leicester sheep. He produced an unusually large and sturdy ram with a blue face and ears. Sonley leased this ram to Richard Outwaite near Bedale, North Yorkshire. Outwaite raised a now extinct type of longwool known as Mug sheep. According to the Royal Agricultural Society Report of 1880, the Mug became extinct by the mid-nineteenth century. The Mug was described as an active, hardy, lean sheep.

This Mug crossing created an outstanding ram, also blue of skin, with an exceptional and fine white longwool fleece. Born in 1839, this ram was named Bluecap. Bluecap weighed 448 pounds as a two-year-old but was notably active, and he passed to his offspring all of his excellent qualities. In 1890, the first flock book of the Pure Select Wensleydale Sheep Breeder's Association described Bluecap as the best ram in the north of England, with a very dark blue head and fine and long white, lustrous wool. Bluecap combined the conformation and early maturity of the Leicester with the active hardiness of the native longwool.

The resulting offspring met the demand for large carcasses of mutton and still yielded lustrous fleeces. Bluecap sons were used on Pennine mountain ewes

to produce the sheep sold in the markets of Masham. The crossbred ewes could then be bred to the Wensleydale or to another large breed to produce market lambs. This profitable system was the beginning of Britain's unique market sheep production system.

Bluecap's descendants were given the name Wensleydale in 1883. During the Middle Ages, the monks of Jervaulx Abbey originally produced Wensleydale cheese from the milk of area sheep. Although these white-faced horned sheep are now extinct, the name honors the history of the Dale. The Wensleydale Longwool Sheepbreeders Association was formed in 1920, combining two separate registries.

The Wensleydale grows a renowned, fine, white luster fleece that falls in distinctive spiraling ringlets topped off by a shaggy forelock. This shine is especially valued in tapestry hand wool. Wensleydale wool is also used in fine woolens. A Wensleydale annually produces 7 to 12 inches of kemp-free wool weighing 7 to 20 pounds, depending on age.

Fifteen to 20 percent of Wensleydale lambs are born black or silver-black in color. Blue faces are a breed requirement, so those lambs born with white or black color are culled. The Wensleydale Longwool Sheepbreeders Association recognized the qualities of naturally colored wool, and the flock book has maintained a separate registration section since 1982 for sheep with black or silver-colored fleeces. Some breeders prefer this color variation and the wool it yields. Others desire the traditional deep blue color in the face and ears.

The Wensleydale remained the premier crossing sire in northern England and southern Scotland through World War I but gradually lost ground to the Teeswater rams, which sired a more fashionable black-and-white-colored face. By the late 1960s, the Wensleydale had fallen on its darkest days, with fewer than 200 breeding ewes in 18 flocks. More than thirty years later there are about 1,500 ewes in more than 160 flocks. The Wensleydale is still found mainly in Yorkshire, although it has found admirers across Britain.

The Wensleydale is again being used a crossing sire to produce large yet lean heavyweight carcasses. The Wensleydale ewe has a lambing rate of over 175 percent, and triplets are common. The Wensleydale remains one

of the largest breeds of British sheep, with ewes weighing 200 to 250 pounds and rams up to 300 pounds, yet the Wensleydale is a calm, easy-to-manage sheep. The dark pigmentation is also an advantage in hot climates. The Wensleydale's lustrous fleece has certainly attracted admirers.

Small numbers of Wensleydales were exported to North America, but they are unaccounted for today. However, with the support of the Wensleydale Longwool Sheep Breeders Association in Britain, the members of the North American Wensleydale Association, formed in late 1999, are importing British Wensleydale semen for upgrading efforts on Cotswold, Lincoln, and Leicester Longwool ewes. The NAWA will register rams at 92 percent pure and ewes at 87 percent pure Wensleydale through upgrading. The ALBC is as concerned about this effort as it is about the Teeswater upgrading effort discussed above in the Teeswater breed profile, and for all the same reasons.



At Risk

### *Leicester Longwool (pl. 26)*

The Old Longwool was part of the fertile fields and green pastures of Lincolnshire and Leicestershire for many years. Called Lincolns in that county and Leicesters in their own home, these breeds were essentially the same big-boned, heavy, slow-growing sheep that carried a long coat. The Old Leicester still occasionally carried horns on its long, thin body. Wool was of greater importance than meat in these breeds.

When Robert Bakewell assumed the running of his father's farm at Dishley Grange in 1760, he was just twenty-two but full of ideas for agricultural innovations—irrigation, artificial waterways, crop rotation, and, most significantly, an organized approach to breeding and promoting livestock for specific market needs. Faced with a decreasing demand for longwool and a rapidly growing market for fat and mutton to feed the expanding urban population, Bakewell set out to improve the carcass quality of the Leicester sheep. He was guided by the goal of developing a finer-boned, more compact, smaller, rounder animal that quickly put on

fat. Wool production was not an important consideration.

Bakewell selected Lincolns in this improvement effort, perhaps along with Ryeland sheep or other shortwools. He documented his efforts, practiced careful selection, bred like to like (including close breedings) to fix desired qualities, and conducted performance testing of his rams with the flocks he and others owned. The result was a breed that was a remarkable producer of mutton and lamb, yielding three times more than average but with less prolificacy.

These new sheep were variously called the Dishley Leicester, Bakewell Leicester, New Leicester, Improved Leicester, Leicester Longwool, Bakewells, or English Leicester (as it was known in the United States). Bakewell founded the Dishley Society in 1793 to promote the selective breeding of improved sheep. After Bakewell's death in 1795, his friend George Culley, among others, continued his work. The Culley family also developed the Border Leicester, which would eventually surpass the Leicester in popularity in Britain and overseas.

This view of Bakewell's importance in the history of the modern Leicester has dissenters. These observers believe that Bakewell's aim was to create a new, better breed, not to improve the native Leicester sheep, which he often denigrated. However, Bakewell is regarded as the father of scientific animal breeding, and his fame was soon carried beyond Britain.

The refined Dishley Leicester was highly praised and therefore spread throughout England, dominating sheep production in the Midlands. Its promoters believed that it would become the most important breed of sheep in the world. In the first half of the 1800s, Dishley Leicesters were exported to Australia and New Zealand, where they would become an integral part of the sheep-raising economies of these countries.

The New Leicesters were imported into North America, where they joined their relatives, for the Old Leicesters had already made the trip to the Massachusetts Colony beginning in the 1620s. As the improved Leicesters became available, they were much in demand. By 1793 in the United States, President and agriculturist George Washington was looking for good

[To view this image, refer to the print version of this title.]

Fig. 16 A Leicester Longwool wether as found in *The Cultivator* in 1845. Courtesy of the IAB and Hans Peter Jorgensen.

rams to add to his breeding flocks. He circumvented Britain's "prohibitory laws or customs" by obtaining lambs sired by illegally exported Bakewell Leicesters. Washington kept a small flock of purebred Leicesters and used the rams on his other flocks. The Leicester survived the Merino craze by remaining strong in the eastern states (fig. 16).

Almost one hundred years later the Leicester was still being praised in the United States as one of the most important breeds of sheep. In a popular farm handbook the Leicester was described as differing from the Cotswold in possessing "a more delicate frame, somewhat smaller and a finer bone; finer and more lustrous wool." The American Leicester Breeders Association was founded in 1888, yet soon consumers were moving away from the fatty mutton and lamb of the Leicester. When the market for carpet wool declined, the longwool breeders were lost. The Leicester became virtually extinct in North America before World War II.

In Britain, a group of Leicester breeders on the Yorkshire Wolds had organized the Improved Leicester Sheep Breeder's Association in 1893. These breeders were active in the continued improvement of the breed into the modern Leicester. Indeed, the modern Leicester is much changed from the Dishley Leicester. It has become larger, polled, and white- or gray-faced, and the production of lustrous wool is again of importance. The Leicester's value is found not as a purebred meat animal but in the production of crossbred, heavyweight lambs.

The New Leicester was used in the improvement programs of many breeds, including the Lincoln, Wensleydale, Romney, Cotswold, Galway, Devon Longwool, and the Dartmoors and Exmoors. The Leicester was also used in the creation of such breeds as the Border Leicester, Blue Faced or Hexham Leicester, and several breeds in France (Ile-de-France, Cotenin, Bleu du Maine). The breed has been widely credited with a major influence on sheep breeds in Britain and in other countries.

There has been renewed interest in preserving and improving the fleece, which was not of great importance in Bakewell's time. The Leicester produces 11 to 13 pounds of lustrous fleece with a staple length of 10 to 13 inches. The wool is often used for upholstery fabric, braids, and coats.

Hand spinners, weavers, and artisans now enjoy using all the varieties of longwool, and so in 1986, an appendix to the flock book was created for black-colored Leicesters, and approximately 100 females have been registered. Black Leicesters carry their color in an unusual and attractive pattern that falls like a cape over the back, underside, legs, and head. Black Leicesters are reputed to produce a superior, leaner carcass than white Leicesters.

Finer of face than the Lincoln and more refined in appearance, the Leicester is a large-framed, polled sheep with rams weighing up to 330 pounds but generally smaller than other longwools. The sheep have clean legs, a forelock, and long ears. The Leicester has a 160 percent lambing rate. A docile breed, the Leicester is not an active forager, but it has proved its hardiness in environments from the Yorkshire Wolds to Tasmania. Breeders are striving for lean, long sheep and encouraging greater prolificacy.

The fortunes of the Leicester illustrate what can happen to a breed once it is regarded as old-fashioned or uneconomical. After World War I, the Leicester numbers began to decline. Its carcass size was too large and the wool market was poor. From a serious crisis in 1974, when only about 200 ewes were left in 22 flocks, the Leicester population has grown to 600 to 700 breeding ewes. Although there are dedicated or longtime breeders, the Leicester has not captured a

large following because its main use is still in cross-breeding situations that are dominated by other breeds.

In North America, a few breeders in Canada are producing about 25 registered lambs yearly. The Leicester was brought back to the United States in 1990, when the Colonial Williamsburg Foundation obtained a carefully selected group of 8 ewes, 6 lambs, and a ram from Australia. These sheep came from a family that has raised Leicesters for three generations. After the establishment of their historical flock, a Leicester Longwool Satellite Program was set up to establish several new flocks. There is a long list of enthusiastic future adopters. There are now 165 registered Leicesters in the United States, and semen has been imported to introduce new bloodlines into the population.

 Rare  Rare  Endangered

### *Cotswold (pl. 27)*

The Cotswolds bring to mind a vivid picture of England—rolling green hills, fertile pastures, limestone cottages, picturesque villages, and glorious “wool churches.” And sheep. Sheep have grazed these green fields for many centuries. By the mid-thirteenth century, the Cotswolds were the center of England’s wool industry, the source of the nation’s wealth for seven hundred years. In the House of Commons, the chancellor of the exchequer sits symbolically on the Golden Fleece—a sack of Cotswold wool. About 500,000 sheep once grazed on the Cotswolds. Their wool was packed out on horses down from the Cotswold hills and shipped to Flanders and Lombardy to be woven into cloth.

Wool brought prosperity and wealth to landowners, woolmen, and the land-owning abbeys. By 1300, Gloucester Abbey had more than 10,000 sheep. In the 1500s, at Northleach in the Cotswolds, woolman William Midwinter memorialized himself on a brass plaque laid on the floor of St. Peter and Paul Church standing with one foot on a sack of raw wool and the other on the back of a sheep. This sheep carries its fleece in wavy staples, and its head is remarkably similar to a modern longwool. Another brass memorial in the church,

dating to 1458, has two sheep that also look very much like the modern Cotswold sheep.

Medieval Cotswold wool has been described as fine. This sounds somewhat at odds with what is known of the Cotswold of the eighteenth century, when the wool was described as coarse. However, nutrition plays an important role in wool growth. Better nutrition causes sheep to grow thicker or coarser fibers. The improved feeding of sheep in the eighteenth century may have adversely affected the fineness of the wool.

The early Cotswold sheep was probably not as large and heavy as the modern longwool, considering the land on which it was raised. Between 1780 and 1820, Dishley Leicester rams and possibly Lincolns were brought into this sheep country and used to improve the Cotswold Lion. It is hard to determine how much this changed the original native sheep, but Cotswolds have certainly come to resemble the Leicester and Lincoln in many ways. The Cotswold was used in the development of such other breeds as the Oldenburg, Hampshire, Shropshire, and Oxford. They also helped saved the Wiltshire Down.

The Cotswold enjoyed great popularity in the mid-1800s. Many breeders kept careful records and pedigrees. Soon the factors that led to the demise of so many other breeds began to affect the Cotswold as well. The Cotswold Sheep Society was founded in 1892 in an attempt to reverse declining numbers of Cotswold sheep and to promote the breed’s attributes. The first flock book registered 645 ewes. Many flocks had been in existence since the late 1700s.

The first major importation of the modern Cotswold to North America was made by Christopher Dunn to New York in 1832, though the original Cotswold may have been brought across earlier. The American Cotswold Record Society was founded in 1878, predating the British society by fourteen years. By this time the Cotswold had become well established and popular in the United States, especially in the West, where rams sired market lambs from range ewes. *The People’s Farm and Stock Encyclopedia* of 1885 described the Cotswold as “an animal of a majestic port, perhaps to the impartial layman the most beautiful of the various breeds” (fig. 17).

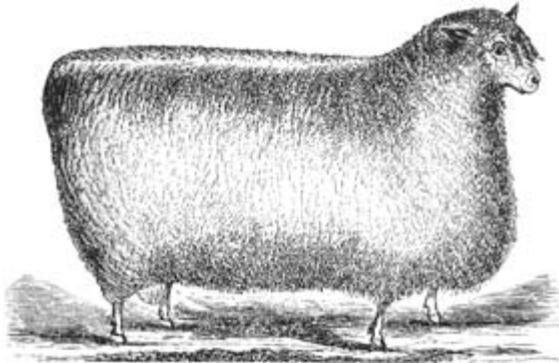


Fig. 17 A stylized portrayal of a purebred Cotswold ram in Canada in 1877. Courtesy of the IAB and Hans Peter Jorgensen.

The Australian wool trade and the consumer's wish for leaner, smaller lambs rather than mutton severely affected the Cotswold in Britain and North America. In Britain, the Cotswold also had trouble competing with the improved Down breeds as producers of meat. In 1949, William Garne, who still owned a historic flock of Cotswolds on his family farm, was believed to be one of the last breeders. The Cotswold was close to extinction in its native land.

The Cotswold Sheep Society was re-formed by a small group of devoted breeders, and in 1974 the Cotswold was entered in the RBST Combined Flock Book, although it now maintains its own registry. Even with the support of the RBST and dedicated breeders, by 1988 there were still fewer than 500 Cotswold ewes in Britain. Its numbers are steadily but slowly growing, with most sheep still found mainly in Gloucestershire and nearby.

In 1970, there were only 23 Cotswolds registered in North America. Twenty-five years later the numbers had increased to about 200 registrations yearly in a large number of flocks. Flocks can be found in many states but are more common east of the Mississippi.

For hundreds of years, one endearing and identifying characteristic of the Cotswold has been the forelock of uncut wool on the top of the polled head. The forelock falls forward in cords, often obscuring the eyes. The original purpose of this forelock was to prove the quality of the sheep's wool even when shorn, and it can still be seen in several longwool breeds. On average, a

ewe produces a 12-to-15-pound wavy white fleece of 10 to 12 inches in length that has been called "poor man's mohair." Cotswold pelts are also a premium product. The Cotswold has a clean face and legs.

The Cotswold is a large, strong, slow-growing sheep, with rams weighing from 250 to 290 pounds and ewes 190 to 220 pounds. The hardy ewe is a good mother, with a 150 to 170 percent lamb crop. Cotswolds thrive on coarser feeds. They are calm and content to stay in their fences, although they spread out when grazing rather than bunching together. Adjectives such as *stylish*, *noble*, *regal*, and *beautiful* as well as *curious* and *friendly* are frequently used to describe the Cotswold, which seems to have an attractive and affectionate nature.

The appearance of color in the Cotswold was never encouraged until recently. As early as 1868, flocks of black Cotswold sheep were raised in Kentucky, but black sheep remained rare and were not registrable. In 1990, the Black Cotswold Society was formed, with the support and assistance of the American Cotswold Record Association, to register purebred sheep from the United States and Canada. The Black Cotswold Society maintains a separate flock book as an autonomous breed. The color of the Black Cotswold ranges from white through shades of gray, silver, and blue to jet black. Badger-faced markings are also acceptable. The lovely black fleeces provide wool to fiber artists as well as sheepskins.

The Cotswold is mainly kept by small flock owners for both sentimental and practical reasons. The breed's lustrous fleece has found great favor with spinners, weavers, and craftspeople. The breed still has much to offer commercially as a sire of slow-growing but flavorful lamb. The Cotswold can also improve wool clip in crossbreeding. The Cotswold remains a hardy, multi-purpose breed that is well suited to the small farm flock.

 Rare  Rare  Vulnerable

### *Galway (pl. 28)*

County Galway lies on the western coast of Ireland. Over many centuries Irish sheep became adapted to

these wet, cold lowlands. In the seventeenth century, the English who came to Ireland brought longwool sheep with them. Crossed on the native Irish sheep, two longwool breeds, known as the Roscommon and the Galway, were developed by the sheep raisers. Both wore a characteristic tuft or bob of wool on their foreheads.

The Roscommon was described as a big sheep, as large as the Cotswold or Lincoln. The Leicester Longwool was crossed on the breed, and the Lincoln may also have been used. These large breeds added refinement and size. Roscommon mutton enjoyed an excellent reputation, but the breed was also criticized as coarse. Later Roscommon sheep lost popularity in the mutton market because of this coarseness and their large size.

The Galway was smaller and more compact than the Roscommon. British landowners continued to import more stock through the early nineteenth century, including the Dishley Leicester, which was obtained directly from Robert Bakewell. Ryeland and possibly Merino were also mixed into the Galway. The result was an improved longwool breed with great hardiness. The Galway produced a fine-textured, heavy white fleece that was in demand, and the Galway Sheep Breeder's Society was organized in 1922. Although the Galway survived, its sister breed, the Roscommon, became extinct by the mid-twentieth century. Some Roscommon sheep were probably absorbed into Galway flocks.

The Galway is a large, clean-faced sheep that still sports the traditional tuft of wool on the forehead. The breed is rectangular in shape, with wide-set straight legs and good bones. The hooves are black and the nostrils are dark, but the ears are free of black spots. The moderately long fleece is fine and wavy, with a broad staple. Wool extends down to the knees and hocks.

Galway sheep raisers long selected for large lambs that grew big, heavy fleeces. Consequently, ewes usually gave birth to singles. More recently, Galway breeders have chosen to breed ewes that were born of multiple births. This has been successful in increasing the lambing percentage. Galway ewes lamb outdoors in February or March. Their only shelter tends to be the

stone walls that enclose the pastures. Even under these conditions, the ewes achieve a 140 to 180 percent lambing rate.

The Galway enjoyed good support until the 1950s, when their wool was no longer a valuable product. By 1994, the purebred flock had fallen to extremely low numbers of about 300 ewes and an accompanying lower number of rams. There were only 10 breeders of Galways. The RBST responded by adding the Galway to the Priority List.

The dozen members of the Galway Sheep Breeder's Society have set a goal to increase the purebred ewe numbers to 1,000 sheep in the next few years. They are making good progress. They have actively searched for new flock owners willing to take on this hardy, docile breed, and they are also encouraging the owners of small flocks.



Endangered

### *Devon and Cornwall Longwool*

The Devon and Cornwall peninsula extends to the furthest southwestern point of England. In the eighteenth century, the native sheep were crossed with Old Longwools, producing two local breeds known as the Bampton Nott and the Southam Nott. Lincoln and New Leicester rams were brought in to improve the sheep, and eventually two breeds were developed for slightly different needs.

The Devon Cornwall or Devon Longwool was found in the northern areas of Cornwall and Devon into the south of Somerset. The Devon was somewhat smaller than its neighboring breed, the South Devon Longwool. The Devon was noted for its heavy fleece, which was also the coarsest of the longwool breeds in Britain. Wool from the Devon was traditionally made into cloth known as Long Ells and sold to the East India Company. The Devon was used in the development of the Devon Closewool.

The South Devon was generally found in the southern areas of Cornwall and Devon. Farmers in south Devon had adopted the cultivation of turnips as a forage crop for feeding sheep. The South Devon was large,

with longer legs than the Devon Longwool, and was selected for a heavy wool crop.

In the twentieth century the differences between the two breeds became less pronounced and it became more practical to combine the flock books, which was made official in 1977.

Although Lincoln or Leicester blood was used on the native Devon and Cornwall Longwool, the breed retains its distinctive, hard fleece texture. It is the heaviest wool-weight producer in Britain. The staple length is usually 8 to 12 inches, and lengths up to 18 inches are not uncommon. Fleeces normally range between 15 and 22 pounds, and lambs bear a quality fleece of sufficient quantity to allow shearing at six months. This lambswool is especially noted for its warmth and resiliency in garment fabrics. The adult fleece is open and falls in lustrous curls. It is a strong fiber used today in rugs, carpets, and durable tweeds. The wool's resiliency, absorbency, and ability to felt also permits its use in commercial and industrial products.

The Devon and Cornwall Longwool is a polled breed with a white face and black nostrils. Head, body, and legs are covered with long, curly wool. The breed is also sturdily built and large, so as to produce a good meat carcass. Ewes average 220 pounds and rams 300 pounds. The Devon and Cornwall Longwool is generally raised today on grass or fodder crops. The slow-growing lambs are raised economically on grass for good value at the late winter market. Ewes average a 160 percent lambing rate on grass alone. The breed is also used in crossbreeding operations for market lambs or production ewes.

The Devon and Cornwall Longwool is known for its docility and adaptability. It is still found mainly in the West Country of southwest England, although its numbers seem to be on the decline. This is unfortunate because the breed has so many dependable and valuable characteristics.

Both the Devon and the South Devon Longwool breeds were brought into North America, but they were eventually lost in the New World flocks.

### *White Face and Greyface Dartmoors (pl. 29)*

The tan-faced, horned, primitive sheep that were present in Britain since 3000 B.C. were eventually crossed with the white-faced, polled Roman stock. Among their descendants were the West Country Moorland sheep that grazed the heaths in Dartmoor in the 1500s. The trails through Somerset and Dorset were almost impassable until the advent of the railroad. Dartmoor itself, with its moorlands and dangerous swamps, was difficult to traverse. This may explain the lesser impact of the improved Leicester and other breeds upon the native Dartmoor longwool sheep.

The Widcombe or White Face Dartmoor has grazed the moors as far back as there are records. Little effort was made toward improvement in this area, and the White Face Dartmoor Sheep Breeders Association was not formed until 1950.

The White Face Dartmoor is the only longwool breed with horned rams. This horned feature seems to be lessening among ewes. As its name indicates, this breed has a white face, sometimes with black spots on its ears. Unlike its cousin the Greyface Dartmoor, this breed has a face clean of wool and dark speckling.

The White Face is exceptionally hardy, even on poor pastureland. It produces a strongly crimped carpet wool weighing 10 to 16 pounds. Ewes are excellent mothers, which makes them valuable in the crossbred lamb market. White Face lambswool is also a prized product. The breed is somewhat more secure than its relative the polled Greyface but needs monitoring.

Although the Dishley Leicester was brought to Devon, the Improved or Greyface Dartmoor retains much of its own character and does not appear to have been as heavily influenced as many other longwool breeds. The Southdown may have contributed to the breed, especially in the speckling or spotting on the face and legs. The Dartmoor Breeder's Association was established in 1909, although some flocks are much older.

The Dartmoor was a dual-purpose breed, supplying carpet or blanket wool and meat. From the 1930s to the 1950s, hill farmers kept 5,000 to 6,000 Greyface Dartmoors. This hardy, mostly unregistered breed produced a good wool clip, one or two lambs each year for

market, and sheep for crossbreeding use. In the early 1980s, however, the ewe subsidy paid to farmers was changed to a calculation based on the number of ewes owned. As a direct result of a governmental action made without regard to contributing factors, the number of Greyface Dartmoors fell almost immediately to about 600. The farmers now keep Scottish Blackface sheep, which can be stocked at higher rates per acre. The subsidy, which makes up a substantial portion of farm income, is thus higher to the farmer, but the Blackface sheep produce fewer lambs and far less wool, and they overgraze the land. The rapid decline of the Greyface Dartmoor caused the RBST to recognize the breed as at risk in 1987. There are about 600 ewes and 85 rams.

This polled Dartmoor breed is characterized by a large, strong head and neck and a heavy fleece of coarse, wavy wool. The Greyface Dartmoors are medium-sized sheep, with rams weighing about 220 pounds and ewes about 150 pounds. The breed appears more compact in body than other longwools. Greyface Dartmoors are long-lived, calm, bright-eyed, and hearty. Their head is broad and woolly, with a face that is white and mottled gray or black. The legs are also woolled. The fleece measures 6 to 8 inches in length and yields an excellent 14 to 18 pounds yearly. It should neither be too straight and harsh or finely curled in ringlets but somewhere in between. The fleece is used in woolens, blankets, and carpets and by hand spinners. Greyface lambswool is especially valuable.

The hardy Greyface Dartmoor is still found primarily in Dartmoor and Devon on the exposed moors to which they are so well adapted and well suited. They are noted for their ability to survive heavy winters. The Greyface rams pass on their good constitution in crossbreeding situations, producing a prime lean and juicy lamb. Dartmoor ewes are excellent mothers and heavy milkers, with a 165 percent lambing rate.

The breed standard decrees that Greyface Dartmoor are polled, so sheep with scurs or horns are culled. Somewhat more controversial is the culling of sheep with black hair on their knees or above the eyes. All lambs are inspected before registration. This breed needs to avoid selecting for show stock, especially the use of a few winning rams or a few popular ram lines

on a large percentage of the ewes. Diversity of type and bloodlines must be maintained in a small population.



Greyface — At Risk White Face — Minor

### *Ryeland (pl. 30)*

Originally known as the Hereford, the Ryeland is the native sheep found in the Rye district of Herefordshire in western England. The Hereford was also known as the Archenfield or the Ross. These sheep are believed to be direct descendants of Roman shortwool sheep. By the fourteenth century, Herefords were well known for bearing a fine, light wool. Two hundred years later, Hereford wool was known as “Leominster Ore” and was used for fine broadcloth manufacture. Bred by the monks of Leominster, the sheep were famous for the wealth they brought.

The Hereford or Ryeland was a well-adapted and useful breed in its area and beyond until it began to face competition from the longwool and Down breeds. In the late eighteenth century, the Hereford was “improved” by crossings with Southdown and Dorset rams and perhaps longwools. Husbandry practices also changed, with increased reliance on feeding turnips. By the beginning of the nineteenth century, larger sheep had replaced many of the original fine-wooled Herefords or Ryelands.

Shortly after the turn of the twentieth century, the Ryeland was nearly lost. When the Ryeland Flock Book Society was established in 1903, it was able to gather together only 14 flocks. In order to survive, the Ryeland was rapidly changed into a sheep very much like a meat-producing Down breed. This evolution was successful, and by 1920, there were 80 Ryeland flocks.

Unfortunately, some of the special quality of the Ryeland fleece was lost in the breed’s transformation, although the Ryeland still produces a 6-to-8-pound medium-fine fleece with a 2-to-5-inch staple used for tweed, hosiery, and knitting yarn. Ryeland fleece is noted for being dense, springy, and practically free of kemp or dark fibers. This polled breed has a heavily woolled white face and legs. Breed enthusiasts feel that the denseness helps protect the sheep against fly-strike.

There is growing interest in colored Ryeland wool. Colored lambs may be black or gray and show stripes, spots, or patches. Hand spinners enjoy these varieties with their soft, springy feel.

The short-legged, compact Ryeland is only slightly larger than the small Southdown. Rams weigh about 180 pounds and ewes about 120 pounds. The ram is used as a meat sire in market lamb production. Ewes lamb easily, with a 170 percent average lambing rate, and they are good milk producers.

Ryelands were exported to New Zealand in 1901 and from there to Australia, where they have become taller than in their native land. The Ryeland remains a minor breed in Britain but may be invigorated by the recent importation of Ryeland rams from Australia.



Minor

### *Herdwick (pl. 31)*

Although it is related to both the horned, black-faced, coarse-wooled sheep and the long-tailed, tan-faced breeds of the south, the distinctive Herdwick is a very old and different mountain breed native to northwest England's famous Lake District. Almost surrounded by water, the Cumbrian lakeland lies securely bounded by the Pennines to the east. Around the world the Lake District is known as the home of the beloved children's author Beatrix Potter, who is herself related to the story and mystique of the Herdwick sheep.

By the twelfth century, Herdwick sheep were already important in the production of wool on abbey land. Their long, coarse fleeces were used in the production of carpets. Born black or dark brown, the Herdwick color lightens every year—eventually turning to a delightful shade of blue-gray. Shepherds in the Lake District traditionally rub red ocher into the wool, giving it a reddish brown color.

The breed characteristics were defined in the 1840s, although the breed association was not founded until 1916. In the early part of the twentieth century, the Herdwick was predominant in a large area, although today it is reduced to the Lake District fells and the central and western Dales. Herdwick sheep face miserable

weather and yet rarely receive an extra feed, instead rustling up their own forage all year. The Herdwick has been called the hardest breed in Britain and is famous for its strong hefting instinct, making it difficult for the sheep to leave the pastures on which they are born and raised.

The Herdwick is a slow-maturing sheep with very heavy bones and legs. Rams weigh up to 165 pounds and ewes about 100 pounds. They are also extremely long-lived and productive. One eighteen-year-old ewe was recorded as bearing 35 living lambs. On the rough fells ewes are not as prolific as on better land. The lambs are dark and flavorful.

The Herdwick has a grayish-white face clean of wool. Rams are horned, but ewes are polled. Their coarse and kempy fleeces grow as long as 10 inches and weigh up to 4.5 pounds. The multishaded color is very attractive (fig. 18).

The Herdwick possesses an unusual and potentially valuable trait. According to Lawrence Alderson in *The Chance to Survive*, Herdwick sheep tolerate organophosphate worming medications better than other breeds because they hydrolyze the compounds more rapidly and are thus less subject to any harmful side effects.

Although the Herdwick has found admirers elsewhere, the breed is still seen primarily in large flocks in the Lake District. They are so much a part of the landscape that when Beatrix Potter donated her beloved Troutbeck Farm to the National Trust, she stipulated that Herdwick sheep would continue to be kept there as in the past. The National Trust now owns more than 87 farms in the Lake District and promotes Herdwick brand wool.

### *Southdown (pl. 32)*

Before written records, a leggy, dark-faced little sheep grazed the heath on a stretch of the chalky coastal hills of Sussex. Although this small, long-tailed breed carried a fine, short wool, it was already known for a good leg of mutton.

In 1780, young John Ellman began to run his father's farm near Lewes on the South Downs. Aware of

[To view this image, refer to the print version of this title.]

the needs of the growing urban population, he began a program of improvement with his sheep. Ellman's sheep came to be described as thick and deep, wide and round. They grazed on these softly rolling green hills and were folded through fields that were then used to grow wheat. Besides fertilizing the soil, the sheep provided fast-growing lambs and wool.

Ellman and other well-known breeders promoted the Southdown sheep, and so by the turn of the nineteenth century, there was much debate on whether the Dishley Leicester or Southdown was the superior sheep. Like the Leicester and the longwools, the Southdown became a strong influence on the other Down breeds. Besides the Suffolk, the Southdown was responsible for the creation of the Hampshire Down, Dorset Down, and Oxford Down. The Southdown itself became very successful and was used in crossbreeding with breeds like the Romney Marsh. Adaptable to various conditions, the Southdown was exported to Europe, North America, and elsewhere.

Fig. 18 This Herdwick ram named Scawfell illustrated a little-known English breed to American readers of the agricultural papers. Courtesy of the IAB and Hans Peter Jorgensen.

After Ellman's death in 1832, a Cambridge farmer named Jonas Webb became a noted Southdown breeder. The sheep continued to gain in popularity. By the early twentieth century, there were more than 100,000 registered Southdowns and many more production and crossbred sheep.

Although the native Southdown sheep were exported to the English colonies in America very early, documented imports of sheep from Ellman's flock were made from 1824 to 1829. More sheep were imported later from Jonas Webb. These Southdowns were found mainly in Pennsylvania, New York, and Illinois. The American Southdown Association was created nine years before the English Southdown Society was founded in 1891.

In North America, Southdown registrations peaked

in 1959. In the following years, larger Southdowns from New Zealand were imported to “upscale” the breed in order to make them more competitive in the marketplace. After a low of some 3,300 registered sheep in the mid-1970s, the American Southdown has now almost doubled that annual figure. The ALBC does not consider the Southdown an endangered breed. In Canada, fewer than 400 Southdowns a year are registered, even though the breed was once one of the dominant sheep.

Soon after the end of World War I in Britain, inexpensive imported wheat brought an end to the wheat and sheep system of the South Downs. For a while, the breed found a new home as a grassland sheep or was grazed on a variety of crops. Eventually, the large modern and Continental breeds and changing consumer tastes supplanted the blocky, compact Southdown, although it is still used as a crossbred sire.

In Britain today, the Southdown breed numbers fewer than 2,000 ewes, mostly in Sussex. Breeders are somewhat divided, with some striving for greater size and others seeking to maintain the size and conformation of the small Southdown. Rams have also been imported from New Zealand.

The polled Southdown carries a tight, fine wool about 2 to 3 inches long with a weight of 4 to 6 pounds that is suitable for hand spinning. Commercial wool is used for hosiery and dress flannel. Both the legs and face are woolly. The Southdown is the smallest of the Down breeds, and a mature ewe weighs about 130 pounds. The breed’s short, broad head and small ears give it a very appealing face. Quiet is the Southdown’s motto, making it highly adaptable to intensive conditions. British Southdowns have their closewool carefully sculpted to show off a boxy body and rounded haunches.

Whereas the British Southdown breeders generally selected for short legs and a lighter tan face, the Southdown overseas more closely resembles Ellman’s original nineteenth-century Southdown, with longer legs and darker faces. Longer legs are strongly encouraged in an attempt to promote leaner carcasses. American ewes weigh 120 to 180, with rams ranging up to 230 pounds. Faces are gray to brown in color, not white.

The American Southdown was the first breed to

be shown “slick sheared,” or close clipped on its body along with shaped wool on the legs. The close clip emphasizes its potential as a producer of a lightweight carcass. A lesser amount of wool on the face and around the eyes is desirable to prevent wool blindness. Less wool is also preferred on the underside and legs. The Southdown averages a 150 to 200 percent lambing rate, and fleece is of minor importance.

In the United States, a version of the old-fashioned, chunky British Southdown is called the Olde English Babydoll. Promoted as an orchard or vineyard grazer and hobby or petting farm sheep, this teddy-bear-faced “miniature sheep” was reputedly bred from remnants of the smaller-sized Southdown flocks of the 1940s before the modern improvement program. The Babydoll Southdown is less than 24 inches tall. Any color or color pattern is allowed. There are 132 breeders in the association. In 1996, the Babydoll was imported into Canada, and from there a small number may be sent back to Britain.

This breed is in a quirky place. A modern-type Southdown is competitive in America and New Zealand, an “old-fashioned” Babydoll is being promoted, and British breeders seem caught between these two types.

The traditional Southdown carries several strong and valuable characteristics, including exceptional docility, adaptability to various raising conditions, good conformation, and the ability to raise a market lamb quickly with minimal feed. It is difficult for this breed to compete with the larger range breeds in North America, but their qualities have proved valuable in the past and may yet again.

 Insecure  Recovering  At Risk

### *Oxford Down (fig. 19)*

Beginning in the 1830s, the sheepmen of Oxfordshire made use of the Hampshire sheep to the south and the Cotswold breed to the west in creating their own specialized breed. The fertile, productive farmland of Oxford allowed for heavy, ample feeding for the production of both meat and wool. The Hampshire sheep

[To view this image, refer to the print version of this title.]

of the time were large mutton sheep that had been improved by the infusion of the Southdown. To increase the size of the sheep and the quantity of wool, the Hampshire was crossbred with the Cotswold. The result was a hardy, huge sheep with excellent conformation and wool. Lambs were heavy and rapid growers. The new breed was called the Down Cotswold or Oxfordshire Down, but the name was changed to the Oxford Down shortly before it was recognized in 1862 at the Royal Agricultural Show. The flock book was established in 1889.

The Oxford Down became the largest of the Down breeds and an excellent sire on Suffolk-cross ewes with rams weighing up to 400 pounds. Oxford Down sheep were rectangular in shape, with straight backs, up-standing heads, and fleeces of 12 to 20 pounds. Face, ears, and legs were very dark in color.

The Oxford Down was first imported to North America in 1846. More imports continued until 1900. This large breed was well adapted to the well-fed farm

Fig. 19 An Oxford Down ram named Freeland from Pennsylvania in the 1880s. Courtesy of the IAB and Hans Peter Jorgensen.

flocks in the Midwestern states of Illinois, Michigan, Ohio, and Wisconsin and in Canada in Ontario and Quebec. The American Oxford Down Record Association was founded in 1882. The Oxford, as it is known in North America, became a very popular breed.

In both Britain and North America, the Oxford became the victim of livestock fads and agricultural trends. In Britain, the Suffolk gained in popularity for use as a terminal sire on the crossbred ewes of the Scottish border country. By the 1960s, this use of the Oxford Down was almost lost. By the early 1970s, there were fewer than 1,000 registered ewes.

In the United States during the 1930s, breeds such as the Oxford were criticized as being too large and not fat enough at market weight. Fat, compact, round sheep were the desired type until studies in the 1950s and

1960s proved that this type of sheep was inefficient to raise and yielded a fatty meat that consumers no longer desired.

Unfortunately, some breeders had used Shropshire and Southdown blood in an attempt to transform the Oxford into a more popular type. Size was reduced and changes were made to body shape and fleece. Parallel to this attempt at changing the breed, there was a totally nonsensical desire to transform the traditional dark-pointed Oxford into a white- or light gray-pointed sheep. Outstanding conformation and other qualities were ignored when a sheep was “too dark.”

It is to the credit of the Oxford breed that it could reject these flights of show ring fancy and return to its roots. Breeders began to regain the size and traditional conformation of the breed, along with making improvements in a heavily muscled loin and hind saddle. Lean, fast-growing heavy lambs again became the desired product. Breeders intend to reclaim the tall, long, high-headed sheep of the past. Oxford ewes now range from 150 to 200 pounds in weight and rams up to 325 pounds.

The dark points of the Oxford are not black but range from steel gray to dark brown. Face, ears, and legs should all match in color. The face is open with the characteristic topknot of wool on the top of the head. The top of the nose should be dusted with white hairs. Feet are dark. In the United States, the Oxford is shown closely sheared with the topknot and the wool on the lower legs shaped.

The modern Oxford is again able to grow a 10-to-12-pound fleece of excellent, fine, light-colored wool with a staple length of 4 to 7 inches. In Britain, Oxford wool is used primarily in hosiery or hand knitting yarn.

The second heaviest British sheep, the Oxford is forced to compete with the large, heavily muscled, imported sires from Europe. Testing has proved that the heavy, rapid-growing Oxford lambs actually outperform the Suffolk, Texel, and other Continental breeds. The trend toward some of these meat sires seems to be fashionable at best.

The Oxford needs to be fed liberally. When raised in that environment the breed will grow rapidly to a very large size. There is no doubt that this breed has

as much to offer as the expensive, imported varieties. The Oxford is also well adapted to its home pastures, which now are mainly in the Midlands, Cotswolds, and South Wales.

In Britain, the Oxford is a minor breed, with some 2,500 ewes, an increase from a low of about 600 in 1973. In the United States, about 1,900 sheep are registered yearly, and about 300 are registered annually in Canada. Oxfords are also found in New Zealand and Holland.



Watch



Vulnerable



Minor

### *Dorset Down (pl. 33)*

This breed was developed by sheepmen on the Dorset Downs to serve as a crossing sire for meat production. Improvements were made to the local heath sheep of Dorset by the introduction of offspring from Hampshire- and Wiltshire-cross ewes bred to Southdown rams. Southdown sheep were also bred on the local Down sheep. These sheep were known in the 1840s as the West Country Down or the Improved Hampshire Down.

The Dorset sheep raisers were seeking to develop a type that would be suited to raising in enclosures, or hurdles, and orchards on the arable farms of the area. The prolific ewes needed to be receptive to early breeding to produce lambs ready for the Easter market. The fine wool also contributed significant farm income.

The Dorset Down breed association was not formed until 1906, although the Hyde family flock of Dorset Downs is 150 years old. Dorset Down sheep were exported around the world. There are registered flocks in New Zealand, Australia, and France.

The Dorset Down is distinguished from the light-faced Dorset Horn and Polled Dorset by its dark points. The face, legs, and ears are grayish brown in color. The Dorset has fine, white wool about 2 to 4.5 inches in staple length, with fleeces weighing up to 6.5 pounds. The wool extends down the legs and covers much of the face. Dorset wool is noted both for its springiness, which gives elasticity to materials, and for its excellent quality. Breeders have maintained this attribute.

Dorset Down wool is used in hosiery and paper-making felts.

The Dorset Down is a heavy, blocky sheep whose wool is sculpted into a squarish form. Ewes average 165 pounds, smaller than some other Down breeds. Owners comment on their smart, alert manner, yet Dorsets are noted as docile, easily managed sheep. Breeders are concentrating on developing the longer, leaner rams now in demand for the crossing market.

A small breeding flock of Dorset Downs was imported in the 1990s from New Zealand, where the breed has been selected for long, slim bodies and lambs with narrow shoulders and small heads for easy lambing.

In Britain, the Dorset Down now numbers about 1,500 registered ewes in 55 flocks. Now found beyond Dorset, there are Dorset Down flocks in Wales, the Midlands, southeast England, and Scotland. The rams remain excellent producers of early spring lambs, and the flocks are especially well suited to small farms because they are excellent enclosure sheep.



At Risk

### *Shropshire (pl. 34)*

In the sheep lands of the Welsh Marches, three now extinct native breeds formed the basis of the Shropshire Down—the Long Mynd, Morfe Common, and Cannock Chase. In the area of the Shropshire Hills, the sheepmen crossed these heath sheep with the Southdown and perhaps a touch of Clun Forest, Leicester, or Cotswold. The result was a polled, black-faced breed that by the mid-1800s was a recognized and profitable sheep for both mutton and its medium-fine fleece. The Shropshire possessed excellent conformation and was a thrifty, easy-to-manage breed.

Throughout Britain, the Shropshire Down became an important meat supplier as both a purebred and a crossbred sheep. The breed society and flock book were among the first in Britain in 1882. Breeders also developed a strong export market, sending large numbers of their sheep mainly to North America but also to Australia and New Zealand. From 1885 to 1895, 20,000 Shropshires were exported, and this market

[To view this image, refer to the print version of this title.]

Fig. 20 A Shropshire ram of the 1880s as illustrated in the agricultural news. Courtesy of the IAB and Hans Peter Jorgensen.

continued strongly into the twentieth century. The year 1906 was the high point of Shropshire production, but breeders hit a wall in the late 1920s when the American market was closed.

In Britain, farmers began to favor larger sheep and to object to the Shropshire's heavily woolled head, although this feature was still preferred in North America. An excessive amount of wool around the eyes, besides irritating the eyes, can interfere with sight and feeding and can cause wool blindness. In response to a temporary whim in livestock judging, American Shropshire fanciers bred for even more wool on the head and legs. In the 1930s, it was necessary to import new Shropshire blood from England to clean up the heads. The British standard had already been revised in favor of wool-free heads (fig. 20).

Although Shropshires came to the United States and Canada earlier, most of the Shropshire stock came during the heyday of British exports. Shropshires were imported to Virginia in 1855 and into Canada in 1861. By 1908, out of the almost 20,000 purebred sheep in Canada, 6,000 were Shropshires making it Canada's second most common breed, surpassed only by the Leicester. By 1934 in the United States, the American Shropshire Association claimed the largest number of members of any sheep registry. Although the Shropshire had become established in eastern and Midwestern farm flocks, breeders soon faced the same competition from larger sheep British breeders were

experiencing. Shropshire breeders started to select for increased size and to reduce the excessive facial wool.

Unfortunately, the Shropshire has never regained its popularity either in Britain or in North America, despite its many favorable attributes. In the United States, the Shrop has held steady for several years, with about 3,500 annual registrations. The modern Shropshire is a medium to large breed with rams weighing 225 to 290 pounds and ewes weighing 170 to 200 pounds. The sheep are blocky and long-backed in shape. Lambs are known to be hardy, fast growing, and lean.

In Canada, the breed is much rarer, with a population of 250 to 300 sheep. Canada is home to at least four flocks of old, traditional Shropshires. The Miller flock was established in the 1860s and was bred continuously on the farm until 1996. There were periodic imports of Scottish Shropshire rams until 1996. The Kelsey and Mastine lines date back to the turn of the twentieth century, while the Ed Jackson flock is more than fifty years old. The RBC intends to secure sheep from all four of these genetic lines and maintain them on host or private farms.

These traditional Shropshires are low to the ground, rectangular in silhouette, with smaller ears and a woollier face than the modern Shropshire. These white-fleeced Shrops still have a teddy-bear look with brown ears, brown rings around the eyes, and brown feet. Rams weigh 225 to 250 pounds and ewes 175 to 200 pounds. They have an 8-pound fleece and produce good meat on poor pasture. The modern Shropshire is a much taller, leggier sheep with a cleaner face and larger ears.

The Shropshire has fared even worse in its home country. In 1974, Shropshire numbers were down to about 400 ewes. That number has increased to about 1,500 through the efforts of the RBST and dedicated breeders. Shropshires are found mainly in the Welsh border regions and southern England, mostly in small farm flocks.

In British meat trials, Shropshire lambs actually grew faster with less food than the now popular Charolais and Hampshires. The Shropshire also produced leaner carcasses than the Suffolk and Hampshire with an eye muscle depth equal to the same breeds. In other

trials, the Shropshire outproduced the Suffolk. The Shropshire can indeed produce prime lamb, and they are still useful as a terminal sire. In Australia, the Shropshire is used on Merino ewes. The Shropshire ewe also averages a 180 to 190 percent lambing rate, lambs easily, is hardy and a good mother, and has a long breeding season.

For a meat breed, the Shropshire is a good wool producer. The white wool extends down the legs almost to the feet. The breed produces a good medium-grade wool of at least 6 to 10 pounds with a 3-to-4-inch staple.

 Recovering  Rare  At Risk

### *Norfolk Horn (pl. 35)*

The Brekland is a dry and sandy heath subject to cold North Sea winds. This stark and bleak East Anglian moor is the perfect setting for the story of a mysterious breed snatched from the edge of extinction.

The origin of these unique sheep, which grazed for centuries on the sparse grass and heather, is lost in the mists of Saxon times. The Norfolk was a long-legged, thin-bodied, black-faced sheep. Both the open-faced rams and ewes wore horns. Some researchers have supposed a cross between primitive Soay-type sheep and the Roman longwool. Others note the similarity to the horned, black-faced mountain sheep with their open, spiraled horns that extend out to the side, a trait that may have come from the wild Argali sheep. But the Norfolk Horn or Norfolk Brekland lacks the long, coarse fleece of the Swaledale or Scottish Blackface. The Norfolk has a closewool fleece somewhat like a Down breed but also different. Unlike other British breeds, the Norfolk has never fit into a neat category. Isolated from extensive interaction with the rest of England, the breed was able to continue its separate evolution.

What is known is that the Norfolk was an exceptionally hardy sheep used as a source of a highly regarded wool and milk. The ewe's milk was made into the cheeses sold in the market towns of Ipswich in neighboring Suffolk and Norwich in Norfolk. The Old English word *wich* literally means cheese town. After their useful life, the older sheep were walked to mar-

ket in London, for the Norfolk delivered a lean yet tasty mutton. The Norfolk was an important part of agriculture in the area and one of the most numerous breeds in England.

Life changed for the Norfolk when the methods of agriculture changed. These sheep had been active foragers that covered large areas, but in the seventeenth century the open land was enclosed and crops were rotated through the fields. Sheep and other livestock began to be fed on cultivated root and leaf crops. These free-ranging, primitive-natured sheep that had thrived on the coarse heathland floundered in the new system. The agile Norfolk also needed higher fences for control.

The program to cross the Norfolk with the Southdown began as an effort to improve conformation and create a more docile sheep that would fatten quickly for market. The result was the Suffolk, which would become an extremely important meat sire in Britain and other parts of the world. By the mid-1800s, this new breed, the Suffolk, had even eclipsed its other parent, the Southdown. Exported to North America, the black-faced Suffolk became huge both in size and in popularity. Weighing up to 400 pounds at maturity, the Suffolk today dominates the United States lamb market. Forty percent of the American sheep registered each year are Suffolks. The immense success of the Suffolk proves the vitality and worth of the two parent breeds.

With the success of both the Southdown and the Suffolk, the Norfolk's popularity began to decline sharply. As early as 1820, the Norfolk was found only in very small numbers. The ever present Leicester had also made its way to East Anglia and was also crossbred on the native Norfolk. The Norfolk hung on by a thread for the rest of the century.

At the beginning of the twentieth century, there were only 10 or 11 Norfolk flocks in existence. In 1895, a Suffolk farmer named John D. Sayer purchased Norfolk sheep from 2 different flocks. By 1919, these sheep would become the last flock of Norfolk Horn sheep. Sayer kept this flock pure until his death in 1956. Aware that he alone was saving this breed from extinction, near the end of his life he became desperate to have

someone understand and care enough to take on the responsibility of the dwindling flock. Whipsnade Zoo and the staff of the Zoological Society of London assumed the care of the Norfolk flock in 1959.

The Breeding Policy Committee placed in charge of the flock was faced with a difficult situation. John Sayer's small flock was almost devastatingly inbred. By 1965, there were only 6 ewes and 7 rams. It was necessary to make the difficult move of using Suffolk ewes bred to Norfolk rams in a back-crossing scheme. In 1968, the sheep were given to the Royal Agricultural Society at Stoneleigh. The last purebred ram died in 1973 and the last ewe died in 1975. Fortunately,  $\frac{7}{8}$  and  $\frac{15}{16}$  Norfolk lamb rams were now available.

Several men were responsible for improving this situation in 1979. Joe Henson of Cotswold Farm Park and Michael Rosenberg, Ken Briggs, Alastair Dymond, and Lawrence Alderson of the RBST worked together to carry out a carefully calculated back-breeding program that would fix the traits of the old Norfolk Horn. Today the flock averages 80 to 90 percent pure and bears a remarkable resemblance to the old breed. The upgrading program was allowed to continue for a time but is now closed. Most important, the valuable characteristics have been preserved.

In 1986, the RBST added the New Norfolk Horn to the Combined Flock Book. The breeding program demonstrated the possibility of the successful preservation of a small population. It also proved that preservation cannot rely completely on modern technology. The Norfolk failed to superovulate because it did not respond to hormone treatment. The work with the Norfolk Horn also contributed to the recognition of the importance of the RBST and the groups it has since inspired around the world.

The medium-sized Norfolk Horn remains an active, long-legged breed. Breeders note that although the sheep are friendly, they are a little flighty and jumpy. The ewes are good milkers and average a 145 percent lambing rate. Lambs finish well on grass and are still very flavorful. Faces and legs are black or dark brown, and both sexes are horned. The horns can grow heavy and large in an open spiral. The fleece is short but tight to ward off cold winds, with a staple length of 3 to 4

inches and a weight of 3 to 4.5 pounds. The face and legs are clean. The lambs are born with a mottled fleece that eventually turns white.

Breeders have observed that Norfolks in some flocks now exhibit meatier conformation and are chunkier in appearance. This is probably due both to selection and to improved husbandry.

The Norfolk Horn is now kept in almost 40 flocks generally in East Anglia but also elsewhere in Britain. A Breeder's Group was formed in 1997. In 1996, there were 417 registrations. Fortunately, the Norfolk Horn breed as well as the potential it may hold for the future has been preserved.



Endangered

### *Clun Forest (pl. 36)*

The Clun Forest lies in the Welsh Borderland, an upland grazing area of narrow valleys and gentle hills that rises to 1,500 feet. The sheep graze as they have for hundreds of years in small green fields bordered by hedges. The old market town of Clun, once a Norman keep, has long been the center of the district. The hill breeds were developed in their homelands to be highly prolific, excellent mothers, long-lived, and efficient converters of grass. Bred to a Border Leicester, the Clun ewe produces the recognized English Halfbred. Although the Clun Forest typifies all that is best in a hill breed, the old traditional hill breeds now compete commercially with halfbred ewes such as the Mashams, Mules, and Welsh and Scottish Halfbreds.

The Clun is descended from the old black-faced, closewool sheep of Wales. The Clun type itself may be a thousand years old. Larger than the Hill Radnor and with a darker face and legs, the Clun is a sturdy polled sheep. The rams are good-sized, weighing up to 200 pounds, while the ewes are smaller at 130 to 160 pounds. The Clun has a distinctive, alert appearance with upright ears and prominent eyes. The breed is a good far-ranging forager, hardy outdoors, and notably early maturing and long-lived.

Although many sheep raisers claim that their ewes are good mothers, the Clun ewe is truly outstanding in

this claim. Cluns usually twin with no assistance, the lambs are quick on their feet, and the ewes are watchful and protective. Because of their good milking ability, Clun ewes are able to grow a good 100-pound lamb.

The Clun has a creamy white, dense fleece, shearing 5 to 9 pounds yearly with a staple length of 3 to 5 inches. The legs and long face are clean of wool, with a large forelock or topknot of wool on the head. In Britain, the fine wool is used mainly for hosiery, knitting wool, and industrial felts.

The first Cluns found their way to North America in 1959, when 6 ewes were brought into New York, but the major importation of Cluns was not until 1970. This group of 2 rams and 39 ewes was carefully chosen by former Welshman Tony Turner of Nova Scotia. This flock formed the basis of the breed's establishment in North America. Three additional rams were brought in later. After the six-year USDA quarantine, Cluns were finally available for purchase in the United States.

The Clun has found strong supporters in North America, mainly in New England, Ontario, the Midwest, and the Northwest, along with Nova Scotia and a few other locales. The breeders who organized the North American Clun Forest Association have to be commended for the decisive position that they have taken on their breed and its future.

The Clun Forest breeders believe that the value of their breed is in its performance, which is defined by their handbook as "prolificacy, mothering, milking, ease of lambing, ease of handling, and longevity." To that end, exhibition and youth activities such as 4-H are encouraged but competitive judging is not, except where production records are included, such as in Canada. Sheep on exhibition should be in reasonable fleece to illustrate quality rather than closely sheared. Only rams from multiple births can be registered, and all sheep must be purebred with no upgrading allowed. The NACFA also maintains a Registry of Merit for ewes that have lambed without assistance and raised 6 or more lambs by age four and a half.

Many of the hill-type sheep in Britain are now found in low numbers. Despite the difficulties in importing sheep, it is wonderful genetic insurance that one of these valuable, hardy old breeds has been established

elsewhere and is being maintained so well. The NACFA is now registering more than 200 sheep yearly.



Vulnerable

### *Kerry Hill (pl. 37)*

The word that breeders use again and again about their Kerries is “alert.” Upstanding, sharp, active, and spiffy in the show ring, the Kerry Hill attracts attention wherever it goes.

The home of the breed is the Kerry Hills, northwest of Clun in the Welsh Borderland. Kerries were first recognized as a separate type from other Welsh sheep in 1809. Before midcentury, agricultural writers described the Kerry as heavily woolled with a dense fleece and larger and less inclined to roam than other hill sheep. Heads and legs were white but often speckled with black. Some interbreeding with the neighboring Clun Forest and the old Radnor Forest sheep was probably inevitable. It has been suggested that Cheviot, Ryeland, Southdown, or Shropshire were introduced to improve carcass and fleece. Ultimately, the enclosure of the Kerry Hill grazings and the cultivation of crops caused greater attention to be paid to the native breed. In 1871, the first organized public sheep auction was held in Kerry after the numbers of private sellers in the village streets grew too unwieldy.

The Kerry Hill Flock Book Society and its first flock book were created by 1899. Before the turn of the century, the Kerry was a white sheep with a brown nose and knee patches. Breeders worked on defining the black nose, eye, and ear markings and the mottled legs. The Kerry weathered the fads and fashions of the years, and now its unique appearance is bringing it new fanciers.

The polled Kerry is more than a pretty face with pricked-up ears. In recent years, breeders have been selecting bigger and heavier sheep. Ewes now weigh 120 to 140 pounds, rams up to 190 pounds. The ewes mature early and bear twins or triplets regularly. The lambs are active, and the flock does not require special care. Known for having a small appetite but also for being good mothers, Kerry ewes raise rapid-growing lambs. Kerry ewes can also breed out of season and in

their first year. They can produce good market lambs from Suffolk or Texel crosses.

The white Kerry fleece is tight, averaging 2.5 to 5 inches in length and weighing about 6 pounds. Its denseness is the reason for the breed’s classification as a Down breed. The head and legs are clean of wool.

Owners of mixed flocks note that Kerries prefer each other’s company. Kerries are found mainly in Wales, but they have spread into England, Scotland, Ireland, and Holland. There are now about 60 flocks, with ewes numbering about 1,500.



Minor

### *Llanwenog (pl. 38)*

The Llanwenog is descended from a now extinct, somewhat mysterious mountain breed from western Wales called the Llanllwni. These local sheep were horned and black-faced, but little else is known about them. They may have been related to the Norfolk Horn, Scottish Blackface, or Cardi, an extinct Welsh breed. Planned DNA testing of the Llanwenog should help unravel these relationships.

When the growing numbers of workers in the coalfields of southern Wales increased the demand for inexpensive meat, the native ewes were crossbred with the Shropshire Down. Beginning in the 1870s, gentlemen farmers brought Shropshires into the Llanwenog area by rail. Pastures and fields were also improved by the application of lime from the Teify Valley.

With further Shropshire back-breeding, the result was a new type, named for its home, that combined the quality of wool and conformation of the Shropshire with the hardy, prolific Llanllwni. Physical isolation prevented the Llanwenog sheep from spreading much beyond the area, but the local farmers successfully raised prime meat lambs as a complement to their dairy herds. Later the Llanwenog would be used to help clean the woolly face on the Shropshire and in the foundation stock of the new Cambridge breed.

The Llanwenog experienced a surge of popularity in the 1960s, when it consistently won the National Lambing Championships with a prolificacy of 200 per-

cent. Unfortunately for the breed, ease of husbandry eventually became more important to the sheep raiser. Today's farm flocks average 180 percent, although increased prolificacy can still be achieved. The lambs are also quick gainers.

This polled Llanwenog with its clean, black face and legs is a hardy sheep, surviving on grass even in the winter. A quiet, compact, medium-sized sheep, it can also be easily housed or confined. Ewes average 120 pounds, with rams larger. Both sexes have an unusual tuft of wool or topknot on the forehead. The Llanwenog bears a very fine white fleece with a staple of 3 to 4.5 inches and a weight of 5 to 6 pounds. The wool is used both for knitting yarn and in tweed manufacture. The Llanwenog ewes are noted for their excellent teeth and long, productive life. The breed is also highly resistant to scrapie.

The Llanwenog is now generally used for crossbreeding, with farmers breeding their own purebred replacement ewes. Raisers must battle EU regulations because the breed is not on the eligibility list for hill or upland subsidies. This is the main reason for the breed's decline. Ewe numbers have declined every year since 1990. The 1997 census shows 50 flocks with 2,136 ewes and 94 rams, but flock holders retained only 641 ewe lambs.

The Llanwenog Sheep Society was organized in 1963. Following the breed's recognition by the RBST and placement on the Priority List in the late 1990s, there has been increased interest by both sheep farmers and hand spinners. The RBST is also providing support for the breed society's improvement plans, ram inspections, and ewe registrations.

The breed is found mainly in western Wales but has now spread into England. An English support group has been formed under the Llanwenog Sheep Society in Wales.



At Risk

### *Navajo-Churro (pl. 39)*

The Navajo weaving tradition was born when the Spanish brought their Churro-type sheep to New Spain in

the 1500s. The tough little Churro or Churra spread rapidly across a large area, becoming an essential part of both Hispanic and Native American ways of life.

By 1528, Hernán Cortés had subdued the native peoples of Mexico and begun the establishment of Spanish colonial farms. Spanish Churro and Merino sheep were brought to his hacienda at Cuernavaca in central Mexico in 1538. These sheep may have come from stock raised on the Spanish islands in the Caribbean. Sheep from these early flocks were later taken to various missions in Mexico. In the spring of 1540, the explorer Francisco Vázquez de Coronado began his search for the fabled Seven Cities of Cibola in western New Mexico, sending scouting parties to explore the fertile Rio Grande Valley. Coronado's expedition comprised hundreds of Spaniards, native people, and slaves, along with herds of sheep, pigs, and cattle. He eventually traveled as far east as what is today central Kansas. After abandoning his quest, Coronado left some of the expedition's sheep with Catholic priests who remained with the native people in Pecos Pueblo, New Mexico. The fate of these sheep is unknown.

Four hundred colonists led by Juan de Oñate made the first attempt to colonize New Mexico in 1598. These colonists brought along their livestock from Mexico, including both the Churro and Merino types from Spain. The flocks in New Mexico soon numbered in the thousands. By this time, 200,000 sheep were being sold each year in Mexico City.

Beginning that same year, Spain established sixteen missions in Arizona and New Mexico. These missions served both religious and military purposes. They were also the center of an agricultural settlement that included the farming of crops and the raising of livestock. Hundreds or even thousands of native people brought to the mission by religious conversion, the power of the sword, or both, worked large areas surrounding the mission. Removed from their traditional ways of life and exposed to foreign diseases, the native peoples were decimated and eventually became dependent on these missions for support. Ranchos were developed around the mission lands, raising large herds of sheep and cattle. In time, many missions became permanent settlements.

From the earliest days of Spanish settlement in northern Mexico, Navajo Indians raided the livestock herds. The raiding continued until the mid-nineteenth century. One military inspector estimated that over a period of eighteen months in 1849 and 1850, the Navajos had stolen over 47,000 sheep from the Spanish.

The nomadic Navajos certainly owned sheep by the sixteenth century, probably obtained from the early Spanish settlements in northern Mexico. The Churro sheep were especially suited to the varied conditions of the Navajo homelands in the Four Corners area of Arizona, Colorado, New Mexico, and Utah. The arid climate was hot during the day but cold at night. Forage was sparse, and winters brought winds and snow. By the early 1800s, both the Navajos and their neighbors the Hopis had become more settled and owned large herds of sheep. Expecting the sheep to be as tough as themselves, the Navajos allowed the rams to run with the flocks all year so that many lambs were born in the snowy winter and the mortality rate was high.

Perhaps more dramatic than the Navajos' adoption of animal husbandry was the way the sheep became an integral part of Navajo culture. In Canyon de Chelly, the natural rock monument that rises 800 feet from the floor of the canyon is called Na'asbje'ii, or Spider Rock. Spider Rock is the home of Spider Woman, who is honored for her great gift to the Navajos—the knowledge of weaving. Although the Navajos may actually have learned to weave from the Pueblo peoples, they saw the sheep as a gift from the gods. And in this matriarchal society, the women owned the sheep, the tribal grazing rights, and the wool. Hand-spun Churro wool was woven by the women and became an important means of economic support for Navajo families.

The Spanish settlers also established a weaving tradition. By 1790 in Albuquerque, New Mexico, there were 64 sheep ranchers with the average family owning 500 to 1,000 sheep. Early in the nineteenth century, the Spanish government sent master weavers to New Mexico, and wool goods became an important trade item. Each year from 1830 to 1846, thousands of sheep were driven south to Mexico City to help feed the growing population.

The primitive or unimproved Churro was very dif-

ferent from the European breeds that eventually populated much of the country. Long-legged and scrawny by modern standards, the Churro was also very hardy and well suited to its harsh new home.

The Churro is a coarse rather than fine-wooled breed. The Churro wears a double coat, with outer wool that is coarse and up to 14 inches in length. This old-style weaving wool, as the women call it, is non-greasy and therefore easier to clean where water is scarce. The long, coarse fibers create a strong yarn that is woven into the famed Navajo blankets and rugs.

Churro wool comes in a wide range of natural colors. The sheep grow fleeces in solid and spotted shades of black, apricot, cream, gray, and a rare and treasured brown. These natural shades form the palette of the Navajo weaver, reflecting the colors of the desert. The unique luster of the long fibers makes the weavings shimmer and glisten in the light.

By the 1860s, most of the Navajo tribal members had become pastoral. Hundreds of thousands of sheep along with horses and cattle grazed in Arizona and New Mexico. The Navajos also cultivated grain fields and peach orchards. The small raiding groups that continued to roam drew the wrath of the United States government, which had now asserted control over the region. In 1863, the United States declared war on the Navajo Nation. In the winter of 1864, Kit Carson invaded the Navajo homelands, killing many of the men, slaughtering the sheep by the thousands, and driving almost 9,000 men, women, and children on foot 300 miles—the infamous Long Walk.

Four years later, about 7,000 destitute survivors were permitted to return home, and they attempted to rescue the feral remnants of their herds and flocks. To support them, the federal government purchased 14,000 sheep and 1,000 goats. Each adult and child received two sheep. These sheep were purchased in New Mexico and were the same common Churro sheep of the Spanish settlers that the Navajo themselves had owned.

In the years that followed, the Navajos began to regain their culture. In a misguided effort to “improve” the scrubby Churro, U.S. Department of Agriculture agents encouraged the mixing into the flocks of fine-

wooled breeds such as the Merino and the Rambouillet. Not only were the crossbred lambs too large for the small Churro ewes, but the resulting wool was weaker and contained more grease-containing lanolin that was harder to clean and card by hand. Because the finer wool lacked the longer, strong hair fibers, the quality and character of Navajo weaving deteriorated. Nevertheless, over the years more breeds were sent to improve the Churro's wool or meat qualities, among them the Shropshire, Hampshire, Cotswold, Suffolk, Lincoln, and Tunis.

The Hispanic Churro flocks were also interbred with Merinos, causing the same problems with the wool. When railroads reached into the territory, bringing commercial textiles at a cheaper price than handmade goods, the Hispanic weaving tradition nearly vanished.

During the 1930s, the U.S. government decided that the reservation was being overgrazed and shot thousands of sheep, leaving the carcasses to rot. Without any selection process or an opportunity to sell the designated surplus, the Department of the Interior decimated over two-thirds of the flocks. For twenty years the Navajo Livestock Reduction Program was continued without any regard for the rights of owners, who also lost goats, cattle, and horses. The Navajo economy was destroyed, reducing many of the people to survival on government subsidies or by bare subsistence farming. In order to continue to weave, the women had to buy yarn made from wool grown far from the reservation that was spun and dyed in eastern mills.

Although grazing pressures should be considered, many people have come to believe that these actions had more to do with possible silting behind Hoover Dam in Lake Mead and other water-management projects along the Colorado River basin. The value of the water to the southern California economy was believed to be more important than the socioeconomic problems of the Navajo people. The slaughter also violated the Navajos' religious and cultural beliefs about their livestock, the gift from the gods, who were pleased when livestock multiplied.

Today almost half of the 200,000 residents on the Navajo reservation still raise sheep, and about 20,000

are weavers, yet less than 5 percent of contemporary weavings are made from Navajo-raised wool, hand-spun in the traditional way. This endangered tradition continues in the Two Grey Hills area, where weavers have access to good Churro wool and the integrity of local creation is encouraged. What the weavers need is more excellent-quality, old-style Churro wool. To obtain that, the people need more old-style sheep, or the "real sheep," as the women call them.

They have found a champion in Dr. Lyle McNeal. In 1977, McNeal began the Navajo Sheep Project (NSP) with 6 old-style Churro sheep. Though they had once numbered 2 million, only about 450 Churros were left on reservation lands. No longer existing elsewhere, the breed was in clear danger of extinction. After more than twenty years of project efforts in identifying, cataloging, and breeding these sheep, the Churro remain rare, but their numbers have increased to about 1,500. They also carry the name Navajo-Churro in honor of their history.

This project is helping the Navajo and Hispanic wool growers achieve several goals. They are preserving a rare and historic breed that is well suited to its desert home. Individual sheepherders are receiving assistance in upgrading their flocks and in good management techniques. And the wool growers are developing ways for the sheep to realize a greater profit for the people through cooperative marketing of wool and other products. The Mexican government has also imported Navajo-Churro sheep from the NSP to help improve the flocks that belong to the Tarahamara Indians in the Sierra Madres of Chihuahua. Individuals across the United States and in Canada are also maintaining small flocks of the breed.

The nongovernmental Navajo Sheep Project is the oldest and largest genetic conservation project of an endangered livestock breed in the United States. The NSP breeding flock, its grazing land, care, and outreach programs, are now supported entirely by much-needed volunteer contributions. Along the way the ALBC has assisted the project. The NSP celebrated its twentieth anniversary by giving 120 young sheep to qualified Navajo families.

The Navajo-Churro Sheep Association was estab-

lished in 1986. In addition to creating this valuable registry, the organization is dedicated to preservation and promotion. The association has brought breeders together into a unified conservation group. Sheep are registered if they conform to the breed standards.

The Navajo-Churro remains an agile, long-legged, narrow-bodied, and fine-boned breed. Although many are white, a wide variety of colors and patterns is still found. Polled and horned rams are both present, with occasional four-horned rams and horned ewes. The Navajos believed that the four-horned trait was sacred and therefore favored the use of four-horned rams. Some sheep also bear the sacred white “hand of God” mark on their foreheads, believed to be a sign of good fortune for the owners. A ram can weigh 120 to 175 pounds, and a ewe about 85 to 120 pounds, with some even smaller. The Navajo-Churro has a long, thin tail and horizontal ears.

The native sheep live in a harsh home of extreme heat and cold, little water, and predation by coyotes. Lambing rates average 125 percent on reservation land and 175 percent with good nutrition. Lamb death rates are lower than other sheep breeds on similar ranges. Navajo-Churro ewes are good mothers with strong protective instincts, and the flocks survive on marginal forage, remaining resistant to such problems as foot rot and parasites. The breed is considered extremely hardy, though small in size with a low growth rate. Carcass yields are 60 to 65 percent but very lean, with the advantage that the sheep eat less yet produce better than other sheep in similar conditions. Aseasonal breeding creates the possibility of raising two sets of lambs each year.

A Navajo-Churro fleece has an inner coat of fine fibers 2 to 4 inches in length and an outer coat of coarse, shiny, hairlike fibers 4 to 14 inches in length. There are varying amounts of coarse and short kemp fibers. This fleece protects the sheep from extremes in moisture and temperature in their high-altitude desert home. The annual grease fleece weight is 4 to 8 pounds. The shine of the outer coat reflects the sun and sheds rain, while the inner coat is dense to protect the skin from windblown dust. The face and legs are clean.

In spite of the elements and people’s attempts to

destroy them, the Navajo-Churro sheep have survived. This landrace breed is now unique due to its separation from its Spanish ancestors by more than four hundred years and its adaptation to the environment. The fleece is highly desirable for rug making as well as hand spinning and weaving. The Navajo-Churro not only serves the needs of the people in its homeland but may be useful to people in other similar regions around the world.



Rare



Rare

### *Santa Cruz (pl. 40)*

Eight Channel Islands stretch along southern California’s coast. These islands are now variously a resort, the Pacific Missile Test Center, protected nature preserves, national parkland, ranchlands, and privately owned homes. Not too long ago they were inhabited by American Indian peoples, nesting birds, and marine mammals. Claimed for Spain in the 1540s, the islands were not colonized, but ships did offload goats and sheep to multiply as a future meat source. As had been their practice, the Spanish brought both Churro and Merino sheep with them to the New World. The English navigator George Vancouver reported the presence of sheep on San Clemente Island in 1793.

By the 1850s, Los Angelenos depended on the sheep from Santa Cruz, Santa Catalina, and San Clemente as a source for mutton. By this time the island sheep had survived for three hundred years and had become fully adapted to the climate and land. Running unfenced and wild over much of the islands, the sheep were undeniably hardy and wily. When the American ranchers began to import fine rams to use in upgrading, they faced a problem. The imported bucks could not compete with the wild rams to catch the fleet, nimble ewes. It became necessary to fence off portions of the islands into smaller pastures.

In the 1890s, some 15,000 Churro-type sheep still grazed Santa Catalina, but Merino flocks soon replaced them. Santa Rosa was home to a huge operation that peaked at 80,000 sheep in the 1880s. Santa Rosa was later turned into a cattle ranch, although the ranch

company continued to raise sheep on San Nicolas and San Miguel. On San Clemente, the old island strain of sheep flourished from 1916 to 1934, numbering 10,000 to 12,000. In 1931, approximately 4,000 old-style sheep remained, but they were eventually culled out.

In 1865, a French immigrant named Justinian Caire had become manager of the 62,000-acre island of Santa Cruz. Caire and his wife and children were able to purchase it four years later, and for sixty years they ran a highly successful sheep and cattle operation. Caire used both Merino and Rambouillet rams on the native island flocks. Rams and ewes ran freely all year on the rangeland, with horseback riders herding them to corrals for shearing once or twice a year. Wool was shipped to San Francisco or to other California ports by the family-owned schooner or by coastal steamers. The amount of mutton produced by the Channel Island ranches had become far more than was needed in California, so it was trucked or railed out. Sheep for market were shipped to mainland stockyards in thousand-head lots. The wool was sold on consignment to eastern buyers.

Caire was noted for his careful attention to good sheep management techniques, preventing infectious disease, and regularly worming his sheep. He was also recognized for his pioneering concern for soil conservation, building many dry rock walls across streambeds. His buildings were made of native island brick and rock, and he planted many trees.

After a dispute between heirs, the island was divided in two. In 1937, Edwin Stanton attempted to establish 10,000 ewes from Arizona on his portion to replace the island sheep. These sheep were unable to survive the island conditions, and this part of the island was turned over to cattle ranching. On the other portion, a Caire granddaughter continued to raise about 4,500 sheep in large fenced *potreros*, or sections.

Santa Cruz was an excellent location for sheep raising, with its abundant forage, mild climate, isolation from mainland disease, and protection from straying and predation. Challenges to the ranchers included periodic drought and occasional poaching by fishermen. The crows that once threatened the newborn lambs had been eliminated.

It is believed that for the past seventy years many of the island native sheep were feral or nearly so. The sheep on the island were based on the original Churro-Merino stock brought in by the Spanish. Beginning in 1865, the Merino was used extensively in breeding. Caire believed that the Merino was well suited to the island's climate and geography, but he also used Rambouillet rams. With attention to health and constitutional fitness, the Santa Cruz flocks did indeed become well adapted to their home.

The Santa Cruz sheep carry a fine fleece, with very little or no wool on faces, legs, or underside. The sheep possess a rattail. Although they are smaller than modern Merinos and most mainland breeds, they are exceptionally hardy and efficient feeders, and they have a high lamb survival rate. Most of the sheep in the small mainland preservation herds are white, but a significant number are brown or dark brown-black, occasionally with a white patch on the head or the tip of the tail. The ewes average 60 to 80 pounds and rams 125 to 150 pounds. They are fine-boned, lively, and gentle if raised with human handling. Offspring seem to retain the island hardiness.

In the 1970s, the Nature Conservancy gained control over 88 percent of the island. In 1980, it began a sheep eradication program. By 1987, it was believed that approximately 25,000 sheep had been killed and about 3,000 had survived. After the Nature Conservancy fenced in its portion of the island, many sheep were trapped in areas that soon became bare. It is assumed that many of these sheep perished.

Small groups of island sheep were rescued by the ALBC, in cooperation with the Nature Conservancy and other dedicated individuals. The ALBC was able to place 12 lambs with 5 breeders in California in 1988. Earl Crewes was able to bring more sheep off the island in the next three years. About 125 sheep are now in loosely organized breeding situations found mainly in California. Semen has been collected from most of the island-caught and first-generation rams on the mainland.

Although some sheep remain on the island, the Nature Conservancy has placed them under a kill order and they are hunted. The conservancy is allowing some

sheep to be removed and placed with adopters through several organizations. These island-born sheep are completely wild and need experienced, dedicated owners. If the sheep are not placed in proper breeding situations, their adoption will not aid the survival of Santa Cruz sheep. More individuals are needed to raise this hardy, low-input sheep on natural range conditions similar to their original island home. Increased support for coordinated breeding plans and financial aid may be necessary to save the Santa Cruz sheep.

The Channel Islands have endured the total destruction of the native islanders' way of life, for these peoples were gone by the early 1800s. Fur traders almost exterminated the sea otter, which is now making a comeback. Two of the islands have been used extensively as military firing ranges. The grazing and feeding of hay and grain to ranch livestock and the widespread presence of feral animals have all affected the ecology of the islands. It is a worthwhile objective to preserve or restore the native flora and fauna to the islands, but this goal is no excuse to disregard the long history of the ranching years or the importance of the feral sheep and goats that have inhabited these islands for more than four hundred years. Long-isolated populations develop unique genetic traits that need to be recognized for their possible value in the future.



Critical

### *Gulf Coast Native (pl. 41)*

Beginning in 1493, the original imports of Spanish Merino and Churro-type sheep multiplied rapidly on the Spanish-colonized islands of Hispaniola, Puerto Rico, Cuba, and Jamaica. Although Juan Ponce de León explored Florida as early as 1513, it was not until 1565 that Pedro Menéndez de Avilés led an expedition into Florida to chase out French colonists and establish Spain's first fort and mission in St. Augustine. Menéndez de Avilés arrived in La Florida with both cattle and sheep. These sheep were mostly the Churro type that was already flourishing in the New World. It was not until the 1700s that Spain founded mission settlements in the northern Florida-Georgia borderland along El

Camino Real, in Louisiana, and in Texas. Soldiers, missionaries, craftworkers, and settlers moved to the missions, which often flourished. Merinos and their French cousins, the Rambouillets, were imported in the early 1800s and influenced the common sheep of the settlements.

After a period of British rule and then Spanish again, Florida was ceded to the United States in 1826. Soon the common American sheep types began to move into this area. These small sheep were a mixture of British breeds (probably Southdown, Hampshire, Dorset Horn, and Cheviot), many with poor conformation and generally coarse and short wool.

This genetic mix was tempered and hardened in the semitropical climate of Florida and the cutover area of the Gulf Coast to Texas, where attention and good management were also minimal. The sheep who survived were heat tolerant and resistant to foot rot. They were not given supplemental feedings or treated for parasites. Generally they ranged freely in the pineywoods and were rounded up once a year. Self-sufficient and hardy sheep were the only survivors.

As high-quality British breeds became available in the United States, rams were brought down to improve the native flocks. These rams suffered from the hot and humid climate as well as the lower level of care, although they left traces of their presence. The native sheep remained successful at providing food and fiber for about 380 years.

Until World War II, this native breed was the major supplier of raw wool in the South. When the more productive and larger breeds began to dominate the sheep industry, the native "unimproved" breeds lost favor and population numbers. Until the late 1930s, there were more than 300,000 native sheep in Louisiana alone. Many large flocks were dispersed in the 1950s. From that time native sheep were mostly kept as small farm flocks.

The regional varieties have gone by various names: Florida Native, Louisiana Native, Louisiana Scrub, Georgia Native, and Pineywoods Native. Some breeders believe that all native sheep can be collected into one landrace breed known as Gulf Coast Natives or just Natives. Natives do have a similar small bone structure,

but they are not uniform in appearance, and there are some separate strains of sheep in existence.

In the 1930s, when they were still numerous, Louisiana Native sheep were described as long-legged and long-backed, active sheep. They had clean faces, legs, and underlines, often shedding their belly wool. They produced a medium, variable wool fleece weighing up to 3 pounds. The sheep were not heavy flockers and tended to graze in small groups or even alone. They were not treated for internal parasites or foot rot and so possessed greater resistance against these problems.

In the 1930s, Florida Native sheep were described as finer boned, smaller, and thinner bodied than other Gulf Coast types. These sheep had considerable hair in their fleece and were available in different colors. Hardiness was noted as their most valuable trait.

Florida State University established its breeding group of Florida Native sheep in the early 1950s. Tunis sheep were used in this flock, giving the sheep reddish brown faces and legs. The university maintained a flock of about 30 animals, but it has since ended this program.

Louisiana State University has maintained a flock of Louisiana Native sheep since 1958. This flock was well documented for many years. The university flocks at Florida and Louisiana exchanged rams in 1985. That year and for the next three years the Florida rams were used on the flock at Louisiana. At the time it was felt that outside blood was needed, but in the long run neither party has been happy with the cross, as their sheep types were different. Tom Gray, who once managed the LSU flock, and Dempsey Perkins, whose family has raised native sheep since the mid-1800s, own private flocks of Louisiana Native sheep.

The Gulf Coast Sheep Breeders Association was formed in 1994 to create a network of breeders, register and promote this tough little landrace breed, and work on a collective breed standard. Formulating a breed standard is important because many different sheep are called Gulf Coast Natives. Many of these sheep show definite signs of outside blood. Careful selection will be required to insure the preservation of the unique Native qualities. However, it will be necessary to create a standard that encompasses both the separate strains and the

large group of sheep bred from different native sources. The ALBC has maintained an open flock book, and those sheep are eligible for registration in the GCSBA herd book. Eventually, further additions will require inspection and validation before admittance.

Gulf Coast Native rams weigh 130 to 180 pounds and ewes 85 to 115 pounds, but they can be as small as 35 to 40 pounds, especially in poor conditions. The faces and legs are white to dark brown in color or mottled. Wool colors rang from white to tan to dark brown with some pied colors. The sheep produce a variable medium fleece with a length of 2.5 to 4 inches and weighing 4 to 6 pounds. Some individuals will breed out of season, producing lambs twice a year. Possessing excellent maternal instincts, the ewes average a 170 percent lambing rate with little or no assistance. Early maturity, resistance to bloodworms, and hardiness under even subtropical conditions are strong characteristics that should be maintained.

Native sheep are excellent foragers, even helping to battle kudzu, honeysuckle, and other pest plants of the South. Although they produce lighter lambs, native sheep have a higher rate of lamb survival and finishing when compared to other breeds in the same poor nutritional and climate conditions. This is a clear indication of the breed's continuing value in sheep production in the southeastern United States and elsewhere.

A particularly valuable trait of Gulf Coast Native sheep is their exceptional resistance to gastrointestinal parasites. This resistance has been verified at Louisiana State and Texas A & M Universities. Other breeds placed in the same pastures have not been able to survive without anthelmintic worm treatment. Gulf Coast Native sheep even do well when pastured with other parasite-loaded sheep. Research seems to indicate that the breed possesses a factor or factors that work against infection caused by parasites in the gut, especially the stomach worm *Haemonchus contortus*, which is common in the Southeast. The breed has higher levels of hemoglobin, which is also linked to its parasite resistance. This breed trait needs to be carefully maintained by strict culling of nonresistant sheep.

Survival of the fittest in the hot and wet areas of the southeastern United States has produced Native sheep

that are well suited to low-input and sustainable agriculture practices. Native sheep may also be useful in sheep dairying. Gulf Coast Native sheep are now being used as crosses to improve hardiness and ability to gain on grass in the southern states. The Walt Disney Animal Kingdom recently acquired a flock of Gulf Coast Native sheep because they are so well suited to Florida's climate.

Certainly the breed's unique attributes are of genetic value to the sheep industry. At present the most important task is to maintain strict husbandry standards to preserve and foster the traits of disease and parasite resistance, self-sufficiency, and fertility of the Native sheep. Some breeders have noted that their sheep seem to be losing these distinctive characteristics.

The breed is experiencing a rapid introduction of genetics from breeds of British origins and from Katahdin rams. Although the population has been estimated as high as 2,000, the impact of this crossbreeding could rapidly reduce these numbers. The American sheep industry believes that the native sheep can be important as a meat breed in the southern U.S. and Latin American markets, but immediate action will be required to save this landrace breed.



Rare

### *Newfoundland Local (pl. 42)*

The province of Newfoundland includes the island of Newfoundland, the mainland portion of Labrador, and numerous smaller islands. Home to the Beothuk native peoples, Newfoundland was first discovered by Europeans when Bjarni Herjolfsson sighted these lands in A.D. 986. Several years later Leif Eriksson explored the area, naming the lands Vinland or Wineland after the wild grapes that abounded there. Remains of a Viking settlement have been excavated on the northwest tip of the island.

This portion of the New World was rediscovered by John Cabot in 1497 and claimed for the English. The French, English, Spanish, and Portuguese used Newfoundland Island as a Grand Banks fishing station. In 1583, Newfoundland was declared an English possess-

sion, and the colony of St. John's was established in 1610. Because the French also occupied land on the island and coastal areas, control over Newfoundland was disputed for many years. The French continued to fish from areas of the island until 1904 and still own two small islands off Newfoundland's southern coast.

During the nineteenth century, the population grew, mainly based on fisheries but also in rural homesteads along the many small, rocky harbors. The rocky land and short, cool growing season made farming very difficult.

The sheep found on the island and in Labrador were originally shipboard provisions in the sixteenth and seventeenth centuries. Other sheep may have descended from survivors of a shipwreck off Mistaken Point on the southeastern end of Newfoundland. The fishermen and permanent settlers brought more sheep over a four-hundred-year span. Accordingly, a native breed of extremely hardy sheep sprang from many breeds from several countries.

Early reports about these sheep described them as long legged with a well-developed body and long, narrow heads. Fleeces were long and coarse, 80 percent white and 20 percent black. Hardiness, longevity, and twinning were noteworthy. Many of the inhabitants called them the "old-fashioned" sheep.

The island sheep population was about 100,000 head in the early twentieth century. Under a system based on community trust, most sheep roamed freely on natural pastures without supplemental feeding. Breeds such as the Suffolk, Border Cheviot, and North Country Cheviot were introduced to increase meat production.

Changing economic conditions and government policies brought an end to many of the small communities on the islands and rural areas of Newfoundland. Where the sheep once roamed on open land the farmers were forced to build fences to control them. The sheep numbers on the island have dwindled to about 7,000, with many fewer showing the trademarks of the traditional Newfoundland Local type.

Many of the sheep that have been identified as the native Newfoundland type have been found on the smaller outpost islands. Through its members, the

Rare Breeds Conservancy is maintaining a breeding flock, as do some members of the Sheep Producer's Association of Newfoundland and Labrador. Saint John's Research Station is also fostering a breeding flock based on a foundation group of sheep gathered in the 1970s. Near the Bay of Exploits, Richard Wells maintains an extremely pure flock that has been in his family for more than a hundred years. A cooperative study of 52 farm flocks was completed by representatives of the Nova Scotia Agricultural College and the Newfoundland Department of Forest Resources and Agrifoods in the mid-1990s.

Newfoundland Local sheep are noted for their exceptional hardiness. The breed takes the harsh and extreme weather of this northern Atlantic climate in stride. The sheep forage on rocky barrens and taiga forest. They are also known to eat kelp on the seashore.

Ewes are excellent mothers, good milkers, and able to mother up to 4 lambs, although they average a 170 percent lambing rate. They require little assistance at lambing. Some Newfoundland Local sheep also breed out of season.

Although some shepherds feel that their sheep are docile and not prone to jumping fences, others state that the sheep can be difficult to handle. Newfoundland Local sheep do have a strong flocking nature. The breed is also long-lived and productive until fourteen to seventeen years of age.

Even though their numbers are small, Newfoundland Local sheep enjoy large genetic variability in size, bone structure, and face and fleece color. Female sheep are usually polled, though horned ewes can occur. Most rams are horned similar to a Dorset type. The sheep are generally white or off-white in color. At least 10 percent are black or black and brown in color. Many are mottled, but others do not have face markings. The face is open and free of wool. The breed carries a medium-coarse wool, with a staple length of about 6 inches and a fleece weight of 5 pounds. Tails are left undocked at about three-quarters in length. The tail is generally hairy.

Newfoundland Local sheep are usually small in size with straight backs, short, strong legs, and strong pasterns. Although sheep may be as short as 21 inches,

they range up to 29 inches. The cooperative study commented that the shorter sheep tend to resemble the Border Cheviot or Welsh Mountain, whereas the taller sheep resemble the Border Leicester or North Country Cheviot.

There are no clear or reliable figures of the Newfoundland population. At one point, Agriculture Canada at the St. John's Research Station estimated that only about 125 sheep remained of the native Newfoundland type. There are about 500 Newfoundland sheep in the inspection program. The research flock at St. John's Research Station numbers about 60 animals.

The cooperative study concluded that Newfoundland Local sheep are a breed, evolved by natural selection, with wide genetic variability. It urged the formation of a breed association, the establishment of general breed standards, and registration. DNA research and collection of production data are also planned.

Newfoundland Local sheep represent a unique and historic genetic type that has become well adapted to harsh climatic conditions while retaining good production and hardiness. The breed can be economically successful with a minimal input. This Canadian landrace breed is highly deserving of preservation efforts.



Rare

### *Hog Island (pl. 43)*

The sheep found in the middle colonies during the Revolutionary War era were generally a mixture of the early English breeds to which the Improved Leicester and Merino were being introduced. Merinos may have found their way to the barrier islands much earlier; residents believed that Spanish shipwrecks in the 1600s left sheep to fend for themselves. In 1808, George Washington Parke Custis noted the long-established feral sheep on Smith Island off the Virginia coast. In Maryland, a friend of Washington's described the local breed of rattle-tail sheep as producing a rich and flavorful mutton.

Hog Island is found off the seaward coast of the Delmarva Peninsula. More than two hundred years ago, local sheep were raised on this barrier island. The climate was hot and humid in summer, but the island itself

is low-lying, and the winter could bring unprotected storms. The sheep who survived were small, tough, and self-sufficient. Occasionally, rams were taken to the island to prevent excessive inbreeding. A Hampshire ram was used in 1953, and a Dorset ram also spent a short period on the island in the early 1950s. Sheep were used by the island residents and sometimes sold off the island.

The human population left the island in 1938. In 1974, the island's owner, Henry Bowen, sold Hog Island to the Nature Conservancy. Most of the sheep and cattle were removed. About 70 sheep went into the hands of private owners, and unfortunately many of these sheep have disappeared.

The Animal Science Department of Virginia Polytechnic Institute also removed 10 rams and 20 ewes from the island. Researchers were interested in studying the breed's hardiness and possible resistance to internal parasites. Breed records were not kept carefully and the research was discontinued. The sheep were not found to have a special resistance to parasites, though they were extremely hardy.

Hog Island sheep are generally small, with rams weighing about 125 pounds and ewes about 90 pounds. The sheep somewhat resemble an old-type Spanish Merino. Horns can appear on both rams and ewes and are present in about half the population. The medium fleece produces about 3.5 to 5 pounds of raw wool. Lambs are frequently born with spots that disappear as they mature. The adult sheep often have mottled feet and faces. About 10 percent are black.

Because the Hog Island sheep resemble the sheep found in the colonies in the 1700s, the breed has found a home on exhibition at several historical sites. George Washington's birthplace in Pope's Creek, Virginia, obtained some sheep from Virginia Polytechnic Institute. In 1981, 6 sheep from this flock were taken to Gunston Hall Plantation in Mason Neck, Virginia. Gunston Hall has been able to offer sheep for sale to other historic sites and a few individuals. Plimoth Plantation in Massachusetts has also established a flock. At George Washington's home, Mount Vernon, there is now a large flock of more than 40 sheep involved in a careful breeding program. These sheep represent four

bloodlines. Sheep from this flock have been used to establish a few new flocks.

The Museum of American Frontier Culture in Staunton, Virginia, is using Hog Island sheep at its American Farm site, which depicts a nineteenth-century Virginia farm. In an attempt to re-create the sheep of the times, Hog Island sheep with a small addition of Dorset have been bred to resemble the native sheep raised for meat and their short fleece. These sheep are called American Site sheep.

The numbers of Hog Island sheep are critically low, and they can suffer from inbreeding problems. Shepherds are reporting problems with stillbirths and atypical-looking sheep. In an attempt to stabilize the population, some breeders have decided to bring in outside blood. Gulf Coast Native sheep have been crossbred with the Hog Island sheep, and their offspring will be bred back to Hog Island sheep until nearly pure. When populations are extremely small and have been so for many years, there will always be a debate between those who feel that the genotype must be preserved pure and those who believe that the population will not survive unless there is a carefully regulated introduction from outside.

In 1995, there were about 200 Hog Island sheep, an increase from about 60 only ten years before. The sheep desperately need an organization and a coordinated breeding program. An interested group has been meeting since late 2000. The population of this historic breed is found mostly in a few flocks in Virginia. The sheep are no longer found on Hog Island.



Critical

### *Tunis (pl. 44)*

Although Europeans and North Americans are familiar largely with wool and meat sheep breeds, the fat-tailed, carpet wool breeds make up 25 to 30 percent of the world's sheep population. Fat-tailed sheep are truly multipurpose, providing milk, meat, and wool for carpets. These breeds are certainly very old—the Bible contains many references to fat-tailed sheep.

Tunisia, Libya, and northern Egypt are the primary

homes of these fat-tailed breeds, but they are found throughout the Near East. The Tunis type is reputed to be three thousand years old and is still found in the area. In the eighteenth century, one variety known as the Barbary or Mountain Tunis was a horned sheep with a multicolored fleece of black, brown, and white.

Tunisian sheep were early imports to the United States. John Adams mentioned Tunis sheep in his diary in 1782. In 1799, General William Eaton was serving as the U.S. consul in Tunisia. He purchased a small group of 10 sheep and sent them to the United States aboard the man-of-war *Sophia*. Unfortunately only one ram and one ewe survived, and they were delivered into the guardianship of Judge Richard Peters of Belmont, Pennsylvania. For twenty years the judge built up a flock based on these two imports, with the original ewe raising her last lamb at age sixteen. With Peters's skill at promotion, the Tunis soon acquired a reputation for producing delicious mutton. Although it is unappetizing to today's consumers, the 8-pound fat tail was considered a delicacy.

From Judge Peters's flock various breeding groups were dispersed to the Carolinas, Virginia, and Georgia. Peters also allowed his Tunis rams to be used freely by his friends and other farmers. The Tunis attracted many admirers in the South, including Thomas Jefferson, who had more Tunis sheep brought over on a government ship. Commodore Barron also imported Tunis sheep to Virginia in 1808. Thirteen more Tunis sheep were eventually imported in 1825 to New York.

A serious and knowledgeable farmer, George Washington had purchased Leicester ewes from Robert Bakewell in England. Through his efforts, Washington was able to more than double his average yield of wool from his flocks. He also used a Tunis ram in this improvement effort. In 1797, he obtained another "Persian" ram and ewe. Washington passed along his interest in agriculture to Martha's grandson, George Washington Parke Custis, whom they adopted and raised at Mount Vernon after Parke Custis's parents' death. Although Washington's flock was dispersed after his death, Parke Custis continued to cross this Tunisian or Persian ram on the improved Bakewell Leicester ewes,

producing an excellent wool and meat sheep. This Tunis-Leicester cross quickly became popular along the East Coast and was called the Arlington, Arlington Supreme, or Arlington Longwool, all named for Parke Custis's home, Arlington House. Judge Peters, George Washington, and Parke Custis were all members of the Philadelphia Society for Promoting Agriculture.

Some sheepbreeders believed that the fat tail of the purebred North African Tunis interfered with the rams when breeding the ewes. Hoping to lessen the tail size and improve the wool, a Pennsylvania farmer named Powell crossed Southdown and Leicester sheep into the Tunis bloodlines. With these crosses and selection for white wool and polled heads, the North African Tunis was changed into a new American breed that has been maintained ever since.

The Tunis breed survived the "Merino madness" and was well on its way to great success by the beginning of the Civil War in 1861. Tunis lambs were favored in the eastern meat markets for their fine texture and delicate flavor. Unfortunately, wartime needs, combined with confiscation and destruction by Union troops, almost destroyed the Tunis and Arlington breeds.

Almost twenty years after the war, a group of Indiana sheepmen, including Charles Roundtree of Crawfordsville and James A. Guilliams of Putnam County, purchased the best Tunis flocks they could find and moved them north. The Tunis breed was revived in Indiana and soon spread to Ohio, Michigan, New York, Pennsylvania, and then New England and the rest of the Middle Atlantic. Today the breed remains strongest in those areas.

The American Tunis Breeder's Association, founded in 1896, enthusiastically promoted this revival. Although the organization fell apart during the early years of the Depression, it was replaced by the National Tunis Sheep Registry, which seeks to preserve the purity of the American Tunis by not allowing cross-breeding.

The modern Tunis has a striking and unusual appearance. The lambs are born in shades of tan to red, occasionally with a spot of white on the top of the head

or at the tip of the tail. The face and legs retain the tan or red color, but the wool gradually turns white or creamy ivory. The underlying skin is pink. The Tunis has long, broad ears that droop pendulously. When startled or curious, the Tunis carries its ears up and forward.

The Tunis is medium sized, with rams weighing 175 to 230 pounds and ewes weighing 130 to 160 pounds. The rams exhibit a Roman nose. The polled sheep are fine boned with narrow heads that allow the ewes to give birth easily without assistance. Ewes are aseasual breeders, usually delivering twins. Abundant and heavy milking has remained a Tunis trait. As a result, the lambs are fast gaining and early maturing. Neither pregnant ewes nor growing lambs require heavy supplementary grain feeding. The breed itself is noted for being very feed efficient. Sheep raisers note that the ewes are excellent mothers and that both rams and ewes are friendly, curious, quiet, and gentle natured. Tunis sheep have a strong flocking instinct.

Tunis sheep are particularly heat tolerant and the rams are vigorous breeders out of season. They have done well in colder climates, even coping well with the snowdrifts in Canada. They produce a medium-wool fleece of about 8 to 12 pounds that is enjoyed by hand spinners.

If the tail is not docked, it will develop into a medium-sized fat tail. Growing lambs retain the fat-tail trait of laying on weight on the dock before fattening over the ribs, back, and internally. This tendency to concentrate the fat helps to produce a nice, lean lamb carcass for market. Adult Tunis sheep also have this fullness over the rump and dock and can use this fat deposit during poor feed periods.

The National Tunis Sheep Registry estimates that the population has climbed to 5,000 sheep from a low of 2,500, with an annual registration of 400 to 600 lambs each year. There is quite a bit of variation from flock to flock. The breed needs to safeguard the Tunis's lambing ease, milk abundance, temperament, appearance, and aseasual breeding ability.

One of the oldest American breeds, the Tunis remains a low-input, hardy, long-lived breed that produces fine market lambs and wool and has a possible

use in sheep dairying. Because the Tunis carries a different genetic background from the other sheep breeds in North America, it is valuable in crossbreeding operations.



Rare



Rare

### *Delaine Merino (pl. 45)*

Twenty-five-hundred-year-old fine white wool similar to that of the Merino has been found in the Black Sea region, possibly coming from an ancient Anatolian breed. Later brought into northern Africa, the forerunner of the Merino may have been moved into Spain during the Islamic occupation. Another theory holds that the ancient fine-wooled Tarentine sheep developed by the Romans were eventually interbred in Spain with a breed known as the Laodicean from the Near East. However the event occurred, beginning in the late 1500s, wool from the Spanish Merino became the foundation of that country's economy. The sheep were zealously protected until the second half of the 1700s.

Although the undercoat fibers of the Mouflon and Soay are finer, the Merino produces wool measuring about 22 microns in diameter, among the finest in the world. In the Merino fleece, only the fine inner fibers grow, and they are present about five times more per square inch of skin than in any other breed. The fibers have a uniform U-shaped wave or crimp. Abundant yolk or oil, either clear or straw colored, protects the entire length of the fiber. The Merino flourishes in hot, dry climates and can travel far for water and food. Merinos also have a highly developed flocking instinct and will breed out of season. The genetic separateness of the Merino has made it potent in the creation of and contribution to many other breeds.

In 1765, the king of Spain sent 200 Merinos to Saxony, forming the beginnings of the once huge German wool industry. The original Saxony Merino is now believed to be extinct in that country, although a German Merino breed and crossbred mutton Merino still exists. In Britain, King George III also obtained Merinos and used them on some native breeds. Here,

other than in a few flocks kept by careful, dedicated breeders, the Merino did not thrive in a purebred state. In recent years there has been an interest in crossbreeding Merinos to British breeds for wool improvement.

Taken to France, the Merino was the basis for the Rambouillet, which itself became a breed of tremendous influence. Later, Australian Merino wool would eventually spell the demise of both the powerful British and German wool industries. Today the Merino in its many forms numbers in the millions worldwide, and its story is complex and far-reaching.

Although Merinos made their way to North America earlier, the significant importations began in the late eighteenth century. Merinos were extremely valuable stock, selling for a small fortune—\$1,000 to \$1,500 apiece. Thousands of Merinos were in the United States by the 1820s, and American producers were rapidly modifying them to suit their conditions and purposes. Many American experts described the breed as “the most valuable of the domestic animals.” American Merino breeding centered in Vermont, Ohio, Pennsylvania, New York, the Virginias, and Indiana. The ensuing “Merino craze” became a near mania, displacing many practical and established breeds.

In 1893, the primary types of the Merino were given letter designations. With a true American penchant for improvement, several new varieties were created, including a heavily wrinkled Merino with an oily, fine fleece. Developed chiefly in Vermont from the 1850s to the 1880s, this “A” type produced record fleeces of 25 to 35 pounds but was hard to shear. The large wrinkles produced a lesser-grade wool, and the heavy yolk attracted flies and created odor. This draped Merino was slow growing, needed shelter from the wet, was prone to foot rot in damp areas, and produced a poor meat carcass. Ewes were small at 85 to 100 pounds. The “A” type needed the care of skilled sheep raisers and was not suitable for range flocks. The “A” type Merino is now nearly extinct except for preservation and reconstruction efforts by historic museums such as the Firestone Farm at Greenfield Village and Henry Ford Museum in Michigan.

Another variety known as the “B” type was developed in Ohio. This Merino was larger and produced a

better carcass. It was certainly better suited to general farm conditions. The “B” type carried heavy neck and rump folds with fewer wrinkles on the body (fig. 21).

Washington County, Pennsylvania, was the home of the American Merino, Blacktop, Delaine Merino, or just Delaine, which eventually became known as the “C” type. The Delaine is the truest representative of the American Merino breed, which eventually established itself throughout the West and Southwest in massive range flocks.

Delaine ewes average 125 to 160 pounds and rams 190 to 240 or slightly smaller. They are hardy, long-lived, good foraging sheep with a strong flocking instinct. Generally singletons but with twins now occurring more often, the lambs grow faster than the old A and B types.

The Delaine may have one or two folds of skin on the neck, but the body is generally smooth. Small corrugations or pleats may occur on heavy fleece-bearing sheep, but they should not interfere with the development of a good fleece with a 3-to-4-inch staple. A ewe will grow at least a 9-to-14-pound dense fleece of fine, white Merino wool, with rams averaging higher weights. Because of the heavy oil, weight is lost in washing. The fleece covers the legs and the top and sides of the head. Although some breeders have worked on a polled variety, the Delaine ram generally possesses ridged Merino horns that spiral tightly outward from the head.

The American Merino was eventually superseded by the French Rambouillet. The Rambouillet is larger, with variable amounts of wrinkling. With an extended breeding season, this breed also produces a better market lamb. The Rambouillet’s popularity has grown tremendously in the past twenty-five years, now registering more than 16,000 head annually. This breed is now the basis of the western range bands. The Debouillet is a breed created by Delaine-Rambouillet crosses. A variety of other breeds, both native and imported, contain Merino or Rambouillet blood, including the Booroola Merino, Columbia, Cormo, Corriedale, Panama, Polypay, Superfine, and Targhee. Some of these breeds have eclipsed the popularity of the original founding breeds.

[To view this image, refer to the print version of this title.]

Although Delaine Merino sheep are found scattered throughout the country, they are concentrated mainly in Ohio and Pennsylvania. Delaine registrations have been on a steady decline over the past several decades. Only about 600 are being registered yearly in the United States, along with 50 or fewer in Canada.

The Delaine represents a direct link to the old Merino before its many developments. The American flock still carries the genetic potential for the old-type fleeces. The many unique, potent qualities of the Merino have proven themselves invaluable in the sheep industry and in breed creation. For this reason alone, the pure flock needs to be preserved as a genetic reservoir for the future.

### *Caribbean Hair*

Because wild sheep possess the same outer hair coat and soft, seasonal woolly undercoat as the breeds

Fig. 21 The extremely wrinkled Captain Jack Jr. was a well-known American Merino ram of the 1880s. Courtesy of the IAB and Hans Peter Jorgensen.

known as hair sheep, it may be safe to assume that these breeds have been less altered by domestication. The hair sheep stocks of the New World probably originated in West Africa. Today four out of five of the major sheep breeds in West Africa are hair sheep. They include the West African Dwarf and the long-legged Sahel. Other hair sheep in Africa are the Daman in Morocco and the Somalia Blackhead or Blackhead Persian, which has also become an important hair sheep breed in southern Africa. In Asia, breeds such as the Sumatran Thin Tail and the Javanese Fat Tail have potential for hair sheep development.

Just as goats were used as live provisions, sheep were brought to the New World with the slave and trade ships carrying cargo from West Africa. This area is be-

lieved to be the primary source of hair sheep breeds in the Caribbean. Sheep may also have come directly from Spain, Portugal, or North Africa. Hair sheep were exceptionally well suited to the same tropical climates found directly to the west of Africa in the Caribbean and Central American countries south to Brazil.

The better-known Caribbean hair sheep breeds include the Barbados Blackbelly, St. Croix, Virgin Island White, and the Boricua of Puerto Rico. Other populations are found in the Bahamas, Cuba, Dominican Republic, Martinique, and other islands. Mexico is home to a native hair sheep known as the Peliquey or Tobasco. The Santa Ines and Meroda Nova are found in Brazil. The Blackhead Persian is also found in the area and is a recognized breed in Brazil, where it is called the Somalis Brasileira, Brazilian Somali, or Somali Blackhead. The African Red is found in Central America.

These breeds and other native hair sheep are exceptionally resistant to heat stress and internal parasites. They are aseasational breeders and efficient feeders adapted to tropical forage. If they grow a winter coat, it is naturally shed out in the spring. Rams may have a slight mane and throat ruff all year. The sheep graze on native pasture without supplementation and receive no assistance with lambing or mothering problems.

Although leaner than market lamb-producing breeds, these native breeds are well suited to meat production in this environment. Hair sheep research is actively being carried out in the Caribbean nations and throughout the Americas at universities and agricultural institutes. In the Caribbean, most sheep raising is on small farms, where the sheep are expected to be highly self-sufficient. As sheep raisers begin to make use of this research into nutrition, management techniques, reproduction, and better use of genetic potential, hair sheep production should become an important contribution to agriculture.

### *Boricua*

Puerto Rico was a Spanish possession until 1898. Following the pattern on many Caribbean islands, the native peoples were enslaved but soon perished from

harsh treatment. Slaves from Africa replaced them as laborers on the colonial plantations and in the sugar mills. Although Spanish sheep breeds were also brought to the islands, even today the European wool breeds do poorly in this climate.

The Boricua is the native sheep found in Puerto Rico. The Boricua is distinctively Roman-nosed, with pendulous, drooping ears. The sheep carry a hair coat that is reddish brown or black. Some research on the Boricua has been conducted at the University of Puerto Rico.

### *Barbados Blackbelly (pl. 46)*

The island of Barbados lies in the Lesser Antilles near the coast of northern Brazil. The island has an area of 166 square miles and in 1536 was named Los Barbados by the Portuguese for the shaggy rooted banyans on its shores. Barbados had been visited earlier by Spanish explorers, who had taken all of the Carib Indians away as slaves. In 1627, the English settled on the island, established sugar cane plantations, and brought in slave workers.

Twenty years later an Englishman named Richard Ligon lived and worked on a Barbadian plantation, eventually publishing his history of the island in 1657. Ligon recorded the presence of hair sheep and European woolled breeds in the colony, where they were most likely interbreeding. Ligon commented that the hair sheep had better-tasting mutton than the wool sheep. He described the hair sheep as coming from Ginny, Guinea, or Binny. Members of the Bini tribes were in fact brought as slaves to Barbados.

Ligon drew pictures of the wool sheep, depicting them as white, polled, free of wool below the hocks, and with thin, woolled, long tails. He also noted that the wool sheep were not thriving but always bore twin lambs. Prolific sheep of this description probably came from the Dutch traders who supplied the colonists.

Both of these stocks were present early on in the island's colonization and contributed to the creation of a prolific native breed that was highly adapted to its tropical environment. The heat and humidity were

hard on the sheep. The pasture was mainly tough grass and full of burrs. As sugar cane cultivation came to dominate the island, the sheep and goats were limited to rough land and roadsides.

From the mid-1700s, visitors to Barbados often commented upon the hairy or woolless sheep to be found there. The sheep were also noted for their prolificacy and superior meat. At times, new sheep were brought to the island, including "America" sheep about 1850, Blackhead Persian sheep in the 1930s, and the Wiltshire Horn in the 1950s. These sheep did not have a major impact upon the large island population, but their ancestry is revealed in the presence of occasional woolled sheep, horns, and varied colors and patterns. More recently, breeds such as Suffolks and Dorsets were raised experimentally, but they did not thrive.

On Barbados today, the native sheep are numerous and an important protein source. Using the services of a community ram, the ewes are often tied out during the day and after being released in the evening return home dragging their ropes. Although most of the sheep are polled, some rams are fully horned. Other rams and ewes grow vestigial horns resembling a knot or small snail shell on their head. On the island, polled animals are preferred among the Barbados Sheep Farmers Association. The ears are held out laterally, and the facial profile is Roman in character. The sheep are smooth haired with a long 12-to-20-inch tail that is not docked. Barbados sheep tend to be small, with ewes weighing 80 to 100 pounds and rams slightly more. The ewes usually lamb twins or triplets every eight or nine months. Quadruplets and more are not uncommon.

Most native sheep are strikingly colored with black undersides, including the insides of the legs and back of the flank. The black color also extends up the neck and jaw and inside the ears, with a spot or stripe above the eyes known as badger markings. The remainder of the hair coat may be tan, yellowish tan, or frequently a reddish brown or mahogany. Occasionally individuals are black, chocolate, white, light roan, or pale gold. The rams also carry a full, distinctive cape of long hair over the neck and shoulders or a throat ruff.

Barbados sheep were exported to many other West

Indian islands by the end of the nineteenth century. Since the 1960s, Barbados has shipped breeding stock to many countries in the Caribbean basin and Latin America and to Indonesia. The population on the island is estimated at about 30,000, with a purebred registered flock of about 10,000. Most of the tender, flavorful lamb is sold directly to customers, with some 2,500 sheep slaughtered commercially.

The first recorded exports of Barbados sheep were made to the United States in 1904. Although other importations probably occurred, there was only one additional recorded group of Barbados sheep imported to Texas in 1945. The scrapie protocols now make the export of further stock to the United States very expensive.

The Barbados has become an important meat breed in Texas, numbering as high as 500,000, with small numbers in other states and in Canada. Barbados sheep have been successful because of their thriftiness, hardiness, resistance to parasites, early maturity, and prolificacy. They are vigorous grazers and browsers. The Barbados has also demonstrated tolerance for cold weather and dry conditions, with some sheep growing a short winter coat that is shed in the spring. This breed requires minimal care because it does not require docking, crutching, and shearing. The ewes can be somewhat nervous and protective of their lambs without regular handling. The meat is less muttoney tasting and leaner than many breeds, somewhat like young goat. The Barbados can range in size from small to large at 250 to 300 pounds. In the United States and Canada, most rams are horned, as are about half the ewes.

Barbados lambs, weighing 60 to 80 pounds at about four to five months of age, are marketed by the thousands each month to various destinations. Horned and intact ram lambs are desirable for religious and cultural reasons in the Arab ethnic markets, located primarily on the East Coast and in California. If a slight amount of wool is present, lambs are butchered, canned, and shipped to Germany and Europe labeled as Mouflon. The Mexican and Asian markets will take young lambs, older sheep, and culls.

Some meat producers are striving to produce a

polled animal and a larger, more uniform market lamb that would mature at about 90 pounds at four to five months. Because their sheep are slightly smaller than other commercial meat breeds, Barbados sheep producers have had difficulty competing. Demand for market sheep is expected to grow, especially if the meat producers are successful in educating the public about their slightly different, yet highly lean product.

Although some strongly Barbados phenotype sheep are present, many of the large Barbados herds in Texas have been crossbred with domestic breeds such as the Rambouillet, Merino, and Dorset. Texans commonly refer to the different types as black-bellied Barbado, white-bellied Barbado, and mouflon-bellied Barbado. Barbados are not referred to as hair sheep in Texas. There is also a new designation of Painted Desert sheep for spotted Barbados sheep that carry four or five colors in loud, random spots.

A significant impact on the flocks has been made by the European Mouflon and other wild sheep breeds such as the Argali, Bighorn, Dall, and Hawaiian black sheep. Most Texas Barbados are now horned and carry the mark of the Mouflon in the size of their horns or the Argali in the horns' shape or spiral. Horns are often wide open with a heavy base, sweeping up and back 30 inches or more and tightly curled.

Magnificently horned and heavily maned sheep have been developed for trophy hunters on game ranches. Large-horned sheep bring a high price at animal auctions, which has encouraged the development of several amazing types. Besides the Painted Desert sheep, a four-horned Barbados sheep has been developed from crosses with Jacob or Navajo-Churro sheep. Zackel sheep resemble the Navajo-Churro but with huge spiral horns. The Texas Dall is a white sheep breed that can carry a short or long tail and little or no wool. The Texas Dall has an Argali horn or a curled horn from Horned Dorset or Rambouillet infusions. The Texas Slam is similar to the Grand Slam, which includes Dall, Bighorn, Rocky Mountain, and Stone sheep crosses. Strumberg sheep are based on Mouflon ewes crossed with an Argali ram. Strumberg sheep carry huge horns and need higher than usual fences.

Other crosses have included Desert Bighorn, Argali, and Mouflon. Hair sheep colors and crosses are also given such exotic-sounding names as Corsican, Black Corsican, Wild Hawaiian, Black Hawaiian, and Golden Mouflon. The wild sheep breeds do have problems with lack of disease and parasite resistance when held in captivity. They are also harder to fence and handle.

It is necessary to differentiate between the traditional Caribbean Barbados Blackbelly and the Texas Barbado with its greater size, horns, and color variations. Wool, mouflon- or light-colored underlines, and gray color would indicate outbreeding to wool breeds or Mouflon. The trophy-type sheep are another category altogether. The small herds of Barbados Blackbelly in Canada tend to be of the Caribbean type, generally polled with the distinctive black-pointed coloration. They are used as a meat breed.

The Barbados Blackbelly and other hair sheep are genetically threatened by the recent import of Dorper sheep from South Africa. The Dorper is the result of crosses between the British Dorset Horn and the Blackhead Persian, an African native hair sheep breed. The breed was created by Dr. Dawid Engela of the Grootfontein College of Agriculture and the Dorper Sheep Breeder's Society in South Africa in an attempt to create a meat breed hardy enough for the arid and semiarid northwestern Cape Province. Export customers such as the British had rejected the taste of the African fat-tailed and fat-rumped breeds. Breeders also sought to develop a larger, meatier carcass.

The Dorper has black coloration on the head and upper neck with a white body. White Dorper sheep are a result of Dorset Horn and Blackhead Persian crosses bred to Dorset Horn and Van Rooy crosses that were further selected for white color. Both Dorper breeds are registered, although the black-headed Dorpers outnumber the white three to one.

Dorper lambs have high birthweights and continue to grow at a fast rate. Breeders claim that Dorper lambs have achieved weights of 70 pounds at two months. Dorper ewes will breed out of season and have a lambing rate of 150 percent. The breed produces both a hairy Dorper and a woollier Dorper. These two

types are being promoted to different areas of North America. The hairy Dorpers carry great resistance to parasites and are more tolerant to saline soil or high mineral content in water. The woolly Dorpers have larger bones.

Only a small group of 100 or so Dorper sheep was cleared for export into the United States through Canada. More sheep, embryos, and semen will continue to be imported. The first Dorper lambs were born in North America in 1995. At this point, Dorper sheep are sold as an investment opportunity.

The North American Dorper Sheep Association predicts that the Dorper will have a major impact upon sheep production, comparable to the Boer goat, which it resembles. The same cautions would also apply. It is not known how Dorper and Dorper crosses will fare on the range conditions of the major sheep production areas in North America.

The Barbados Blackbelly is an extremely hardy, self-sufficient, meat sheep breed whose genetics need to be protected against the influence of the trophy breeders and the Dorper sheep. The Barbados Blackbelly is now being tested in areas that have high rates of heat stress problems, from North Carolina to California. The breed is also well suited for sheepdog trials.

The numbers of traditional or Caribbean Barbados Blackbelly sheep in the United States and Canada are small, generally unregistered, and vulnerable to loss by outbreeding. Dr. Lemmuel Goode of North Carolina State University imported a small group of sheep directly from Barbados in the 1970s and maintained them as a closed flock for many years. When the university dispersed the flock in 1996, Claude Hughes, former chair of the ALBC Board of Directors, was able to acquire 30 purebred animals. He also maintains his own flock of Barbados Blackbelly sheep selected for traditional Caribbean characteristics.

Two organizations, the Blackbelly Barbados Sheep Association International and the North American Barbados Blackbelly Sheep Registry, have written breed standard and formed registries. At this time, however, individual breeders are working toward different goals

and are not addressing the specific needs of traditional breed preservation.



Watch



Rare

### *Virgin Island White and St. Croix (pl. 47)*

The Virgin Islands are an American territory comprising three large islands, St. Thomas, St. Croix, and St. John, and about 50 islets. The islands have a tropical climate and an economy based today mainly on tourism.

Christopher Columbus sailed into the waters of St. Croix in 1493, where he encountered the Carib Indians who had previously taken the islands from the peaceful Arawak. The Spanish enslaved the Carib to work in their South American gold mines. Colonists came to St. Croix and St. Thomas from England, Holland, and France. Denmark purchased the islands from France in 1733, and St. Croix was developed into sugar cane, indigo, cotton, and tobacco plantations. The islands were dependent on slave labor that was obtained from West Africa, and St. Thomas became the most active slave market in the Caribbean. Slavery continued until the slave rebellion of 1827. In 1917, the United States purchased the islands from Denmark for use as a base of operations against possible German U-boat operations in the Caribbean.

Michael Piel, owner of a large sheep farm in Abbott, Maine, made the first importation of native Virgin Island sheep to the United States in the late 1950s. Piel used these hair sheep in his efforts to develop a new, woolless meat breed called the Katahdin. The Virgin Island sheep contributed hair coat, hardiness, and prolificacy. These original imports were used solely for this crossbreeding purpose.

In 1975, Dr. Warren Foote of the International Sheep and Goat Institute at Utah State University imported a foundation flock of 22 ewes and 3 rams from St. Croix. Foote selected these sheep for uniformity of color, size, and conformation. The original focus of the institute's work was directed toward improving meat sheep production in Iran. Although the Virgin Island

sheep were used in crossbreeding studies, purebred lines were maintained and flocks were eventually established elsewhere and sold to private breeders. These sheep were called St. Croix after their island of origin.

St. Croix sheep are white, although they may have some color on the tip of the ear. The sheep may produce a winter coat of mixed hair and wool or downy fiber that is probably due to the past influence of wool breeds on the islands. This coat is shed out in the spring. The sheep are completely polled and carry their ears laterally. A medium-sized breed, the ewes weigh at least 90 to 100 pounds, and rams weigh 150 pounds or more. Some breeders are reporting greater growth, perhaps due to improved nutrition.

Although vigorous and self-sufficient, St. Croix sheep are notably easy to handle. Even the rams tend to be more docile than average sheep, with many owners reporting that their sheep are friendly and affectionate. The sheep have a good flocking instinct and are easily contained by fencing.

A strong characteristic of St. Croix sheep is their early maturity. Ram lambs are capable of breeding at four months, and ewes will give birth by age one. Ewes generally produce twins, though triplets and quadruplets are common. On the islands, the St. Croix can produce lambs year-round with a shorter postpartum anestrus than that of other sheep breeds. Breeders in the United States have also been able to produce two lamb crops per year. Lambs may have a slightly slower growth rate than more popular woolled breeds, but their remarkable prolificacy provides additional income. Lambs have small bones and heads, allowing easy births.

St. Croix sheep are very heat tolerant and have good resistance to foot rot and parasites. Because they are not heavily woolled during the winter, St. Croix require shelter and access to good feed sources.

By 1990, the St. Croix Sheep Breeder's Association had registered about 1,000 sheep, with an additional population of 1,000 to 2,000 unregistered sheep. Although most flocks are found in California, Washington, and Oregon, several flocks are also found in such diverse areas as Hawaii, Florida, Illinois, and several

other states. The St. Croix is also the object of study at several universities and agricultural research centers. The registry maintains a purebred herd book that is open only to sheep descended from the original imports to the International Sheep and Goat Institute or more recent imports from the Virgin Islands.

On the Virgin Islands, the breed is officially known as the Virgin Island White but is sometimes called the St. Croix. The sheep are polled and most are white, but others are tan, black, brown, or white with dark spots. The rams can carry a large throat ruff. Ewes average about 75 pounds and rams about 100 pounds. Ewes lamb early and produce three lamb crops in two years. Lambing rates vary from 150 to 190 percent.

The St. Croix is an excellent farm flock breed that produces good crops of meat lambs. St. Croix lambs deliver mild-flavored meat with less fat and good carcass conformation. Additional income can be obtained from tanned hides.



### *Katahdin (pl. 48)*

When Michael Piel of Abbott, Maine, set out to create a prolific, woolless, low-management, tractable breed of sheep for meat production, he was truly a visionary. In 1956, the prevailing view of American sheep raisers was to breed sheep that provided the dual incomes of wool and meat. Because wool was providing only 10 to 20 percent of the sheepbreeder's income, Piel believed that it would be more profitable to ignore wool income in favor of high rate of gain and prolificacy. Woolless sheep would also require less routine care such as shearing, crutching, and tail docking.

Already the owner of several thousand sheep, Piel imported 3 hair sheep from the Virgin Islands, at that time called African Hair sheep. The white female, the white male, and the tan female were all born triplets and totally unrelated to each other for many generations. Piel sought to maintain the hair sheep qualities of year-round production, multiple birthing, tolerance to heat and humidity, and hardiness. The smaller bones and

heads of Virgin Island lambs also made birthing easier. Piel wanted to combine these positive traits with the meat carcass conformation and faster rate of growth of the woolled breeds. He used various breeds, including Cheviot, Hampshire, Southdown, Suffolk, Tunis, and other Down sheep, in almost twenty years of crossing and selecting toward his desired goal.

Eventually, Piel chose a base flock of 120 ewes and named them after Mt. Katahdin in Maine. During the mid-1970s, he also used the Wiltshire Horn, Britain's only hair sheep breed. The Wiltshire Horn contributed size and meat carcass quality. After Piel's death in 1976, his wife, Barbara, and his farm manager selected against some of the Wiltshire Horn traits that did not please them, including horns, decreased prolificacy, and a flightier disposition. This diminished the Wiltshire influence and strengthened the desired maternal traits.

At the same time, Paul and Margaret Jepson of Vermont established a second flock of Katahdins. They experimented with additional St. Croix sheep in their flock of Piel sheep. Heifer Project International, the livestock development charity, recognized that the Katahdins were very well suited to hotter climates. The organization built up a large flock in Arkansas based on the Piel sheep.

The breeder's association and registry was organized in 1985 as Katahdin Hair Sheep International. All known Katahdins were inspected for entry in the original flock book, including those of the Piel Farm, the Heifer Project, and 21 other breeders. Each registered Katahdin must still be inspected after its first shedding at about one year of age. An upgrading program is possible. There are now about 120 breeders in the United States, 45 in Canada, and a few hundred sheep in Mexico, the Caribbean, and Asia. Katahdin Hair Sheep International believes that 5,000 to 6,000 Katahdins are in active production.

The purpose of the Katahdin is to produce meat efficiently and economically. The Katahdin has an extended breeding season, and ewes normally give birth to twins or triplets, which they can easily support with their milk. Ewes are excellent mothers and require very

little assistance. Both ewes and rams reach puberty early and live long lives. Rams are usually fertile all year, and with selection a flock can lamb consistently all year.

Hair sheep genetics give the Katahdin a greater resistance to parasites and heat stress, although they flourish well in cooler climates, such as their Maine home. This is a medium-sized breed but heavily muscled and rapidly maturing. Ewes weigh 120 to 160 pounds, with rams reaching 175 to 250 pounds. The Katahdin is preferably a polled sheep. Ears are held laterally.

Katahdins may be of any color or color pattern. The coat has coarse hair fibers and a fine woolly undercoat. Although they may grow a thick, long wool undercoat in cold winters, it should shed out completely and naturally in the spring along with some hair. Breeders encourage Katahdins who are naturally free of visible woolly fibers all year.

The Katahdin has enjoyed a good acceptance with sheep producers who recognize their low management requirements. Katahdins are also very practical in land conservation uses and grass or forage-based systems. Katahdin ewes are suited to market lamb crossbreeding programs as well.

The development of the Katahdin clearly illustrates the potential value of old or rare breeds. As production systems change, breed traits that are now out of fashion may again become useful or valuable.



Watch

### *Karakul (pl. 49)*

A Karakul lamb has a strikingly unique appearance, with its tightly curled, lustrous black coat known as Persian wool. The Karakul is one of the Asiatic broad or fat-tailed sheep breeds that are so important in the Middle East and Central Asia. The fat-tailed breeds are major sources of milk, meat, tallow, and wool. The milk is used for drinking and making cheese, the meat is favored, and the fat tail especially is considered a delicacy. The coarse wool is used in weaving and felting.

The fat-tailed breeds are believed to have originated

[To view this image, refer to the print version of this title.]

Fig. 22 Above, a one-week-old Karakul lamb. Facing page, a flock of multicolored Karakul ewes. Photographs by Julie DeVlief, Rice, Washington.

in Central Asia and moved southward through Iran and Afghanistan into the Middle East and west to northern Africa, where the Berbers kept them. The existence of a distinctive Persian woolled lambskin has been verified by archaeological evidence dating to 1400 B.C. Carvings of this type of sheep have been found on Babylonian temple walls.

Coarse-wooled, fat-tailed sheep breeds abound in southwestern Asia, and their numbers remain large even today. Much of this area is high-altitude desert, requiring hardy livestock adapted to the scarce water and extremes of heat and cold. With well-developed flocking instincts, these breeds can travel long distances

for water. These sheep generally produce only a single lamb, perhaps in response to the harsh climate.

The Karakul is native to the area known historically as Turkestan. The fertile Amu Darya River valley divides Uzbekistan and Turkmenistan. The Karakul breed is named for the village of Karakul (meaning black lake) near the city of Bukhara in the river valley, where large flocks of sheep still roam.

The breed known as the Arabi is similar to the modern Karakul. The black Arabi is small, very hardy, accumulates fat very well, and is reputed to produce the finest-quality lamb pelts. It has been suggested that the Karakul is the result of crossing the long-tailed black Danadar sheep with the Arabi. It is not possible to trace the origin of these breeds clearly because the boom in demand for Persian lamb pelts resulted in the intermixing of the various native breeds. The native flocks now

[To view this image, refer to the print version of this title.]

exhibit a wide variety in fleece types and color as well as body types. Some experts suggest that there are two varieties of the Karakul—the smaller Danadar and the Doozbai.

The label “Persian lamb” first appeared in 1889 to describe the skins of very young Karakul lambs. Because the first skins were exported to Europe from Persia, the sheep took on that name even though they are not a native Persian breed (fig. 22).

Persian wool or “fur” was extremely popular as a trimming for coats, clothes, and hats in the early 1900s. The Persian lamb birthcoat is marked by distinctive black, tightly curled ringlets. Scientifically this is explained as a distinctive morphological characteristic of coarse-wooled genotypes called sycletips. This highly desired fleece remains after birth for only about five days or slightly longer, and then the ringlets begin to

open. As the curls soften to waves they are known as Caracul, which is generally obtained at ten days to two months of age. Broadtail is the skin of a prematurely born Karakul lamb, and it is silky soft and rippled in appearance.

The first 15 Karakuls were imported from Russia to the United States in 1908, and another group of 17 followed in 1913. In 1914, 21 Karakuls were exported from Bukhara. One hundred and thirty Karakuls from European Russia were imported to Canada in 1914, and in 1929, a final 10 sheep arrived from Germany. Most of these imports were made by the Agnew Syndicate, which hoped to develop a domestic source for Persian wool.

The Karakul industry flourished from the 1920s to the 1940s. However, much of the increase in numbers was from crossbreeding to other breeds such as the

longwool Lincoln. This practice yielded poor-quality lamb fleeces. The industry was never able to produce a large volume of high-quality pelts, so it was abandoned and the flocks were either dispersed or simply disappeared. Persian lamb is not available domestically unless it is obtained directly from an individual breeder.

There was also a period of experimentation in Britain and North America to determine the value of crossbreeding the Karakul for greater hardiness, disease resistance, and more flavorful meat. This crossbreeding has affected the Karakul mainly in fleece color and in poor lamb pelts. About 14 percent of North American Karakul lambs now exhibit fleece colors other than black, and they can be widely varied. This color variation is also due in part to fiber artists' demand for different colors.

Through the 1950s and 1960s, the Carson family of Ontario gathered together the remaining Karakul flocks. These sheep, coupled with some American imports, eventually formed the foundation of the modern Karakul in Canada.

In the United States, the Karakul thrived in New Mexico and other parts of the Southwest, where they were well suited to the high desert. The largest herds of Karakul are still found here. The Karakul population in North America is estimated at 1,300 to 1,500 sheep.

The breed is now finding favor with felters, hand spinners, and weavers for the qualities of its fleece. The black lambs develop fleeces in shades of black, reddish brown, tan, bluish-gray, gray, white, silver, gold, and other unusual colors and mixtures. Some breeders are intentionally selecting for different or specific colors. Karakul fiber is long stapled, strong, and lustrous. Texture varies from coarse to silky.

The sheep have clean faces and legs, fine bones, and long, drooping ears. Rams can be horned or polled, while the ewes are usually hornless. The head is long, narrow, and Roman-nosed. Karakuls also occasionally have neck wattles. Karakuls are known for their long-lasting teeth and longevity. They are tall sheep, with rams weighing 175 to 225 pounds and ewes 100 to 150 pounds. Ewes generally have a single lamb, but they are exceptionally good mothers who rarely need assistance at lambing.

Because the fat tail of the Karakul can interfere with mating, most breeders dock the tail of the ewe. Other breeders remove only the unusual S-shaped curl of the tail, leaving the fatty pad. Interestingly, research seems to indicate that there is less carcass fat to trim in lambs who have been docked. The Karakul is not a noted meat breed, although some ethnic groups do favor the meat from fat-tailed sheep. Recent research also documents that uncastrated Karakul ram lambs have less saturated fat than several other breeds.

As with many other sheep, the Karakul needs to be handled when young to prevent unusual aggressiveness or flightiness. Karakuls can exhibit strong protective instincts, with the herd forming a circle to protect the lambs in the center. Karakuls are also vigorous browsers and grazers.

Large flocks of Karakuls and related breeds are still found in Uzbekistan, Afghanistan, Iran, Iraq, India, and southwestern Africa. Stability in some of those regions is uncertain. In recent years many Karakul sheep were slaughtered in Afghanistan's civil conflict. Afghani breeders then requested breeding stock from the United States.

All the Karakuls in North America are descended from the original imports, and new imports are financially prohibitive, owing to quarantine restrictions. The Karakul in the United States and Canada should be considered an Americanized breed that is different from the native type. The registry is provided by the American Karakul Society, which has continued the work of the Karakul Fur Sheep Registry founded in the 1930s. The open registry has resulted in crossbred characteristics appearing in the breed. More stringent requirements such as grading lamb pelts could assist standardization, although some breeders believe that fiber production should be the breed's primary focus.

It is certainly important to preserve and maintain the Karakuls in North America. The exotic Karakul possesses many strengths that are quite different genetically from the vast bulk of the modern sheep population.



### *California Variegated Mutant / Romeldale*

The California Variegated Mutant or CVM Romeldale was only recognized by the ALBC for its genetic uniqueness in the 1990s. The CVM was developed from the white-colored Romeldale, which in turn was the result of selective breeding between Romney rams and Rambouillet ewes. The ALBC has commented on the close relationship between the two in that the CVM may be considered a derivative of the Romeldale, two parts of a single breed, or two closely related breeds. Both the CVM and Romeldale are uniquely found in the United States and quite rare today.

The Romeldale was developed by T. A. Spencer of California. Spencer purchased a small group of Romney rams from New Zealand after they had been exhibited at the 1915 Pan American Exposition in San Francisco. He crossed these rams on his Rambouillet ewes to produce a greater amount of fine wool with very little shrinkage. Spencer was also selecting for high carcass yield because good-sized crossbred lambs were very marketable. Ewe lambs were kept as replacements for the flock. With further interbreeding and selection, the sheep became known as Romeldales.

During the 1940s and 1950s, the J. K. Sexton family refined Romeldale selection for high rates of twinning and strong maternal ability. Fine wool and fleece weight remained a priority. Pendleton Mills of Oregon often purchased the entire wool clip.

In the 1960s, a recessive color pattern appeared in the white Romeldale and was developed by Sexton partner Glen Eidman, who called his sheep California Variegated Mutants. The pattern may vary somewhat on each sheep, but it typically appears as badger-face markings. The body wool is cream, dark gray, or silver. The underline and head are a darker shade, resulting in a range of colors on each fleece. Other interested breeders have now developed brown, moorit, black, and spotted fleeces. Owners have observed that the fleece color often darkens rather than fades as the sheep ages.

Hand spinners are attracted to this combination of color, quality, softness, and ease of spinning. The fleece is dense, soft, and high yielding. Fleeces gener-

ally weigh 6 to 12 pounds with a 4-inch staple. The fleece is well crimped and free of kemp. Faces are generally clean of wool except on the foreheads of some individuals. Sheep should be free of skin folds on the neck and shoulders.

Fleece quality remains an important selection criterion for both CVM and Romeldale breeders, who also continue to emphasize excellent mothering, ease of lambing, and twinning in ewes. Rams are active breeders. Romeldale and CVM sheep weigh 120 to 275 pounds with sturdy, well-boned conformation. Owners report that they are healthy and long-lived and have good resistance to parasites.

The CVM-Romeldale Registry was established in the 1970s. Sheep may be registered as white Romeldales, naturally colored Romeldales, or CVM Romeldales. Moorit and solid-faced sheep are registered as naturally colored Romeldales. Breeders may own mixed flocks of Romeldales and CVM sheep.

During the first half of the twentieth century the breed was found mainly in California, and it has never been large in numbers. For a time an inactive breed organization was unable to publicize the sheep adequately. It was also difficult for breeders to locate good-quality rams. Successful breeders are now found in Alabama, California, Ohio, and Washington, but the ALBC estimates that the population of both breeds is 300 or fewer.



Critical

### *Feral Hawaiian*

Sheep arrived in Hawaii in 1791 when Captain George Vancouver visited these islands. He left small groups of rams and ewes as gifts, and the royal family protected them. A little more than a century later, in 1903, the territorial government estimated that there were about 100,000 sheep on the islands. Sheep ranching declined in the twentieth century, and the Parker Ranch on the Big Island of Hawaii, which included a large sheep station, closed in 1964. By that time the sheep population on the islands had fallen to about 10,000. Domestic sheep are now found mainly on Maui and the Big

Island and are raised mainly for the local meat and wool markets.

Sheep also established a strong feral presence in Hawaii and were regularly hunted. Feral sheep were removed from many areas after World War II but remained a major problem on the Big Island, especially on the slopes of Mauna Kea, where they were found as early as 1825, mainly in the *mamane* forests. By 1937, the number of feral sheep was estimated at 40,000.

On Mauna Kea, the feral sheep seemed to be basically of Merino stock with some other introductions. Only the males were horned, with large, outwardly spiraling horns up to 34 inches in length. The sheep were seen in colors of black, red to brown, and white. Weights varied between 60 to 150 pounds. Feral sheep were on Kahoolawe, but they appeared to be genetically different because no black or brown color was present.

Although feral cattle caused greater overgrazing problems until they were controlled, feral sheep and goats were found to be harming the *mamane* forestland, home of the endangered Palila and other rare endemic birds. By 1950, the numbers of feral sheep were reduced to a low of 500, but state game officials allowed them to remain in slightly larger numbers for managed hunting. In 1979, the Sierra Club finally obtained a court order requiring the state to remove all the feral goats and sheep from the *mamane* forest to protect the birds. The eradication began in 1980 and included hunting from helicopters. The population is now believed to be so low that the feral animals do not threaten the Palila.

The Hawaiian sheep should not be completely eradicated. As P. Quentin Tomich writes in his comprehensive book *Mammals in Hawaii*, "Some thought should be given to preserving a line of the original feral sheep uncontaminated by Mouflon characteristics. This unique form has been possibly 150 years in development and is worthy of genetic, serologic, and other evaluations, in captivity if not in the wild" (Tomich 1986, 167).

### *Naturalized Wild Sheep*

European and Asian wild sheep have been brought to North America to stock zoos, private collections, and game ranches. In Oregon, some game farm stock, such as the Barbary and Mouflon, have escaped to run on public land, at times with small numbers of other feral sheep. In Jefferson County, Oregon, the planned re-introduction of Bighorn sheep will necessitate the removal of these sheep.

In Hawaii, Mouflon were imported specifically as a game animal and released on at least three islands. Pronghorn antelope, Mule deer, and Axis deer have also been brought to the islands for hunting without regard for the native ecology.

Twenty-eight animals were placed on the western side of Lanai from 1954 to 1959. By 1964, the population had grown to about 200 and hunting was permitted. In 1980, the population was estimated at about 900 sheep. Four Mouflon were released on Kauai but have disappeared.

On the Big Island, 78 Mouflon were released on Mauna Kea between 1962 and 1966. Mauna Kea is the site of a large, long-standing feral sheep population. Interestingly, the Mouflon did not readily intermingle with the feral sheep. Solitary Mouflon rams would join the feral sheep groups siring hybrids, but small groups of Mouflon remained apart. Observers have noted that there is increasing separation between the two types of sheep rather than an expected merging. Crossbreds tend to run with the feral sheep.

A breeding program to develop more game animals was conducted from 1961 to 1963. Mouflon were used to create hybrids with captured feral sheep. When the program ended, 12 Mouflon rams and 99 hybrids were released at different times on western Mauna Kea. On the eastern areas 30 rams and 48 ewes, all Mouflon, were also released. Hybrids have been observed with both sheep and Mouflon flocks.

Perhaps because they are viewed as a game rather than feral animal, the Mouflon were not included in the sheep and goat eradication order of 1979, even though they threaten the same *mamane* forest that shelters the

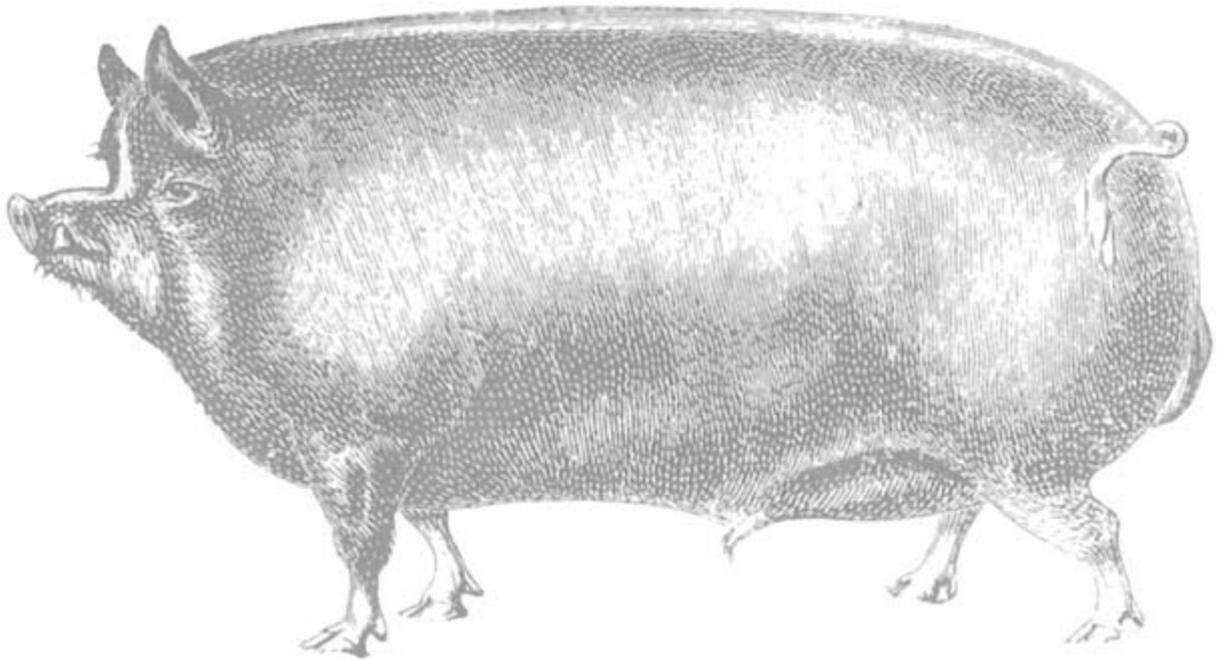
endangered Palila. Mouflon have been seen stripping bark from mamane trees. The population runs to about 500. Although Mouflon usually flock in small bands, a large herd of about 140 has been sighted. The rams range up to 160 pounds and the ewes up to 90 pounds. The hybrids on the western slopes of Mauna Kea were

removed with the feral sheep, and the Mouflon have not been seen there since.

On the other side of the Big Island on Mauna Loa, the Mouflon population now numbers several hundred, mostly on private lands.

CHAPTER FIVE

# *Swine*



See those hogs? No man should be allowed to be President who does not understand hogs, or hasn't been around a manure pile.

—Harry S. Truman

The lowly, often maligned pig has probably fed more people throughout history than any other livestock animal. The world today is populated by some 825 million domestic pigs, and that number continues to grow to meet the increasing needs of the human population. At the same time, the numbers of different pig breeds are steadily decreasing, mainly due to the narrow choices the swine industry is making in breed stock. In the United States, more than 85 million hogs are marketed each year, yet all the minor breeds together register only about 25,000 pigs. In Britain, some 7 million pigs are raised annually, but the members of the rare breeds are counted in the hundreds. Among the 4 million hogs marketed yearly in Canada, some rare breeds can be listed by individual animals.

Although greater numbers of beef and poultry are produced in North America, in Europe there are more pigs than cattle. And with a pig population of 335 million, China raises far more pork than any other country, most in backyard pens for family use. This traditional, old-fashioned method of pig keeping is in direct opposition to the intensive systems of pork production now used in western Europe and North America. Most people believe that pigs need to be fed corn and other grains, but in truth the pig has always been a scavenger and forager, perhaps the best natural recycler in the livestock world. Much of the famous, old-time flavor of country ham resulted from what pigs ate: acorns, roots, the milky leavings from butter making, waste fruit, and crop residues. Most people have never tasted pork from swine raised on a variety of foodstuffs. This difference is akin to fresh versus canned vegetables.

## Natural History

The life of the contemporary pig is far removed from that of its ancestral forebears. Forty million years ago, long before the advent of humans, giant piglike animals, the Entelodontidae, roamed the Eocene earth. One of the largest members of this family, *Dinohyus hollandi*, or “terrible pig,” lived in North America and was the size of a bison. *Dinohyus* stood 6 feet high at the shoul-

der and 11 feet long with a 3-foot-long, wedge-shaped head. Lacking a true snout, *Dinohyus* dug its primary diet of roots and ground vegetation with its tusks. Like most giant mammals of this era, the Entelodontidae were headed down the road to extinction.

Contemporary with the entelodonts at the end of the Eocene, the family Suidae, or modern pigs, would succeed at survival. Pigs are paleodont members of the order Artiodactyla, the even-toed ungulates, which also includes goats, sheep, cattle, giraffes, deer, camels, peccaries, and hippopotami. The animals of this order have contributed more to human survival than any other mammal group. Curiously, nineteenth-century scientists originally placed the pig in a different order, grouping it with the elephant, rhinoceros, and hippo because of their rotund appearance.

The family Suidae is divided into three subfamilies: the Suinae (pigs and hogs), Phacochoerus (warthogs), and the Babyrousa. The Suinae includes ten *Sus* or pig species, but the most familiar of these and the progenitor of most domestic pig breeds is the Wild boar (*Sus scrofa*). *Sus scrofa* historically inhabited the forests of Europe, North Africa, and Asia, a greater range than the ancestors of any other livestock animal. The Wild boar is the largest of the wild pigs and has remained relatively unchanged for the past forty million years.

The other *Sus* species inhabit much smaller ranges, such as the Visayan warty pig (*Sus cebifrons*) and Warty pig (*Sus philippensis*) of the Philippines and the Pygmy hog (*Sus salvanius*) of Bhutan, southern Nepal, and northern India. Southeast Asia is the home of the other six “true” pigs: the Javan pig (*Sus verrucosus*), Flores warty pig (*Sus heurenii*), Bearded pig (*Sus barbatus*), Timor wild boar (*Sus timoriensis*), Celebes wild boar (*Sus celebensis*), and Vietnamese warty pig (*Sus bucculentus*). The Vietnamese warty pig was described more than a century ago in the dense forests of central Indochina. Although scientists have still not seen this yellow-and-rust-colored pig, the skull of a young male was recovered in 1995. DNA analysis reveals that this elusive pig, which was classified as extinct in 1996 and, if still extant, is likely critically endangered, is neither a known Eurasian wild pig nor a domestic breed.

*Pig* From Middle English *pigge*, from Old English *picga* or *pigga*, young pig; *piglet* did not appear until the late nineteenth century

*Hog* From Old English *hogg*, possibly Celtic in origin

*Swine* From Old English *swin* and based on a prehistoric Indo-European root

*Pork* Middle English, from Old French *porc* (which arrived with the Normans in 1066), from Latin *porcus*, pig, based on a prehistoric Indo-European root

*Sus scrofa* Latin for breeding sow

There are two other members of the Suidae. The Giant forest hog (*Hylochoerus meinertzhageni*) is about the same size as a large pig and has coarse, sparse black or brownish black hair. This pig has a long snout and a large head with short, thick tusks. It lives in small family groups in a variety of forest habitats of central Africa and is somewhat rare.

The Bushpig (*Potamochoerus larvatus*) is more common and found in different forms south of the Sahara Desert. Weighing less than 285 pounds, the Bushpig is smaller than the Wild boar. The other member of this genus, the Red River hog (*Potamochoerus porcus*), has a bright rufous coat and white whiskers and ear tufts and is found in equatorial Africa.

The Warthog (*Phacochoerus africanus*) is also found in sub-Saharan Africa. Armed with two pairs of fierce and powerful tusks and several big, warty bumps on its large, flattened snout, the warthog has a definite image problem. Some experts believe that the smaller Desert warthog is a separate species.

More exotic, and perhaps even more frightening in appearance, is the unusual Babirusa (*Babyrousa babyrussa*). This wild pig is found only in the rain forests of Indonesia on northern Sulawesi and two other islands. Its canine teeth do not grow up around the sides of the upper jaw but come through the snout itself and then curve backward. Its lower tusks, too, are quite large. Almost hairless, the brown-coated Babirusa lives in small family groups and gives birth to only one or two piglets at a time.

Peccaries, which comprise the family Tayassuidae (also classified as the family Dicotylidae), are often confused with pigs by the casual observer. Like pigs, they

are artiodactyls, but unlike pigs, they have a scent gland on the back rather than between the toes. Peccaries, or javelinas, as the three living species are also called, are found today in the Americas from Texas south to Paraguay. They once roamed further north and south of their present range. Peccaries are much shorter than pigs and may weigh upward of 50 pounds. The peccary has not been domesticated.

The modern Wild boar was alive and well at least six hundred thousand years ago. Cro-Magnons drew representative images of these wild pigs on the walls of the Altamira caves some thirty thousand years ago. These pictures are the earliest historical records of the pig. During the past ten thousand years of the postglacial era, the Wild boar was extremely common in northern and western Europe, especially in the vast deciduous forests, marshes, and lush valleys. Along with the Red deer and Aurochs, the extinct wild ancestor of domestic cattle, the wild pig was the primary source of meat for Mesolithic or middle Stone Age peoples.

The thick-skinned European Wild boar carries a gray, brown, or black outer coat of coarse bristles with a wooly undercoat and a five-to-six-inch mane of hair on the neck and shoulders. The Wild boar is long-legged and able to run at speeds of 30 miles per hour. Boars are heavier, taller, and more sharply angled in the shoulder than domestic pigs and carry a straight tail—never a curly one. Just like their domestic relatives, boars' scent glands are found between the toes. In the Middle Ages, these small marks were sometimes thought to be the sign of the devil. Although boars usually weigh about 250 pounds, large individuals may stand 39 inches at the shoulder and weigh up to 400 pounds.

A threatened boar can be a very dangerous animal. Wild pigs are armed with self-sharpening tusks 8 to 9 inches long. These upper and lower canine teeth grow continuously. The boar also has well-developed senses of smell and hearing and almost panoramic vision.

All pigs are single-stomached omnivores who feast on roots, nuts, fruits, fungi, insects, larva, small rodents, reptiles, birds, eggs, and dead animals. The pig's snout is composed of tough cartilage, yet it is also a sensitive tool for exploring and scenting, and food is often unearthed through rooting in the soil. This powerful urge to root is frustrated when pigs are confined, and they respond by reducing their pens to an overturned mess.

Pigs are active in the day and evening, retiring to sleep together in dens or nests at night. Pigs are extremely clean in their habits, excreting only in separate areas. Because they have few sweat glands, pigs need to wallow in water or mud to cool off. A pig will wallow in its own excrement only if it has no alternative.

In the wild, boars are usually solitary, although young males form bachelor herds. A few related sows and their piglets live in small family groups. Breeding occurs once a year. The sow builds a nest for the birth of a small litter of piglets. The piglets are usually red and cream colored with silver stripes that fade away with maturity. The sow has at least twelve teats and litters of least 6 to 8, significantly more offspring than other hoofed mammals. The piglets will nurse for six to ten weeks, although they begin to forage as early as two weeks of age. A young male can breed at five to eight months, and a gilt, or young sow, can mate at six to eight months. In the wild, pigs can live twenty to thirty years, a life span that domestic hogs are seldom granted. Pigs communicate through noisy grunts, squeals, and other chirping or clicking noises.

## Domestication

The traits of the wild pig made its domestication easier than that of horses, cattle, goats, or sheep. In fact, the pig is more like another domesticate, the dog, and is often compared to dogs in the areas of intelligence and trainability.

Newborn piglets are extremely dependent on their mothers in comparison with other hoofed animals, whose young can run with the herd soon after birth. This helplessness made the wild piglet easier to tame. The nurturing of wild piglets still occurs among peoples following more primitive ways of life. Very young piglets are even suckled by women who carry them like infants.

Perhaps the most important consideration in the domestication of the pig is its omnivorous nature. The pig's lack of specialization means that pigs can live on the same foods as humans; pigs can adapt to what is available or can be scavenged. Scavenging probably led pigs to humans' early camps and settlements, and even after domestication pigs have often been left to scavenge and forage for themselves. Throughout most of human agricultural history, garden plots were fenced to keep livestock out, not fence the animals in. Pigs are also fast-growing, early maturing, prolific animals — all valuable characteristics for early farmers.

Pigs are social animals and enjoy body contact. Yet they are content in their small groups, not needing the security of large herds, and the boars are accustomed to a solitary life. These natural behaviors are strikingly similar to the methods of keeping swine that people have traditionally employed.

The pig is not a ruminant that eats, chews cud, and naps continuously throughout the day and night. Instead, pigs are content with people's feeding patterns, either foraging throughout the day or being fed but twice daily. They then sleep through the night. And pigs will not overeat to the point of death, as will horses and cattle.

Three basic methods of pig husbandry have been employed throughout history. Well into the twentieth century in the United States, pigs were often kept as semiwild scavengers and rounded up only when needed. At other times and places, swineherds followed and guarded pigs during the day and guided them home at night. Although these two methods of using natural forage were the most common, even in ancient times some pigs were fattened in confinement.

It is impossible to know exactly where and when pigs (or any other animal) were first domesticated. In

At different times the pig has figured in mythic tales, religion, and ritual among the cultures of the Egyptians, Greeks, Romans, Gauls, Celts, Hindus, Buddhists, and Christians. The pig was often associated with fertility and ridden by gods.

The Egyptian goddess Isis and the Greek goddesses Artemis and Demeter were frequently depicted with a white sow or a young pig. Following a prophecy, Aeneas knew he had located the site where Rome was to be built when he found a great white sow with 30 piglets. The Great White Sow became an important Roman symbol.

In Scandinavia, the magic golden boar Saehrimir was a symbol of power and might in the tales of Valhalla. The Teutonic Gullinbursti was a golden mechanical boar belonging to Frey, the lord of nature. In the early Middle Ages, the Wild boar symbolized power and bravery. Later, the hog became associated with vices, ridicule, and filth, and instead of denoting prosperity, the pig came to symbolize greed, demons, and the devil.

In New Guinea and Melanesia, the pig is worshiped, sacrificed to ancestors, and the cause of wars. The pig is interwoven completely with cultural practices of all kinds.

Turkey in the late 1990s, archaeologists discovered pig teeth that were smaller than those of Wild boars at Hallan Cemi, a ten-thousand-year-old site. Previously, the earliest theoretical remains of domesticated pigs were found in Jarmo in northeastern Iraq, Jericho, Greece, Syria, and other sites in Turkey all dating about a thousand years later. Actual domestication probably happened earlier and in multiple locations, including Southeast Asia.

One of the first observable characteristics that separates domesticated pigs from their wild cousins is the shortening of the frontal areas of the skull. In addition, the snout length was often reduced or altered to lessen destructive rooting. The jawbone became smaller and the teeth became more crowded or smaller. Body shape also changed, producing a rounder or longer pig with shorter legs. Domestication often encouraged a less-solid bone that is associated with a more sedentary life in confinement.

Domestication also brought about many nonskeletal changes that were recorded in art or the historical record. Most visible was the range of skin and hair color, especially the color white, which lacks any camouflaging ability and is prone to sunburn but produces a cleaner-appearing carcass. The bristly haircoat was

reduced while fatness was increased, and only domestic pigs have lop ears or curly tails. The domestic pig is also fertile year-round.

Early historical records provide considerable information about domesticated animals. The earliest representative models of pigs have been discovered in Turkestan and date to about 6500 B.C. The first imperial Chinese decrees regarding the raising of pigs date to 3468 B.C., although swine were being widely raised at least twenty-five hundred years earlier.

In Egypt and Mesopotamia, Neolithic villagers were raising wheat, barley, goats, sheep, pigs, and cattle by 4500 B.C. Egyptian and Sumerian illustrations depict pigs, sometimes muzzled, treading grain into the ground with their sharp feet. Figurines of sows nursing their piglets were used as amulets for good luck and fertility, but pigs were also associated with evil among the gods. Indeed, at times a taboo against eating pork was very strong among the upper classes, who viewed them as unclean food, although the lower classes continued to raise and eat pigs in large numbers.

The geography and climate of the Middle East were not completely suited to pig raising, and goats and sheep have thus always outnumbered pigs in this area. Instead pigs became a more important livestock animal

in the primitive Neolithic villages of China and Europe. Along with cattle, pigs were the first domesticated livestock in western Europe.

In much of Europe, Mesolithic hunter-gatherer societies were making the transition to a sedentary agricultural way of life more slowly than in the Middle East and China. European Neolithic villages were just developing at the time of high Egyptian culture. In some areas, semimobile farmers cleared the land, cultivated it for a few years, and then moved on. Although Europeans hunted the native Wild boar, it is likely that the domesticated Middle Eastern pig arrived in Europe as agricultural practices moved westward. These pigs, descendants of Turkish wild boar, would then have interbred with the native wild pig of the European forests.

Wild pigs, feeding on the fallen nuts of beeches and oaks, were abundant in the forests of ancient Britain and continental Europe. In Britain, the early hunting societies, who certainly ate wild pigs, were invaded by farming peoples beginning around 5000 B.C. The remains of domesticated pigs dating to before 3000 B.C. have been found at sites such as Windmill Hill near Avebury. Salt was used in the preserving of ham and pork, and saltworks have been located on the coasts dating back to 1000 B.C.

These Celtic peoples valued cattle highly, but pigs were a close second. The domesticated Celtic pig had long legs and a long head with lop ears. Its narrow body was hairy and generally white or tan with spots or a belt of color. This pig, known later as the Old English hog, would survive through the nineteenth century. North in the Highlands and on the islands of Scotland, a smaller dark pig with prick ears was allowed to forage freely. This pig survived into the mid-eighteenth century.

By the rise of Rome about 300 to 200 B.C., different types of pigs existed in domestication in Europe. A semiwild pig foraged in the forests, sometimes cared for by swineherds. A different white pig with short legs and a flattened snout, possibly Asian in origin, was fattened in sties following specific, written recommendations. A Roman coin dating to A.D. 80 depicts a long-legged, lop-eared sow that was very fat and largely hairless. The first-century Roman writer Columella

recommended that boars used for breeding should be square in shape with a large belly and haunches but shorter legs; sows should be long in the back; and in colder climates, hairy coats were good. No doubt these different Roman pig types were introduced throughout Europe by the Roman expansion.

When the Roman forces invaded southern England in A.D. 43, domestic Celtic pigs were plentiful, which was fortunate because lard and pork were important foods for the Roman legions. During the occupation, along with Roman swine breeds, different methods were introduced and agriculture was organized. Pigs were raised in sties, cared for quite well, and fattened on grain. The result was a larger, healthier animal. The Romans preserved pork by dry salting or barreling in brine and shipped these products to foreign markets. The Romans also enjoyed a number of exotic dishes from the pig, incorporating such delicacies as the liver, stomach, kidneys, womb, and udder.

When the empire fell and the Roman troops left, England returned to a more peasant-based form of agriculture that would continue through the Norman Conquest. Pigs foraged in the woodlands and were turned out on crop waste, perhaps fed only in the late winter and early spring. Much of this meat was salted for later use. Villages and estates gradually expanded as society reorganized along feudal lines.

In Anglo-Saxon Europe, the pig was the favorite meat animal, and the ownership of pigs was a symbol of wealth. Beginning about the time of the Norman Conquest, pig ownership lost status as cattle and horses became more valued, although pigs still far outnumbered cattle at the time of the Domesday Book census in A.D. 1086.

The pig remained the main food animal in western Britain, and all the parts were eaten. The head (including ears, cheeks, and snout), front parts, and feet, or trotters, were pickled or jellied. A pottage of parts known as brawn was vinegary and spicy. All the fat was valuable, and bone marrow and blood were made into puddings.

Throughout the Middle Ages, villagers and farmers continued a dual system of raising pigs. Swineherds,

[To view this image, refer to the print version of this title.]

Fig. 23 The common eighteenth-century European hog.  
From *368 Animal Illustrations from Buffon's  
"Natural History"* (Dover, 1993).

sometimes aided by herding dogs, kept watch over pigs as they roamed the nearby countryside for food. These herds of 50 or so animals were often led by the belled "lead sow." In the Celtic north, where cattle were more important, pigs still ran wild.

By the fourteenth and fifteenth centuries, more land had been cleared for agriculture, which reduced free and open grazing land. The increasing use of pigsty farming hurt the peasant population. The burden of supplying food for pigs meant that medieval peasants raised and consumed fewer pigs, with the result that their diet became harshly simple and limited. The wealthy, however, enjoyed great amounts of meat in their diet. It would be many years before the common folk's diet began to improve as the general standard of living increased.

Domestic pigs also contributed valuable work for the farmer. In the centuries before the development of mechanized agricultural implements, pigs prepared the land for crops. Pigs cleared forested land by root-

ing and eating seeds, roots, and small growth. When turned loose in a harvested field, pigs consumed the crop residues and discouraged pests and diseases that lived in rotting fruits or vegetables. The pigs' rooting would then turn the soil over in preparation for planting the next year.

In Britain, this use of the pig was an extremely valuable weapon in the war against a poisonous weed—the bracken fern. As early as 3000 B.C., farmers battled the bracken with pigs as the weed invaded cleared land, ruining pastures for cattle, horses, and sheep. Pigs rooted through the soil, damaging the bracken roots.

Because English commoners were forbidden to use hunting dogs during the eleventh to fifteenth centuries, hunters often took pigs with them into the woods. Pigs also killed snakes, work that would later be greatly valued in the colonization of the New World. In France and Italy, pigs aided in the search for truffles, which grow some 12 inches underground. Over many centuries, sows known as *chercheurs*, or searchers, have proven themselves to be excellent locators of these valuable delicacies.

In postmedieval England, nearly everyone kept a sty pig that was fattened on recycled scraps. Beef, the product of a large and slow-growing animal, was eaten rarely. Poultry and pork were the main sources of protein for most people. Both kinds of animals matured rapidly and were not big consumers of grain but rather scavengers and users of waste (fig. 23).

Wild boar remained the centerpiece of the traditional Christmas feast until the fifteenth century. It was widely hunted and was second only to deer in popularity. The boar was considered a fearsome opponent, and the solitary boar hunter was greatly honored. The boar itself symbolized bravery and fierceness, as many medieval coats of arms reflected. The numbers of true Wild boar were eventually reduced in the wild, and the Wild boar became extinct in Britain in the late seventeenth century.

Throughout human history, many cultures have respected animals for their traits and powers. Mythological heroes often gained their special abilities from an animal parent or ancestor. During the Middle Ages, the changing attitudes of people toward animals closely

In the words of Genesis, Leviticus, and the Koran, the pig was declared unclean. For this reason, observant Jews and Muslims do not consume pork. Many possible theories have been advanced for the origin of this decree.

The obvious reasoning is that pigs are dirty, but in fact, the pig is cleaner in its habits than other livestock and an agrarian people would have been aware of this.

Another theory states that pigs were forbidden as a public health measure due to the threat of trichinosis, a disease communicated to humans who eat undercooked pork containing parasitic worms. Yet other livestock carry such deadly diseases as brucellosis, tuberculosis, and anthrax, and their consumption is not prohibited. Even the early Egyptians understood anthrax and its link to animals.

Pork might have been prohibited because the pig was an object of pagan worship and sacrifice in the ancient Near East, but then so were cows, sheep, and goats. Forbidden foods do bind a religious or ethnic group together, and so this may be part of the reason for the strictures concerning pigs, certain other foods, and food preparation practices.

Marvin Harris in *Cows, Pigs, Wars, and Witches: The Riddle of Culture* (1974) suggests another explanation. Pigs would not have fit well into the nomadic or pastoral-farming culture of the Hebrews and ancient Near Eastern cultures. Pigs are not bodily suited to the hot and arid climate. Unlike sheep and goats, pigs consume food resources that humans could otherwise eat. They are not a good milk source, and they also are not herding or flocking animals. Accordingly, the pig was never a significant livestock animal in the Middle East. The urge to raise pigs would be a luxury and not a good ecological or survival strategy. The fact that Christian culture did not continue the Old Testament prohibition on eating pork lends weight to this theory. Western Europe was ideally suited to raising pigs, and pork was a favorite food of the earliest peoples there.

A pork taboo led in 1857 to a famous incident in Indian history known as the Sepoy Rebellion. Erroneously believing that their new rifle cartridges were greased with lard, Muslim soldiers refused to follow the orders of the occupying British army.

and curiously mirrored the ways in which pigs were viewed.

At the beginning of the Middle Ages, animals were clearly believed to be property and obviously different from people. Nonetheless, the lives of animals and people were closely intertwined. As cities grew, the numbers of farmers began to diminish. Although animals were still featured in fables in an instructive way, the increasingly repressive dogma of the Church became obsessed with bestiality and the belief that animals could be the agents of demons. Beginning in A.D. 1266, animals could be held responsible for criminal or demonic acts and were often punished by death. The pig, perhaps more than other animals, was linked with both the devil and other undesirable traits. Pigs

were labeled as unclean, brutish, stupid, and unfeeling. Probably because they produced such large litters, pigs were associated with the sins of lust and promiscuity. The poor pig has never regained its reputation.

In the early seventeenth century, the common pig stock in Britain was somewhat collectively known as the Old English hog, but pigs were often referred to by their origins: Bedford, Berkshire, Cheshire, Cornish, Cumberland, East Anglian, Irish, Lincolnshire, Montgomeryshire, Nottingham, Shropshire, Suffolk, Ulster, Welsh, Western Isles, Yorkshire, and others. Confusingly, these names were often used interchangeably. Some of these types were bristly primitives, whereas others were very large or long. Pigs were also seen in a variety of colors: white, black, red, and spotted. The

*pig* In North America, a young pig not yet ready for market and weighing less than 120 pounds. In Britain, all swine are called pigs

*hog* In North America, a pig weighing over 120 pounds

*sow* An adult female that has had at least one litter

*gilt* A young female that has not yet produced a litter

*boar* An adult male kept for breeding

*barrow* A male castrated before sexual maturity

*stag* A male castrated after sexual maturity

*farrow* The act of giving birth to a litter

*piglet* A nursing pig, to about four weeks of age

*suckling pig* A recently weaned pig, about 30 pounds

*shoat, weaner* A recently weaned pig about 30 to 55 pounds

*young pig, runner* A larger yet not fully grown pig, under 120 pounds

*feeder pig* A pig kept for four to six months until it reaches a weight of 200 to 245 pounds (yielding at least 150 pounds of meat)

*drove* A herd of hogs driven on foot to market

Western Isles pig, in particular, was described as small, white, and delicious.

Pigs still ran in the woods and forests, and cottagers kept a few pigs in their sties, but increasingly food was being raised or purchased to raise swine on a larger scale. Potatoes were grown as feed, while other pigs were fattened on distillery waste or whey.

Late in the eighteenth century, led by the work of master breeder Robert Bakewell, livestock breeders began to follow the principles of scientific improvement and record keeping. Also at this time there was great swine improvement with the introduction of Asian and Continental pigs. These popular imported pigs were

called Chinese, Neapolitan, and Tonkinese or Siamese. The Asian breeds were smaller, fatter, and faster maturing. They also had broader heads, shorter snouts, and dished faces. The imported breeds were widely crossed on the native types, but through the mid-nineteenth century at the Royal Show, sponsored by the Royal Agricultural Society of England, pigs were still simply divided into "Large" and "Small." Various breeds were eventually developed to supply specific markets for such products as bacon, pork, and lard. Some regional types were merged into single breeds, while others set out on an independent course.

Before refrigeration, the ability to cure meat to prevent bacterial spoilage was essential. Drying, smoking, sugaring, and salting have all been used to preserve pork. Common table salt (sodium chloride) is essential to life because it holds water in tissues. In food preservation, this binding of water in the cells of the meat inhibits the growth of bacteria that cause spoilage. Humans also make use of other naturally occurring sodium compounds, such as baking soda (sodium bicarbonate), sodium benzoate, and sodium nitrite.

Nitrites have been used to preserve meat for more than two thousand years for the excellent reason that they are the only available additive that will prevent botulism in cured meats. Most preserved pork products today are still treated with sodium nitrites. In recent years questions have surfaced about the use of sodium nitrite in processed meats, especially in suggested links to cancer and childhood leukemia. The proposed danger from nitrites is that the preservative can react chemically or digestively to produce nitrosamines, which have been found to cause cancer in laboratory animals.

Nitrites have not been banned because this link to humans is still unproven and the use of preservatives certainly outweighs the potentially deadly risk of botulism. The elimination of nitrites would create products with a much shorter shelf life, requiring consumers to handle and store cured meats differently.

In times past, the most valuable product of the pig was the fat, the importance of which is definitely not appreciated today. Fat was so valuable that pigs were selected for fat development at an early age. Before the

relatively recent and widespread use of petroleum, cultivated oil seeds, and electricity, animal fats were the only oil source for cooking, manufacturing soap and candles, and other industrial needs. Although modern dietary guidelines stress reducing our intake of fats, fat was once an important source of calories. When people had limited diets, fat also made meals more palatable. In 1832, the process for breaking down lard into liquid glycerine, another valuable product, was discovered. As late as the nineteenth and early twentieth centuries, lard was more valuable at market than meat. For all of these reasons lard was of vast importance in World War II, when fats were rationed and saved in households to be collected for the war effort.

An interesting side note on the uses that people have made of the pig is the subject of pig's milk. All livestock animals have been milked at some time. Goats, cattle, and sheep were most often milked, but people have also milked horses, camels, and reindeer as well as pigs. Although it may seem culturally repulsive today, pig's milk is well tolerated and useful to humans.

Milking pigs presents a few problems. Pigs themselves nurse their young while lying down. More important, pigs can have sixteen to twenty small teats, and the sow lets down her milk many times daily for short periods, yielding only small quantities of milk each time. Although this certainly suits the nursing of many piglets who lie with their mother, it is difficult to adapt the pig to people's need to milk their animals only twice daily. However, pigs must have been milked occasionally, for history records that Francisco Pizarro, the Spanish conqueror of Peru, was an orphan who was raised by nuns on sow's milk.

Except for their distant relatives the peccaries, pigs did not exist in the wild in the New World. Along with other introduced livestock, pigs have made an enormous impact on both the environment and culture of the Americas, and their history is intertwined with the story of colonization and the development of agriculture in the New World. In fact, the extremely adaptable pig may have had an easier time settling the Americas than the colonists.

It has been proposed that the Vikings brought pigs

to the New World on their voyages of discovery and settlement, but the first pigs known to have set their feet on the New World arrived with Columbus on his second voyage in 1493. These 8 pigs were released on Cuba. Together with later arrivals, they populated the West Indian islands with Spanish breeds. During the Spanish explorations and conquests of Central America, Hernán Cortés drove pigs along as live provisions for his troops. As the Spanish settlements eventually moved into the American Southwest, pigs were also introduced successfully. When Hernando de Soto landed in Florida in 1539, he brought along 12 hogs from the West Indies. Later, accompanied by droves of hogs, Soto explored the areas that would become Georgia, Alabama, Mississippi, Louisiana, the Carolinas, and Tennessee.

The Spanish more than favored pork as a meat, they reveled in it. Having recently expelled the Moors, the Spanish greatly enjoyed eating pork as an affront to the Muslim beliefs of their former conquerors. As a result of this affection for pork, the wild pig population of North America was strongly influenced by Spanish types of swine.

The British colonists, settling at Jamestown and other sites in Virginia, found this new land excellent for raising the pigs they had brought from home. The pigs multiplied beyond the resources of the original settlements, and the colonists eventually set the herds loose in the woods, where they thrived. In the early 1620s, both the Pilgrims and the Puritans brought hogs to Massachusetts. By 1627, the herds in many areas were described as "innumerable."

Everywhere the European colonists and conquerors came into contact with the American Indian peoples, the pig was quickly adopted as a food animal. But the growing numbers of domestic and feral pigs often caused conflicts. Because they had no tradition of owning livestock, Native Americans truly saw the free-ranging pigs as fair game. The tribal people who grew corn crops killed any foraging pigs and then faced the wrath of their owners. Interestingly, the Indians' anger was more justifiable than the colonists knew. As a gift of the gods, corn was to be eaten by humans alone, and for animals to consume it was a sacrilege.

*pig* A slobby, dirty, greedy, or overweight person; the small car that travels vertically in the shaft of a coal mine; a tool or device used in pipes or ducts to check for corrosion, leaks, and other defects; a police officer

*air pig* A small round tank for storing air

*guinea pig* A small-eared, tailless rodent of the genus *Cavia* often kept as a pet and used widely for scientific experiments, hence the informal use of the term to describe the subject of any sort of experimentation

*male chauvinist pig* A male who acts in a superior manner toward women in the belief that they are inferior to him

*Nazi pig, fascist pig* An oppressive or dictatorial person

*pig-out* Food binge

*pigheaded* Stubborn, obstinate

*pig eyes* Little or beady eyes

*pig iron, pig lead* An oblong block of iron or lead poured from a smelting furnace into a *pig*, the round mold into which it is cast

*piggish, piglike* Greedy or dirty

*piggyback* To ride on the shoulders of another

*piggy bank* A container for saving coins, as a greedy person might

*pygg* A clay used in the Middle Ages to make pots

*pigboat* A World War II-era submarine, descriptive of the smell found in close quarters

*pig Latin* A form of language, used especially by children, in which the syllables of English are transposed (originally, it was a secret version of Latin)

*pigpen, pigsty* A dirty or messy place

*pigskin* A North American football, now made of cowhide

*pigtail* A hank of hair worn straight, curly, or braided

*pig in a poke* Something not adequately appraised, deriving from sixteenth-century English: a naive customer would purchase what he or she believed was a suckling pig in sack; later, when the sack or poke was opened, the buyer would “let the cat out of the bag” and find out that he or she had been fooled

*when a pig is offered, hold open the poke* Seize the opportunity

*a pig in the parlor* You cannot change who or what you are (a pig in the parlor is still a pig)

*like a pig in clover* Happy, content, and living in luxury

*slippery as a greased pig* Hard to catch, from a contest still held at local fairs

*Squeal, roar, or bleed like a stuck pig* Descriptive of a pig at the time of butchering

*sweat like a pig* To sweat heavily—ironic and inaccurate, because pigs cannot sweat

*if pigs could fly* Not very likely to happen

In New England, the numbers of pigs grew so large that laws were soon passed requiring colonists to notch the ears of their pigs for identification and place rings in their noses to stop crop damage from rooting. By 1663, feral pigs were found as far west as the Ohio Valley.

William Penn and the Quakers found Pennsylvania to be excellent pig-raising country. It was here in Pennsylvania that the practice of fattening hogs for market on Indian corn first became widespread. By the 1700s, it was common practice throughout New En-

*pork* Costly or unnecessary project that rewards the constituency of an elected politician

*pork barrel* Government projects that benefit the constituency of a legislator; originally, the barrels that salt pork was stored in and dispensed from

*porker* An overweight person

*BBQ, bar-be-que, barbecue* Among the French in the Caribbean, a pig roast was *de barbe et queue*, or from beard to tail

*can't make a silk purse out of a sow's ear* The impossibility of creating something fine out of something coarse

*casting pearls before swine* To offer something valuable that will not be appreciated

gland and the Mid-Atlantic colonies to fatten hogs in this way. The Pennsylvania settlers were soon exporting hogs throughout the colonies, back to Britain, and shipping cheap salt pork to the sugar islands in the Caribbean. The colonists also participated in regular livestock markets and annual hog fairs. Through the early 1800s, droves of hogs were driven to market on trails that would later become the railways.

In the land that would become the nation of Canada, the British colonists and their livestock settled in Newfoundland and Nova Scotia. Soon they were outnumbered by the French colonists in eastern Canada. After the Revolution, some 40,000 Loyalists from the United States resettled into Canada. As this history relates to livestock, Canada and the United States became a melting pot of genetic stock that would continue to flow back and forth across the border into the present.

The immigrants who came to this new land brought their livestock breeds with them, including British, French, Spanish, Neapolitan, and Scandinavian pigs. Other hogs were deliberately imported from Russia and Africa. Pigs from East Asia and the Pacific were also brought into the western coastal states.

Asian pigs were brought to Hawaii with the colonizing Polynesians in the second century A.D. These pigs, or *pua'a*, were small, weighing 50 or 60 pounds, and had erect ears and a long head. The pigs were very tame and often kept as pets by women, although pork was taboo to women and could be eaten only by men. Captain James Cook left a boar and a sow from his ship at

Niihau in 1778. With further imports, the old original Polynesian type was completely superseded.

Salt pork was a mainstay of the American troops in both the Revolutionary War and the War of 1812. In that second war, "Uncle" Sam Wilson, a pork packer from New York, shipped barrels of salt pork to the soldiers all stamped and identified "U.S." Uncle Sam, and his caricature became a symbol of patriotism and nationhood. Cured pork, including the now infamous pork product Spam, would be a basic ration of soldiers in many wars to come.

When the Louisiana Purchase opened vast lands to American settlement in 1803, homesteaders took their hogs westward. Many sows walked westward alongside Conestoga wagons. Under the wagons, settlers slung coops of chickens and crates of piglets.

Everywhere hogs came to fill the land. The distinction between feral and farmed was somewhat nebulous, with much interbreeding between the two groups. Often pigs grew up roaming freely, only later to be penned and fattened. The common sandy, brown, or black pig was a rangy, tough, and self-sufficient hog known by many nicknames: razorback, pineywoods rooster, prairie racer, alligator hog, mortgage lifter, woods hog, and many more. Landrace types developed in different areas of the country, including the Guinea, Mulefoot, Red Wattle, and Choctaw. The pig flourished in the New World, feeding in the vast forests and marshes. American Indian nations throughout the East and in the Midwest as far as Kansas also owned significant numbers of hogs.

*hog* Originally a large steam locomotive, now a large motorcycle, especially a Harley-Davidson, also known as a *hawg*

*chopped hog* A motorcycle stripped of its heavy fenders and other parts

*gas hog* A large automobile with poor mileage

*to hog* To take more than your share of something

*road hog* A greedy, self-centered driver

*hogback* A sharp ridge of land

*hogshead* A barrel or cask of a liquid

*hogtie* To hamper or thwart, to tie all four feet of an animal together

*hogwash* Originally the garbage fed to pigs, now something worthless or ridiculous

*sand hog* A tunnel worker

*Hog* Eighteenth-century term for a shilling

*go whole hog* To be willing to spend a whole shilling, stop at nothing, go all the way

*go hog wild* To be lavish, extravagant, or act wildly

*hog and hominy* An old southern expression for everyday, old-fashioned good food and those who ate it

*living high on (or off) the hog* To live or eat well; formerly, in the army, soldiers ate the shoulder and leg cuts while the officers ate the more desirable top loin cuts

*root, hog, or die!* Get to work or suffer the consequences; a common colonial and frontier saying

*as independent as a hog on ice* To act confident or cocky; the exact opposite of a real pig on ice

*bring one's hogs to a fine market* Things are going well; an old New England saying

*run like a scalded hog* Formerly, after being stuck or bled, a pig was submerged in a tank of hot water to loosen its hair and bristles

The very commonness of the pig in North America would seem overwhelming to us today, where the pig is not seen by urban dwellers and is confined in buildings, even in the country. In the century past, almost every rural farm or homestead kept several pigs for family use and trade. Hog-killing time, like barn raising, cornhusking, and threshing, was a community effort. Many city dwellers kept a cow, some chickens, and pigs in the rear yard to help supply food for the family. A common sight in the early 1800s was hog drovers driving pig herds numbering in the hundreds as much as 1,000 miles to reach eastern markets. By midcentury, there were almost 35 million hogs in the United States, and the nation was beginning to supply the world with bacon, ham, and lard. In 1842, there were still some 10,000 pigs in New York City itself. That same year, Charles Dickens commented in his *American Notes* that

“free-roaming pigs” were numerous just north of Wall Street on Manhattan Island.

By 1840, although the southern states were responsible for about 60 percent of the nation’s pork production, pig raising in the Midwest was booming. Live pigs and barrels of salted or smoked pork were an important and lucrative trade. The shipments went down the Mississippi to New Orleans or via the Ohio River and Erie Canal to the Eastern Seaboard. As the processing center of this water and rail network, Cincinnati became known as Porkopolis.

In the later nineteenth century, several factors were involved in moving this industry westward. The Civil War destroyed much of the South’s agricultural base for some time. Abundant fertile land in the Midwest favored corn growing and pig raising. With the development of the refrigerated railway car, the pork indus-

The largest pig on record was a Poland China that hailed from Tennessee in 1933. Big Bill weighed 2,552 pounds and was 9 feet long. In more recent years, the largest hog was a Berkshire named Chief from North Lewisburg, Ohio, at 1,230 pounds.

The most expensive pig was a crossbred barrow named Bud, who sold for \$56,000 in 1985.

Although the largest litter belonged to a Large White–Duroc cross sow that produced 36 piglets in 1993, rare breeds have come close. In 1955, a Wessex sow gave birth to 34 piglets, and in 1971, a Saddleback sow farrowed a litter of 32 piglets.

Rare breeds have earned other top honors. From 1940 to 1952, a Large Black sow farrowed a record twenty-six litters. In 1957, an Essex sow weaned her 18 piglets at a high combined weight of 1,134 pounds. In 1994, a Saddleback boar fathered three litters that were all born within a twenty-four-hour period, for a total of 52 piglets.

try eventually moved to Chicago, “the Hog Butcher to the World.” Later still, the packing industry would move westward to Omaha, Nebraska. Iowa remains the largest hog-producing state, more than twice as large as the other big producers of North Carolina, Illinois, Minnesota, and Nebraska. As the twentieth century began, the collective hog herd in the United States comprised fully half of the world’s pig population.

Whereas some livestock farmers were developing breeds suited to their unique areas and conditions, others were concentrating on the development of specific traits such as fatness, lard production, early weight gain, larger litters, or disease resistance. Occasionally the wish to develop certain traits came at the expense of other good qualities. In both England and North America, this urge to improve and develop breeds took on an almost frenzied air. Many breed registries were organized, and more importations of swine types and breeds were made. Animals for show or breeding stock were sold for large amounts of money. Farmers came to believe that purebred swine were superior, and they used purebred swine to upgrade their farm herds, although the common farm pig was still a black or colored animal, not white.

Breeds were born, occasionally flourished with great popularity, and then later passed into obscurity. Other old or general-purpose breeds were cast aside and passed into extinction. Beginning in the late nine-

teenth century, many breeds were completely lost or absorbed into new breeds. For some breeds very little is recorded or known but the name. In Britain, several breeds disappeared: the old Cumberland, the exceedingly obese Dorset Gold Tip, the appealing Lincolnshire Curly Coat, the Small White, the Ulster White, and the Yorkshire Blue and White. Other British breeds also disappeared in North America: two Bedford hog breeds (also known as the Woburn and Cumberland), the Byfield, the Irish Grazier, the Essex, and the Suffolk. American creations with fascinating names have also passed away: the Big China, the Cheshire, the Curtis Victoria, the Davis Victoria, the Jersey Red, the Kentucky Red Berkshire, the Miami, and the Red Rock (fig. 24).

## Husbandry

In the twentieth century, governments in Europe and North America began to influence agriculture to a much greater extent through various programs: meat inspections and slaughter regulations; price supports and purchases of surplus products; disease control and medical advances; food rationing during wartime; encouragement to adopt new technologies, education, and research via the land grant colleges; and involvement in foreign marketing efforts. The result of these

[To view this image, refer to the print version of this title.]

Fig. 24 The now extinct Essex pig as illustrated in the American agricultural papers of the nineteenth century. Courtesy of the IAB and Hans Peter Jorgensen.

efforts was a great increase in output and a major change from outdoor or extensive production to highly intensive production mainly or partly indoors. Soon after World War II, the public was encouraged to become more concerned about health issues. Consumers began to demand leaner meats and move away from use of lard.

In the 1930s and 1940s, research on crossbreeding demonstrated the value of hybrid vigor in raising hogs. Crossbred foundation stock gave the industry the opportunity to select new genetic combinations to achieve higher levels of performance than single-breed stock. Swine-testing stations helped breeders identify boars with less backfat. Modern health recommendations stress the consumption of less fat in the diet, and pork producers have responded by producing a leaner meat. A center loin cut is now equal to or even lower in cholesterol than many beef or poultry cuts and has fewer calories than broiled beef, tuna in oil, and dark poultry meat with skin.

At times the breeder's rush to increase leanness and growth rates has come at the cost of other problems:

lower meat quality, tastiness, loss of docility, reduced desire of boars to mate, and sows that had problems getting pregnant, delivering, and producing enough milk for their litters. In both Europe and North America, another serious problem in recent decades has been PSS, or porcine stress syndrome, which emerged in the 1970s. The symptoms of this condition are related to stress or anxiety and can cause sudden death. The gene that causes PSS is linked to extreme leanness, which is valuable and desirable. But PSS pigs can produce a meat that is pale, soft, and exudative, or watery in texture (known as PSE), which is not desirable. Retailers dislike the tendency of PSS pork to release greater amounts of water during curing or after packaging. Consumers dislike the mushy texture as well as the possible discolorations of grayness or darkness. Because of problems with PSS meat, the Japanese, the world's fussiest pork consumers, believe that North American pork is of inferior quality.

PSS pigs are extremely sensitive to stress of many types, including mating, farrowing, changes in housing, introduction to unfamiliar pigs, handling by people, transport, and fear before slaughter. These pigs experience a rise in temperature, rigid limbs, and collapse. They can also be anxious, nervous, and hard to handle.

People have traditionally used most of the meat, bones, and other parts of the pig. Pigs also supplied bristles for brushes of all types, a product that is no longer available from the white or nearly hairless breeds. Pigskin makes unique leather: the hair follicles from the bristles allow the leather to breathe. Today, however, the pig industry boasts that “everything is used but the oink” and pig by-products are used in an incredible range of both medical and consumer products, some of which cannot be duplicated by synthetic substances:

*pigskin* Garment leather, gloves, shoes, upholstery

*bones and connective tissue* Gelatin, glues

*blood* Sticking agents, adhesives, feed additives, fabric dyes

*bones* Buttons, bone china, bone meal, porcelain, glass, water filters

*hair* Artists’ brushes, hair brushes, upholstery, insulation

*meat scraps* Pet foods, other animal feeds

*glycerine, fats, and other fatty acids* Cleansing creams, cosmetics, perfume, toothpaste, mouthwash, soap, emulsifiers, lubricants, polishes, waxes, waterproofing agents, insecticides, weed killers, antifreeze, nitroglycerine, matches, crayons, chalk, plastics, paint, solvents, inks, textiles, cement, rubber, cellophane, fiber softeners, linoleum, pet food

*pepsin* (a digestive enzyme found in the hog’s stomach) Cheese, gum, digestive aids, beer clarifiers

If both the boar and the sow are PSS carriers, one-fourth of their offspring will be susceptible to the extreme symptoms of the disease. DNA analysis and a halothane gas test are now available to identify pigs for PSS, allowing breeders eliminate the gene. Other breeders choose to manage the genetic syndrome by breeding PSS-free sows with PSS-carrier boars.

It is possible, but admittedly harder, to breed for lean meat without PSS. Breeders are beginning to recognize that they need to balance leanness, PSS and meat quality, growth rates, good mothering, and productive sows. Of great importance is the fact that the old, rare breeds of pigs may carry the genes for these various important and valuable traits. Some rare breeds produce a very lean meat without the PSS gene. In Europe, where producers depended heavily on the PSS-carrier Landrace and Pietrain breeds, the industry is beginning to breed for improved meat quality or taste by adding Chinese and North American genetics.

From a few pigs in the backyard or farmyard to the farmer who raised a load of feeder pigs as a mortgage lifter, a revolution has definitely occurred in pork production and specialization. The size of pig-raising operations has increased tremendously even though

the number of producers has decreased. In the past thirty years in the United States, the number of farmers raising hogs has fallen from 1 million to 157,000. Meanwhile, a record number of pigs is being raised. The largest area of growth is in facilities that produce thousands of hogs annually. More than two-thirds of the 100 million pigs raised yearly come from farms with more than 1,000 hogs.

From hog farming to pork production, modern swine raising is definitely an agribusiness encompassing the seed-stock producers, commercial producers, feed companies, equipment manufacturers, and packers. The pork industry has adopted such industrial practices as the use of interchangeable, standardized parts and increased production on demand.

The pork industry starts with the breeding firms that develop hybrid stock. These companies now supply most of the stock to the industry. There are three huge corporate breeders (Pig Improvement Company in England, Farmers Hybrid in Iowa, and DeKalb-Pfizer Swine Genetics in Illinois) and a number of smaller breeding companies. The genetic mix used by these companies includes only a few breeds. In North America, the red Duroc, white Yorkshire, and belted

Hampshire breeds account for 75 percent of annual hog registrations. The Chester White, Spotted, and European Landrace are also used, but to a lesser extent.

The situation is similar in Western Europe, where pigs of the Danish Landrace and Large White breeds are dominant. The Landrace is a very long, white pig with great depth and leanness. The Large White is known as the Yorkshire in North America. In Britain, pork production also makes use of the Welsh, the heavily muscled Pietrain, and imports from North America—Chester White, Duroc, and Hampshire.

About 80 percent of the pork in North America and continental Europe is produced on “farrow-to-finish” farms. The hog population on these production farms tends to be larger in the United States than in Britain and Canada. Although the size of pig farms in North America continues to grow, large, highly intensive units are on the decline in Britain and northwestern Europe due both to economics and to the public’s increasingly negative attitude toward them.

These large hog farms generally raise pigs totally indoors. The pork producer carefully regulates air quality, ventilation, temperature, humidity, light, food, and water. Medical care is also intensively managed with the use of antibiotics, vaccines, and hormones. These management techniques, though costly, tend to reduce land and labor costs while producing a consistent, continuous product.

By-products from the processing of canola, corn, milk, soybeans, wheat, and distilling grains make up approximately 20 to 30 percent of the modern hog’s diet in North America. These by-products, as well as some grains raised for animal feed, are unsuitable for human consumption. The modern hog requires 3 pounds of this grain-based feed to produce a pound of pork, compared to 5 to 6 pounds for a pound of beef and 2 to 3 pounds for a pound of chicken.

Sows are usually bred naturally, producing litters at least twice yearly. In North America, the sow is moved to a farrowing crate before giving birth to her piglets. In the crate the sow is closely confined, but she can stand up or lie down to nurse her piglets. The piglets are enclosed just outside the crate, where they are kept warm, dry, and safe from crushing by the sow.

The new Hurrik-Morris farrowing crate, developed in Canada, is ellipsoid or oval shaped. This design allows the sow to follow her nest-building instincts yet keeps her piglets safe when she lies down. Research on the Hurrik-Morris crate has shown that the sow is healthier, more fit, and exhibits fewer vices. The stillbirth level is lower, possibly because of her reduced stress. The piglets also have better access to their mother’s udder, and their survival rates are significantly higher in this oval-shaped crate than in the standard rectangular crate. Other alternatives to the crate are deeply bedded farrowing stalls, inexpensive wooden farrowing boxes, or individual sow huts outdoors.

Farrowing crates are controversial. The public sees them as cruel, and outdoor hog producers claim that their piglet survival rates are about the same without the use of crates. It is probable that modern hog breeders have not valued good mothering skills as highly as leanness and rate of growth, making it harder for the sow to do a decent job in caring for her piglets. Although they are still used in North America, close confinement or tether systems were banned in Britain in 1999.

Soon after birth, the piglets have their tails docked and their needle teeth clipped to prevent the growth of tusks. Clipping also decreases the incidence of biting at each other’s tails and ears. Tail biting is a common vice linked to the pig’s need to chew roughage, often lacking in formulated diets or life in all-metal pens. Damage from biting not only slows growth rates but may cause infections and even death. Piglets usually have their ears notched for identification, and the males are castrated.

There is a growing trend to vertical integration in the pork industry—that is, the ownership by a single corporation of all or most of the segments from breeding stock to processing meat. Increasingly, farms operate as contract operators to the packing companies. The resultant decrease in the number of sale barns and slaughter facilities is hitting the small farmers hard, especially those with fewer than 100 sows. Whereas the major food processors have posted record profits, the farmers are increasingly being forced out of pig raising as they receive the lowest pork prices in four decades. Oversupply and the late 1990s Asian economic crisis

have contributed to this serious problem, but pig producers in both Britain and North America cannot continue to operate at a loss without major governmental aid or a restructuring of the system. In addition, Europe has stringent animal welfare regulations that control how pigs are raised, transported, and slaughtered—all of which strongly affect the individual farmer.

Some European experts are highly critical of overcrowding in American weaner pens. Crowding promotes disease and slows growth due to reduced feed intake. Correctly designed feeder pens can reduce fighting and aggression by allowing pigs to follow their natural behaviors in the patterns of feeding, elimination, resting, socialization, and drinking in different areas. The reduced human contact that pigs receive in high-production farms also affects their docility. Daily handling improves reproductive performance and causes less stress when pigs need attention or medical care.

Pigs are not perfect. Just like other livestock, they can hurt each other and injure their babies, and adults can be dangerous. But some of the problems pork producers face are the result of genetic manipulation and modern pig-keeping methods. When pigs are unable to satisfy their urge to root or are frustrated in nest-building attempts, they can be extremely destructive on equipment and toward each other. Intensively farmed pigs can exhibit other manic or stereotypical behaviors in response to their frustrations. Problems with weak hind quarters and leg deformities can be the result of excessively long bodies, standing on hard floors, or both.

The industry is also aware that a large percentage of poor meat quality may be caused by stress in transportation and slaughter, negating the hard work of the farmer. Pioneering studies are proceeding on methods to reduce stress and anxiety by understanding and working with the animal's natural behaviors and tendencies, from sow and piglet management to the pig's arrival at the slaughter facility. The pork industry has a responsibility to provide humane, respectful treatment of animals that so benefit humankind. Consumer support of the possible higher costs associated with more humane treatment would support these changes.

Alternative methods are available to pork producers. A greater use of extensive production is compatible with the growing trend toward sustainable agriculture. Sustainable agriculture includes the rotation of land between crops and grazing. It also returns to the use of manure and animal work in disturbing weed and pest cycles. British farmers have begun this movement back to outdoor production, and as the pendulum swings back, outdoor production is again being studied at research institutes and land grant colleges. Soon 20 to 25 percent of pork will be raised outdoors, and the trend is increasing owing to public pressure and the return of greater profits in capital expenses.

Sows and young pigs can be fed on pasture or harvested cropland, combined with supplemental feeding. Good pasture can replace up to 50 percent of feed, even in growing pigs. Other agricultural products can be used as feedstuffs, such as hays, sunflower and soybean hulls, corn and wheat by-products, beet pulp, and distiller's grains. Waste is also returned naturally to the soil, eliminating the large amounts of liquid waste produced by large-scale pork production that requires careful and inoffensive disposal (fig. 25).

The advantages of extensive production include lower capital investment and annual maintenance; less odor; lower energy costs for heating, cooling, and ventilation; and reduced use of antibiotics due to increased health. Extensive production does have two expensive requirements: more land and increased human work. Most important, the outdoor producer must have access to breeds with color genetics, strong foraging instincts, and good mothering skills. The highly specialized confinement breeds simply may not work in such a system.

One of the goals in achieving greater leanness is greatly reduced backfat, but these lean pigs cannot be comfortable outdoors because their lack of insulating fat and hair makes them susceptible to cold and heat. White coloring can lead to sunburn and heat stress. Color genetics will be essential in a return to outdoor production.

Consumers are also very concerned about feed additives and medications. There is debate about the use of such hormones as PST, or porcine somatotrophin,

[To view this image, refer to the print version of this title.]

Fig. 25 Extensive production of Hereford hogs on the farm of Orlan Schulte, Norway, Iowa. Courtesy National Hereford Hog Record Association.

which improves feed efficiency and reduces fat. There is great concern in the medical field about the increasing ineffectiveness of antibiotics, and as a result the heavy use of antibiotics in food animals may need to be greatly reduced. Hardy, old-fashioned breeds raised outdoors do not depend as much on antibiotics to maintain their health.

Widespread medical uses of the pig are possible because of the similarity of pig and human tissue. Over 250,000 pig valves have been used to replace defective or diseased valves in humans. Pig valves eliminate the problems of blood clots that are associated with mechanical devices. The valves are preserved and prepared before implantation and are available in different sizes for children through adults. Pigskin is also used to treat massive burns and other skin injuries in people.

Pigskin relieves pain in major injuries and sticks without the use of adhesives, allowing easier removal for treatment. SIS, or small intestinal submucosa, is a thin material derived from the small intestines of pigs. Researchers are excited by its ability to serve as a scaffold for healing and to stimulate the growth of new blood vessels. Its potential uses are the repair of tendons and ligaments, arteries, intestines, and the esophagus.

The medical field makes wide use of chemical and glandular substances from the pig to treat humans. Insulin is obtained from the hog pancreas, and although synthetic insulin is now available, some diabetic individuals are allergic to anything but pig insulin. ACTH (adrenocorticotrophic hormone), which is extracted from the pituitary gland, aids in pain relief from arthritis and assists in the treatment of leukemia and rheumatic fever. Brain cells from fetal pigs have shown promise in the treatment of Parkinson's disease. Many other medical substances are obtained from the glands, organs, and blood of pigs: thyroid

The smallest breed of pig is the Cuino, from the highlands of central Mexico. Fully grown, the Cuino weighs only 22 to 26.5 pounds. Through the 1800s, the Cuino was still a popular household animal. It is now extremely rare.

Another small breed is the Yucatan miniature pig. This hairless, dark gray or black pig is raised for meat and lard and reaches a maximum size of about 165 pounds. The Yucatan is noted for being gentle, intelligent, and clean.

The Yucatan was imported into the United States in 1960 for use in medical research. Charles River Laboratories, Inc., has copyrighted its strains of the Yucatan as the “minipig” and “micropig.” The smaller micropig weighs from 77 to 110 pounds. It is a viable animal, not a genetic dwarf. Efforts to reduce its size further are continuing. As a smaller and easier to handle pig, the micropig is valuable for laboratory research (fig. 26).

Other breeds of miniature pigs have been developed specifically for biomedical research, including the white Hanford minipig, and the Sinclair, Hormel, and Pitman-Moore miniatures. In Britain, the Froxfield Pygmy is a cross between the Potbelly pig and the Yucatan.

and other pancreatic extracts, cortisone, corticosteroids, norepinephrine, epinephrine, plasmin, fetal pig plasma, blood fibrin, estrogen, progesterone, relaxin, pepsin, oxytocin, liver extracts, and heparin used to prevent blood clotting.

Pigs are widely used as test animals in research. Pigs are similar to humans in many biological ways, and so they are useful in the study of cardiovascular systems, diet, gerontology, and stress. The fast reproductive and maturing qualities of pigs speeds up the accumulation of data. The humanlike nature of pigskin is used in the teaching of surgical methods and researching skin diseases and wound treatments.

Highly specialized breeds of pigs have been developed for laboratory use. These breeds are very clean, sociable, and trainable. Humane handling is critical to reduce the stress factors that could compromise research findings. Specialized equipment such as the Panepinto Sling, a humane animal restraint, has been developed to facilitate gentle and safe handling of these small pigs.

Pigs are of great importance in the study of the ever-changing influenza viruses. Besides humans, flu viruses can infect pigs, horses, seals, and birds. Unfortunately, the flu virus genes from one species can mix with the virus genes of another species to create an en-

[To view this image, refer to the print version of this title.]

Fig. 26 The Yucatan micropig is now bred for use in research. Courtesy Jace Trickey, facility manager, Charles River Laboratories, Maine.

tirely new flu. China, home to the world’s largest populations of both humans and pigs living closely together, continues to be the primary site of new flu strains. Researchers monitor samples from China for new viral transformations in pigs, hoping to get a jump on protection against them.

Interesting results are coming from the cooperative work of British and American researchers in the development of transgenic pigs. The goal of this transgenic work is to produce organs that are genetically engineered to avoid attack by the human immune sys-

[To view this image, refer to the print version of this title.]

Fig. 27 A one-year-old Kunekune pig named Tui.  
Courtesy Katie Rigby.

tem and the resultant rejection problems. Human genetic material is injected into the sow's egg or embryo, so that the offspring's cells will carry human protein signals. Work is still required to stabilize the amounts of human proteins produced in the pigs. Among several concerns about these procedures is the danger of disease transmission.

The possibility of providing transgenic heart, kidney, liver, pancreas, and lung transplants would ease the large shortage of human transplant material. Xenotransplants could prevent up to 100,000 human deaths each year that occur because these people failed to receive a human donor transplant. Transgenic research may also lead to human-tailored hormones and other medicines from pigs.

The pig is such a rapid and excellent user of resources, as well as a producer of valuable products, that it will continue to be an important livestock animal. The rare breeds will become increasingly important as

they offer the genetic material necessary to develop new seed stock to meet a changed production system. Unfortunately, the rare breeds are now extremely endangered. The disparity in numbers between the rare and commercial breeds or crosses is huge, and in some rare breeds, the genetic pool has become extremely small.

In Britain, the preservation of the rare pig breeds has long been a focus of the RBST, but it has been a difficult battle. The population numbers of the minor breeds are very low. Pig producers, unlike cattle and sheep farmers, do not receive subsidies, and they are subject to the volatile pig market. Conservators worry during times of improvement, knowing that there will be a downturn that will cause breed numbers to fall again. Britain also imports a large amount of pork, often produced in Denmark, the Netherlands, and the United States. The RBST can be proud that none of the rare breeds have disappeared since their recognition in 1975. The Traditional Breeds Meat Marketing Scheme may provide a sound base of support for breeders, which will encourage the rare breeds.

Each rare swine breed has valuable traits, many of

Pigs have probably been kept as pets since their earliest contacts with humans. Young piglets are appealingly humanlike in size and dependancy. Pigs are clever, trainable, and sociable—all excellent qualities in a pet. The sale of pet pigs in North America and Britain has undergone a boom and bust in the past decade. In that space of time, the Vietnamese Potbelly pig has become very well known.

Are pigs happy as pets? They probably accept the pampering as stoically as a poodle, while enjoying human company. Prospective owners should remind themselves that their pet pig will be a pig, not a dog or a cat.

The Vietnamese Potbelly pig does indeed exist in Vietnam, where it is found in large numbers in river deltas. Known by the native name of *I*, the breed is small at about 200 pounds and quick to mature with a very high percentage of fat. These pigs have swaybacks, straight tails, and a definite potbelly. Rural peoples keep the *I* on crop waste and aquatic plant forages. The breed is valuable and well suited for its environment. The *I* also resembles many other potbellied breeds found in Southeast Asia and China, some of which may have contributed to what is known as the Potbelly pig in Western Europe and North America.

The Potbelly pig was on display in European zoos by the 1960s. In 1985, a Canadian imported 14 sows and 4 boars gathered from zoos in Germany and Austria. These pigs formed the basis for Potbellied pig breeding in North America. The population now numbers about 200,000. Both inbreeding and the desire to breed smaller and smaller pigs have resulted in genetic problems that now require conscientious breeders to monitor their bloodlines. Unfortunately, unscrupulous breeders have also bred the Potbelly to other outside breeds and types of pigs.

The boom in Potbellies has caused many problems. In many urban areas, pigs are not allowed as pets because they are considered livestock. Even if zoning regulations are no obstacle, purchasers may still find that their adorable baby soon becomes a hefty 200 pounder—or even more, if its heritage contains other breeds. Poor breeding can also result in weak legs and other health problems in the Potbelly. Unhappy buyers then abandon their porkers at animal shelters or the slaughterhouse. For their part, many breeders have not received a return on their investment in expensive breeding stock.

The Potbelly Pig Registry is now beginning the work of standardizing, researching genetics, and promoting responsible breeding and selling to the public. Many breeders are aiming for a size closer to 40 and no more than 125 pounds. Now that the fad for Potbellies has ended, the breeders who were in the business for the money will leave it to those who truly enjoy their pigs.

Other small pig breeds that are being promoted as good pets include the Yucatan or Mexican Hairless, the Juliani or Painted Miniature (created from Potbelly and other crosses), and the Froxfield Pygmy (Potbelly and Yucatan crosses) and various other laboratory-bred minipigs.

In 1995, a rare and historic small breed from New Zealand was imported to the United States. The Kunekune resembles the small domestic pigs of Asia that spread throughout Polynesia at least a thousand years ago. Although its exact heritage is unclear, the Kunekune has long been raised by some Maori tribes in New Zealand. Unlike later European imports to the islands, now called “Captain Cookers,” Kunekunes never ran feral. Kunekunes were kept in villages, where they were extremely docile, curious, and affectionate with humans (fig. 27).

The hairy Kunekune stands no taller than 24 inches. *Kunekune* means fat and round in Maori, and the pigs are just that. Boars can weigh up to 110 pounds and sows up to 90 pounds. The short face is dished with a snubbed snout. Many Kunekunes have neck wattles, known as *pire pire*. Kunekunes may be black,

(continued)

blond, tan, gold, mahogany, spotted, or calico in color. The Kunekune is a grazing pig and does very well on grass.

The European and American breeds introduced into New Zealand were much larger and were often interbred with the native type. The New Zealand Kunekune Breeders Association was founded in 1987 to preserve the traditional Kunekune and provide a registry. The global population is believed to be fewer than 2,000. In 1995, Katie Rigby of Kansas imported a group of registered Kunekune pigs selected by New Zealand breeders. The Kunekune Registry of the Americas will continue to register pigs in the New Zealand association. Kunekunes are also available in Great Britain and Canada, but some may be of mixed background.

which may be useful today. Each breed needs to be conserved to provide the maximum genetic stock for future use. At present, there are no government programs for this effort, only the dedication of the conservation groups and individual breeders.

## Breed Profiles

### *Tamworth (pl. 50)*

The Tamworth is one of most unusual breeds in Britain. The Tam remains the only native red breed, and it may trace its heritage directly back through the Middle Ages to the wild pigs of Europe. Experimental crossings of Tamworths with wild hogs have produced “Iron Age” striped piglets similar to those kept in early domestication.

The Tamworth also retains many “unimproved” traits. The exceptionally long snout is excellent for rooting and foraging. It is a long-legged, active, strong, and hardy pig. Sows produce slightly smaller litters than the modern breeds, but they are known for their excellent mothering capabilities, being both gentle and protective of their young. Owners describe them as intelligent and affectionate. The Tamworth’s color protects it from the sun, and it has done very well outdoors in both hot and cold climates. The red color may range from light ginger to dark chestnut.

As an old or primitive type, the Tamworth and its relatives were no doubt once found over a wide area of Britain. It has been noted that the early Berkshire seems

to resemble the Tamworth, which may reveal their common ancestry. Although the Tamworth type was found in the Midland counties of England earlier, the first record of purposeful Tamworth breeding began with the import of Irish stock by Sir Robert Peel to his Tamworth estate in Staffordshire in 1812 or 1815. Peel bred his Tamworths until 1850, when they were already a recognized type and promoted as a bacon pig. The first separate breed classification for the Tamworth occurred at the Royal Show in 1865.

Described as a red or reddish black pig, the leggy, narrow Tamworth was criticized for its inability to fatten. A slow-maturing breed, the active and hardy Tamworth was traditionally turned loose in the woods to scavenge for food. Toward the end of the nineteenth century, some breeders attempted to improve the Tamworth’s commercial worth by crossing it with the Large White, but the Tam failed to become the popular choice and would remain a minor breed into the twentieth century. An introduction of outside blood into the Tam may have come from West Indian pigs in the mid-eighteenth century, and it has been suggested that such imports may have contributed the red coloring, but red was certainly seen in British pigs in the past. Ultimately, the Tamworth retained its appearance despite the widespread use of Asian pigs in improving the other native British types.

Through the efforts of the RBST, the Tamworth has been making a steady increase in Britain. From the shockingly low numbers in 1974 of 11 boars and 32 sows, there are now about 70 boars and 300 sows. Un-

fortunately, about one-third of the owners are not registering pedigree breedings. On a more positive note, a Tamworth Breeders' Group was established in the 1990s. The Tamworth breed has been exported to Australia, New Zealand, Brazil, Egypt, Hungary, Kenya, Spain, Southeast Asia, and North America. Tamworths have been reimported to Britain to assist in rebuilding the breed numbers.

Although colonists may have carried the early Tamworth type to the New World, the first recorded imports of Tamworths to North America were made in the 1870s. The first Tams came to Canada in 1877 and were entered in the Dominion Swine Breeder's Association Herd Book in 1893. Imports of better stock from England increased in the early 1890s, and the Tamworth enjoyed some success as a bacon producer in Canada. Thomas Bennett of Rossville, Illinois, made the first import of Tamworths to the United States in 1882. Canadian stock continued to enter the country, but the lean breed did not initially find favor among American hog producers. By 1940, more than 30,000 Tams had been registered.

The Tamworth's genes for high-quality lean meat were used in early crossbreeding experiments. The Tam was one of the foundation animals used in creating the first commercial breed, known as Minnesota No. 1. This synthetic breed enjoyed some success but before the end of the twentieth century slipped into extinction when the only living animals were sent to slaughter. Unfortunately, all the remaining animals were controlled by the University of Minnesota and therefore were extremely vulnerable to this type of loss (fig. 28).

Today the Tamworth is far more numerous in the United States than in its homeland. The American Tamworth Swine Record Association, founded in 1887, registers up to 2,500 pigs yearly. In Canada, the Tamworth became rare and remains only in small numbers. The North American Tamworth has probably diverged from the British Tamworth, due to both show ring and market demands.

A medium to large pig, the Tamworth has been noted as a bacon-type pig producing naturally lean meat. Boars generally weigh 525 to 800 pounds, and sows 450 to 650 pounds. Boars are active and fertile,

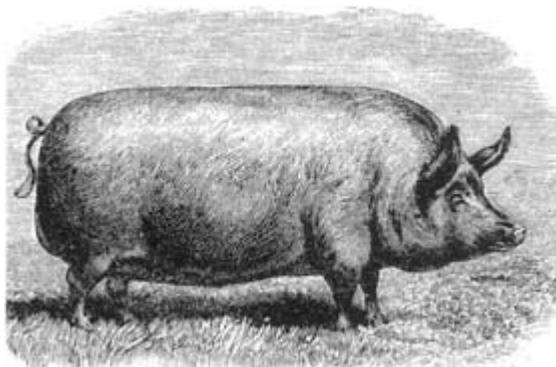


Fig. 28 The Tamworth as found in the American newspapers of the 1880s. Courtesy of the IAB and Hans Peter Jorgensen.

and the sows are excellent mother and good milkers. Although the Tam is not as wide or bulky as other breeds, it is a deep-sided, smooth, and firm animal. The neck, head, and snout are long, the face is straight, the ears are erect, and the jowl is trim. Although the red color shades may vary, black spots are objectionable, as are curly coats. Quality coats are important, and the hair should be long, smooth, straight, and free of swirls.

Because the Tamworth is genetically purer and so different from most other breeds, it imparts great hybrid vigor when used in crossbreeding programs. A very hardy pig, it is also able to survive and grow on lower qualities and amounts of foodstuffs. Tamworth weanlings are typically heavier than many other breeds. The dark coloring is a great advantage in outdoor production because the breed does not sunburn. The Tam's natural leanness is an extremely valuable trait and it attracts specialty markets. It is still a premier bacon producer. All of these characteristics hold great promise for the Tamworth's future.



Rare



Rare



Critical

### *British Saddleback (pl. 51)*

At first view, the rare British Saddleback resembles the very popular Hampshire, but a closer examination reveals the differences. The Saddleback is a large pig with lop ears and a long snout. A black pig, it is marked by the white belt that encircles its neck and runs down

through its front legs. The belt may be narrow or wide, and not all offspring carry the required markings.

The official name British Saddleback was first used in 1967, when two old breeds, the Essex and the Wessex Saddleback, each with small populations, were combined into one registry.

The Essex pig was well known by the early nineteenth century, coming from East Anglia and Essex itself. It was a black-and-white pig and was sometimes called the Essex half-black because the rear half was white and the front half was black. It was a good foraging and early maturing pig. Around midcentury, British breeders began an improvement program with the addition of Berkshire breeding. This improved breed was appropriately called the Improved Essex.

The Essex Pig Society was organized in 1920, and the breed acquired a following south to Kent and north to Scotland. The desired color pattern was black with a white belt encircling the shoulder and including the forelegs. White also marked the tip of the tail and muzzle. White on the hind legs could not rise higher than the hock.

By 1820, the old Essex had been imported into North America. Aside from contributing to other breeds, the Essex gained great popularity in the United States. By the end of the century, the American Essex Association was flourishing. However, by the 1920s the Essex fell into decline, burdened by a poor reputation as an unhardy and fatty pig. Eventually it became extinct. Small groups of Improved Essex pigs were imported into Canada around 1884 and continued in low numbers.

Another native British breed, the belted or sheeted Wessex hog, hailed from Dorset. Although they carried similar color patterns, the Essex and Wessex were not closely related. The Wessex was also heavier in the shoulder than the Essex and matured somewhat later. A society for the Wessex Saddleback was formed in 1918. The original Wessex pigs were also imported into Canada.

The origin of the saddleback pattern in England is unknown, but pigs with this same coloring, from neighboring Hampshire, were imported into the United States about 1825. These "Hampshire" pigs were de-

veloped by breeders in Kentucky into the modern Hampshire, the third most popular breed in the United States today. The Hampshire is a prick-eared, exceptionally lean, and modern pig.

Today in Britain, the new British Saddleback breed has absorbed both the Essex and Wessex bloodlines. As a result of the pork processors' preference for non-colored breeds, the Essex population went into a serious decline. By 1965, when the national society could no longer function, the National Pig Breeders' Association worked out a compromise solution. Following experimental crossings between the two breeds, the Essex and Wessex were merged into one new breed. This action did not please all the breeders, and because the Essex population was extremely low, the Wessex type came to dominate the new breed.

The amalgamated British Saddleback continues to be a good, docile outdoor pig but may have too much fat to compete successfully on the modern market. The breed is often used in crossbred pork operations, where it produces excellent hybrid vigor. Saddleback-Landrace sows are often bred to Large White boars to produce piglets used in outdoor production. Their crossbred offspring inherit the Saddleback's good feed efficiency and rapid growth. Saddleback sows also equal the litter rates of the popular breeds. These characteristics should bode well for its future.

In Britain, Saddleback numbers have declined since 1968, when the population stood at more than 1,300 adults. Although Saddleback numbers have stabilized somewhat, they still experience ups and downs in response to the market. Breeds such as the British Saddleback may benefit from the RBST's Traditional Breeds Meat Marketing Scheme promoting specialty and superior-quality products. In 2000, there were about 80 registered boars and 372 sows in the hands of about 62 breeders. There are relatively large numbers of male and female lines, but the number of pigs in each line can be small. The British Saddleback Pig Breeders Club works as a unified group in support of their breed. Some breeders are hoping to use Saddleback imports from Australia. Interestingly, one pure Essex herd is also still in existence in Staffordshire.

There may still be about 200 Saddlebacks in the

United States and a smaller number in Canada. There is no functioning breeder's association.

 Critical  Rare  Endangered

### *Gloucestershire Old Spots (pl. 52)*

The lop-eared Gloucestershire Old Spots pig has a romantic and endearing quality to its appearance. This rounded creature resembles the illustrations in many old children's stories and probably with good reason. The Old Spots is descended from the native Old English pigs of western England, probably aided by the refinements of Neapolitan pigs imported from Italy late in the seventeenth century.

The Gloucestershire (or Gloucester) was mentioned as early as the 1780s, although a herd book was not established until 1913. At that time the herd society became interested in preserving the old Orchard or Cottage breed of spotted pigs that had developed and remained primarily in the Berkeley Valley of Gloucestershire.

The Old Spots was a dual-purpose pig, supplying both bacon and pork. It foraged on windfall fruit in orchards and used other by-products on the farm such as dairy whey, beet tops, kale, potatoes, root crops, and many other crop remains. Outdoor living made the breed hardy and self-reliant with excellent mothering abilities. Unfortunately, as with many old-fashioned breeds, the demands of modern pork production have bypassed the gentle Old Spots.

The Old Spots is a large, round, and deep pig. At the turn of the twentieth century, this white pig was more liberally spotted with black, but today it possesses only a few spots. The national Pig Marketing Scheme of 1939 penalized colored pigs, so breeders reduced the spotting. Now the G.O.S. (as it is also called) usually has only one or two spots on each side.

Even after the turn of the century the Gloucestershire Old Spots remained largely unknown outside its native area. By 1918, at the same time that the Gloucestershire Old Spots Society was established in Great Britain, pig breeders in Indiana organized the National Spotted Poland China Association. This breed, which

became known as the Spotted Swine, was based upon the original Poland China pig crossed with 2 Gloucestershire Old Spots hogs imported from England in the nineteenth century. This effort resulted in the development of a breed with many of the good qualities of the Gloucestershire.

The Spotted Swine or American Spot has become a very successful breed in the United States with about 64,000 registrations in 1990, three times greater than its ancestor and competitor the Poland China. The Spotted Swine is the fourth most numerous production hog raised in the United States today.

In 1935, several pig breeds, including the Gloucestershire Old Spots, the Old Spot Welsh, and the Large White, were used in the early work to develop hybrid stock for commercial production at the University of Minnesota. This breed, named Minnesota No. 3, is now extinct, although it performed well.

In 1985, there was another importation of about 50 pigs to the United States, where breeders hoped to promote the Old Spots's excellent ability to forage in outdoor production. In 1990, there were 36 Old Spots registered in the United States and none in Canada. Unfortunately, the breeder network failed, and the stock was mostly lost or used for crosses into the Spotted Swine breed.

A new group of American breeders was established to conserve the Old Spots by arranging for breedings between the few surviving animals. In 1995, 20 British G.O.S. were imported from a variety of bloodlines to Kelmscott Farm Foundation in Maine, and they have successfully produced new breeding groups. Semen from 2 additional imported boars is also now available. The new Gloucestershire Old Spots Registry is promoting such efforts and attracting new owners. There are approximately 60 G.O.S. pigs in the United States.

In Great Britain, the Old Spots has recovered from near extinction in 1977, when only 13 boars and 57 sows could be located. The breed owes much to the Ribbesford and Horsehill herds of George Styles and his family. In the 1960s, the Styleses were responsible for conserving 80 percent of the breed's global population, and their stock can be found in the pedigrees of

most G.O.S. pigs today. Recent years have found the breed remaining stable at higher numbers, about 600 breeding adults in the dedicated hands of about 120 raisers. The RBST's Traditional Breeds Meat Marketing Scheme has benefited the breed by providing opportunities for gourmet meat sales.

Crossbreeding with the Large White or Landrace also produces a practical and profitable hybrid pig. In 1979, a small group of Gloucestershire Old Spots pigs were exported to France. Although the G.O.S. is mainly raised indoors in Britain, the breed would also be an excellent grazing pig in sustainable agriculture and is now increasingly being kept in smallholdings. The Gloucestershire Old Spots Pig Breeders' Club is now the advocate of this traditional and beloved pig.



Critical



Rare



Endangered

### *British Lop (pl. 53)*

Although the British Lop looks a great deal like the popular modern breeds of white pigs, it actually belongs in the company of the old native pigs of England—the Cumberland, the Lincolnshire, the Ulster, and the Welsh. Historically the Lop itself was first noted in Tavistock, West Devon, and has remained primarily in the Cornwall-Devon area and neighboring Somerset and Dorset. Logically, the breed has also been known as the Devon Lop and Cornish White. The Lop also carried the long moniker of the National Long White Lop-Eared pig. For a time, the Lop was in a combined registry with the similar Welsh pig, which is successful commercially. The British Lop Pig Society is now the breed association.

It may take a careful eye to discern the Lop from the more popular white breeds. The Lop is perhaps somewhat deeper bodied or heavier and wears larger ears that cover its face almost completely. As with other lop-eared breeds whose ears somewhat obstruct their vision, the British Lop is easy to handle and confine. It is one of the largest pig breeds in Britain—lean, long, and deep bodied. The breed produces a meat with a slightly higher amount of fat, which contributes to its superior taste and texture.

The Lop retains the economical ability to maintain itself on grazing and is still raised mainly outdoors. Sows have excellent maternal instincts. In addition, the Lop has not been influenced by the Asian bloodlines brought into Europe. These traits have been used to good advantage in crossbreeding.

With all of its excellent traits, why isn't the Lop more popular? It has been suggested that its very similarity to the Landrace and Welsh has discouraged fanciers from raising the breed. It also lacks the distinctiveness of color or spots.

The breed has not been exported in significant numbers. The Lop is critically rare in Britain, but the numbers have now stabilized. From low figures in 1974 of 14 boars and 58 sows, the 2000 population numbered 55 boars and 200 sows. The number of breeders who keep the British Lop is quite low, only about 37.



Critical

### *Berkshire (pl. 54)*

More than two hundred years ago, the Berkshire was a well-known favorite of both farmers and royalty for its exceptionally flavored meat. It was raised on rich farmland west of London and fattened on food wastes. Yet its story illustrates the difficulty that can occur in tracing the history of a breed. Farmers frequently describe a breed of livestock with the name of the area in which it was raised. In early nineteenth-century agricultural records, several differently appearing hogs were called Berkshires. Some were large red or sandy-colored stock, often with black spots. Others were colored black and white or spotted. Both prick and lop ears were seen. Some possessed the characteristic Berkshire white points on the feet and tail. Asian or Neapolitan breeds were also introduced to upgrade these native pigs, giving them a dished facial appearance and more rapid maturity.

Despite this confusion, the Berkshire became one of the earliest recognized breeds of pig. By 1825 in Britain, a registry and a standard had been established that described a medium-sized, stout pig that was generally black with white points—that is, white on the face, feet,

[To view this image, refer to the print version of this title.]

and tip of the curly tail. An official breed society was formed about 1883.

By the end of the century, the Berkshire had been changed by the demands of the show ring into a smaller, very fat, short-snouted pig. Pure black with white points was the established coloration. The Berkshire still supplied pork and bacon, but its dark skin was losing favor with butchers. Eventually, the Berkshire could not compete with the Danish Landrace, and its numbers began to slip. By 1979, only 16 boars were registered.

The Berkshire was imported into the United States as early as 1823 and to Canada soon afterward. It was noted as a great improver when crossbred to native farm stock. Beginning in the 1830s, the Shaker religious communities often raised the Berkshire. The Shakers at Pleasant Hill, Kentucky, owned a boar named Black Hawk the Great, reputed to be the finest Berkshire boar in the state. In 1875, the American Berkshire Association was formed. This registry was limited to English

Fig. 29 These Berkshire pigs, named Wharfdale Chief, Wharfdale Rose, and Hillhurst Rose, were found in Pennsylvania in 1873. Courtesy of the IAB and Hans Peter Jorgensen.

stock and their direct descendants. Accordingly, the Berkshire bloodlines have remained exceptionally pure (fig. 29).

The American Berkshire has upright ears and a distinctive upturned nose. The breed is also noted for its good mothering abilities, heavy milking, quiet temperament, easy feeding qualities, and hardiness. Although the Berkshire has succeeded in confinement swine production in the United States, it remains an excellent pig for raising outdoors. Its dark color is an advantage in hot and sunny climates.

In both Britain and the United States, the Berkshire has been selectively changed to meet the needs of the modern market, including fast growth, reduced fat, and greater standardization. A few breeders maintain

an older traditional type. Because of the breed's purity, it has great value in crossbred hybrid operations. The Berkshire is noted for its sweetly flavored, lean meat. Some packers pay premiums for Berkshires because of this high-quality pork. In the 1990s, a small group of Berkshires was again imported to the United States specifically to improve the flavor of meat destined for Japanese export markets.

The status of the Berkshire is critical in its native home. Fewer than 500 breeding adults are owned by 120 breeders. The Berkshire Breeders Club serves as a breed society.

In Canada, the numbers are much lower, with only 50 pigs registered annually. It has been difficult for Canadian breeders to find meat markets for this rare breed, but the Asian interest in the Berkshire is promising. A breeder in Alberta imported 28 Berkshires from Britain in 1997.

Fortunately, the Berkshire has fared better in the United States, where it numbers about 20,000 and has excellent prospects for the future owing to the demands for its traits. The Berkshire is also found in Australia, Japan, and New Zealand. The British Berkshire has benefited from the reintroduction of these bloodlines.



Rare



Endangered

### *Middle White (pl. 55)*

With its dished face and snub nose, the Middle White pig looks almost like a large version of a pet pig. The Middle White pig owes many of its traits to the Chinese pigs that were imported into England late in the seventeenth century. These Chinese pigs were much smaller, shorter-legged, faster-maturing, and fatter than their European cousins. Fine coated rather than coarsely haired, the Chinese pigs came in either black or white coloration. Their traits came to influence many European and American breeds. In England, these traits were expressed most directly in the extinct Small White pig. The Small White was a fancier's pig, even kept and shown by royalty in the mid-nineteenth century. The Middle White benefited from large amounts of the Chinese bloodlines through the Small White breed.

The other portion of the Middle White's pedigree comprised the very large white pigs found in Yorkshire in northern England. This Large White or Yorkshire breeding would eventually become very popular in Britain, North America, and around the world. Pig fancier and breeder Joseph Tuley was instrumental in perfecting both the Large White and Middle White types in the mid-nineteenth century.

Into the early twentieth century, the Middle White became very popular as a pork or specialty meat breed. The first-generation cross between the Middle and Large White yielded an excellent bacon pig. The Middle White sow was a good mother and easy to handle and keep. The distinctive, flattened snout prevented rooting and the destruction of fences and yards. The breed's smaller size made both sow and boar easier to handle. Perhaps its greatest asset was early maturity. The young pigs grew rapidly, reaching a good market weight economically. The Middle White was also very popular with Yorkshire's working class, who showed their pigs with great enthusiasm and fervor.

The Middle White ultimately suffered the fate of many old-fashioned, fat-type pigs. The British government also began a concentrated effort to develop and promote a bacon-type hog to compete with imported meat. Farmers hedged their bets by raising dual-purpose hogs, selling young for pork or fattening longer for bacon. The Depression era, interwar years, and a changing marketplace forced the Middle White off many farms.

By the end of the World War II, the Middle White numbers were extremely low. In 1974, the RBST could locate only 5 boars and 27 sows. Through the trust's support, the population has climbed higher but remains critical. Figures in 1998 tallied at least 87 boars and 305 sows scattered among 79 breeders. Besides the very small herd size, many Middle White sows are crossbred, and some are even kept as pets. The Middle White Pig Breeders Club continues to work in the breed's behalf.

The Middle White was imported into Japan in the 1930s. Further imports of small breeding groups in the late 1980s added to the breeding program there. Today there are more Middle White pigs in Japan than in Brit-

ain, including several family lines extinct in their homeland. The Middle White has made a significant impact on Japanese pig breeding, and this genetic pool could be valuable to the Middle White in Britain.

Japanese consumers demand a finer and more flavorful pork than Western shoppers, and they have found it in the Middle White. For this reason the Middle White can still maintain a niche in the increasing market for specialty or gourmet items in the West. This breed could also serve as an excellent pig for family pork production.



Critical

### *Large Black (pl. 56)*

The Large Black is a critically endangered breed. The remnants of the breed are carefully maintained by dedicated individuals in Britain and North America.

The Large Black herd book was started in 1899. Its founders trace their breed to two older types of English pigs. One was a large, well-formed black pig from Essex and Suffolk in East Anglia known as the Essex or Essex Black. The other source of the breed was the Lop-Eared Black pig from Devon and Cornwall in extreme southwestern England. This pig also may have been influenced from across the Channel by an older, lop-eared French import. Other agricultural historians propose the addition of black Guinea hogs brought back to England by seafarers or the black Neapolitan hogs of Italy.

What is certain is that by the end of the nineteenth century, the popularity of the Large Black had spread throughout England. The Large Black was an excellent farm pig for the times. It thrived on grazing alone and grew to an immense size. Boars could easily reach 1,000 pounds, following the common practice of grazing the young pigs much longer than today. Year-old pigs would then be grained to provide fat bacon, which was a staple in the diet of many people. The Large Black was one of the most popular breeds in Britain and was exported in large numbers to several countries.

The Large Black was crossed on the Middle White to produce a pork or bacon pig. Crosses with the Large

White contributed an improved carcass to the hardy, outdoor good mothering of the Large Black.

The Large Black was not a lean meat pig, and its popularity plummeted accordingly later in the twentieth century. Its dark hair was reputed to affect the appearance of the meat cuts, and pork producers now preferred the white-skinned breeds, which were more commercially successful.

The Large Black has many good attributes. It is a large, long-bodied pig with an exceptional growth rate. It outperforms many breeds in the weight gains of young pigs. Its greatest value for the future may lie in crossbreeding, which results in leaner offspring with fast growth rates. The Large Black is unrelated to North American breeds, which bodes well for hybrid vigor.

The Large Black is also known for its superior maternal instincts, raising good-sized litters. Both the Large Black sow and the young pig can function quite well on grass, reducing the farmer's costs. Their very large lop ears also obscure so much of their vision that the pigs are calmer and easily contained in fencing that would not hold other pigs. The breed's black skin is also an attribute in outdoor pork operations in many climates.

Unfortunately, the Large Black is in dire straits. From the mid-twentieth century, when in England, 1,000 boars were registered each year, by 1974, there were only 18 boars and 55 sows. These numbers have been increasing slowly. The 1998 survey revealed 300 females and 70 boars in just 6 male lines. About 100 dedicated breeders are assisted by grants from the RBST. Encouragingly, slow but steady gains have been reported in the past few years, although some of the pedigree sows are used primarily for crossbreeding. The Large Black Pig Breeders Club remains a supportive influence for its members.

Large Black pigs were imported into North America in the 1920s. As an outdoor production breed, it never established a firm base before the change to intensive production. In 1985, North American breeders again imported the Large Black, but the numbers have remained very small. Cabbage Hill Farm in New York, which would like to sell offspring and organize a breed association, undertook another import in the 1990s.

In 1997, the RBC located the last Canadian herd and began to establish 6 small starter herds on member farms.



Critical



Rare



Critical

### *Oxford Sandy and Black (pl. 57)*

The Oxford Sandy and Black pig illustrates a quandary in rare breeds conservation. In the strictest sense, a breed whose numbers have fallen so low that it requires the use of outside animals is no longer genetically pure. Some experts would even declare that the breed is extinct. Yet there are recognized rare breeds that have been rescued by the judicious use of related breeds or types followed by careful selection in order to regain the attributes of the original animals, which is sometimes called breeding back to type. In addition, upgrading through repeated breedings to come close to a pure animal has long been an acceptable practice in many livestock associations. And still other breeds whose breeders use similar methods are labeled as reconstructed or reconstituted but not authentic.

The old Oxford Sandy and Black pig was believed to be closely related to the old Berkshire, Tamworth, and Gloucestershire Old Spots pigs. All of these pigs were bred to different ends in the eighteenth and nineteenth centuries. By the mid-nineteenth century, the pigs of Oxfordshire were described as white or sandy colored, spotted with black. Hardy and prolific, the type was popular because it survived well on household and garden scraps, crop residues, and forage in woodlands or pasture. The hogs were sometimes called Plum Pudding pigs, because of their color, or Oxford Forest pigs. Mixing of types inevitably occurred. Sandy, black, and white crosses with the Berkshire were described as the New Oxford. Tamworth and Berkshire crosses also produced spotted pigs but with prick ears.

Unfortunately, the breeders of the Oxford pig never formed a viable breed society or registry, and they disagreed over points of conformation and color. The breed was never well established, and there are no records of exports. As early as the 1920s, breeders were attempting to restore and promote the Oxford-

shire Spotted pig, but few breeders participated in licensing programs. Only one recognized and licensed boar was reported in 1947, with 7 in 1949. The RBST believes that the pure Oxford and Sandy pig became genetically extinct with the death of the last purebred pig sometime before 1970.

A breed society was organized in 1985 in an attempt to rescue the traditional Oxford Sandy and Black pig. The members felt that there were enough pigs displaying the proper ears, coloration, and qualities of the old breed to form a foundation herd book. They also believed that it was possible to locate purebred pigs from herds dating to the early twentieth century but without proper pedigrees. They inspected all boars before accepting them for registration and culled all pigs whose ears or color were not appropriate. Fifteen males and 72 females were entered in the first herd book.

The RBST has maintained that the genetic makeup of the breed now includes significant amounts of Tamworth, Berkshire, Poland China, Gloucestershire Old Spots, or grade spotted pigs and should be considered a reconstructed breed. The Oxford Sandy and Black Pig Society respectfully disagrees. The RBST has remained helpful, and the society continues to research the breed's history. The population remains small, but the breeders are dedicated.

The Oxford Sandy and Black is a medium to large multipurpose pig for pork or bacon. These pigs remain excellent foragers and browsers for outdoor production. The breed is easy to handle, and the sows are good mothers of decent-sized litters. The pigs are light sandy to deeper rust in color, with black spots and lop or semi-lop ears. A white or pale blaze down the head, on the feet, and the tassel or tip of the tail are typical. The head is slightly dished and moderately long.

### *Ossabaw Island (pl. 58)*

The Ossabaw Island hog illustrates the potential value of a feral breed. Generally, feral animals are held in low regard, and their destructiveness to animal and plant life has been well documented, especially in island situations. Feral populations are often composed of a mixture of modern breeds and are often not especially

valuable or genetically important. Yet feral animals can develop unique biological adaptations or carry the pure genetic heritage of a historical or extinct breed. Of all the feral pig groups in the world, only two meet these criteria—the feral groups on an island in the Bay of Bengal and those on Ossabaw Island.

The earliest Spanish explorers carried pigs aboard their ships as provisioning and often left pigs on islands to survive and reproduce as a food source for future voyages. Later, explorers and missionaries established herds of pigs and other livestock in the New World. These pigs were so successful at adapting to the local conditions that by 1560, the Indian tribes in Florida were able to supply the French colonists with herds of pigs. These early pigs were probably the typical, unimproved village scavengers widely kept in Spain.

Ossabaw is a large, unspoiled barrier island off the coast of Savannah, Georgia. It is believed that the island's pigs have been feral for at least four hundred years and that they represent closely the original Spanish stock. During plantation days some domestic hogs were probably introduced, but it is believed that this impact was minimal. For many years the Ossabaw hogs were protected and isolated by the owners and the Ossabaw Island Foundation.

Ossabaw Island hogs come in a rainbow of colors and patterns, including black, gray, tan, red, and an occasional white. They are often multicolored or spotted. They have heavy, long, bristly hair coats, upright ears, long snouts, and long, straight tails. They are also small, weighing as little as 25 pounds and never more than 100 pounds even when pregnant. Their maximum height is about 20 inches. Harsh conditions, food availability, and even periods of starvation contribute to this size. When Ossabaws are raised off-island, they can grow much larger.

Ossabaw Island hogs run wild on the island and are not handled unless necessary. They are very self-reliant and intelligent. Some orphan or injured piglets are raised on the bottle and become somewhat tame. In spite of their size, Ossabaws are not suitable pets, and it is troubling that some pig enthusiasts have been promoting the breed as such. Although some promoters insist that their Ossabaw pigs have excellent tempera-

ments, researchers have recorded highly aggressive behavior in their study herds.

Although the word *unique* is often overused, DNA studies have proven that the Ossabaw is genetically unique. Ossabaw hogs feed heavily in the fall and winter, storing a far greater proportion of body fat than any other hog and most other mammals. During periods of semistarvation, the hogs use their unique fat-metabolizing enzyme systems to survive. This obesity is also linked to the presence of low-grade diabetes in the healthy hogs. These two remarkable traits are of great interest to researchers studying diabetes, growth hormones, and the synthesis, storage, and use of fat in obesity. Other studies have focused on the Ossabaw's reduced ovulation rates and kidneys, which tolerate very high salt levels.

The Ossabaw hog has been somewhat protected from natural disasters by the placing of breeding stock on the mainland at several farm museums, historical sites, zoos, and with a few individuals. But these hogs are in small groups and are not involved in a comprehensive and coordinated breeding program. Some may have been crossbred, and none remain in any university herds. After studying the Ossabaw for ten years, Pennsylvania State University disposed of its stock by sending the hogs to slaughter.

Concern is ongoing that the population on the island will grow too large and become overly destructive of the habitat. The hogs have affected the sites where Loggerhead turtles breed, although it may be possible to screen these sites from the pigs. To combat these concerns, the population has been reduced in the past. Now that much of the island is held in trust by the state of Georgia, rather than conducting a careful scientific evaluation of the population genetics before making necessary reductions in the herds, there have been proposals simply to issue hunting permits for this valuable and historical breed. The local press has printed much misinformation about the Ossabaw hogs, describing them as common Georgia feral pigs.

The Ossabaw Island hog is classified as critical. There are at most 150 to 200 Ossabaw hogs living off the island, all descended from 14 founder animals. There is a great need to introduce more island stock

into these captive populations, but some island pigs are now carrying or have been exposed to infectious diseases that prohibit any transfer to the mainland.

The population on the island is now lower than ever. While the numbers have been as high as 1,500, the group has been reduced to about 500 in the mid-1990s. Researcher Jack Mayer of the Westinghouse Savannah River Company believes that this unique population is in “clear and present danger” and that steps need to be taken immediately to protect this feral breed.



Critical

### *Guinea (pl. 59)*

The Guinea hog is neither a Guinea pig nor a potbelly pig. The Guinea is also wrongly called an African Pygmy or African Miniature. The Guinea is a true hog, not a dwarf or miniaturized pet breed.

The origin and history of the Guinea hog in the United States is confused because similar names have been used for very different breeds. The name Guinea itself was said to reflect the breed’s ancestry in the pigs from the Guinea coast of Africa, brought to the New World by slave traders. But true African Guinea hogs are a large, red breed with upright ears, bristly hair, and long tails. Once in America this hog, often called the Red Guinea, was probably interbred with other large red breeds and used in upgrading common hogs. This Guinea breed was well known by the beginning of the nineteenth century but today is extinct.

Hot and humid West Africa does have another very small, black breed known variously as the West African Dwarf, Nigerian Black, or Ashanti pig. This village scavenger weighs 55 to 100 pounds. This small pig may also have contributed African genetics to American hogs.

Today’s Guinea hog has also been linked to the Essex pig from Britain. The Essex was a popular black pig first imported to the United States from England in 1820. The Essex flourished for a century before falling out of favor in the United States. Another black breed was kept at Texas A&M University in the 1960s, the

remnants of a very small breed known as the Guinea Essex. These pigs may have been a cross between the Essex and the Guinea. Agricultural historians are continuing to research the Guinea hog’s history from these many possible sources.

Whatever the history, this small black pig was a common sight on homestead farms throughout the South. Sometimes they were called the Guinea Forest hog, the Gulf hog, or the Pineywoods Guinea. The word *Guinea* was also commonly used in the South to describe other small livestock such as cattle. There were undoubtedly different regional types or strains of the Guinea hog. These hogs produced both meat and lard for families on farms and were valued for their snake-killing abilities. With the falling prices for lard and the development of production pork operations, farmers could no longer keep small herds of grazing and foraging pigs as a profitable sideline. The Guinea hog fell into almost complete extinction.

The Guinea is a considerably smaller pig than the norm, ranging from a third to a half in size of a typical hog. This smaller size makes them extremely manageable for an individual farmer or family. More active and less lethargic, smaller pigs can also be cheaper and easier to keep. Turned loose in woods or harvested fields, they can find much of their own food. They can eat the wasted parts from other crops or even table scraps. Small pigs tolerate heat better, are healthier, require less housing and fencing, and are less likely to crush their piglets or injure their caretakers.

The Guinea hog is pure black and stands 15 to 20 inches tall. A hairy rather than bristly pig, the Guinea usually weighs 100 to 300 pounds. Today the Guinea Hog Association prefers the smaller pig and deems pigs over 200 pounds as unacceptable. The association does accept variance in bone structure and head size from smaller and light to heavier and broad. Feet and legs must be well formed. The tail must not be straight or kinked, but curled.

The Guinea is a very healthy, sturdy pig with nice large, pointed, upright ears. The Guinea also has a pleasant disposition, which is now contributing to its popularity with petting zoos and family farms. The

breed was also used in the development of the Minnesota Miniature pig.

There is still great value in the Guinea hog, whose size could nicely supply a family with pork products at small cost because Guineas are excellent foragers. In addition, the sows are very good mothers and do not require expensive farrowing systems. Sows generally produce 4 to 8 piglets. The Guinea is certainly an option for a diversified or sustainable farm because it is a hard little worker at rooting or tilling the soil.

As stated above, the Guinea hog is not a Potbellied pig, although it is sometimes mistaken for one. The Guinea has longer legs and a smoother body than the Potbellied, which has very short legs, a sway back, an exaggerated belly, and fatty, wrinkled skin. Unscrupulous or uneducated breeders have occasionally crossed the Guinea with the Potbellied; this results in a much larger pig than pet owners would desire and dilutes the Guinea genes. Although the pet market is partially responsible for saving this landrace breed, the Guinea Hog Association is now seeking to identify and maintain pure Guinea hogs.

The Guinea Hog Association, formed in 1991, is small. About 200 Guinea hogs are recognized in some 15 herds.



Critical

### *Poland China (pl. 60)*

This American breed is historically linked to the Shakers, a religious sect that originated in Great Britain. Among the Shakers' rich contributions to American life was their interest in excellent-quality livestock.

In 1774, a woman named Ann Lee emigrated to New York, establishing the first American Shaker colony in 1776. From that small beginning, Shaker communities flourished and spread. The Shaker colony of Union Village in Ohio's Miami Valley dates to 1805. This colony was very successful, producing almost everything its 600 members needed. In Philadelphia in 1816, Shaker trustee John Wallace purchased a boar and 3 sows known as Big China hogs. The Shakers

used these hogs to upgrade their common farm hogs in Union as well as the swine of the farmers in the surrounding valley.

The local farm hogs in Ohio included two breeds known as the Russia and the Byfield, both now extinct. Little is known of the Russia hog other than that it was white and very large. The lop-eared Byfield hog was a descendant of Old English, Chinese, and Bedford hogs. The Bedford, also now extinct, traced its ancestry back to pigs given by the duke of Bedford to George Washington. The combination of these stocks along with the Big China hogs led to the development of the Warren County hog, which was well known for its large size and its ability to travel to market on foot.

In the next thirty years the local hogs were infused with the Berkshire and another famous but now extinct breed, the Irish Grazer. Imported from its native Ireland, this hog lived up to its name—able to grow to a huge size by grazing and foraging. By 1846, the breeders of the Warren County hog began to concentrate on self-improvement and the development of their new breed, which was heavy, hardy and fat. The names Warren County, Big China, and Poland were all used to describe the breed until the standardization of the name in 1872 as Poland China (figs. 30, 31).

By the turn of the twentieth century, the Poland China had become one of the most popular breeds in the United States, but after the demand for lard fell, the Poland China's popularity diminished. The breed is now selecting toward a leaner and more modern-type pig. However, the American breed association is rightfully defensive against some fads in modern pig breeding, recognizing the value of proven genetic traits. The Poland China is today a large pig with short legs, full jowls, and lop ears. They generally carry the Berkshire coloration, black with white points.

The Poland China is rare in Canada, with perhaps 90 registered hogs, but unfortunately, they produce only a handful of offspring yearly. In the United States, following the breed's serious decline, the Poland China has regained some strength. In 1990, approximately 18,000 pigs were registered with the breed association. The breed deserves to be watched, however, because

[To view this image, refer to the print version of this title.]

Fig. 30 The Poland China enjoyed great popularity around the turn of the twentieth century. This pair was from Ohio in 1876. Courtesy of the IAB and Hans Peter Jorgensen.

these numbers represent less than a tenth of any of the three major breeds—Hampshire, Yorkshire, and Duroc.

 Rare

### *American Mulefoot (pl. 61)*

Syndactyl animals have a genetic mutation whereby two or more digits are fused. This mutation can occur in any animal and has been noted in pigs since ancient times. The American Mulefoot hog was a recognized breed of pig by 1908, when the National Mulefoot Hog Record Association was established. By 1910, the Mulefoot was a successful minor breed with 235 breeders raising hogs in twenty-two states. Two other Mulefoot registries were also organized. The Mulefoot

was exported to Canada, where it was not successful and no longer exists (fig. 32).

The origin of the Mulefoot has not been unraveled. One theory suggests that imported Berkshire pigs were crossed on the razorbacks of Arkansas, which probably had Spanish origins. Mulefoot pigs do seem to share significant traits with southern homestead breeds such as the Choctaw hog, and the two landrace breeds most likely had common ancestors. The Mulefoot hog was already recorded in the southern states by the Civil War.

The breed standard at the turn of the twentieth century described a medium-sized, black pig with flop ears, white points, soft hair, and hooflike feet. The Mulefoot supplied both lard and tender meat. It was a self-reliant pig, able to forage for food and survive outdoors very well. Mulefoot hogs were fast growing, and the sows were excellent mothers. The breed was known to be extremely hardy and disease resistant.

Although the Mulefoot association failed as the breed's popularity dwindled, a former director, R. M. Holliday, continued to preserve his herd for forty years

[To view this image, refer to the print version of this title.]

in Missouri. The ALBC believes that this herd stock is the most direct link to the original recognized breed. Holliday himself felt that the name Mulefoot had hurt the breed, implying a mutant instead of a healthy animal. Eventually, he was able to establish small herds with individuals interested in preserving this breed. In 1993, Mark A. Fields of Iowa began purchasing breeding stock from Holliday and reactivating the National Mulefoot Hog registry. Fields, who also serves as the president of the Dominique Club of America, and Kent Whealey, of the Seed Savers Exchange, have organized satellite breeders. The National Mulefoot Hog Association has also been reinvigorated. Although the American Mulefoot population remains below 200 animals, these pigs are now in a secure situation that holds the best hope for their survival. The ALBC has encouraged this effort and hopes to conduct research on the breed's genetic makeup.

The medium-sized Mulefoot remains a hardy, healthy, vital pig that provides a succulent, flavorful meat. Mulefoots weigh 400 to 600 pounds. They have good, heavy bones and tolerate both cold and heat ex-

Fig. 31 This prize Poland China boar named Tecumseh hailed from Iowa in 1897. Courtesy of the IAB and Hans Peter Jorgensen.

tremely well. The Mulefoot is well suited to outdoor production but does not produce a commercial carcass due to its fat content. The sows are good mothers and heavy milkers to their good-sized litters. As opposed to the historic type, the ears now appear to prick forward, white points are uncommon, and neck wattles are occasionally present.

Dr. I. Lehr Brisbin of the Savannah River Ecology Lab has identified another group of unrelated mulefooted hogs known as the Manatee River Mulefoot hog. These feral hogs are found along the Gulf Coast in south-central Florida, curiously strung out along the route of the Spanish explorer Hernando de Soto. They have also been raised locally for about forty years.

The Manatee River Mulefoots are small to medium-sized pigs, with soft, curly hair, erect ears, and wattles. They are generally red with black markings but also multicolored blond, white, red, and black. These pigs

[To view this image, refer to the print version of this title.]

Fig. 32 A close-up of the foot on an American Mulefoot hog.  
Courtesy IAB.

all have a reddish blond stripe down the face and are born with faint horizontal stripes of the same color on their bodies that generally fade away with maturity.



Critical



Rare

### *Red Wattle (pl. 62)*

In the early years of the twentieth century, large collective herds of semiwild wattle hogs ran in the forested hills of east Texas. These wattle hogs were known locally as woods hogs, and they were identified by the ear marks owners placed on their pigs. When the herds needed routine care or were ready for market, they were rounded up from horseback with the assistance of trained dogs. The market-ready hogs were placed in corrals alongside the river to await the barges that would carry them to the railroads for shipping to the great slaughterhouses of Chicago.

The woods or wattle hog is thought to have made its way to Texas through Louisiana, where the French colonists kept a wattle pig as a favored meat breed. It

has been suggested that the French brought these hogs to New Orleans from New Caledonia. Texas was also the home of Spanish pig stock that also carries the traits for wattles.

The theory that wattle hogs were obtained by the French in New Caledonia has some merit. New Caledonia is a French territory off the eastern coast of Australia. Lying southward is New Zealand, where the unusual Kunekune pigs do slightly resemble the Red Wattle hog. Kunekune pigs come in many colors, have similar erect ears and wattles, but they also have a dished face and an Asian appearance. Kunekune means fat and round in Maori.

Other pig breeds also have wattles, which are controlled by a single gene. In Britain the original Gloucestershire pig and an extinct breed called the Irish Greyhound also carried wattles. There are also some Chinese pigs with wattles. Without DNA testing, the genetic history of the Red Wattle will probably not be unraveled.

When the forested areas of Texas came under the control of lumber companies, bounties were placed on the hogs to eliminate the damage they caused to the trees by their rooting. Some of these hogs were kept by local farmers into the 1970s and 1980s. A few individual breeders began to make an effort to preserve and breed these unusual hogs. Harry Wengler of Texas assembled a herd of wattle hogs and served as the source for several other breeders, mainly in Texas and Iowa. The breed became known as the Red Wattle hog, and records were kept by a variety of small registries. Red Wattle hogs were also kept elsewhere in the South, Midwest, and into Canada.

The Red Wattle hog is now comparable in size to the major breeds. Although generally red in color, black markings are also observed. Some individuals are mostly black with red markings. The head is lean, with a straight snout and erect or slightly drooping ears. The essential identifying features are the wattles, which hang from the lower jaw and neckline. Most hogs have two wattles from 1 to 5 inches in length. Each wattle is about thumb-size in diameter and contains cartilage. Occasionally pigs are born with one or no wattles (fig. 33).

[To view this image, refer to the print version of this title.]

Fig. 33 A six-week-old Red Wattle piglet. Courtesy of Kurt A. Buschbeck.

Red Wattle hogs are also known for their calmness and ease of handling. They are extremely hardy and grow well on grazing. The breed is especially noted for its natural leanness and high-quality meat. Wattle meat is said to have a unique taste, sometimes described as a cross between pork and beef. The Red Wattle is being used to supply boars for small crossbreeding programs on local farms. The meat is also sold as a specialty product.

There are a handful of breeders in the United States and Canada. Approximately 200 offspring are registered annually in the United States and fewer than 100 in Canada, although they once existed in much larger numbers. Some records have been continued by a variety of small registries. The ALBC believes that further research is needed to document the breed and establish breed definitions and standards.



Critical

### *Choctaw (pl. 63)*

The Choctaw hog's origins lie in the pigs brought to the New World by the Spaniards. The Choctaw Indians of the Mississippi region owned this type of pig before they and the other peoples who made up the Five Civilized Tribes were forcibly relocated to Indian Territory in Oklahoma in the early 1800s. Once in Oklahoma, the Choctaw hog was generally raised as a free-foraging pig and was later adopted by American settlers. Farmers

kept Choctaw hogs into the twentieth century, and the pigs are still found in southeastern Oklahoma.

Choctaw hogs are small to medium in size, averaging about 120 pounds. They can have erect or semierect ears, wattles, and mulefooted feet. They are generally black, but white markings are sometimes found on the ears, wattles, and feet. The Choctaw is an active, long-legged pig able to range widely for forage.

Choctaw hogs are extremely rare but can be seen at the historic Overstreet-Kerr Farm in Keota, Oklahoma. This farm was established in 1871 by Tom Overstreet and his wife, Margaret, who was a member of the Choctaw Tribe. Following Margaret Overstreet's death thirteen years later, Tom Overstreet married Elizabeth Krebbs, who was also of Choctaw ancestry. The family maintained the farm until 1981, when it was given to the Kerr Center for Sustainable Agriculture to be operated as a historic site. Today the farm demonstrates Choctaw and American life and agriculture as practiced in the late nineteenth and early twentieth centuries.

The ALBC estimates the Choctaw population at a few hundred, mainly in southeastern Oklahoma. The Choctaw hog lacks commercial viability at this time, but the breed represents an original Spanish population uncontaminated by crossing with other homestead breeds or feral pigs.



Study

### *Hereford (pl. 64)*

Hereford enthusiasts believe that they are raising the "world's most attractive swine." The Hereford is indeed an attractive hog, colored light to dark red with a white face, white socks, and often a white belly. The Hereford is a medium-sized to large hog with drooping ears and a curled tail. Its face is wide between the eyes and slightly dishd. Modern Herefords are lean, meat-type hogs that mature early to a good market weight and conformation. Market hogs weigh 200 to 250 pounds at five or six months. Docile and quiet, the sows are prolific and good mothers.

Early Hereford breeders set out to create hogs with the red and white markings of Hereford cattle. The

Hereford registry was opened in 1934 from the foundation stock of several breeders in Nebraska and Iowa. Beginning in 1920, several of these men had used Poland China and Duroc hogs to develop a new breed with specific characteristics including great hardiness outdoors. This old-fashioned Hereford was basically a lard hog. From a foundation stock of 100 pigs, the association rapidly grew to 450 members who were found mainly in Illinois, Indiana, and Iowa. Hereford cattlemen were especially attracted to the breed, and they initially sponsored the National Hereford Hog Record Association. The Hereford's popularity grew in the 1930s and 1940s but began to decline with the onset of the production pork industry and the demand for leaner meat.

The ALBC believes the population now numbers about 2,000, with approximately 884 Herefords registered in 1999. The breed association also believes that many additional hogs are not registered but are raised directly for market. Hereford hog raising is centered in the Midwest in Illinois and Nebraska but is also found in neighboring South Dakota, Wisconsin, Missouri, Indiana, and Iowa. A few herds are located elsewhere in the United States. Although the Hereford is relatively unknown, the modern breed compares very favorably with other commercial hog breeds. Its color and hardiness could also be valuable in outdoor production.



Critical

### *Feral Hogs and Wild Boars*

Subjected to overhunting and deforestation from encroaching agriculture, the Wild boar has been extinct in Great Britain since the seventeenth century. Across the English Channel in France, however, the numbers of Wild boar, or *sanglier*, are rising rapidly and becoming a serious concern for farmers and truffle hunters. When the wild population fell due to overhunting in the late 1980s, domestic sows were released in the forests to interbreed. The results have been disastrous. Whereas the true sanglier gives birth only once a year to about 3 piglets, the ferals reproduce twice a year and give birth

to some 20 piglets. The National Hunting Office now estimates the total population of sangliers and hybrid ferals at about 700,000.

In North America, most "wild" pigs today are the descendants of domestic pigs gone feral. Survival favors those pigs who exhibit wilder forms—long legged, rangy, well snouted, darker colored or striped. Feral pigs interbreed with different domestic breeds and true wild pigs, resulting in varying colors. Feral pigs have been recorded in sixteen states and number about 2 million.

An estimated 1 million feral pigs in central and southern Florida are hunted extensively with little effect on their numbers. These pigs are mainly the descendants of the Spanish colonizers. Their numbers are so large that they cause destruction in farm fields, possibly spread disease, contribute to traffic accidents, and compete with endangered native species for food.

True Wild boars from the Russian Ural Mountains were imported to Tennessee in the early 1900s. These wild pigs were released to establish game animals for hunting. Later, more wild pigs were released in North Carolina, on some coastal islands off Georgia, and in Texas, California, and a private hunting preserve in New Hampshire. These wild pigs and their feral crosses are still found in some areas, including Great Smoky Mountains National Park in Tennessee. Wild boars also occasionally escape from game ranches in many other states.

The original fat, little Polynesian pig of Hawaii ran loose until it was needed as food but the contemporary Hawaiian feral pig looks more like a typical wild boar in Tennessee or California—a mix of European Wild boar and domestic feral pigs. Imported boars have been released on some islands to improve the game quality of the hogs because they are widely hunted and eaten. Feral pigs are found on Hawaii, Oahu, Maui, Kauai, Molokai, and Niihau. The pigs are studied and managed in an attempt to balance ecological damage, crop damage, and the demands by Hawaiians to continue hunting and eating pig. Piglets are usually black but often show reddish striping. Adults are also usually black with occasional white-colored feet or spots.

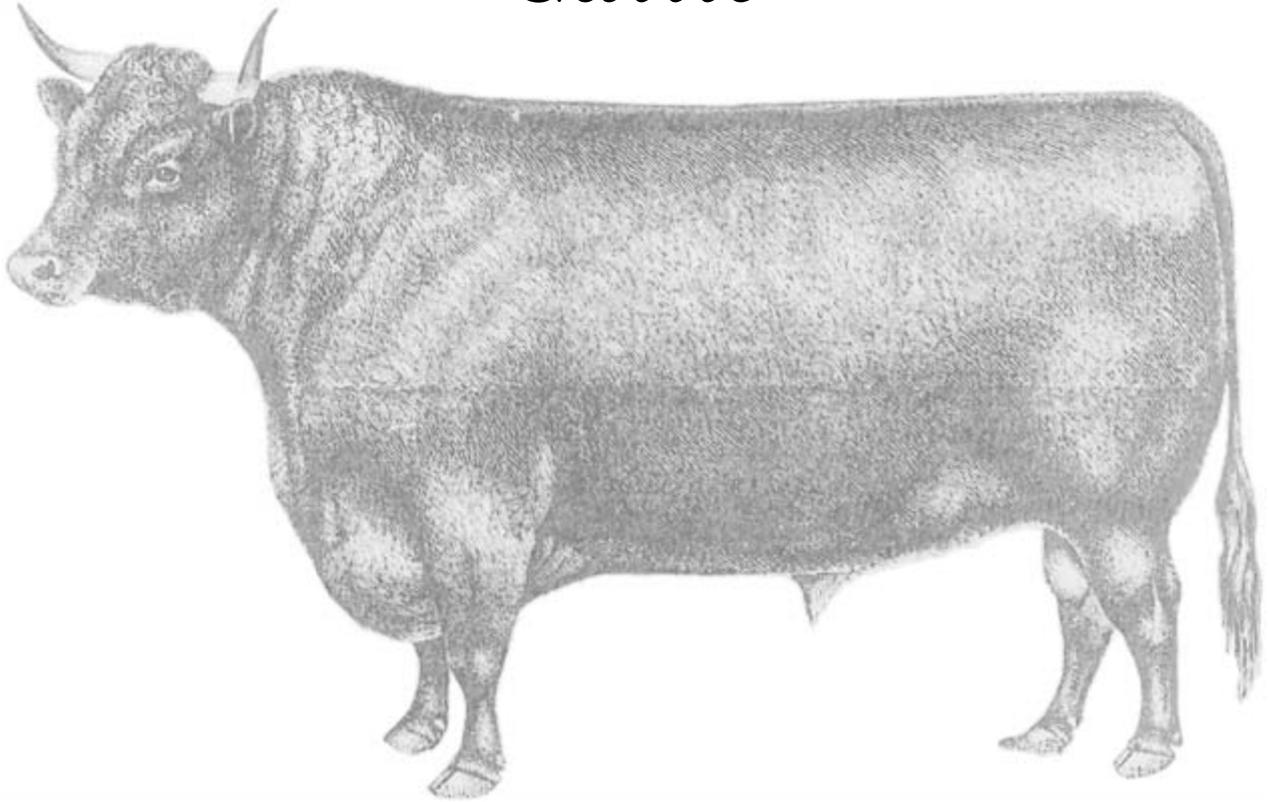
Because feral pigs are highly prolific and lack preda-

tors in many situations, their populations can explode. Feral pigs have caused great ecological damage in many areas, even contributing to the extinction of native species of plants and animals. Yet feral pigs should be studied carefully before any extermination efforts are undertaken. Feral populations often contain a genetic

pool of hardiness, other important characteristics, or unique traits. Public opposition has grown against the snaring programs used by some conservation groups to eliminate feral pigs in threatened environments such as Hawaii.

CHAPTER SIX

# *Cattle*



A tender, timid maid! Who knew not how

To pass a pig-sty, or face a cow.

—George Crabbe, *The Widow's Tale*, 1817

## Natural History

The bovines (order Artiodactyla, family Bovidae) are descended from a large cattlelike antelope named *Leptobos* that was somewhat similar to today's wildebeests and elands. With horns that grew forward, *Leptobos* looked much like a lightly built ox and was a transitional animal between antelopes and cattle. The Aurochs, the Bison, and the Water buffalo of Asia can all trace their lineage to *Leptobos* and its Pliocene relatives. African buffaloes appear to be more distantly related.

The bovine subfamily includes the bison, *Bos* or cattle, water buffaloes, the African buffalo, the Nigali, and some interesting antelopes. Because cattle are closely related to the buffaloes and bison, interbreeding is possible. There are five species of *Bos*: *Bos taurus* (which includes both the humped and humpless cattle and *Bos primigenius*, the extinct wild ancestor), the Banteng, the Gaur, the Kouprey, and the Yak. In Asia, most of these species have been domesticated and their still-wild counterparts are endangered.

The endangered wild Banteng (*Bos javanicus*) lives in herds of a few males with 30 to 40 females and is still found in remote areas from mainland Burma to Indonesia. In Indonesia, domesticated Banteng, known as Bali cattle, weigh just 650 pounds and are used as agile draft animals. The lightly horned Banteng is also raised for its meat. The males are black, the females golden brown. Both wear white-colored inner ears, rumps, and high socks and perpetually quizzical expressions. Bali cattle are highly adapted to heat and humidity, and for that reason small numbers have been exported to Hawaii and Texas, where crossbreeding experiments have occurred. In Australia, Bali cattle now run feral.

The Gaur (*Bos frontalis*) is the most massive of the wild cattle, weighing up to 2,500 pounds. It was once found throughout India, Southeast Asia, and the Malay Peninsula but is now found mainly in isolated forests, bamboo jungles, and tall grassy areas. The Gaur has large, upturned, heavy horns and a long tail. The heavily humped bulls are black, while the cows are

reddish brown and the calves are golden. With light-colored socks, foreheads, and horns, the Gaur is striking in appearance.

The domesticated Gaur is smaller and known variously as the Mithan, Gayal, Bami, Menscha, and Dulong. Besides the wild Gaur color pattern, some Mithans are lighter in color, piebald, white, or even panda patterned. The Mithan is used as a draft and meat animal but serves mainly as a symbol of wealth and is used for ritual purposes. Mithans are owned by hill tribes in northeastern India, Burma, Nagaland, and northern Yunnan in China near Burma. They are crossbred with cattle to create hybrid draft and milk animals.

Perhaps the rarest of the wild cattle is the Kouprey (*Bos sauveli*), also known as the Cambodian Wild or Forest ox. The Kouprey is Cambodia's national animal, but after years of war it may now be extinct. Before the troubles, fewer than 200 animals were believed to exist in scattered areas of Vietnam, Laos, and Cambodia. Unfortunately, the Kouprey is not found in zoos. The black Kouprey bull is tall, with huge, widespread horns up to 32 inches long. The cows are smaller and colored light brown or gray with unique corkscrew, lyre-shaped horns. Both males and females have white socks and are thin and long-legged with a large dewlap. The shy and nervous Kouprey was unknown to science until 1937, and it remains uncertain whether the Kouprey was genuinely wild or a previously domesticated animal that had become feral.

The endangered wild Yak (*Bos grunniens mutus*) was named for its distinctive silence, which is broken only by a grunting sound usually heard only during mating. Once found over much of the Himalayas, the Yak has retreated to the high, cold Tibetan tundra at altitudes of up to 20,000 feet. Although the Yak is protected by the Chinese and Indian governments, hunting persists and has reduced the population to a few hundred animals.

Living in small groups of cows and calves, Yaks forage on grasses, herbs, and lichens. The Yak has a high red blood-cell level to help it deal with the low oxygen of its high-altitude habitat, and although it is short-legged, it is an agile climber. With a long back, high

withers, and humped shoulders, wild male Yaks weigh from 1,500 pounds to a ton or more and stand about 6 feet tall. Females are smaller. The Yak's heavy head carries large horns that curve out and up, with a large diameter at the base and a length of about 36 inches. The Yak is slow to mature and often not fully grown until its eighth year.

The wild Yak is colored dark brown with a woolly undercoat. The long outer hair can grow up to 2 feet in length, especially on the chest, underline, flanks, and the thick, horselike tail. There are black accents on the fringes and tail. The dorsal stripe is colored silver-gray, as is the muzzle.

The Yak was probably domesticated in Tibet about seven to eight thousand years ago, and it remains an important cultural animal in its homeland. Domesticated yaks now number about 12 million, found mainly in China and Tibet but also in the surrounding region. The domestic Yak is noticeably smaller than its wild ancestor and is found in many colors and patterns, including white, silver, shades of brown, black, red, piebald, or spotted. The horns are smaller, and some Yaks are polled. There are also different geographical or regional types.

The domestic Yak is a valuable animal for draft work, pack, and even riding. Yaks are slow but steady walkers, sure-footed and able to carry about 300 pounds. Cows supply a milk with 8 percent butterfat. Yak butter is used as fuel for lamps and to flavor tea. Yaks are also bled and supply a dark, tough meat with a yellow fat. The dung, hair, wool, and hides are all used. Their wool is often felted, and their white hair is sold to make false beards and wigs.

Yakows are the common cross or hybrid between the Yak and the Zebu or the local yellow cattle. The males are sterile, but the females are fertile and have many advantages over pure Yaks in lower altitudes, including doubled milk yield, faster maturity, increased hardiness, and docility.

Domestic Yaks were exported to Europe in 1854 and later to Scotland. Yaks were imported to the United States in 1909 and to Canada nine years later, but both failed as a commercial venture. In recent years, Yaks have again been introduced as an exotic animal of inter-

est to fiber artists. Numbering almost 1,000, Yaks are found in Canada, Alaska, and the mainland United States. Experimental crossings have been made with domestic cattle and even the American Bison. The Yacmac was a cross between Yak cows and a Highland bull.

Bison were once distributed throughout Eurasia. Early cave art depicts a very uniform animal almost identical to the modern Bison. Colored in black, these Bison have a thick and bushy mane, a beard, and small horns. It is believed that Bison migrated to North America across the ice or land bridge from Asia during the Ice Age. European and American Bison remain completely interfertile.

Living in small herds, the Old World bison or Wisent (*Bison bonasus*) once roamed forested lands from Europe to the Caucasus and southern Ural mountain ranges. There were two subspecies—the smaller Caucasian or mountain subspecies and the wood, lowland, or Białoweiza bison, which had a larger range. The subspecies were distinguished by small differences in the head and horns.

Loss of habitat and hunting pressures led to the extinction of Wisent in Britain and France by the early Middle Ages. By the 1800s, wild Bison were to be found in only two areas—the Caucasian group, which was eventually exterminated in 1927, and the Białoweiza Forest group in Poland and Lithuania, which numbered fewer than 2,000. Fortunately, gifts of Wisent were made to zoos and other individuals. After the habitat destruction of World War I, the only pure Wisents remained in these private herds, and they numbered as low as 34 animals.

An international society was formed to protect the Wisent in 1932. By the 1960s, their population had increased to about 200. Remarkably, their numbers have now risen to almost 3,000. About 1,400 were reintroduced into the Białoweiza Forest in 1956, where they live in semiwild conditions. The remainder is found in zoos, wildlife parks, and reserves in Russia, Poland, Europe, and North America.

Wisent live in large herds in the winter and spring, splitting into smaller groups led by an older cow during mating season. Wisent will live into their mid-twenties. They are lighter in build with a smaller hump and

longer legs than the American bison. The calves and adults are brown with a long mantle of hair on the head, shoulders, and front legs. Wisent can grow about 6.5 feet tall and 10.5 feet long, and they can weigh more than a ton. The forequarters are more developed than the hindquarters. The Wisent's horns are larger than those of its North American cousin.

By the late Pleistocene, several kinds of bison, both long- and short-horned, had evolved in North America. *Bison latifrons* had a horn spread of more than 72 inches. The Paleo-Indian culture of the Bison Hunters pursued this bison, which became extinct about five thousand years ago.

When the New World was discovered, American bison (*Bison bison*) probably existed in large numbers of 60 to 75 million. Bison were common in the eastern forests from Pennsylvania to Georgia through the Great Plains into the Rocky Mountains and north into Canada and south into Mexico. The subspecies known as the Plains "buffalo" (*Bison bison bison*) was more common than the subspecies known as the Woodland or Wood bison (*Bison bison athabascae*) of the Canadian Northwest Territories. Confusingly, the Bison was and still is commonly called the Buffalo, although it is only distantly related to Asian or African buffaloes.

Native Americans hunted the Bison and used every part—meat, hides, bones, and horns. The Bison played an important role in the religious and cultural life of many tribes, who often followed the migrating herds or traveled to places where they would pass. Before the Spanish introduced the horse, the Bison was hunted on foot. Quiet hunters were able to approach the herd and shoot a few individuals with their arrows. Elsewhere, hunters would lure a large herd down man-made lanes and then frighten them into a stampede over a gentle rise that disguised a steep cliff known as a buffalo jump. The largest and best-preserved buffalo jump is found in Alberta, Canada. Head-Smashed-In Buffalo Jump reveals a boneyard of tens of thousands of skeletons.

The bison moved northward in small herds in the spring. The males and females came together in the summer to mate, with the bulls fighting by charging with their massive heads. The Bison returned south-

ward in the fall in great herds. The migrating Bison followed a roughly circular path of up to 400 miles. When moving southward the Bison sometimes walked single file wearing down their trails as much as 3 feet deep. Migrating Bison created these long-used paths known as buffalo roads or traces, which the American colonists later used. One famous trace led the settlers through the Cumberland Gap in the Appalachian Mountains. The New York Central Railway followed another buffalo trace into northern Ohio.

Between 1650 and 1750, the horses introduced by the Spanish spread to the Great Plains and were adopted by many tribes. The Plains tribes gave up their permanent villages to follow the great herds. Trained buffalo horses allowed the hunters to charge the Bison and kill several animals on a run. The numbers of animals that were killed increased even more after the hunters acquired guns.

By 1820, Bison were mostly gone east of the Mississippi River. Although ranches and farms disrupted the migration routes of the Bison on the Plains, it was the railroad that allowed hunters into the vast ranges of the West, where they shot the herds, often taking only the tongues, hump meat, or hides. The U.S. government encouraged hunting because it eliminated the Plains Indians' main source of food. The Euro-American settlers also brought about 4 million cattle with them out west. Some scientists believe that diseases such as brucellosis were carried with these cattle, which then infected the herds of Bison, American elk, and Pronghorn.

Around the turn of the twentieth century, approximately 300 to 1,000 American bison still roamed in the wild, mostly in Canada. In 1894, President Grover Cleveland signed the Buffalo Protection Act, one of the first official recognitions of an endangered species. Buffalo hunting was made illegal in Yellowstone National Park, where some wild Bison still existed. The private American Bison Society was also established to protect and promote the Bison. These official actions and private efforts saved the American bison from extinction. Additional reserves for Bison were established in both the United States and Canada. At one point, Bison from the Bronx Zoo were sent to the West.

By 1935, the Bison herd had increased to about 20,000. Today there are more than 250,000 Bison in North America in parklands, reserves, zoos, and private ranches. Just 77 bison from 5 herds are believed to be the ancestors of most of today's Bison, and most of these animals were descended from the Plains bison. The larger and darker Canadian Woodland bison have mostly become crossbred with the Plains bison, and they are nearly extinct as a separate type.

Although slightly shorter than the Wisent, the American bison is heavier, weighing up to 2,800 pounds, though the cows are significantly smaller than the bulls. American bison have a larger hump, which is supported by long spinal vertebrae, and longer hair on the head and mantle. The massive, shaggy head serves as insulation against the winter wind and driving snow as the Bison stand facing into blizzards. They also use their heads to brush snow aside to find grass in winter. In the summer, Bison shed their winter hair and wallow in mud for protection against biting insects. Their horns are short and black, curving outward and upward. Bison are extremely agile, fast, and strong. Aided by their excellent senses of smell and vision, Bison are extremely protective of their calves and their territory. Calves are born red or cinnamon colored, turning brown after a few months. Very rarely, Bison are born pied, black, or white, considered a sacred color by Plains Indians. Bison can live as long as thirty to forty-five years of age.

In Yellowstone Park's 2.2 million acres, the Bison herds usually number about 3,500, all descended from the original 21 animals that had survived the years of hunting. The harsh winter of 1996-97 contributed to the loss of 2,000 or more Bison. Although hunting has controlled the Yellowstone population in the past, the Intertribal Bison Coalition intends to restore Bison herds to Indian reservation lands using surplus animals. The Nature Conservancy also maintains Bison that it introduced in 1993 on its 37,000-acre Tallgrass Prairie Preserve in northern Oklahoma, where individuals and groups can adopt a buffalo. Ted Turner, founder of Cable News Network, is the largest private owner of Bison, which roam historic ranges on his large ranches in Montana and New Mexico. Some experts

advocate the use of Bison to rejuvenate agriculture on the Plains. The Bison's natural behavior of staying on the move helps prevent overgrazing or trampling of small streams and watering holes.

More North American ranchers are raising Bison as a profitable enterprise. About 11,000 to 15,000 buffalo are now slaughtered commercially each year. However, there is still no such animal as a domesticated Bison. Ranchers will confirm this as they carefully handle or move these large animals, which can outrun and outmaneuver horses. Bison are not castrated but are vaccinated and ear-tagged in specially reinforced and designed squeeze chutes, corrals, and fences. The cows receive no help in birthing their calves. Bison need far less hay than cattle on the same winter pasture because they can slow down their metabolism to require less food.

Bison are marketed at about two years of age at weights of about 1,250 pounds. The meat is sold as an exotic or gourmet product for a premium price. Bison meat has one-third more protein and less fat and cholesterol than chicken breast. It tastes similar to beef with a little sweeter or wilder flavor. Ranchers also sell breeding stock at good prices.

Bison herds face two challenges today. One is that Bison ranchers are tending to breed toward a uniformity not present in nature. Culling for certain characteristics will reduce genetic variety. The disease brucellosis is the other problem. Some of the Bison in Yellowstone National Park are infected with this non-fatal disease, which causes females to abort their young. Although there is no documented case of brucellosis transmitted from Bison to cattle, these Bison and the region's 10,000 elk are one of the last sources of infection in the United States. In order to eliminate brucellosis from the park herds, all of the Bison would have to be caught and tested, with infected animals sent to slaughter.

It has become easier for the Bison to wander out of Yellowstone because the roads are groomed for snowmobile recreation in the winter and the Bison simply follow the roads out of the park. In hard winters Bison will also leave the park in search of forage. The practice of shooting Bison found outside the park as

a disease preventative has met with public outrage. In the winter of 1996–97, more than half of the park herd was slaughtered for this reason. Beef ranchers in surrounding Montana, Idaho, and Wyoming are legitimately concerned about brucellosis, yet there remains no easy answer to this problem.

Bison have been used to create the Beefalo, which is considered an American cattle breed. Earlier experimental crossings in Canada resulted in the Cattalo, but the breeding project was abandoned in the early 1960s. Beefalo are defined as three-eighths Bison and five-eighths bovine and can be based on any recognized cattle breed. The Beefalo association registers about 3,000 head yearly and promotes them as a leaner, low-cholesterol meat. The hybrid Beefalo is hardy, but the Bison-bovine cross is sometimes hard to achieve, often resulting in infertile animals in the early crosses. The Beefalo does not appear Bison-like, although it can be woollier than most cattle.

There are two species of true Buffalo, Asian and African. The African buffalo (*Syncerus caffer*) is found throughout sub-Saharan Africa but has never been domesticated. The horns of the African buffalo meet at the base, where a helmetlike shield covers the forehead. The large, distinctive horns vary as to shape and size even in the same herd but usually spread out laterally and then curve upward. The cattle disease rinderpest has seriously affected Buffalo numbers. Today they are scattered and have been steadily decreasing.

The African buffalo vary according to habitat from the small Dwarf, Red, or Forest buffalo to the large Cape or Black buffalo. The Forest buffalo is found mainly in the marshy forests of western Africa, living in large herds of up to 1,000. Also called the Bush cow, this buffalo is only about 43 inches tall and weighs about 440 pounds. At the other end of the spectrum is the Cape buffalo, which once lived throughout Central, East, and southern Africa but has been greatly reduced—and nearly exterminated in South Africa—because of hunting and diseases. The brownish black Cape buffalo stands about 60 inches tall and weighs about 1,750 pounds. Although hunters have labeled the Cape buffalo as a very dangerous animal, it is actually a peaceful grazer unless attacked or frightened.

The Asian buffalo (*Bubalus*) is divided into five species, including the very rare Tamarao, the tiny, endangered Anoa, the Mountain anoa, the Water buffalo, and the extinct Short-horned water buffalo. The Tamarao (*Bubalus mindorensis*), which is found only on the Philippine island of Mindoro, stands just 39 inches tall and weighs about 660 pounds. Like its close relative the Anoa, the Tamarao is a dark-colored, shy animal. In the 1970s, only a few hundred animals were believed to survive. Less is known of the Anoa, or wild Dwarf buffalo (*Anoa depressicornis*), which is found on the Indonesian island of Sulawesi. The Anoa can be even smaller and somewhat resembles a goat. The endangered Mountain anoa (*Bubalus quarlesi*) is found only in the mountain district of Sulawesi.

Wild Water buffalo (*Bubalus bubalis*) may once have been found from Mesopotamia into most of southern and southeastern Asia. Wild herds may still be found in Nepal, India, Borneo, and Indochina. Standing almost 6 feet tall and weighing up to a ton, wild Water buffalo carry massive horns spanning almost 84 inches and sweeping back in a curve. Its triangular-shaped and heavily ribbed horn cores are a distinguishing feature. The wild Water buffalo is black with lighter-colored legs and a white marking under the jaw. Living in herds on grass or shrub land, these buffaloes are found mainly in protected reserves, where they need to cool themselves daily in mud or water because they have few sweat glands.

The Water buffalo was domesticated at least four or five thousand years ago. Many depictions of Water buffalo have been found dating to that period in the Indus Valley, where they may have held religious significance for the valley's people. River cultures found the Water buffalo valuable for its widespread feet, flexible joints, strength, and docile nature—all of which suited its work in muddy rice paddies. Many breeds of Water buffalo have evolved between the two general types: the Swamp buffalo of Southeast Asia and the River buffalo of India and Europe. The Swamp buffalo is a draft animal and most closely resembles its wild ancestor. The River buffalo also works as a draft animal but is especially valued for dairy production. Water buffalo remain important in agriculture, and the popula-

type Water buffalo has been developed called the Buf-falypso, which has also been imported into the United States. A large herd of feral Water buffalo in the Northern Territory of Australia is used for meat production and has been studied extensively.

## Domestication

[To view this image, refer to the print version of this title.]

Fig. 34 A five-year-old Water buffalo cow with Chris Braet of Springhill Farm Water Buffalo in Sheriden, Oregon. Courtesy Chris Braet.

tion numbers over 100 million working animals, found mainly in China, India, and Southeast Asia.

The domesticated Water buffalo gradually moved westward into Egypt, Turkey, the Balkans, and then into Italy and Greece by the twelfth or thirteenth century. Mainly of the River type, Water buffaloes in Europe were used for draft and meat but were more successful as dairy producers. European buffalo milk contains 7 to 8 percent butterfat, with annual yields up to 7,700 pounds, but higher fat levels and yields are found in India. In Italy, Water buffalo milk is still used for mozzarella and ricotta cheese production, despite Benito Mussolini's attacks on the Water buffalo as a symbol of primitivism and his attempts to eliminate buffalo from Italy.

Water buffaloes have been exported to countries in Central Africa, Latin America, and the Caribbean, as well as the United States (fig. 34). On Trinidad, a beef-

The Aurochs (*Bos primigenius*) was the direct ancestor of domesticated cattle. This large black ox evolved in Asia, but by the late Pleistocene, Aurochs were present in much of Asia, northern Africa, and most of Europe, though not in Ireland or the far north. Cave paintings and engravings show bulls that are much larger than their cows, which look as elegant as a modern heifer. The Aurochs are shown as active animals, and there is some variety in coat colors. At Lascaux, a bull and cow have a white stripe on their shoulders and another has a dark-colored head. The Chauvet-Pont d'Arc cave, discovered in 1994, contains artwork estimated to be about thirty thousand years old, nearly twice as old as Lascaux. Here some of the heads of the Aurochs are dramatic and darkly shaded with distinct facial features. Other Aurochs are outlined. The heads and horns of these Aurochs look much like the engravings at Lascaux and Ebbou, also in France. The horns are large and grow out and forward then upward, almost S-shaped. The massive necks show strong muscles and high withers.

Varying only in size and horn shape, two or three races of Aurochs developed in the Old World—European (*Bos primigenius primigenius*), North African (*Bos primigenius opisthonomus*), and Asian (*Bos primigenius nomadicus*). It is believed that the Aurochs of northern Europe were larger in size and possibly woollier in winter. The bulls were often deep brown to nearly black, sometimes with a light saddle patch, light-colored dorsal stripes, and a muzzle ring. Curly pale hair grew between the horns on the head. The smaller cows and their calves were often red to reddish brown. The slow-maturing Aurochs was long-legged with a small udder. Weighing 1,500 to 2,000 pounds, the Aurochs stood 5 or 6 feet tall at the shoulder and was 8.5 to

*cattle* From Old French *catel*, personal property, from Latin *capitale*, property  
*cow* From Middle English *cou*, from Old English *cu*, female cattle; *cy*, the plural of *cu*, evolved into *kyn*, then *kine*, which was widely used to denote livestock  
*bull* From Middle English *bule*, from Old English *bula* or *bullā* and Old Norse *boli*  
*bullock* From Middle English *bullok*, from Old English *bulluc*, the diminutive for bull  
*bovine* From Latin *bos*, ox; *bossy* is an informal word for cow  
*beef* From Old French *boef*, Latin *bos*, ox  
*steer* From Old English *steor*, young ox  
*calf* From Old English *cealf*, young cow  
*heifer* From Old English *heahfore*, a young cow that has not yet given birth  
*veal* From Middle English and Old French *veel*, from Latin *vitulus* or *vitellus*, small calf  
*ox* From Old English *oxa*  
*milk* From Old English *milc*

10 feet long. Skulls found in Britain measure 3 feet long, with an equal distance between the horn cores. Recovered horns have been measured at 120 to 132 inches long from tip to tip. The Aurochs browsed and grazed mainly in forest. Once believed to be a separate race of Aurochs, the smaller *Bos longifrons*, or Celtic ox, is now thought to be a European Aurochs variety and possible Neolithic domestic animal.

DNA studies have revealed that the taurine type (*Bos primigenius taurus*) of humpless cattle and the Zebu type (*Bos primigenius indicus*) of humped European cattle have evolved separately for 500,000 to 750,000 years. Although the bulls of the humpless cattle family can have a crest between the shoulders and head, humped cattle, or Zebu, all carry one of two types of humps. The hump is made of muscle and fat and is carried either over the neck (cervico-thoracic) or over the withers (thoracic). The neck hump tends to be more muscular, and the withers shoulder hump is usually fattier. The hump and loose folds of skin have been believed to radiate heat better, but this has not been proven. Higher humps may provide better support for neck yokes on oxen, but the humps might have also been favored for their impressive or powerful appearance. Historically, the neck hump seems to have been present first, but only slightly. The earliest evidence places humped cattle east of Mesopotamia in

Persia, Iraq, or India, where they are depicted by 2500 to 1500 B.C. Zebu cattle also have pendulous ears, a prominent dewlap, long legs, and a longer, narrower head than taurine cattle.

Sanga cattle from Africa are believed to be a mixing of the Zebu and taurine types, but they have some characteristics that are unique, such as a narrow face and extremely long horns. Further DNA research may reveal whether the Africans once domesticated their own Aurochs, which were later mixed with imported cattle.

In 65 B.C., Julius Caesar described the wild Aurochs he encountered during the Gallic Wars: “In size these are little but inferior to elephants, although in appearance, color, and form they are bulls. Their strength and their speed are great. They spare neither men nor beast when they see them. In the expanse of their horns, as well as in form and appearance, they differ much from our oxen” (*Bellum gallicum*, 6.28). In coming centuries, the Aurochs was also called the Giant ox and the Urus.

The lyre-horned Aurochs of Africa was still hunted by Egyptian nobles and hunters around 1000 B.C. but was eventually eliminated, as was the Asian variety by 500 B.C. East-central Europe was the last range of the wild European variant until the last Aurochs cow was probably killed in the Jaktorowka forest in Poland in

[To view this image, refer to the print version of this title.]

Fig. 35 An unusually friendly appearing Aurochs bull as reproduced by Edward Topsell in 1607. From *Curious Woodcuts and Fanciful and Real Beasts* (Dover, 1971).

1627. Agriculture had encroached on this ox's woodland habitat, but the Aurochs was also the target of hunters. Before their demise, European Aurochs were frequently described and depicted (fig. 35).

Attempts were made to re-create the Aurochs from modern cattle breeds in German zoos in the 1920s and 1930s. But that which has been lost can never be truly found again. Today we can only imagine how marvelous it would be to observe the ancestor of domestic cattle.

The domestication of cattle no doubt occurred in separate locations at different times. Cattle were probably domesticated after sheep, goats, and pigs because the cow represented a greater challenge than the smaller animals. The Aurochs was a large, strong animal equipped with dangerous horns—milking would be out of the question. Settled peoples could possibly have enticed wild cattle to remain nearby with salt, food, or

water. Nomadic peoples may have followed the herds on their migrations.

It is believed that by 5000 B.C., pastoralists were herding cattle, sheep, and goats. Besides providing meat and other products, the powerful bull became a religious symbol and ritual offering representing virility and strength. The horns of Aurochs have been found in the Neolithic shrines of Çatal Hüyük in Turkey, dating roughly to 6500 B.C. Bull worship became important in many cultures from Crete, Egypt, and Mesopotamia to India.

Among the problems of keeping any animals are how to keep them out of the planted crops and still protect them from predators. Either dogs and shepherds can protect a herd, or livestock can be confined. Again, young animals are easier to tame and may have formed the basis of the early confined groups of cattle. Food and water must be brought to confined animals, which increases human labor, and so the domesticated animal needs to provide a greater return in terms of food or service. And of course the natural behavior of the animal must be conducive to domestication.

As evidenced by the prehistoric cave art found in Asia and Europe and by the archaeological evidence from the earliest sites of worship at Çatal Hüyük in Anatolia, bulls have inspired fear, awe, and veneration perhaps more than any other animal. Indeed, the Sanskrit word for bull means “prince” or “god.” The Aurochs bull was large and powerful, and lent this admiration and fear to rituals. Massive carvings of the winged bulls of Assyria guarded palace entrances.

The bull has been a sign of the zodiac throughout many cultures and has been associated with the sun itself. Taurus, the Bull, is both a constellation in the Northern Hemisphere sky and the second sign of the zodiac.

The ancient Egyptians worshiped three bulls: Bukhis, who was white with a black head; black Mnevis, whose head was marked with the disk of the sun; and, most important, Apis, who was black with white spots. Apis was believed to be an incarnation of the sun god, Ra. Predating these gods, Hathor the cow was the goddess of love, beauty, and joy and symbol of fertility and motherhood.

The Old Testament relates the story of Aaron and the Israelites’ worship of the Golden Calf, which Moses spurned. The bull was such a widespread object of worship that it was most appropriate that the Golden Calf became the symbol of “pagan” idolatry.

The Minotaur of Greek mythology had the head of a bull on the body of a man. Imprisoned by King Minos, this monster, the offspring of Pasiphaë and the Cretan Bull, was housed in the Labyrinth on Crete. It fed on human flesh until Theseus, helped by Ariadne, slayed it. The beautiful woman Europa was abducted by Zeus disguised as a white bull and carried off to Crete. The ancient Greeks and Romans loved the spectacle of the bullfight and ceremonial rituals involving the bull.

In Hinduism, Nandi the white bull belongs to the great god Shiva, who is revered in his gentle aspect as the herdsman, a personification that is similar to Christ depicted as the shepherd.

In Norse mythology, a cow is central to the story of creation. The primeval cow Audhumla, created from the melting ice at the beginning of time, licked the grains of salt she found on the ice until they formed the shape of the primeval man, Buri. Buri became the grandfather of the supreme god, Odin.

Cattle were of great importance to the Celts as sources of wealth and power. The Cattle Raid of Cooley, a famous Irish epic dating from the seventh and eighth centuries, deals with the conflict between Ulster and Connaught over the possession of the brown bull of Cooley. On the ancient Celtic festival of Beltane (May Day) that marked the beginning of summer, the Irish and Scots purified their cattle by driving them through smoke in sacred groves.

Because the Aurochs no longer exists, wild behavior in cattle is not easily studied, although behavior in feral cattle, the related American bison, and other members of the bovine family has been scientifically observed. Even though the cow was a large and powerful animal, many of its physical and behavioral traits made it conducive to domestication.

Like their relatives the sheep and goats, cattle are ruminants. Also like goats and sheep, they lack the top eight incisor teeth, but they do not use their lips to

gather grass. Rather, cattle graze by grasping plants with a curling motion of their rough tongues and pulling it between the bottom incisors and the upper dental pad while jerking their head forward. The remaining twenty-four teeth are grinding molars that cattle later use to chew their cud. Cattle’s four stomachs are prodigious, holding about 35 gallons, and they have a very long intestinal tract. It can take three to five days for food to pass through their digestive system. Cattle spend about six to ten hours a day eating and another

*bull* An adult male bovine; in the United States, the bull has also been called *male critter*, *toro*, *seed ox*, *stock beast*, *brute*, *masculine*, and *the animal*

*bullock* Usually a castrated bull, sometimes a young bull; also a USDA grade for an uncastrated young bull

*cow* An adult female bovine

*heifer* A female cow before giving birth to her first calf; a first-time mother is sometimes called a *first-calf heifer*

*calf* A young bovine, usually under ten months of age; there are both bull calves and heifer calves

*bob calf* or *deacon* A calf less than a week old

*dry cow* Not lactating

*fresh cow* Just after giving birth or “in milk”

*open cow* Not pregnant

*ox* An adult castrated bull intended to work as a draft animal

*near ox* The ox on the left side

*off ox* The ox on the right side

*springer* A cow that is soon to calve

*steer* A young castrated bull raised for beef

*suckler cow* In Britain, a cow who raises her own and sometimes another calf

*toro* Spanish for bull, from Latin *taurus*

*veal* Calf until three months of age

*vaca* Spanish for cow, from Latin *vacca*, as in *vaquero*, cowboy or herdsman

eight chewing their cud. They drink a large amount of water, with modern dairy cows needing up to 300 pounds each day.

The observation has been made by animal behaviorists that the natural grazing pattern of cattle was adopted and used by humans using oxen for farming or transportation. An ox could work for eight hours each day if given six hours of grazing and the remainder of the day to ruminating and resting. The work period had to be divided into two four-hour periods to allow for periodic grazing. This pattern was followed widely at least two thousand years ago, lending itself to midday breaks, or siestas, and even the spacing of towns. An ox was able to walk at 2 to 2.5 miles per hour for eight hours, and ancient settlements in the classical world were generally 16 to 20 miles distant from each other.

Also useful to early domesticators was the fact that cattle tend to do things together: drinking, eating, lying down, chewing their cud, and eliminating. This mutual

mimicking serves a purpose in the wild by reinforcing the herd instinct and providing protection from threats. Cattle will seek sheltered grazing areas to spend the night, beginning again to graze actively and move during the day. During the hottest time of day, cattle will frequently seek shade to lie down and chew their cud. They do not deliberately eliminate in certain areas but expel waste randomly.

Cattle see better than has been reputed, up to 2 miles away. They see well in the dark and have wide-angle vision, which helps individuals in the herd remain aware of each other's location as they move together. Cattle also swing their head from side to side while they graze, which enables them to scan the area for possible threats. Contrary to its use by bullfighters, the color red does not especially infuriate bulls.

Cattle have an excellent sense of smell and can detect odors several miles away. Cattle also have a better sense of hearing than humans. They have a repertoire of

calls, including contented rumbles, the insistent mooing of cows in heat, the bawling of calves, and the bel-lowing of bulls.

The herd provides protection, but it also has an internal social order. In the wild, older cows tend to lead the herd, bulls are found in the middle, and cows with young calves are often at the rear. In domestication, bulls do not generally live year-round with the herd. Dairy herds are exclusively female, but they acknowledge a pecking order that is achieved mainly through pushing, shoving, head butting, and the occasional clashing of horns. Age, size, and personality also influence the pecking order. This social order affects such activities as eating, drinking, leading the group, and entering the barn.

New cattle introduced into the herd may cause upsets that are detrimental to feed efficiency and milk production. Some cows are naturally more combative or dominant and so cause more distractions. Cows are extremely social and may become extremely upset if separated from their herd mates. If kept alone, a cow will seek out the company of other animals or people.

The bulls in a herd generally fight only during breeding season. For the rest of the year, displays of dominance, such as lowering the head and horns, keep the older and stronger bulls in their positions. Bulls will display these same threats toward humans, pawing the ground and lowering the head and horns. Dairy bulls have a reputation for being fiercer and more dangerous than beef bulls. Although artificial insemination is now extremely common in the dairy industry, beef bulls are more likely to be running with a herd rather than confined alone, which may make a bull more aggressive. The natural courtship behavior of a bull toward a cow coming into heat is not seen as often in modern agriculture.

A cow about to give birth will leave the herd for privacy. In free-ranging situations, most calves are born between March and June. Domesticated cattle are carefully bred to deliver at certain times for either dairy or management purposes. Beginning at about ten months of age, cows come into a short heat period roughly every three weeks. Domesticated cows are not generally bred until eighteen months to two years of age. Cows are

pregnant for 277 to 290 days, or about nine months. If the cow is out on pasture, she will hide her calf for one or two days.

A hidden calf can be difficult to find because it lies quietly waiting for its mother while she is away eating or drinking. Eventually the calf will join the herd, and after a week or so, it will begin to nibble food. A frightened calf will bawl loudly, bringing its mother or other cows in the herd to the rescue. Calves can be weaned after two months but may continue nursing for several more months. Calves rapidly become bonded to the herd. When young calves are separated from their mothers, as in dairy herds, and grouped together, they will behave as a herd. This is valuable for farmers because it encourages the young calves to eat and drink. Extremely young calves will suck on each other's tails or ears to the point of soreness. Calves are active or playful with each other and more curious than adult cattle.

As a meat animal, cattle do mature more slowly than sheep, goats, and swine, which would have been a disadvantage to early farmers. The long working life and power of the cow or ox would have been a more desirable trait. Later, the possibility of providing milk for a significant time was also an advantage. The natural life-span of cattle is about twenty years. Breeding cows are kept as long as they produce, but many modern dairy cows are kept for only three or four lactations of almost one year each before being culled and sent to slaughter.

Cattle have hollow horns. Worldwide most cattle remain naturally horned, although in North America and parts of Europe, many cattle raisers consider horns to be inconvenient or dangerous. Cattle can become stuck by their horns or injure other cattle and people in the close quarters of barns, feedlots, or in transit. Broken or injured horns bleed heavily. Cattle raisers who prefer horned cattle can actually train the horns to a desired shape with strings or weights. Horns can be necessary for some types of ox yokes.

Calves can be dehorned by destroying the horn bud before it begins to grow. This can be done with caustic compounds, mechanically, or by burning. Horns are not easily removed from full-grown animals because removal can expose the frontal sinus cavity.

Cattle can be naturally polled, and this has been en-

Jewish dietary and ceremonial laws guide the slaughter and use of meat from animals with cloven hooves that chew their cud, primarily sheep, goats, and cattle. These animals are slaughtered according to detailed rules, and the carcasses must be drained of blood and examined. Certain nerves and sinews must also be removed from meat from the hindquarters. The meat must be broiled or salted and rinsed before cooking. Meat is neither served with dairy products at the same meal nor cooked with the same utensils as other foods. These practices make the meat edible, or *kosher*. Islamic dietary laws are similar and also require ritual slaughter. Dietary laws often aid the hygienic preparation of food by formalizing food handling.

The Hindu taboo on eating beef comes from a different source. Hindus venerate the cow because it represents life. On posters and illustrations, the heads of beautiful women are placed on the bodies of healthy white cows bearing milk. Cows wander freely in the cities and countryside, although many are owned and milked daily. Cows are also brought to homes for direct milk delivery. Farmers often cherish their cows, treating them like family members. Yet these cows are also often underfed and give very little milk. That millions of nonproductive cows exist in a country that struggles to feed its people may seem paradoxical to Westerners. Yet in *Cows, Pigs, Wars, and Witches: The Riddles of Culture* (1974), Marvin Harris proposes a theory to explain this cultural practice.

Cows are a vital part of the low-energy, small-scale Indian agricultural economy. The sheer volume of cattle dung is an important source of cooking fuel. And the hardy Zebu has great powers of recuperation. As long as an unproductive cow survives, there is hope for the farmer that she will again calve. And if she calves, she may give birth to a male, which as an ox provides the main source of power for plowing and cultivation in India. By making the eating of beef a powerful taboo, the culture preserves hope for the future instead of consuming it all. In addition, India cannot grow enough excess grain or feedstuffs to feed cattle for meat production. India's cattle survive mainly on crop by-products and plants that are inedible by humans.

Dead cows are used in India, and their death is often deliberately hastened. Members of the lower castes, who are often leatherworkers, eat the beef and recycle other by-products. Instead of being wasteful, the Indian system wastes very little.

couraged in some breeds. The gene that controls the presence of horns is recessive to the polled gene. Interestingly, this dominance can be variable so that some cattle breeds are described as “strongly” or “weakly” polled or as the opposite, strongly or weakly horned. The strength or weakness of this trait is passed to the offspring. Only when the masked horning factor is completely eliminated does the breed become truly polled.

Humans have also selected cattle for other characteristics. Cattle were originally darkly colored, but now color genetics have become complicated and may vary in different breeds. The length of the coat has also been altered through domestication. Milking potential, both

as to volume and length of lactation, has been strongly developed in many breeds of dairy cattle.

Domesticated cattle have long provided meat, hides, bones, horns, hair, tallow, and other body products. Manure provides fertilizer, and dried cattle dung has long been used as fuel and building material, extremely valuable in arid areas. Dried cow dung burns with a clean, low, long-lasting flame.

Over time, people developed techniques for handling such a large animal. Regular feeding conditioned cattle to return to a desired location. Castration provided for easier management of older male animals used for work or raised for food.

An ox is not a special breed but rather a castrated

male calf of any breed. Training begins when the calves are a few months old. The calves become accustomed to being yoked, and they learn to respond to command words or control from a stick or tether. Young oxen are capable of light work. By four years of age, oxen have developed strong neck muscles and will work steadily and reliably for ten years or more. Mithans, Bantengs, Water buffalo, and Yaks have also all been harnessed or yoked for work.

The power available from oxen, the first large draft animal, revolutionized agriculture. Oxen have provided labor for thousands of years, and the ability to harness the power of the ox may have been the overriding reason for domestication. Only grass was needed to feed the work animal, and the equipment was simplicity itself. Oxen can be harnessed from the head or neck, and many types of yokes and harnesses have been used around the world. Cattle have been used to plow, carry loads, pull carts, pump water, and tread grain.

Cattle needed to be comfortable with people before dairying could become practical. Not only did the milker need to feel safe around the cow, but the cow needed to be relaxed for the milk let-down reflex to work. One of the earliest depictions of cows being milked is found on a stone engraving from ancient Babylon, approximately six thousand years old. Sanskrit writings, also six thousand years old, mention milk as an essential food. Various types of soured or fermented cow's milk products were common in Mesopotamia and Egypt. In Europe, northern peoples were fonder of butter than the Greeks and Romans, and they discovered the processes for salting and making harder butter pats. Heating butter creates a clarified product called ghee that has long been a traditional food in Asia.

It has been theorized that cheese was discovered when milk curdled after being stored in a calf's stomach. The inner lining of the fourth stomach of calves and other young ruminants is called rennet. Rennin is the dried extract, containing a milk-coagulating enzyme, made from this stomach. Rennin is used in the production of cheese. Neolithic and Bronze Age cheese-strainers have been found in Greece, and cheese molds have been found in Egyptians' tombs.

Other early uses of cattle were sacrificial in nature or involved sport. The Bronze Age Minoan civilization dominated the Aegean Sea by 1600 B.C., and paintings of acrobatic men and women vaulting over the backs of enormous bulls decorate the palace walls at Knossos. Minoan culture promulgated the legend of the Minotaur, half man and half bull. Roman gladiators later fought bulls in the Colosseum and many other arenas. Bullfighting continued as a dangerous, crowd-pleasing thrill through the centuries, although it was eventually banned in many countries. By 1900, the modern style of bullfighting had evolved in Spain, Portugal, Mexico, and several South American countries, where it continues to be popular.

The earliest evidence for the presence of domestic cattle is found in Israel at about 7000 B.C., when most cattle bones show an atypical age of death at about five years old. The Halafian site in Iraq yields cattle remains from about the same time that appear domestic rather than wild. Suggestions have been made by researchers that cattle were present in western Egypt as early as 7700 B.C., which may indicate separate domestication. Dating to about 6500 B.C., two types of leg bones have been found in Çatal Hüyük in Turkey. One belongs to the wild Aurochs, and the other is definitely from a smaller type of cattle. By 6200 B.C. in Greece, cattle bones that have been recovered are mainly from immature animals. Three thousand years later, cattle were being used as draft animals in the Middle East and Egypt, where both lyre- and short-horned varieties had been present for some time. Short-horned cattle were becoming more commonplace by 3000 B.C. Cattle were being milked by this time, from the side in Egypt and from behind in Mesopotamia.

By 3500 B.C. in Thailand, farmers were raising both rice and heavy cattle. About the same time, Water buffalo and two types of cattle were present in the Indus River valley. The presence of humped domestic cattle is seen in the thoracic vertebrae, which are forked at the ends. These are found in Jordan and Egypt by 1400 B.C. and in Somalia from 2500 to 1500 B.C.

Well before this time, cattle exhibited a variety of colors, color patterns, horn shapes, and sizes. A profu-

sion of colors and pied or spotted coats are seen quite early in Egypt. By 2300 B.C., an illustration of a polled bull was found on tomb walls in Egypt. In 450 B.C., Herodotus wrote of naturally polled cattle in Scythia and hugely horned cattle in northern Africa. The Roman writer Columella described local breeds in the different areas of the empire in the first century A.D. Dwarf and short-horned cattle were common in northern Europe. Changes such as length of hair, color, and horn size are proof of human preferences and desires that were sometimes unrelated to practicality.

Throughout Asia, Africa, and Europe, wealth was often measured in cattle. Evolving from this common practice, Roman coins were sometimes stamped with a picture of a cow or ox. *Pecus* was the Latin word for cattle, which led to *pecunia* for money.

Although the Aurochs was present in western and northern Europe, domesticated cattle seem to have followed sheep and goats into these areas. Northern European tribes based their economy on cattle, and their earliest writings discussed oxen, the value of the ox's labor, and their status as personal property. Cattle were housed in enclosed woodland pastures or thatched shelters. Often accompanied by his cattle dog, the cowherd took the cattle to and from the pasture and slept with them at night. The peasant-owned cow often lived in a section of the family home. Cattle wore bells to help cowherds finding them, and the stealing of cowbells was a serious offense.

Frankish law of the sixth century A.D. revealed that one bull was sufficient to serve the cows of three villages, so most bull calves were castrated to have working lives. Oxen were not generally worked until they reached about four years of age. They wore wooden yokes and labored for four to six years before meeting their ultimate fate.

In Britain, farming immigrants who brought their cattle with them arrived in about 4500 B.C. Neolithic remains reveal large, long-horned cattle that then became smaller through the Bronze Age. The wild Aurochs survived until about 1900 B.C. in Britain, although feral cattle persisted in the forests through the twelfth century A.D.

Cattle bones outnumber those of other livestock at

Neolithic habitation sites in Britain. All the parts of cattle were generally eaten, and they were often prepared by roasting. Heads, organs, blood, the partially digested food found in the stomach, and the bone marrow were consumed along with the meat. Cows were milked at this time in Britain, but the lactation period was still quite short. Cheese-making colanders have been found in a few Bronze Age sites, but it is not known when rennet was first used to create harder, long-lasting cheeses. Both butter and meat were salted for preservation. Although hay was gathered to feed livestock through the winter, this was so difficult that most animals were slaughtered in the fall and their meat was salted, dried, or smoked. Live cows were also bled, with the blood used in pottages or mixed in cereal cakes just like fresh blood from a just-slaughtered animal. Bloodletting was a feature of many ancient cultures and is still practiced by some Africans and Tibetans. A nick is made in a vein in the throat, the blood is collected in a bowl, and the cattle usually survive the loss of a pint or two of their blood.

The Bronze Age farmsteads in Britain often had an enclosure wall surrounding the dwelling to provide a safe area for livestock. Banks and ditches were also built to enclose cattle in fields. Forestland retreated as demand for pasture and cropland increased. Oxen were routinely used for draft work by this time.

By the beginnings of the Iron Age, around 550 B.C., the cattle population was probably represented by a small, horned type similar to the Kerry, a Celtic type much like the Highland, Celtic White cattle, and other long-horned cattle. Short-horned red cattle from Europe began to make their way to Britain with Germanic peoples. The Vikings introduced other types of cattle, including polled, white color-pointed, dun-colored, and lyre-horned cattle. These stocks contributed to the pool of genetics from which Britons developed many breeds and regional types.

The Roman invasion of Britain began in A.D. 43. The areas under Roman rule became quite settled, and agriculture became more organized. The Romans enjoyed beef, and they raised it on their villas. Bones from small, Dexter-sized cattle have been found in Roman ruins, although in northern England, remains that

are very similar to Chillingham White Park cattle have been found. It is not known whether the Romans introduced cattle from continental Europe to Britain, but improved feeding and husbandry probably resulted in larger, heavier cattle. The Romans did use rennet to make cheese, and they produced large amounts of hard, soft, and herbed cheeses in Britain. Butter and lard were used for cooking because imported olive oil was expensive.

With the onset of the Dark Ages, farming returned to its original, largely subsistence-based nature. As time went by, wattle fences were built, hedges were planted, and ditches were dug to divide the fields of wheat, rye, barley, and flax that were plowed by oxen. The heavier soil of northwestern Europe and Britain necessitated the use of a heavy, wheeled plow often drawn by 4 oxen. A large knife cut the sod ahead of a moldboard, which allowed even heavy, wet soil to be turned aside. This new plow appeared in the sixth century in western Europe. Because it required more power, peasants often needed to pool their oxen cooperatively.

The weight of the plow made the creation of long furrows more practical than short furrows in small, square fields. The change to these long strip fields altered the look of the countryside. An eighth-century illustration shows a 4-ox team, a plowman guiding the plow, and a teamster guiding the team by a pole. The length of 4 poles equaled a chain of 22 yards. Ten chains equaled one furlong. Finally, one chain times one furlong equaled an acre, which was the amount of work the plowman and his team were expected to plow in a day's work.

By A.D. 690, laws had been enacted to govern the use of oxen, the roaming of cattle, the maintenance of fencing, and the damages that could be incurred by loose cattle. In some areas, cropland was forcibly gathered into larger fields. Peasant families became tenants on these strips of land but enjoyed rights of grazing on the commons. Some private pastureland remained around homesteads or between fields. Although pigs were now more commonly raised, peasant families often owned one or two cows. Providing winter feed remained a difficult chore, requiring the cutting of grass from hay meadows.

The Saxon ascendancy brought new preferences and farming traditions. The smaller livestock animals became more numerous, and cattle were generally used for work. In the east of England, most of the butter and cheese came from ewes, whereas cow's milk was more important in Wales and northern England. In Wales, Ireland, and Scotland, cattle often spent the winter on fields around the village and the summer high in good pastures on the hills. Butter and cheese were made at these summer camps. This seasonal pattern continued into the eighteenth century.

In Scotland, agriculture existed primarily on the islands and coastal areas until after the Viking invasions. Settlers from Scandinavia settled in the Shetlands, Orkneys, and Hebrides, bringing their cattle with them. In the Highlands, cattle became the most important facet of the economy. For centuries, cattle were driven south into the lowlands to the cattle market towns of Crieff and Falkirk and then to English markets. By 1723, some 30,000 cattle would be sold to English dealers at Crieff alone (fig. 36).

The Domesday Book of 1086, the written census ordered by the Norman ruler William the Conqueror, reveals much about agriculture and livestock populations in this period. Sheep, pigs, and goats outnumbered cattle (except in Scotland and Wales), although several hundred oxen were used for draft work. Oxen remained the primary draft animals until the 1500s. One-third to one-half of the land was pastured, with about half used as open common land. The occupation of cowherd was still of importance, insuring that the cattle were herded away from crops and returned to their village owners. After the harvest, cattle were turned loose to graze on the stubble and enrich the field. Hay was cut from meadowland to be used in winter. Clover was not grown specifically as cattle fodder until the seventeenth century, and to limit the amount of hay or peas needed for the winter, excess cattle were slaughtered in the fall and the meat was salted. Only the milking, breeding, and work stock were kept over winter.

Dairying was the province of women, both the milking and the making of cream, butter, and cheese. The word *dairy* actually comes from the Middle English

[To view this image, refer to the print version of this title.]

Fig. 36 The bull as illustrated by Edward Topsell in 1607.  
From *Curious Woodcuts and Fanciful and Real Beasts*  
(Dover, 1971).

word *dey*, meaning female servant. Milk was more available in summer while the cows grazed on lush grass; in winter, milk could be three times as costly. The annual milk yield per cow was estimated at 120 to 150 gallons. By comparison, a modern cow can produce ten times more milk. The milkmaid's butter churn, however, remained the same from the early Middle Ages through the nineteenth century.

As the manors of the landowners became larger, specialized cattle farms called vaccaries were built. On the manor, cows produced products for market, including milk, cheese, butter, and meat, with the leftover milk products often used as pig food. Great parks were enclosed for "wild" cattle, deer, and boar. Enormous monastery lands were established, although they were concerned mainly with sheep and wool raising,

with dairies not gaining importance until the thirteenth and fourteenth centuries. By the thirteenth century, cattle driven long distances from Scotland or Wales were often fattened in the Midlands, East Anglia, and around London to supply meat for the city markets.

Beef had by now become a favorite meat. It was still generally spit-roasted or stewed, but tender cuts were often grilled. Meat from old, worn-out oxen was tenderized, stewed, or used to make broth. The organs, brains, glands, entrails, heads, stomachs, tongues, tails, and even udders were eaten. Blood, suet, and lard were made into puddings, and the marrow from bones was used for broths, pies, stuffings, and puddings. Calves feet were used to make gelatin, and the intestines were used for sausage casings. Lightly brined beef would last a few days longer than fresh meat, but for long storage, beef was heavily brined and then barreled or hung to smoke. Hard salt beef had to be simmered for hours or made into pottage. Pickled beef in vinegar was introduced about A.D. 1600.

*bull* A large, strong man; a police officer; a bulldog; someone who believes that stock prices will increase

*bullheaded* Obstinate, stubborn

*bullish* Stupid or obstinate; conversely, hopeful or optimistic

*bull, bullshit* Nonsense, lies, or exaggeration

*bull session* An informal discussion

*shooting the bull* To talk aimlessly

*to bull* To force or shove

*bull in a china shop* An awkward or clumsy person

*bull market* A market characterized by rising prices

*bulldog* (from *bulldogge* or *bolddogge*), *bullmastiff*, *bullterrier* Dogs bred originally for bull baiting

*to bulldog* To wrestle a calf or a steer to the ground by seizing the horns and twisting the head

*bulldog edition* The earliest edition of a newspaper

*bulldoze* To bully someone; to move or clear a site; a *bull dose* was lashing an ox to make him move or whipping a person

*bullpen* Originally a place for bulls, now more commonly a holding place for prisoners or where baseball relief pitchers warm up

*bulwhip* A heavy rawhide whip

*bully* A cruel person; an expression meaning excellent

*bully beef* Pickled or canned beef

*take the bull by the horns* To attack an obstacle fearlessly (the actual act would take a lot of courage)

*John Bull* The personification of England; an Englishman or the English people; named after the central character in John Arbuthnot's *The History of John Bull* (1712); later a caricature in political cartoons

Butter and cheese were brought in to the cities and towns from the surrounding counties. Four general types of cheese were available: a hard cheddar type, a soft cream cheese, a new green cheese, and *spermyse*, which was a cream cheese flavored with herbs. Cheeses from certain areas were especially popular. Both butter and cheese were heavily salted for preservation. Hard cheese was a basic food of the rural laborer, although physicians felt it was more harmful than the softer cheese eaten by the affluent. The poor also ate a great deal of butter, which was viewed by the wealthy as more suited to children and old people.

In the countryside, the life of the peasant was becoming increasingly difficult. The milking of ewes had lessened with the increasing value of their wool, which became the important cash crop of the landowners. Enclosures for sheep grazing often removed common land from the poorest of people, who could no longer

support their livestock easily, and many displaced rural laborers left for jobs in the cities. Those who remained in the country, though they might be able to raise a few animals for themselves, generally ate less meat than town dwellers.

Through the centuries, oxen were often worked in inexpensive or homemade yokes. The yoke suited the ox very well because its point of draft was high on the shoulder. Although oxen did pull four-wheel wagons, a single ox or team of oxen was more commonly used on two-wheel carts. Increasingly, long teams of up to 8 oxen were hitched together and guided by a pole used to prod the oxen. The use of oxen began to decline in the eighteenth century. For some time afterward, oxen were worked in leather harness like horses, but the use of draft horses continued to increase until the era of farm mechanization.

About this time, Robert Bakewell, the agriculturist

who revolutionized livestock breeding, and the breeders who adopted his methods began to pursue livestock improvement, uniformity, and the use of breed records. Much of this effort was directed toward feeding the increasing demand from the urban population. The use of winter fodder and new feed crops made tender, flavorful beef more readily available. With improvement came changes that recognized and intensified breed character. Popular beef, dairy, and multipurpose breeds such as the Shorthorn, Hereford, Angus, Ayrshire, Devon, Guernsey, and Jersey were exported overseas with great success.

In the mid-nineteenth century, cattle were still brought to the cities on the hoof and slaughtered in town. Surrounded by London houses, the famous Smithfield market and stockyards could hold an estimated 4,100 cattle plus other livestock. Located nearby were the by-product industries—tripe processing, bone-boiling, gut-scraping, and others. Livestock by-products and hides often sat for a time before being carted off for processing. Sanitation was not a priority.

Cattle hides were valuable as a source of leather. Ox hides made a smoother leather than other cattle hides because oxen were less fatty, and these hides were often used to make shoes or boots. Calfskin, too, made a fine leather, with milk-fed calves producing the finest skins. Calfskin was also used to make the strong, thin parchment known as vellum. Uterine vellum was made from fetal calves.

Bullbaiting is a sad chapter in the story of cattle domestication. The practice probably began with the use of butcher's dogs in the Middle Ages. The dogs helped to bring in the cattle for slaughter, and it was believed that putting dogs to a bull would tenderize the meat. By the sixteenth century, bullbaiting had become an entertainment viewed by royalty and commoner alike. The bull was tied to a stake by several yards of rope, terrorized by goads and the crowd's taunts, until a bulldog was turned loose to pin the bull by its nose or ears until it fell to its knees. Bulldogs, with their strong, under-shot jaws and pushed-in noses, could still breathe while hanging on to the bull with great tenacity. They eventually came to symbolize the British nation. Bullbaiting was not outlawed until 1835.

In the late eighteenth century, there were an estimated 7,200 cows kept for milk production in London and Middlesex. By the late nineteenth century, that number had increased to about 10,000 cows in London alone. They were kept in some 745 byres, or sheds, in town or on the outskirts. Sometimes newly freshened cows that had just given birth were brought to town and milked through one lactation before being slaughtered. At times, cows could be found grazing in city parks. Loads of hay were brought into town, and the resultant manure was hauled out. Cows were milked three times a day, and customers received home deliveries twice a day owing to lack of refrigeration. Dairy shops also sold fresh products.

By this time, cow's milk had become much more common than goat's milk for both rural and city dwellers, although goat's milk, boosted by health claims from doctors, did enjoy some popularity in the city. Many people felt that fresh cow's milk was hard to digest, so most of it was used to make cream or butter, and the by-products of skimmed milk were turned into cheese and buttermilk. When whole milk was used for cheese making, the rich whey was turned into whey-butter. Whey and buttermilk were popular drinks. Clotted cream, trifles, fools, syllabubs, and ice cream became favorite desserts. Milk that was curdled with ale and sweetened made a hot drink called posset. Curds were also used in cooking. Because rich, older cheeses naturally developed a more golden color, the practice of coloring cheeses yellow began with the use of saffron, marigold petals, and then annatto. The increasing numbers of cows being milked created more calves, which were usually eaten as veal.

Sometimes these city dairies were unhealthful with the cows kept inside continuously or even in underground stalls. Besides the unsanitary conditions and the threat of disease, milk could be watered down or delivered in filthy pails. Some cows were driven door to door so that the purchaser could be assured of a fresh, relatively clean product. Pasteurization did not become common until the 1890s. Tuberculosis was a threat until legislation in the 1920s began to improve health conditions.

Train and reliable truck transportation ended the

need for city dairies in the 1860s. Dairy products could now be shipped some distance. By the 1850s, beef was being shipped from as far as Aberdeen to London.

As cattle raisers moved into the twentieth century, the popularity of various breeds continued to change. Many farmers were forced by market demands or the pursuit of productivity to adopt the Holstein for dairy needs or to use new imports such as the Continental beef breeds. In this rush for improvement, perfectly useful and productive breeds were abandoned and valuable native genetics were cast aside. The minor breeds of cattle struggled to survive with the help of dedicated breeders. Other breeds lost the fight and passed into extinction.

Among those British cattle breeds that disappeared were the Alderney, Blue Albion, Caithness, Castlemartin, Glamorgan, Irish Dun, Sheeted Somerset, and Suffolk Dun. The Irish and Suffolk Dun were both excellent dairy breeds, but not flashy enough to attract the eye of the showmen. The Alderney was so well known at one time that it lent its name to all the Channel Island cattle. The linebacked Glamorgan was a useful triple-purpose breed. The Sheeted Somerset carried the unusual belted color pattern.

The fate of the Blue Albion remains confused—whether the breed became extinct and was later re-established or whether it was actually preserved. Early in the twentieth century in the uplands of Derbyshire and the Peak District, Shorthorn cattle were crossed with Welsh Blacks and possibly Friesian and Kerry cattle as well. Although this dual-purpose breed did not breed true for color, often the black and white colors mixed to create an attractive blue roan or blue roan and white cattle. A breed society was formed by 1921. Because the blue did not breed true, it was necessary to eliminate the white, black, or black-and-white calves from the registry in each generation.

The Blue Albion achieved its highest level of popularity after World War I, but the last herd book was issued in 1937. The breed society dissolved in 1966, and the remaining animals were hit hard by the foot-and-mouth outbreak in that decade. One bull did remain licensed until 1972. The RBST does not believe that any purebred animals survived to the present, al-

though some breeders dispute this assertion. A new breed society was established in 1989. The RBST has chosen not to recognize the Blue Albion on its Priority List for these reasons as well as the ready ability to recreate the breed from its founder stock.

In the New World, the first true cattle landed in Newfoundland with Leif Eriksson about A.D. 1000, although unfortunately both the colony and the cattle disappeared. Columbus introduced cattle he had purchased on Grand Canary Island to Hispaniola, present-day Haiti, on his second voyage in 1493. Spanish cattle made their way to Mexico in 1520 and accompanied Francisco Vázquez de Coronado into the Rio Grande valley. Oxen pulled the first wheeled vehicles in the Americas, the *carretas*, and supply wagons. In 1565, the Spanish ousted French colonists from Florida and built a fortified settlement. Cattle were imported from Cuba then and again in 1640.

The introduction of the cow profoundly affected the Hispanic cultures that would emerge in much of the New World. Native peoples heretofore had no dairy products such as milk, butter, cream, or cheese. Because there was no lard, foods were not fried, tortillas were not lightened, and cooked beans were less flavorful. Beef, pork, chicken, mutton, and goat were all adopted by the evolving culture and cuisine. And perhaps more important to many people, cacao and milk gave the world the delight that is chocolate. What today is viewed as Mexican, southwestern, or Hispanic cuisine actually evolved from a true mingling of cultures.

On the eastern coast of North America, the first successful English colony was founded at Jamestown, Virginia, and was supplied with cattle in 1611. The original colony of Cape Ann, which moved to Salem, Massachusetts, received both cows and bulls. In 1627, the Plimoth Colony inventoried its cattle, which included black heifers, a “great black cow,” a red cow, and a “great white backed” cow. More cattle came to the Massachusetts Bay Colony in 1630 and to Delaware in 1647. By the mid-1630s in Massachusetts, there were 4,000 colonists and 1,500 cows, mostly used for draft or dairy purposes. The Dutch also brought their cattle to New Holland, later known as New York. Irish immi-

*to beef* To complain or grumble  
*beef up* Originally to fatten cattle before slaughter, now to gain weight or add strength;  
*beefy* Brawny  
*beefcake* Photos of nearly nude young men displaying their muscles  
*beefeater* Originally a well-fed servant, now a yeoman of the English royal guard or warder of the Tower of London; an Englishman  
*calf* A detached piece of an iceberg  
*calf-eyes* Flirting  
*kill the fatted calf* To prepare an elaborate celebration or feast  
*cash cow* A foolproof source of money, such as a milking cow  
*cattle* A mass of people who are herded or follow blindly  
*cow* An obese or slovenly woman; a woman who has many children or is often pregnant  
*sacred cow* Something that should not be criticized  
*to cow* To frighten or intimidate  
*cowman, cowherd, cowhand, cowboy, cowgirl, cowpoke, cowpony, cowpuncher, cowcamp* Words associated with the cow culture of the American West  
*drugstore cowboy, urban cowboy* An imposter  
*cow catcher* A triangular frame on the front of a locomotive to move obstacles such as cows off the track  
*cow college* Land grant university or agricultural college  
*cow town* Small town in the West  
*cowlick* A section of hair that grows up or away from the rest of the hair as if licked by a cow  
*cowpea* A tropical vine grown for feed in the South  
*till the cows come home* For a long time, forever (the cows come home early in the morning from the pasture to be milked)  
*don't have a cow* Don't have a fit  
*greenhorn* An inexperienced person; originally an ox with unripe or young horns  
*horn in* To shove or push, as cattle with large horns intimidate cattle with smaller or nonexistent horns  
*milksop* A weakling  
*ox* A large man, sometimes not very intelligent; he may also be *strong as an ox*  
*oxblood* A deep, dull red  
*oxbow* The U-shaped piece of a yoke; a similar curve in a river or stream  
*off ox, Adam's off ox, as poor as God's off ox, don't know him from Adam's off ox* The off ox is on the right side, or the farthest from the teamster on the left, and is therefore less well known  
*to see red* To become angry; the matador waves a red cape before the bull

grants called curdled sour milk clabber and called their cattle home by shouting “sookie” or “sook cow.” These words were adopted throughout the new settlements.

Cattle were too valuable to be eaten, but they multiplied rapidly, often simply turned loose in the woods. English agriculturists were disdainful of the free-

running New World cattle and the failure to enclose fields or collect manure. As time went by, the agriculturists of the new nation, including George Washington and Thomas Jefferson, promoted the use of planted forages and hays, crop rotation, improved husbandry, and the careful breeding of livestock.

In North America, old beef was the type that would be eaten most frequently for the next two centuries. These oxen and cows had often worked hard or delivered many calves until they were finally slaughtered. Cooks dealt with this toughness by marinating steaks in clarified butter or a vinegar and wine mixture, pounding and tenderizing, or simmering for several hours in red wine. Veal was usually available only in the spring.

Although cattle were highly valued as oxen, markets for meat and milk products grew along with urban population. Export markets were also available to the colonists, who sent both live cattle and barreled meat to the sugar islands in the Caribbean. By the Revolution, Americans were eating more meat (mostly pork, chicken, fish, and game) than their European relatives. Salted beef was common, and the Native American method of preservation, called jerking, made jerked beef or jerky an everyday food, although other meats were also jerked, such as venison or bison. In the growing towns and cities, milk could be distinctly dangerous unless it was fresh and clean.

The Euro-American settlers continued their relentless expansion westward, traveling over the Appalachian Mountains into Kentucky, Tennessee, and the Ohio River valley. The settlers found their way into the wilderness mainly by Conestoga or other large wagons drawn by three yokes of oxen. A few spare oxen usually trailed behind the wagons. Smaller wagons only needed one or two yokes.

Oxen worked throughout the new land. They logged the forests and drew the plows through unbroken ground full of roots and stones. Hitched to stone boats and sleds, they removed rocks and boulders from the fields. Oxen lent their power to the block and tackle as barns were raised. They pulled just about every type of implement, road grader, or wagon. Oxen powered treadmills, water pumps, and sorghum presses and threshed grain. Farther west, they hauled freight under the control of the bullwhackers. The large transportation firm of Russell, Majors and Waddell operated with 75,000 oxen in 5,250 teams during its peak freight period during the 1850s and 1860s.

In the nineteenth century, just as in early colonial days, the family cow was often pressed into service as

a draft animal when needed. Settlers usually penned or tethered the family cow and the draft ox, mule, or horse close to the house. Cool spring water was the only source of refrigeration, so the cow was milked frequently during the day.

Early French colonists to Canada found life difficult, but they imported cattle from Brittany and Normandy for their use. A large influx of settlers to New France began in 1681. Most of these families engaged in subsistence farming and owned just enough livestock to support themselves. Although imports of quality cattle did occur later, the native *Canadienne* cattle evolved largely on their own.

These cattle penetrated the North American interior at French missionary outposts both in Canada and in the future Northwest Territory of the United States. They appeared in Detroit by 1707, followed by Kaskaskia, Mackinac, Sault Sainte Marie, and Vincennes. These small black cattle were already called French Canadian. In the 1780s, travelers continued to find cattle descended from these attempts by missionaries to introduce agriculture to native peoples.

In the United States, most citizens lived in rural areas, so they usually provided for their milk needs with the family cow. By the mid-nineteenth century, growth in the cities had created a large market for all animal products. In particular, farmers in New England and New York, who had found it hard to raise crops with a short growing season and hilly, rocky ground, increasingly turned to dairy farming. In 1841, the first milk was shipped by railroad, stored in wooden or metal cans often packed in ice.

As Americans settled the West, Wisconsin became a prime dairy area, with milk cows on 90 percent of its farms. After the advent of mechanical refrigeration in the 1880s, Wisconsin began shipping butter and cheese to Chicago and beyond. Inventions and new processes in the dairy industry multiplied, including pasteurization, glass milk bottles, and mechanical milking machines. Factories were built for cheese, butter, and evaporated and condensed milk production. All of this occurred before the first national dairy show in 1905. Even with the growth of commercial dairies in the early twentieth century, many families still kept their

own house cows. President William Howard Taft loved his milk fresh and brought his two cows, Mooly Wooly and Pauline Wayne, to Washington, D.C., during his tenure from 1909 to 1913.

The safety of dairy products increased with the passage of compulsory pasteurization laws and the start of the national tuberculosis eradication program in 1917. Daily delivery of milk was soon available in cities. In the 1920s, the average cow was producing 5,000 pounds of milk per year.

On the West Coast, cattle were brought to the first Spanish mission at San Diego in California in 1769. Mainly Berrendas and Retinos, they were raised throughout the mission and rancho system in New Spain until about 1800. Throughout the New World, the hardy descendants of the Spanish cattle are known as *criollo* cattle.

By the Civil War, feral criollo cattle in Texas numbered in the millions and were recognized as Texas Longhorns. Texas, which Americans had settled in the early nineteenth century, was home to 3 to 4 million Longhorns. During the era of the great cattle drives, cowboys would move cattle as far as 1,500 miles from Texas to Kansas and Missouri. Cattle were sent by the thousands to the packing plants in Kansas City or the stockyards in Chicago. The Industrial Revolution and the exploding urban population demanded large amounts of inexpensive food, and so Chicago and Kansas City became centers of the stockyard trade as the railroads brought in more and more western cattle.

After the demise of the buffalo and the destruction of the Native American way of life on the Great Plains, the Longhorns were taken throughout the West and often crossed with imported Angus, Hereford, and Shorthorn cattle. Foreign investors, especially from England and Scotland, invested in huge western ranches. Severe weather weeded out the weak—both ranchers and stock.

By 1886, there were an estimated 9 million cattle in Wyoming alone. The cattle industry became a great political and economic force. Range wars erupted over

water rights, sheep versus cattle conflicts, and the pioneer farmers who were moving to the Plains and building barbed wire fences.

It cannot be overstated how much the cattle culture of the American and Canadian West profoundly influenced the national character of both nations into the present. Westerners feel strongly about their way of life, and the American and Canadian national identities have become linked with this spirit of independence. Art, music, literature, language, fashion, and recreation all still reflect much of the western cowboy heritage. The sport of rodeo also grew out of the cowboy skill contests of bronco riding, calf roping, steer wrestling, and the ultimate dare of bull riding. Western-style riding is also an important recreation activity.

Another important development in American culture occurred in the nineteenth century—the introduction of the hamburger, whose humble origin is mostly unknown. By the turn of the twentieth century, the hamburger was well on its way to becoming the classic American dish. Each year Americans eat billions of hamburgers from the fanciest restaurants to their car at the drive-through window. The average American eats about 30 pounds of ground beef a year, and ground beef contributes 45 percent of market sales of beef.

By 1900, the U.S. cattle population was estimated at 60 million, but only about 6 percent of the draft animals were still working oxen. Some areas did not abandon the ox completely in favor of the faster horse. In the coastal South, oxen were used in the wetness of the rice fields, and in the deep woods, they were valued by loggers. In Atlantic Canada and New England, teamsters and farmers kept their oxen longer than anywhere else. Oxen worked the woodlots, hauled stone, and did other jobs on small farms. Local fairs continued ox-pulling contests, which have enjoyed a renewed following in recent years. Fortunately, the traditional skills of training and driving oxen have been preserved in these areas. In New England, young people still train and show oxen in 4-H clubs. Dairy breeds such as Milking Devons, Ayrshires, Milking Shorthorns, Brown Swiss, and Holsteins have remained especially popular in New England. But Shorthorns, Herefords, Dexters,

[To view this image, refer to the print version of this title.]

Belted Galloways, Highlands, and even the huge Chianinas are all used as oxen today (fig. 37).

The great surge of imports of European livestock occurred from the mid-nineteenth century through the early twentieth century. Breed societies were organized, and enormous amounts were paid for prize stock. Breeders and farmers began to show their animals at county fairs, national shows, and exhibitions. Steers were frequently not slaughtered before five or six years of age, when they could weigh a ton or more. Fat or tallow was more valuable than the meat, and so immense size was also prized in show cattle. One record steer of the time weighed more than 2 tons. With the showing and registering of cattle other traits such as color or color patterns became important. Breeders also began to specialize for one production trait, such as meat or milk. Some breeds were heavily promoted, and this, too, affected popularity.

In the late 1930s, show ring judges began to reward very small beef cattle, believing that consumers

Fig. 37 Drew Conroy and his team of four-year-old Milking Devon oxen. Photograph courtesy of Drew Conroy, Thompson School, University of New Hampshire.

wanted smaller cuts of meat. For a time, these baby beef, compest, pony, compact, or belt-buckle cattle were all the rage. To achieve such a drastic reduction in size, breeders used the smallest, blockiest cattle they could find, unwittingly making use of the dwarfing gene. By 1950, large numbers of dwarfs, or snorters, began to appear in these herds. Cattle raisers had to make a correction toward performance, with bulls evaluated on realistic factors such as carcass conformation, weight gain, fertility, hardiness, and calving ease rather than exterior elements such as smoothness or shape.

Dairy cattle shows provided opportunities for farmers to see stock from other herds and show off their best cows or new breeds. Unfortunately, judges sometimes rewarded show-ring cattle whose traits may have been irrelevant to milk production. Cows with lots of fat and

Big Bertha was a linebacked black Drimon, an old Kerry variety in Ireland. She lived to age forty-eight and gave birth to 39 calves. Bertha died in 1993.

The highest price ever paid for a single animal was \$2.5 million for a Beefalo bull named Joe's Pride in 1974 in Calgary, Alberta.

Although the largest breed of cattle is the Italian Chianina at about 2,800 pounds, the heaviest animal on record was a Durham-Holstein cross named Mount Katahdin. Dying in 1923 after living a normal lifespan, he was 6 feet, 2 inches tall at the shoulder and weighed 5,000 pounds.

The smallest breed of cattle is probably the Dwarf West African Shorthorn. Cows average about 275 pounds, although they often weigh less than 220 pounds. Other small breeds weighing about 350 pounds and up include the Nigerian Muturu, the Dwarf Zebu of Somalia, Tanzania, Uganda, and Kenya, the Namibian Ovambo, and the Nepalese Hill cattle. These cattle are often kept as village scavengers or pets, sometimes even living indoors. Some are the cattle of pastoralist peoples.

Since 1970, researchers at the Veterinary Medicine School at the National Autonomous University in Mexico have bred a miniature Brahman. Averaging about 300 pounds, these mini-Brahmans yield two-thirds of the milk of the normal-sized Brahman (which is not an especially prolific milker) while growing only to one-fifth the size and needing only one-third the amount of pasture. The researchers believe that such small cattle will enable those with very little land to maintain a cow that delivers 6 pints to a gallon of milk daily.

substance may have looked good, but what the dairy farmer needed was good udder support and capacity, fertility, temperament, and the ability to make milk on low feed costs. Too frequently judges rewarded extreme expressions of a particular trait regardless of performance records. Outside the show ring, the highly productive Holstein came to dominate the dairy industry.

Along with the widespread use of artificial insemination (AI), performance testing has now become the basis of dairy cattle breeding. Frozen semen extended the range of coverage from such pioneering AI companies as American Breeders Service. The main negative aspect of AI is the overuse of predominant bulls and their lines. One Holstein bull named Round Oak is believed to have sired 2.7 million offspring around the world. In addition, performance factors do not take into account such features as temperament, low maintenance, and long, productive lives. Approximately 88 percent of AI procedures take place in the dairy industry, as opposed to just 12 percent in beef production.

Many new beef breeds have been developed in

North America and Australia since the beginning of the twentieth century. There are now many crossbred, manmade, and composite breeds, which consist of specific percentages of two or more breeds. Moving up from Mexico in the 1930s, the Charolais brought muscle and size. The Brahman breed of Zebu cattle were imported to the United States as early as the mid-1800s, and they were widely crossed on breeds in hot, humid areas. The latest wave of imports to North America began in the 1960s, when some twenty-six new breeds began working their way through Canadian quarantine into the United States. Fortunes were often made dealing in these new breeds, at least in the beginning. The new imports included such breeds as the Salers, Gelbvieh, and Tarentaise. The Simmental contributed growth and milk, the Limousin had a meatier carcass, and the Chianina possessed tremendous size. Interestingly, most of these huge European cattle were actually very old draft breeds. Belgian Blue and Piedmontese cattle introduced the double-muscling genetic mutation, which, although it is sometimes linked to fertility and calving problems, also brings lots of lean beef.

The introduction of these new breeds and the drive for higher production led all except dedicated breeders to abandon many breeds. Triple- and dual-purpose cattle have been especially vulnerable. Many dual-purpose breeds were guided toward specialization in either milk or beef production. Shorthorns, Devons, Red Polls, Brown Swiss, and even Friesians were all

originally considered dual-purpose animals (fig. 38). Landrace types, such as the Florida Scrub and Pineywoods, were scorned as scrubby or unimproved. In Canada, government agricultural policies targeted the historic Canadienne for extinction. The legendary Texas Longhorn itself was nearly wiped out.

Some breeds disappeared altogether. Many of the

Fig. 38 The Shorthorn bull before the turn of the twentieth century in the United States. Courtesy of the IAB and Hans Peter Jorgensen.

[To view this image, refer to the print version of this title.]

lost breeds had been imports to North America, such as the Alderney, Danish Red, Glamorgan, Gloucester, Holderness, Kerry, Polled Albion, Yellow Dane, and Dutch Wittrik. Most of these cattle had been imported before the age of breed improvement or the organization of registries.

It can be difficult to trace cattle breeds when there is confusion over names. British cattle were often called by the name of their native area, rather than an official breed name. Channel Island cattle, such as Guernseys and Jerseys, were frequently called Alderneys. The use of Alderney continues today in certain areas of the United States, although the breed itself no longer survives. Galloways and Aberdeen Angus cattle were often confused and even considered one breed. Red Polls were often called Suffolks. Milking Shorthorns were sometimes called Teeswater cattle and are still frequently called Durhams or Red Durhams in the eastern United States. Durham cattle were highly regarded from early colonial days, with a widespread reputation for strength and power.

In the Midwest, cattle breeders crossed Shorthorn bulls, naturally polled Shorthorns, and other polled cattle to create the Polled Durham. This breed was first recognized at the Ohio State Fair in 1888, and Polled Durhams became popular in Ohio, Indiana, Illinois, and Texas. The American Polled Durham Breeder's Association was organized in 1889 and soon published its first herd book. Polled Durhams were reputed to give more milk than Shorthorns, and their lack of horns was promoted as a safety feature. Though no specific reason can be found for their eventual loss of popularity, the last herd book was published in 1918. Soon after World War II, the remnants of the Polled Durham breed were absorbed into the Shorthorn registry, which accepts polled Shorthorns.

In Hawaii, cattle arrived with the visit of Captain George Vancouver in 1793. As a gift to King Kamehameha I, the explorer left 5 cows on the big island of Hawaii. The next year, 2 more cows and 3 fine young bull calves were also left for the king in a deliberate act to establish cattle on the islands. The first 5 cows came

from Mission San Carlos in California. The second imports were described as black New Albion cattle. About that same time, criollo longhorn cattle were brought to Oahu from Mexico by a Señor Don Marin. Feral cattle on the Hawaiian Islands soon became so numerous that they had a major impact on the island forests and were widely hunted. Hawaiian beef was traded to the Pacific Coast settlements in North America. Hides and tallow were also exported. Immense cattle ranches were established in the islands, and today the Parker Ranch remains one of the largest private cattle ranches in the United States. Purebred beef and dairy cattle have now replaced the scrub cattle of the past.

In Alaska, cattle were brought to the Aleutian Islands in the late nineteenth century. Highland cattle were the most successful, although Angus, Hereford, and other breeds were introduced. The islanders have selected against horns in their stock. Winters are very hard on these herds, and mortality is high. Herds are also managed on Chirikoff and Sinak Islands. In Alaska, dairy farming is profitable and is one of the main agricultural enterprises in the state.

## Husbandry

There are about 1.05 billion cattle in the world today. It is a misconception that North America is the premier land of cattle, awash in their overabundance. In reality, with its 111 million cattle, North America has fewer cattle than the other continents. Both Europe and the nations of the former Soviet Union each have slightly more cattle. Africa, South America, and Asia are the true cattle-raising continents. In India alone, there are more than 270 million cattle.

The annual world production of cow's milk is about 500 million tons. By a great margin, most cow's milk is produced in temperate nations: the United States, Russia, India, France, Germany, Ukraine, the United Kingdom, and Poland. The annual American production is about 18 billion gallons from commercial dairy farms. The average farm milks about 60 cows, although herds of 1,000 or more dairy cows now exist. The North-

east and Great Lakes states tend to have smaller herds. Milk and its products comprise about one-eighth of the American diet.

The ubiquitous black-and-white Holstein numbers about 9 million in North America, but mostly as grade or unregistered cows. Even with only a small percentage of Holsteins registered, the breed still accounts for about 83 percent of all dairy cow registrations. The Jersey still garners about 9 percent of registrations, with the Ayrshire, Guernsey, and Brown Swiss each holding on to about 2 or 3 percent.

Milk production is recorded in pounds of milk per cow per year. Production has soared from an average of 5,000 pounds or less in the first half of the century to 17,000 pounds in the mid-1990s, with individual records and elite herds much higher. Individual cows have produced 60,000 pounds or more. Rolling herd averages of 24,000 pounds are frequently recorded.

The result of this progress has been a dramatic drop in the numbers of dairy cattle, down from 25 million in 1945. Wisconsin remains the premier dairy state, followed by California, New York, Minnesota, and Pennsylvania. In the 1980s, the United States was producing more milk than it needed, so the federal government purchased surpluses to support prices. Economic pressures combined with buyout programs have now sent many dairy herds to slaughter. In 1980, there were more than 300,000 American dairy farms, but only one-third of those exist today. With the loss of price supports, the lower-cost and most efficient producers will be the most successful.

In most herds, lactation continues for about 305 days, with the greatest production during the two months after freshening. Cows are rebred two or three months after calving, generally through artificial insemination. Bulls are generally selected based on progeny testing.

Newborn calves require colostrum either from nursing their mothers or from artificial feeding. Calves are then taught to drink milk replacer because it is usually less expensive than whole milk. Unweaned calves are usually housed separately to reduce the transfer of disease and the problems of suckling on each

other. By two months of age most calves can be housed together in group pens. Holsteins have short production lives, with farmers urged to raise replacement heifers at the rate of 30 percent of the herd each year. The life expectancy of a modern dairy cow is five or six years.

Although some dairy farmers sell their milk directly to private businesses such as cheese producers, most farmers market their milk through dairy cooperatives, most of which belong to the National Milk Producers Federation. Some cooperatives are large multi-state operations, while in other areas cooperatives are fiercely competitive. The cooperatives sell the milk to processing or manufacturing firms.

Dairy cows are checked for diseases such as tuberculosis, and samples of the cooled raw milk from the farm are tested for flavor, odor, bacteria, drug residues, sediments, and protein and milk-fat content. Most milk is pasteurized to kill bacteria and prevent fermentation. It is also homogenized so that the cream will not rise in the milk. Besides the fat, milk contains the valuable protein casein, lactose, plus calcium, phosphorus, and many vitamins.

Some people enjoy drinking raw milk, either from their own cows or purchased from a local source. Raw milk can contain such harmful bacteria as salmonella, listeria, campylobacter, *E. coli*, or others, but it is estimated that only a small percentage of raw milk is affected. Clean cows, udders, milking equipment, and careful handling can produce healthful and safe milk. Pasteurization can also be done at home. Raw milk is sometimes used for cheese production, but the cheeses must be aged longer than sixty days to be sold.

Dairy fat is not necessarily bad. Cream contains six times more protein than vegetable oil or margarine, plus valuable calcium and vitamins. Although 40 percent of the fat in whipping cream is unsaturated, certain margarines, oils, and shortenings can have more calories and grams of fat than real cream. Milk substitutes are usually made from corn-syrup solids and vegetable oils. Federal regulations require that vitamins A and D be added to skim and lowfat milks because the removed dairy fat is the natural source of these vitamins.

About 37 percent of the U.S. milk production be-

comes milk, cream, and yogurt. The remainder is used for cheese, butter, and ice cream, with much smaller amounts used for sweetened condensed milk, dry milk powder, cottage cheese, and condensed or evaporated milk. Milk can be reconstituted from dry milk powder, water, and milk or vegetable fat. Milk can also be frozen or ultrapasteurized to preserve it longer.

Butter is usually made from cream. The dark yellow color of butter originally came from the carotene found in green plants grazed by cows on pasture. Today food coloring is often added to achieve the proper color. Unlike margarine, butter is a natural food with nutritional benefits. Butter is composed mainly of butyric acid, which is believed to have anticancer and antiviral properties. It may also be helpful in cases of Alzheimer's disease. Both margarine and butter have the same number of calories, although butter does contain some cholesterol.

Cultured milk products are fermented by harmless bacteria. These products include sour cream, sour milk, buttermilk, acidophilus milk, and yogurt. Lactose is the milk sugar that sweetens milk and provides the major source of energy. Although most infants can digest lactose, some adults lose their ability to synthesize the necessary enzyme needed to digest milk comfortably. In cultured buttermilk, yogurt, and sour cream some of the lactose is already broken down. Lactose-reduced milks allow many people with this enzyme deficiency to digest milk without difficulties.

Rennet is the inner lining of the fourth stomach of calves, lambs, and kids. It is so rich in the digestive enzymes that clot milk that only very tiny amounts are needed to make cheese. Rennet transforms milk into curds, which then have different amounts of moisture removed and microorganisms added. The resulting cheese is shaped into molds and then ripened in different humidity and temperature conditions. Many factors thus affect the character and flavor of a cheese, and cheese making is both an art and a science with unnumbered variations.

As a food, cheese is a concentrated source of protein, calcium, minerals, and vitamins. Cottage and cream cheeses are not made with rennet. Cottage cheese is made with lactic acid cultures, and cream

cheese is a smooth mixture of whole milk and added cream.

The United States and Russia are the largest producers of cheese, followed by France, Germany, Italy, and Holland. France and Italy use more milk in cheese production than for fluid uses.

Dairying has become such low-profit business in the United States that dairy farmers need to pay careful attention to cost of production. In an effort to lower feed costs, there is growing interest in grass- and forage-based dairy farming. Along with the increased use of grass-based dairying, there is greater interest in more active, grazing cattle, unlike the typical Holstein, which also requires greater amounts of grain and protein concentrates. The milk output from other breeds may be lower, but so is the farmer's input. Milk fat and protein content now often determine more than 90 percent of the milk price, and interestingly, some rare breeds have higher levels of both factors than the ubiquitous Holstein.

Agriculturists predict that most dairy farms in the near future will have herds of 150 to 400 cows, with some herds considerably larger. New technologies in breeding, in genetic manipulation of both the cattle and their feedstuffs, and in health management will continue to challenge dairy farmers. With the loss of the price-support programs of the past, cooperative programs will probably be reinvigorated. This would be a positive move for moderately sized operations.

There are about 15 million cattle in Canada, three-quarters of them in the western provinces. After grain production, beef and dairy production are Canada's most important agricultural products. There are about 66,000 beef farms and about 29,000 dairy farms in Canada.

Canada exports much of its beef production to the United States, sending lesser amounts to Japan and other countries. Manitoba, Saskatchewan, and Alberta have a large beef cattle industry in conjunction with the important grain belt. Feeder cattle are often imported from the United States into Canada. Canadians have increased their per capita consumption of beef in recent decades.

The Canadian Dairy Commission coordinates the national supply of milk, which is governed by the National Milk Marketing Plan. Almost half of the nation's dairy farms are in Quebec, where half of all farms are involved in dairy production. Ontario is home to mixed farming and dairy. British Columbia and Alberta also have significant dairy herds, with lesser numbers in Manitoba and Saskatchewan.

Great Britain is home to about 12 million cattle, including about 2.8 million dairy cows. Milk and its products are an important contributor to national farm income. Dairy cows also produce 65 percent of the beef market calves. Herds average 68 cows, but the number of dairy farms has fallen precipitously in the past half-century. In the mid-1950s, there were 170,000 dairy farms, but by the early 1990s, that number was reduced to about 100,000.

Both the Shorthorn and Ayrshire were popular dairy breeds until the years after World War II, when the old dual-purpose Friesian became the dominant dairy breed. Imports of larger, higher-yielding Holsteins from North America have greatly affected Britain's national herd, which is now over 90 percent Holstein-Friesian. The Ayrshire is still part of the dairy herd, especially in its home of Scotland. Jerseys and Guernseys are now a very small portion of the national herd.

For many years milk marketing was centralized in the United Kingdom. In 1933, the Milk Marketing Board was established to collect all the dairy production, sell it to buyers, and return a payment to the farmers based on the pool value. With the end of the Milk Marketing Board in 1994, farmers are free to sell to any buyer. Cooperative marketing should help farmers deal with the growing concentration in the retail and wholesale industry. Higher protein levels are more advantageous than butterfat in setting the milk price. In response to surplus production and the cost of price supports, milk quotas were enacted in the 1980s that now restrict the annual production of each farm. Quotas can be bought or sold, but sometimes at a much higher cost than the cow is worth, and they can be accompanied by complicated legalities. Regulations also

govern more than milk storage—housing, light, ventilation, manure disposal, movement of stock, and health care are all controlled. Quotas, new technological developments, and increased production from fewer cows will continue to challenge milk producers in Britain.

Beef production in Britain is also governed by complex production quotas and price supports for each suckler cow raising her calf at her side for meat production. Individual bulls or steers also receive premiums at specific ages, verified by individual documents issued for each animal. It is projected that in the future farmers will receive more income directly from the marketplace rather than from supports.

Two-thirds of beef production in Britain originates from dairy cattle, often bred to beefy sires. Some calves are transferred to suckler cows, who raise two calves. Most breeding beef cows are pastured in the hills and uplands in small herds averaging 22 animals in size, although there are some lowland grass herds. More intensive practices include cereal or barley beef cattle raised on grain or protein concentrates and veal production. National regulations forbid the use of veal crates for calves. Veal calves are raised in straw-bedded group pens, although significant numbers of calves are exported to continental Europe to be finished and labeled as French veal.

The traditional British beef breeds, like their American counterparts, endured the trend for small blocky cattle in the years around World War II. Also at this time, the export market to North America and particularly to South America was very strong. The Aberdeen Angus and the globally successful Hereford were the most popular beef breeds until the imports of the large Continental breeds such as the Charolais began in the 1960s. Crossbreeding of both domestic and Continental breeds is now common.

The Angus and the Hereford account for about 46 percent of North American registrations. Continental breeds, the Simmental, Limousin, and Charolais, comprise another 26 percent. Another fifty or more beef breeds are bred and promoted, often aimed at specific climate and feeding conditions. Even with all this variety, four beef processing companies control more

than 80 percent of the market. The market seeks uniformity for large size, muscle, and weight. Cattle bought under contract represent only about one quarter of the market at present.

The American beef industry comprises about 100,000 seed-stock producers, about ten times that number of cow-calf operations, feedlots that finish off about 88 percent of market cattle, packers, and retailers. Large operations are not necessarily the norm. About 80 percent of cattle farmers raise fewer than 50 head. These producers supply about 40 percent of American cattle. The major beef-producing states in size of production are Texas, Iowa, Nebraska, Kansas, Illinois, California, Minnesota, Missouri, South Dakota, Oklahoma, Wisconsin, Colorado, Montana, and Indiana.

Beef calves weigh about 80 pounds when born, and they are weaned at six to seven months of age. Some go straight to feedlots, while others are grazed. Finished cattle are about fifteen to twenty-four months of age at 1,000 to 1,400 pounds.

In the 1950s and 1960s, American consumers began to favor grain-fed beef. Commercial feedlots tended to be located in the Corn Belt and in the irrigated fields of the Great Plains and Southwest, mainly Texas, Oklahoma, Kansas, and Nebraska. These feedlots were also drawn westward by the growing population of the western states.

The traditional handling of beef in sides, quarters, or wholesale cuts has given way to "boxed beef" prepared at the packing plant. Smaller, trimmed cuts are vacuum packaged and packed in boxes of about 100 pounds. Vacuum packing extends shelf life and reduces transportation costs and labor at the local store. This development has increased pressure from the packer for more standard and uniform cattle.

Lean beef is a big consumer demand, although consistent taste and tenderness remains extremely important. The beef industry has not yet been as successful in promoting its lean products as chicken, turkey, and pork producers. Beef consumption per capita in the United States fell each year until 1999, when the trend was reversed. Branded beef programs, such as the

Angus, might encourage customer loyalty if the quality is recognizable.

The federal grading program, which rates marbling and maturity, has been criticized. Neither marbling nor maturity is necessarily linked to taste and tenderness. Marbling can actually create a negative response in the consumer, who sees the fat. Farmers seek to have their cattle graded "choice" because it pays better, but a choice grading demands wasteful overfeeding to create more back fat than is needed for palatability.

Some consumer testing has revealed that even with the same marbling, different strains of cattle or breeds deliver better eating satisfaction. Different breeds also tend to deposit fat differently, as either back fat or internal fat. Other factors that affect meat tenderness are muscle acidity, the rate of carcass cooling, the age of the animal, and enzyme activity in the muscles.

Each year since 1970, the beef industry has slaughtered 1 million fewer cattle, yet production in pounds of beef has actually increased. Exports to Mexico, Japan, and elsewhere will probably continue to grow, although the Asian economic crisis of the late 1990s drastically reduced imports of American beef. Exports to Europe remain a problem because hormone additives are prohibited there.

The need for carcass consistency may narrow the genetic base of American beef cattle. Some cattle raisers feel that more efficient and consistent production could be obtained through the development of genetic lines, as in pork or poultry, or the use of fewer breeds. They point to the success of the pork industry, where breeds have been virtually eliminated except by seed-stock providers who create composites or hybrids. Composite or hybrid boars now control 30 to 40 percent of the market. The three purebred hog registries that still have significant numbers have consolidated their registries under one roof. And the six large poultry companies use just six composite chicken breeds. There are also no chicken breed associations of any significance. The pork and poultry industries have become vertically integrated, which some in the beef industry now advocate.

Cattle shows are also under criticism as an unneces-

About 15 percent of the value of a slaughtered cow and more than half of its weight are found in the by-products of its carcass. A cow is more than meat, hides, and dairy products. Ninety-nine percent of a slaughtered animal is used in an astounding variety of products. Some of these products can also be synthesized, but at greater cost and with the use of nonrenewable resources. Other products have no vegetable or mineral substitutes.

Gelatin is made by soaking small pieces of tissue and bone and then processing the liquid into sheets of gelatin, which can be ground into a powder. In addition to being an ingredient of desserts and fingernail supplements, gelatin is used to make medicinal capsules and pill coatings and is the base for photographic chemicals. Gelatin is also used in dyeing, tanning, papermaking, waterproofing, and India ink. Whipped into a gel, it emulsifies other liquids and is found in ice cream, yogurt, mayonnaise, and marshmallows.

Plasma proteins are used in such products as cake mixes, pasta, imitation seafood, and batter mixes for frying. Rennet, obtained from the lining of calves' stomachs, is used to curdle or clabber cheese and aid the digestibility of infant formula.

Lactose, a crystalline sugar found in whey, is a by-product of dairying. Lactose is used in baby food, food products, medicine bases, and the penicillin fermentation process. The protein casein is a by-product of making skim milk. Casein is used in fine printing paper, glue, paint, and plastic buttons or jewelry. Oleo stearine is used in chewing gum, margarine, shortening, and candy. The inedible fat glycerin is used in lipstick, makeup, cosmetic creams, medicines, and explosives. Collagen is a desirable ingredient in many cosmetic products. Biodegradable soaps are often at least 60 percent beef tallow.

Cattle by-products are used in more than three hundred medicines and pharmaceuticals, including hormones for treating blood pressure, arthritis, allergies, and intestinal and renal function, insulin, prolactin, heparin, thrombin, epinephrine, pancreatin, glucagon, iron, calcium supplements, trypsin, albumin for treating Rh factor, and other blood fractions for use in treating hemophilia and killing viruses.

Industrial products use fatty acids for lubricants and fluids, including antifreeze, brake fluid, runway foam, and machine oils. Tires, auto bodies, asphalt, and steel ball bearings all contain cattle by-products.

Cattle hides are used in shoes, boots, saddlery, luggage, belts, clothing, upholstery, gloves, sporting goods and balls, harnesses, and machine belts. Hair is used in artists' brushes. Dogs enjoy rawhide toys, chews, and the occasional hoof.

Fats, fatty acids, protein meal, and collagen are used in a multitude of products: waxes and polishes, candles, cellophane, crayons, insecticides, linoleum, plastics, and textiles. Collagen adhesives are used in bandages, wallpaper, and glues.

Popular supplements for joint problems are made from the bovine trachea.

sary expense for the industry and breed associations. Part of this criticism comes from those who advocate a move toward standardization and hybrid lines. It is true that successful show ring cattle may emphasize single traits or fail to meet commercial economics. The show ring does not reward moderate birth size in calves or maternal milk supplies.

The show ring does, however, strongly support purebred cattle. Pure breeds offer genetic variation, valuable registries or databases, and promotion. The breed associations probably need to increase their services and use of performance records. Greater cooperation between breeds using EPDs, or expected progeny differences, could allow them to become an important

information source. Duplication of efforts between the many cattle and beef groups is wasteful and nonproductive, and so consolidation or alliances between the many cattle and beef groups may help the industry. The associations need to help the producer improve his costs and competitiveness.

Cattle raisers see several other issues affecting their future: water quality, grazing and property rights, food safety, and animal welfare.

Water quality is affected by runoff from feedlots. Most feedlots are located in the Corn Belt and have a capacity of about 1,000 or fewer cattle, although huge feedlots exist in western states—some with a capacity of up to 150,000 cattle. Feeder cattle are often bought at auction and sometimes travel across several states to reach the feedlot. Some operations have abandoned outside lots in favor of confinement. All feedlots recognize that large concentrations of cattle can lead to manure disposal problems. Water rights can also become a source of contention between beef raisers and burgeoning suburban populations in the West.

The battle over federal grazing rights pits the rancher, whose family may have cared for the land for generations, against environmental or other groups over control of land use. With the acquisition of the western states, the federal and state governments came to own substantial amounts of mostly arid, often steep land. The federal government actually owns 47 percent of the land in the eleven western states. Of this land, 270 million acres is considered public rangeland. The states of Nevada and Alaska are primarily public land. In 1934, Congress enacted the Taylor Grazing Act to bring order to grazing on public land. Twelve years later, the administration of range management was moved to the Bureau of Land Management (BLM) under the Department of the Interior. The BLM also administers federal land for forest, mineral, recreation, and wildlife preservation. The U.S. Forest Service, under the Department of Agriculture, also has administrative control over grazing, timbering, and mining in multiple-use, national recreation areas.

Because they are often long held, federal grazing

leases are usually capitalized into the value of ranches and bought with ranches. Therefore, the right to graze or permit value is tied to the value of private property and includes the bank investment in mortgages and loans. Over the years, many ranchers came to feel that the land they worked and cared for was indeed theirs and they tended to disregard the U.S. Forest Service and BLM suggestions. Ranchers on federal land also invested money and work into fences, wells, and other necessities. The threat to revoke the grazing rights of ranchers is viewed as a matter of property rights, and the issue has become highly politicized in many western states.

Grazing can be compatible with good land management. Soil conservation through the use of water-retention ponds, terracing, rotational grazing, lower levels of stocking, downstream water protection, and the development of wildlife habitats can all be provided for by the rancher. Grazing fees on public land are far lower than those charged on private land. An increase in fees, however, could mean that it would be cheaper for ranchers to raise cattle on feedlots rather than on rangeland, with a greater dependence on grain and other crops.

About 92 percent of American grazing land is either too steep, too rugged, too dry, or too wet for crop cultivation. In the absence of the great Bison herds, grazing is necessary to maintain grasslands and their biological diversity. As the BLM also admits, wildlife such as American elk and Mule deer have increased their populations on public land.

On a related matter, the assertion that cattle are producing world-threatening amounts of methane is unjustified. On North American prairies, cattle have replaced the once-ubiquitous Bison in generating methane. The major sources of the world's methane are in fact rice paddies, wetlands, biomass burning, fossil fuel exploration, and coal mines.

Animal welfare issues that confront cattle raisers include the raising of veal and the handling and shipment of cattle. In general, cattle are raised on ranches, not in intensive situations. The well-known animal behaviorist and livestock expert Dr. Temple Grandin has stated

that as long as cattle stay on the ranch, the industry's animals will remain healthy.

Veal is the meat from a calf usually one to three months old, and it is often a by-product of the dairy industry. Before the specialized raising of cattle for meat markets, beef was generally supplied from old, worn-out draft or dairy animals, and milk-fed veal was a dish generally confined to the wealthy. Veal obtained from calves a few days old was known as bob veal. Tender, mild-tasting, and easily digestible, veal was a recommended food for infants and the elderly. As dairy farms developed, large numbers of superfluous calves, especially males, resulted. Some dairy farmers simply butchered or threw away these calves at birth. Farm women created numerous dishes to use the surplus of veal in the spring. The increased availability of this meat brought veal into the butcher shops and grocery stores.

In the mid-1960s, Americans ate more than four times as much veal as they do today. This has been the greatest decline in per capita meat consumption for the past twenty-five years. Health concerns are not the cause, for veal is low in fat and cholesterol while high in protein. Cost is a factor, but primarily veal has become strongly associated with animal welfare issues. Pictures of veal calves chained in tiny huts have definitely affected consumers' attitudes. Although a milk-based diet does produce the lighter-colored meat, calves do not have to be deprived of light or exercise to produce appropriately colored veal of good quality, contrary to some practices. It is not profitable to keep calves in deliberately unhealthy conditions.

Veal calves are usually kept in separate huts or stalls in North America, but most do not resemble the photographs used by some animal rights groups. Only about a third of veal calves are raised in group pens. Less expensive, less tender, and darker-colored veal is produced from older, pasture-raised or grain-fed calves raised to a heavier weight before slaughter.

Individual calf crates that prevent the calf from turning around have been illegal in Britain since 1990. However, about 500,000 young calves are shipped from Britain to Holland or France each year, where they are raised and marketed under different conditions. The

concern about the use of illegal and toxic drugs, such as clenbuterol, to promote growth in veal calves spurred the European Union drug and hormone bans in meat and dairy products.

The movement of cattle to market and slaughter remains a welfare issue in both Europe and North America. Concerns include maximum journey times, mandatory rest, water, and feed. The research of animal behaviorists such as livestock expert Temple Grandin is providing practical applications that sympathetically use cattle's natural behavior. An understanding of cattle flight zones, blind spots, and natural tendency to circle around the handler is improving the design of livestock facilities. It has been found, for example, that Zebu cattle have a greater tendency to follow other animals or people but become more agitated than other cattle in squeeze chutes.

Temperament testing is another area of increasing importance. AI use means that breeders are dealing with offspring from animals they do not know. Promoters are attempting to find the genetic information that will allow them to identify sires with better dispositions. This may become a trait described by EPDs (expected progeny difference). Just as the regular handling of heifer calves prepares them for their roles as part of a dairy herd, it has been proven that dairy bulls raised by their mothers or in group pens are far less aggressive.

Other welfare issues include the methods and practices of dehorning, castration, and branding. In Britain, regulations govern all of these practices. Chemical and hot iron branding are prohibited, while ear tagging, tattooing, ear notching, and freeze branding are allowed.

Although the practice is sometimes criticized, in North America, hot iron branding is the traditional method that allowed owners to identify their stock among large numbers of cattle grazing on open land. The Spanish brought the practice to the New World, but its roots are ancient. Many ranchers feel that branding reveals their pride of ownership and a sense of tradition or family history. Branding has its own language of letters and symbols, and states have thousands of recorded brands. Freeze branding is less painful than hot branding, but it is not legally recognized in all states.

Ear tagging has increased in popularity as an easy method of identification of specific animals, although it is not permanent. Ear tattoos can serve as a backup to lost ear tags. Scannable microchips or transducers are intriguing possibilities, but cowboys cannot read them from horseback and they are probably too expensive for large herds.

Food safety concerns demand increased inspection and testing at meat packing plants and additional attention to on-farm control of pathogens, especially in reducing fecal contamination of cattle sent to slaughterhouses. Traceback systems may need to be implemented in order to identify producers of contaminated cattle. Attention has recently been focused on contamination problems within packinghouses, especially in hamburger and processed meats. Irradiation is being promoted as one method to produce pathogen-free meat products.

The use of medicines in beef cattle is another issue of concern to some consumers. Like other livestock, cattle are wormed, vaccinated, and treated to repel flies and other pests. Feeder cattle are also given vitamin and mineral supplements to aid performance. Ranchers promote estrus synchronization with prostaglandins in order to concentrate births and their attendant chores. These uses of medicines are not generally regarded as controversial.

The subtherapeutic use of antibiotics is perceived as a problem because there is a growing public health concern about the overuse of antibiotics and their resultant contribution to resistant bacteria. In cattle, antibiotics are commonly fed in low levels at feedlots as a means to promote faster growth and maintain overall health. This feedlot practice accounts for about half the antibiotics used in the United States for both people and animals. In today's low profit margin situation, the edge antibiotics give can be significant, but the Food and Drug Administration is considering more control over which human medicines can be given to animals.

Bovine growth hormones (BGH), which are given to about 95 percent of American cattle, increase the efficiency of production and reduce fat. The European

Union has banned the importation of meat treated with bovine growth hormones since 1990, believing that it presents a human and animal risk. Beef cattle are not treated with hormones in Europe, although there are abuses of this ban via the black market or the use of other growth-promoting substances not currently covered by the law. The World Trade Organization (WTO) has found no justification for the EU ban, but the issue is not resolved.

Another issue related to purity concerns BST, or bovine somatotropin, another bovine growth hormone banned by the European Union. BST is produced by the pituitary gland of the cow and carried to the liver to produce an insulinlike growth factor (IGF-1) that helps regulate the conversion of dietary nutrients into milk. This concentration drops significantly by the end of the second month of lactation, when the supplementary synthetic recombinant BST can be given to the cow. Additional BST can increase milk production 10 percent or more over the length of the lactation. Although the Food and Drug Administration, the FAO, and the WTO have endorsed the safety of BST, the EU has banned the use of this hormone. Vermont has enacted a BST labeling law, and a small number of American dairies are marketing BST-additive-free milk. Consumers who are concerned about purity may be willing to pay more for such a product.

Perhaps the most threatening situation to affect the cattle business in recent years is BSE, or bovine spongiform encephalopathy, popularly called mad cow disease, which kills cells in the brain, leaving it spongy and full of holes. Cattle are believed to acquire the disease from consuming rendered animal remains that include brain or spinal cord protein materials known as prions. Although the rendering process that cooks animal remains is supposed to kill all disease organisms, the BSE infectious agent is now believed to be highly resistant to heat, ultraviolet light, ionizing radiation, and common disinfectants. The possible infectious nature of the disease is not known.

Similar diseases are present in elk, deer, goats, mink, and cats, and they may be related to the now virtually extinct disease called kuru found among some Melanesians. BSE belongs to the group of transmis-

sible spongiform encephalopathies, or TSEs. In 1996, the British ministry of health unleashed a firestorm when it announced the possibility of a link between BSE-contaminated meat and the rare human degenerative brain disease CJD, or Creutzfeldt-Jakob disease. Previously, CJD occurred around the world at consistent rates of about one case per million people per year. CJD occurs even where BSE is not present and equally among meat eaters and vegetarians. Possible causes include a side-effect of some surgeries or perhaps a genetic predisposition.

Since the disease was first identified in 1985, 173,000 cattle have been diagnosed with BSE in Britain. Although 63 percent of British herds have not recorded a case of BSE and 84 percent of beef suckler herds have never had a case of BSE, stringent measures have been enacted to deal with the disease. In 1988, ruminant protein was banned in animal feed for other ruminants; at present, the use of mammalian meat and bonemeal is banned in feed for all farm animals. All cattle over age thirty months were removed from the food chain in 1996. This has resulted in the slaughter and incineration of 4.6 million cattle, including offspring and herd mates of affected cattle. Cattle registration and tracing systems have been implemented. The RBST has maintained that special dispensations should be made for the rare or minor breeds that have shown little or no incidence of BSE. Often these breeds are raised on grass over a longer timespan, and so the thirty-month rule would discriminate unfairly against them.

No cases of BSE have been identified in the United States. For many reasons, the threat of BSE is much lower in the United States. First, soy meal was the primary feed additive, not meat or bone meal. In addition, a different rendering process is used, and the relative number of sheep is smaller. In 1989, the USDA enacted a ban on the import of live ruminants or their products, such as meat, bone meal, offal, fats, glands, or fetal serum, unless used in cosmetics, from all countries where BSE has been found. No beef has been imported from the United Kingdom since 1985. Beef by-products are banned for cattle or sheep feed. The FDA has also banned blood donations from Americans who

have spent extended time in Britain or other European countries where BSE is present.

In 1990, the USDA began a BSE surveillance program, conducting field investigations of suspicious cases and testing the brains of cattle with neurological symptoms. At present, the disease is detectable only through brain tissue examination, not in live animals. The USDA also began tracing the 499 British cattle imported between 1981 and 1989.

To date, Canada has had one confirmed case of BSE in a cow imported from Britain. All herd mates and nearby cattle were destroyed. Cattle deemed at risk and imported from 1982 to 1990, when imports were banned from Britain, were destroyed.

The impact of the BSE crisis in Britain has been enormous. Faith in British beef has eroded, British beef exports have been banned, and disagreements in the European Union have heightened. By 2001, BSE had spread throughout cattle herds in most of western Europe, and national slaughter programs were initiated. The hysteria has also spread to other meat products, dairy products, cosmetics, human dietary supplements, and other consumer items. The cost to farmers, processors, retailers, exporters, and the government to compensate individuals is staggering, yet it will take a great deal more than money to restore goodwill and confidence. Part of the solution may lie in the production of high-quality meats raised more naturally.

Biotechnology advances that seem likely to affect the cattle business include the identification of gene markers for specific traits, the removal or insertion of genes, and cloning. The temptation to use cloned copies of ultra-high milk producers will be enormous. Sexed semen and the increased use of genetically elite young heifers and bulls for more rapid selection of desired traits are also predicted to become more important. Some dairy experts have predicted that a core breeding group of super-elite cows could serve as the source of high-production clones. The gene mutation labeled myostatin, which produces more muscular cattle in breeds such as the Belgian Blue and Piedmontese, has also been identified.

Profitability is linked to feeding, which is the pri-

mary expense in producing beef. Minimizing harvested feeds in favor of extended grazing or low-cost, crop by-product feedstuffs is becoming more important.

Grass-based dairying, which makes use of intensive rotational pastures, is also receiving more attention. The choice of dairy cow breeds can be very important in this system. Large cows are less energy efficient than smaller cows. Smaller cows also tolerate heat better, are less damaging to wet pastures, have shorter calving intervals, and have fewer calving difficulties. Some dairy farmers are crossing their herds with more active or aggressive grazers such as Ayrshires.

Beef producers predict an increased use of brand-name beef labeled either by producer or by breed, such as the successful Certified Angus Beef program. This is an opportunity for specialized producers. Natural beef, organic beef, and grass-fed beef are all value-enhanced products. Ongoing studies conducted by the USDA Grazinglands Research Laboratory in Oklahoma have demonstrated that grass-fed cattle given a corn-based supplement can become ready for market at less cost without spending time in feedlots.

The breeding of purebred cattle faces many challenges. Color preferences have drifted from red to white to black. Breeding fads have gone from big to small and back to big and will probably change again. Both large beef and dairy animals have increased problems with calving, which can work against profits. Some beef producers predict a return to increased Longhorn genetics for hardiness. The dairy industry may also make greater use of the breeds that provide more fluid milk solids.

Among the threats to pure breeds is the decision of the European Union decreeing that national breed organizations in different countries should have compatible herd books if they export cattle into Europe. This will certainly weaken the genetic purity and strength of certain breeds in which different national registries have allowed outcrossing or upgrading.

In Britain and continental Europe, the BSE threat may support the traditional grass-fed breeds, which may be slow to mature but meet the challenges of purity, ecology, and better welfare. Unfortunately, many of the old traditional beef breeds are being changed through

the use of imported large cattle. The rapid increase in the use of Continental beef breeds in both Britain and North America threatens the security of traditional breeds.

The RBST has established a new category of preservation called Native Breeds for purebreds with no imported bloodlines or crossbreeding. The first breed identified is the traditional British Hereford. While these Traditional Herefords will continue to be registered in the Hereford Cattle Society, they will be given special status in the RBST Herd Book. A Traditional Hereford Breeder's Club has been established to secure and promote the original type. The RBST has added other breeds such as the Lincoln Red to this classification as they have been identified.

Beef and dairy products are valuable, nutrient-dense foods. Both beef and dairy cattle can be raised in systems of sustainable agriculture. The rare breeds can make significant contributions in these systems and to the production of specialized products. Because it is so difficult to import new cattle genetics into the United States, safeguarding the diversity of American breeds is essential to providing the widest possibilities for cattle in the future.

## Breed Profiles

### *White Park (pl. 65)*

In North America, a park is an area of land set aside for recreational use or special scenic beauty. Often gardens are part of city parks, and large gardens are an important facet of both city and country parks in Britain. In the eighteenth century, the park often became a vast canvas painted with landscaped areas.

Originally, however, a park was a private hunting ground. This forest or grassland was enclosed by huge banks, ditches, stout wooden fences, hedges, or stone walls. Protected by strict rules and penalties, deer, cattle, and swine could run free within the park, but they also provided meat for the landowners. Sometimes parks were used as sheep pastures, horse studs, or timberlands. This idea of emparking, or park-making, expanded rapidly from the eleventh to fourteenth cen-

turies. The Domesday Book recorded thirty-one parks, but this number rose to more than nineteen hundred during the height of their popularity.

White cattle with colored points, either red or black, were present in the old Hamitic Longhorn population that came from Egypt. They appear wherever this ancient type was taken: from Spain to North and South America, to Africa, and to Britain. An alternate theory proposes that this color-pointed pattern is an ancient variation and can crop up in different areas. This striking pattern can appear almost unreal or magical and has been associated with religious rituals or sacrifices in different places and times.

Color-pointed white cattle were probably present in Britain four thousand years ago. One of the first descriptions is found in the pre-Christian Irish epic *The Cattle Raid of Cooley*, which is based on an ancient Celtic story. Although a brown bull and a white-horned bull are featured in the story, it is the white cattle with colored points that are so esteemed. The Druids, the ancient Celts' religious order, used such cattle in their ceremonies.

It has been suggested that the Romans introduced these cattle into Britain, but the Roman occupation did not extend northward into Scotland or its borderlands of Northumberland, Cumbria, and Durham or to the west into Lancashire, Cheshire, Staffordshire, Wales, and Ireland. Besides remaining the stronghold of Celtic culture, these areas were home to ancient cattle types such as the Kerry, Highland, and Galloway. It was in these regions that the ancient White Park cattle survived in small enclaves. The White Park has proven to be genetically distinct and distant from all other British breeds, including the British White. In addition, the White Park color pattern is dominant, unlike the color of the British White or Italian white breeds. The White Park most likely represents one of the purest ancient cattle breeds.

White color-pointed cattle were enclosed in several parks from the thirteenth to fifteenth centuries. Tradition held that these were wild cattle, but that cannot be proven. Feral cattle did run in some areas and were the object of hunts. Except in Wales, herds of White Park cattle were not specifically documented until the

seventeenth century, although local stories and circumstantial evidence, such as horned white bulls on family crests, does exist to establish their long history.

The "wild white beasts" at Chillingham in Northumberland were noted in 1692. The Tankerville family has kept this feral herd since 1260, and the cattle are considered a separate breed.

In 1623, the presence of "wild" white cattle was recorded in Durham at the park at Bishop Auckland. White cattle were also present at Barnard Castle in Durham. Additional herds were found in Cumbria at Naworth Castle, in Lancashire at Hoghton Tower, in Cheshire at Lyme Park and Vale Royal Abbey, in Staffordshire at Chartley, in Wales at Lamphrey Court and Dynevor Castle, and in Scotland at Blair Athol, Cadzow, Cumbernauld, Drumlanrig, and Kincardine. When King James I ate a cut of beef from the Hoghton Tower herd, he knighted it Sir Loin.

Some of these herds have not survived to the present, although the herd at Drumlanrig has been reestablished. The cattle from 3 herds contribute to the White Park breed today—Cadzow, Chartley, and Dynevor.

The Wild White Cattle of Cadzow Park have a colorful history. According to legend, wild forest cattle were driven into the park during the thirteenth century. And as the story is told, Robert the Bruce, king of Scotland in the early fourteenth century, was hunting in the park one day when he was rescued from one of the fierce bulls. The current High Park was enclosed about 1650, and the white cattle were definitely part of the estate. They were protected at two other locations during Oliver Cromwell's occupation and then returned. Later, they avoided a destruction order during a rinderpest epidemic when a bull and some 14 cows were hidden from the authorities.

The Cadzow herd is part of the family title for the duke of Hamilton and so has continued to the present. In 1886, a red-eared Chillingham bull was used in the herd. In 1979, the herd was taken to the Lennoxlove Park, where they graze in the parkland near the house from spring through fall. The cattle spend the winter in large covered courtyards. When they are available, cattle are sold from the herd. Bulls from other White Park herds such as Dynevor and Vaynol have

been introduced, and the Cadzow horns do resemble the Dynevor.

White cattle with colored points, known as the Wild or White Forest breed, have long been noted in Wales. The *Laws of Hywel Dda*, the thirteenth-century codification of Welsh law, determined the payment of fines by specified numbers of white cattle with colored points. Early in that century, the Welsh sent 400 white color-pointed cows and a bull to King John in a failed effort at appeasement.

Dynevor Castle in Llandeilo in southern Wales was the home of the prince of Wales and the center of Welsh government from A.D. 800. In the mid-nineteenth century, the white cattle were still fairly common in the area, not only as a park breed but also as stock on farms. The cattle looked much like those found in the parks at Chillingham and Chartley. The cows did occasionally give birth to black calves. Their numbers were beginning to decline about the time that the existence of the Dynevor White Park herd was noted in 1898.

This herd is now owned and conserved by Lawrence Alderson, former director of the RBST. The herd is kept in southwestern England, although some cattle have recently been restored to Dinefwr Park in their ancient Welsh home. The cattle carry horns that grow out to the side and then forward and upward. Horns can measure 60 inches from tip to tip. Dynevor cattle probably share a distant heritage with the Welsh Black, which may be the source of the black recessive gene present in the breed.

The Chartley Park herd in Staffordshire was established by the Devereux family from their own older herd at Lamphrey Court in southwestern Wales. At one point, English Longhorn cattle were used to help save the herd, although the Longhorn characteristics have mainly been selected out of the Chartley cattle. White Park cattle at Chartley can have horns that grow out and then curve downward similar to the Longhorn. A Dynevor White Park bull was also used for breeding. The herd was dispersed in 1905, although it has been reestablished in new herds in southern and southeastern England.

In 1918, the Park Cattle Society was founded by the duke of Hamilton, owner of Cadzow; the duke of Bed-

ford, who had established a herd at Woburn; and the earl of Tankerville from Chillingham, who served as president. In 1932, the Chillingham cattle were withdrawn as a separate breed. The society also registered British White cattle in the herd book until 1946, when their breeders formed a separate group.

By the late 1960s, the only remaining herds of White Park cattle were found at Dynevor, Cadzow, Whipsnade Zoo, and Woburn. Only about 65 breeding cows survived. The White Park became the symbol of the RBST, which offered support to the new breed society and reissued the herd book.

In Britain, there are now about 250 breeding females and 25 bulls. White Parks have also been exported to North America, Denmark, Germany, France, and Australia.

The slow-growing White Park is a large breed, with cows weighing about 1,400 pounds and the bulls growing larger. Long-lived and hardy, the White Park has survived through winters without shelter and grazing only on rough forage. The cows have virtually no birthing difficulties. White Park carcasses are lean with low back fat. Because the White Park is so genetically different from other breeds, it imparts great hybrid vigor when used in crossbreeding to beef cattle. Crossbred White Park calves have exceeded Herefords, Welsh Black, and Limousin in growth rates.

White Park cattle have a pigmented skin with black or red ears, eyelids, muzzle, feet, and teats. Sometimes there are freckles on the face, neck, or shoulders. The tail switch is white. The dominant White Park coloration strongly marks the offspring. White Parks can carry a black recessive gene, but black or overmarked calves are not registered. The breed society seeks to identify bulls that are homozygous for the traditional color pattern.



Endangered

### *American White Park*

Because White Park cattle represent an invaluable piece of English heritage and history, it is fortunate that a separate population has been established elsewhere.

Perhaps as a method of safekeeping in the years before World War II, a small group of White Park cattle was sent to North America in 1938. In North America, the authorities were under the impression that these White Parks represented Cadzow and Chillingham animals. However, it now seems that these cattle probably came from the Cadzow herd, which had used a Chillingham bull in the preceding century.

The cattle were first sent to the Toronto Riverdale Zoo in Canada. One pair of their offspring was sold to the National Zoo in Washington, D.C. In the 1950s, the USDA acquired a small group of White Parks from the National Zoo to use in studies on the inheritance of the color pattern and the production values of the White Parks and their crosses. The New York Zoological Society also purchased two pairs of the Canadian offspring in 1941. These cattle entered the United States classified as wild animals. The next year, when they no longer had the space to keep them, the Bronx Zoo offered the cattle to the King Ranch in Texas. The cattle did well at the ranch but remained small in numbers.

Although the King Ranch has stated that the White Parks were kept in an isolated pasture, colored calves occasionally appeared in the herd, such as black with white markings, white with red points, and white with red spots. A mysterious black-colored "White Park" bull was used to breed the herd in 1977, and a black Texas Longhorn bull was used in 1980, when a White Park bull was unavailable. The population in the 1970s tended to be maintained at one bull and 10 to 15 cows plus their spring calves. Heifers were generally retained and bull calves were sent to slaughter.

When the King Ranch decided to disperse many of its cattle, the Moeckley family of Iowa, breeders of British White cattle, purchased the White Parks. The Moeckley family hoped to use the White Parks in upgrading their British White stock. Forty-two cows and 6 yearling bulls came to Iowa in 1981.

When the 48 White Parks arrived at the Moeckley farm, more than half of the cattle appeared to be Longhorn crosses resulting from a breeding the previous year. The crossbred cattle exhibited characteristics such as White Park coloration but with Longhorn-

shaped horns, salt-and-pepper markings on the hips, or red points. The Moeckleys sold all of the visibly crossbred stock to Longhorn ranchers. All of the remaining calves were dehorned. Three of the best young heifers were placed with the British White herd. Six of the bull calves were sold at auction, with 3 of the bulls going to rodeo stock breeders. The older cows and remaining heifers were used for crossbreeding on a British White bull with the intention of upgrading the calves to the British White registry.

After recognizing the rarity of the White Parks, the family imported a Cadzow bull, which began siring calves in 1987. Several of these calves were black in color.

There are now several White Park herds in the United States and Canada. Kent Whealey of Seed Savers Exchange and Heritage Farm began his herd in 1987 with heifer calves from the Moeckley farm. Three other individuals also purchased cows: Jy Chipertzak, Brad Kelley, and Mark Fields. In 1989, Maryanne Mott purchased the entire Moeckley White Park herd for her Bar-B Ranch in Montana. The herd consisted of the imported bull Cadzow Ernest, 8 older King Ranch cows, 8 dehorned cows, and 9 calves. Frozen semen was obtained from a Dynevor bull in 1991 and from a Chartley bull whose semen had been preserved in Canada since the 1960s.

Jy Chipertzak, founder of Rare Breeds Canada, who had purchased a White Park cow from the Moeckleys in 1987, later obtained a bull from Bar-B Ranch. The 2 dehorned cows obtained by Brad Kelley of Kentucky were bred with frozen semen from Cadzow Ernest. Mark Fields of Missouri also purchased a dehorned cow. He was able to purchase a bull from the Bar-B Ranch to use in his breeding program.

A great confusion resulted when the initial imports of British White cattle were mistakenly identified as White Parks or Polled White Parks. The American breeders of British White cattle named their association the White Park Cattle Association of America and allowed an upgrading program. The Moeckleys called the White Park registry that they organized the Horned White Park Cattle Association.

After the Moeckley herd of true White Parks was

sold, the new breeders reorganized into the Ancient White Park Cattle Society of North America. These cattle should be called by their correct name, White Park, but are sometimes referred to as Ancient White Parks because some British White breeders in North America continue to use the name White Park or Polled White Park. A new British White Cattle Association of America has been established, which may clarify the proper name usage.

The Bar-B Ranch in Montana is involved in organic beef production and is actively conducting progeny testing and blood typing of the White Park cattle. A careful breeding program has been organized in the hopes of maintaining the highest percentage of King Ranch breeding and minimizing the use of British genetics unless the herd proves not to be significantly different from the British herds.

The White Park cattle in North America are white with black points on the ears, muzzle, teats, hooves, lower legs, and horn tips. The bull Ernest Cadzow obviously carried a recessive black gene, as did some of the cows, which is the source of the black calves. Instead of being culled, the small number of black or red calves is being conserved in the interest of genetic diversity. The coat grows to a medium length, generally straight except for some curls on the heads of the bulls. The cattle are distinctively stamped with the primitive conformation, including long, wide faces and lyre-shaped horns. The bulls are fierce and large. The cows birth easily and are extremely protective. Owners have observed a strong herd instinct with more vocalizing between members than other cattle. The White Parks are alert but somewhat nervous or shy around people.

There are about 150 White Park cattle in North America. In the population there are 50 to 70 breeding females, although the older cows are nearing the end of their reproductive lives. The White Park bulls have excellent potential as the sires of crossbred beef calves and have thrived in locations from Texas to Montana. The breed has also found a safe home, although it is far from the parks of medieval Britain. Kent Whealey relates an entertaining story from Heritage Farm's annual Halloween eve bonfire, at which one hundred pumpkins glowed. Kent describes the scene: "This year I

was surprised to notice that the cattle had actually come down after dark from the upper field to see what all the fuss was about, and were curiously watching from the edge of the firelight. Suddenly I started to chuckle, imagining the scene as a *Far Side* cartoon with one of the old cows telling her calf, 'Darn, I was afraid this would happen again . . . Druids!'"



Critical



Rare

### *Vaynol (pl. 66)*

The feral group of white color-pointed cattle in Vaynol Park in northern Wales was established in 1872, using 52 cattle from a herd in Scotland. These cattle may have included some white Highland cattle because they were described as woolly. Three Cadzow White Park bulls were eventually used with the herd, which has never numbered more than 55 cattle. There was little human interference in the herd, although when the occasional black calf was born, it was culled.

After the death of the owner, Sir Michael Duff, the estate was sold and the herd was moved to a farm park in 1980. Four years later the herd was purchased for the RBST and forced to move four times in search of a permanent home. Finally, the herd was settled at Home Farm, Temple Newsam Estate, in Yorkshire. The trust still provides some support to the herd.

The RBST decided to stop culling the black heifers because the population was so small. About half of the herd is now black. Blood tests have revealed the separateness of the Vaynol from other White Park cattle, so they are now considered a breed of their own. By the early 1990s, the population numbered 32, with 6 bulls and 17 breeding females. A second breeding herd has since been established on a farm next to the old Vaynol Estate.

Vaynol cattle are primitive and angular in appearance with sickle hocks and a sloping rump. The horns generally grow upward. At 800 pounds, they are about the size of a Kerry cow and somewhat fearful of people.

The Vaynol remains the most endangered breed in Britain. Semen from 8 bulls has been preserved, but the trust has been unsuccessful in collecting embryos.

The RBST's Genetics Advisory Panel carefully manages the breeding program. Those involved with the breed are pleased that these cattle have found a stable environment with excellent care and are hopeful about the breed's future.



Critical

### *Chillingham (pl. 67)*

Chillingham Park, near England's Scottish border, was probably first enclosed as baronial hunting ground around A.D. 1225, when the king of England permitted the castle to be fortified with battlements and surrounded by a park wall. The "wild" white Chillingham cattle were enclosed within the park at that time and were used both as a meat source and for hunting.

Written records concerning the "16 white wilde beasts" are first found in the Chillingham Park estate account books of 1689. This book also records the presence of both red-eared and black-eared white domestic cattle at the family's estate in West Sussex. At that same time, the inactive family title, the earl of Tankerville, was revived. Each successive earl would continue to protect the park's wild white cattle.

Eighteenth-century records reveal more about the cattle. They were fed hay in the winter and occasionally hunted. By midcentury, the herd numbered 35, including 3 bulls, 15 calves, 17 steers (implying castration), and 2 cows. In 1770, all of the black-pointed cattle were culled, leaving only red-eared animals. In 1789, Thomas Bewick published a wood engraving of a Chillingham bull, describing it as "of the ancient Caledonian breed" and calling the herd the Wild Cattle.

Bewick's description of the cattle probably drew on the writings of John Bailey, who managed the Tankerville properties. At this time, the white cattle had black muzzles, red ears both inside and about one-third of the outside, and fine white horns with black tips. Cows hid their calves from the herd until they were at least a week old. The park keepers were able to approach these hidden calves in order to castrate them. Other than occasionally being culled for the table, the cattle received little or no other management. Bewick also noted that

tame cows were frequently turned out and bred by a wild bull. They were said to produce white calves with red ears.

In the nineteenth century, Charles Darwin wrote about White Park cattle and in 1862 encouraged an annual census of the Chillingham cattle, which continued for a few years. The herd fluctuated between 50 and 70 animals. The sixth earl was a good friend of the famous artist Edwin Landseer, who was known for his paintings of animals and created a stunning portrait of the Chillingham cattle in 1867.

Soon afterward, the fortunes of the Tankerville estate declined, and the size of cattle parkland became smaller. The herd was kept at a smaller size of 30 to 40 animals. The nonprofit Chillingham Wild Cattle Association was created in 1939 to help support the herd.

During World War II, the cattle were fed hay. The herd's greatest threat came in the winter of 1947. During the previous summer, weather had prevented the making of hay, and then the winter turned severe, with a horrendous blizzard in March. The cattle would not eat the oats or pellets offered to them and they fought over the oat straw that was delivered when help could struggle to get through the immense drifts of snow. Only 13 adult cattle survived that terrible winter, 5 bulls and 8 cows. More than a year passed before the cows began to calve again and slowly return to their previous numbers.

In 1972, a reserve herd was established in Banff in northern Scotland on 18 acres, although the group remains very small at 9 animals and seems to have fertility problems. After the death of the eighth earl in 1980, the association assumed ownership of the cattle. When Chillingham Park passed into the hands of the Sir James Knott Charitable Trust eight years later, the cattle lease was extended for 999 years. As a result, the cattle will be protected far into the future.

Lean and primitive in appearance, the Chillingham cattle stand about 43 inches tall, as compared to 51 inches in their cousins the White Park cattle. Chillingham cattle also weigh less than half as much as the White Parks, about 660 pounds in bulls and 615 pounds in cows. Their horns are very upright and become classically lyre-shaped with age. The white cattle

are only lightly marked in red inside the ear and on the muzzle with a dark nose. There is some freckling on the face and neck, reddish, grayish, or blue-black in bulls. This distinctive spotting helps identify the cattle as individuals. Bulls grow longer curly hair on the head and forehead. The bulls survive to about thirteen years of age, and the cows live about four years longer. They mature slowly, with cows often not giving birth until their fourth year.

The size of the park available to the cattle is 330 acres, which they share with Fallow deer and Cheviot sheep. Many small wooded areas dot the grasslands and bracken. The association has begun a program of improvements to the park, planting new trees and controlling the inedible bracken. The Cambridge University zoologist Stephen J. G. Hall has studied the behavior of these feral cattle, revealing much about the natural life of free-roaming cattle.

The cattle are able to breed year-round, so calves can be born at any time. The calving interval is 450 days, slightly longer than domestic herds. The cow gives birth in private and leaves her calf hidden when she returns to the herd to graze. She remains alert, however, and will attack anything that threatens her calf. At about ten days, the calf follows the mother back to the herd for a formal sniffing introduction by all the members.

The traditional opinion has held that only one bull remains with the herd all year. This King Bull earns his reign through fights with the other bulls. The rest of the bulls live in groups of two or three in home ranges that may overlap. Hall's study noted that a cow could be bred, not just by the King Bull, but by the dominant bull of a home range. It is not known how the smaller parkland may have affected the natural behavior of the cattle. In addition, in winter the herd is now fed grass hay, well spread out so that all the cattle can eat. The feeding spot is moved each day. The cattle are highly suspicious of people and have been observed to kill a calf handled by humans. About half of the calves die before the age of two. It is not known whether this high rate of death is due to inbreeding depression, the environment, or attacks by the older cattle.

The cattle have not been culled since early in the

twentieth century. They die natural deaths but have not contracted contagious diseases, nor are they wormed. In 1980, it was necessary to give the cattle supplementary magnesium to combat hypomagnesemia, which killed 24 cattle.

One Chillingham bull was sent to the Cadzow herd in the nineteenth century. A pair of Chillingham cattle was given to the London Zoo before World War I, and another pair went to the Whipsnade Zoo in the 1930s. The eighth earl of Tankerville did not believe that either pair produced progeny. Chillingham cattle were successfully used in crossbreeding with Shorthorns around 1875, and one bull was entered in the Coates Herd Book.

Chillingham cattle are an invaluable, pure genetic reservoir and living laboratory of wild behavior patterns. There is no record of outside blood entering the herd since at least the late seventeenth century. There has been minimal human management for more than seven hundred years. Inbreeding certainly exists and is probably evidenced by the smaller size of the cattle, but the cattle remain healthy, viable breeders. This may be partially due to a lack of human interference in breeding. The strongest bulls survive to mate, as do the strongest cows. The population remains at about 40 to 50 in number.

The RBST regards the Chillingham as a feral breed. Although they are descended from the same white Scottish cattle as other White Parks, Chillingham cattle are now a separate breed due to their long isolation, inbreeding, and earlier selection by humans. Individuals may join the Chillingham Wild Cattle Association and view the park and the cattle.



Feral

### *Highland (pl. 68)*

The Scottish Highlands are famed as a mystical and romantic place of rugged mountains, moors, glens, ocean fjords, islands, barren rocks, and steep valleys falling into icy streams or lochs. The weather can be harsh, the landscape battered by cold, driving rain and snow. The small folds, or herds, of Highland cattle

have been part of this landscape for thousands of years. These shaggy cattle are descended from the Hamitic Longhorns brought to Britain in the second millennium B.C. by Neolithic farming peoples. Through the centuries, Highland cattle were raised mainly as a beef and working breed but were occasionally milked.

Cattle raising was very important to the Scottish economy. Many observers also noted the continuous and numerous cattle raids, known as “reiving,” that occurred back and forth across the borders. The trade in cattle began in the Middle Ages and continued for centuries, interrupted only by war.

The first herd book of the breed society, written in 1884, stated: “No cattle in this country have retained in greater uniformity the same characteristics as a distinct breed than the Highlanders have done, and this seems to point to the conclusion that there has been little change in the character of this class of cattle, except that produced by a more careful system of breeding, so far back as any information on the subject can be obtained. . . . The breeding of cattle has been so general over the whole Highlands and Islands that no single breeder can be credited with the distinction of having started the breed.”

The 1884 herd book describes the two distinct classes, or types, of Highland cattle to be found at that time. The type known as the West Highland, or Kyloe, was found mainly in the Western Isles of Scotland. The usual color of the Kyloe was black, and the cattle were smaller and shaggier than the mainland Highland cattle. It is not known whether this size was due to the harsher conditions of the islands or to a distinctive trait of the Kyloe. The herd book noted that colors besides black had been noticed only in “recent years” and came with introductions of cattle from Perthshire.

The Kyloe cattle may have received their name from the *kyles*, or straits, across which they swam when they were driven 50 miles or more to market on the mainland at Crieff and Falkirk. Because the breed is slow-growing, these market cattle were generally four to five years of age. Many English drovers purchased the cattle at market and drove them over the Pennines into England. In 1723 alone, about 30,000 cattle were sold at Crieff to English drovers. After their journey,

they were fattened to a slaughter weight of about 550 pounds.

The mainland Highland cattle were very common in the north of Scotland. Besides exhibiting a greater variety of color, this Highlander type was fed on better pasture and was larger in size. By the nineteenth century, many breeders were known for their excellent folds developed exclusively from mainland and island cattle without outside breed influence. In the first herd book, the founder animals were drawn from the two intermingled types of Highland cattle. They were mainly black or dun in color. Bulls stood about 44 inches tall, and cows were slightly shorter.

At present, Highland cattle are most commonly colored red, tan, or yellow, although they can be black, brindle, white, or silver-white. Brindle is defined as a tawny or gray color with streaks or spots of a darker color. Many breeders enjoy keeping a multicolored herd. They believe that not selecting for a specific color keeps the genetic pool large and maintains vigor.

The hair coat of the Highland is distinctive. The long forelock can flow down over the eyes or even the nose, giving the animal a bemused expression. The body hair is profuse, long, and slightly waved. A downy undercoat beneath the long outer hair can reach 13 inches in length. The undercoat provides warmth, and the slightly oily outer coat sheds wetness. When Highland cattle are raised in a hotter, drier climate, they shed much of their hair coat in summer.

A long fringe of hair often obscures a Highland's ears. This hair can hide the curious “dock” ears that are often seen. These ears are short or split with ragged edges. The Highland Cattle Society of Scotland views the crop ear as an undesirable genetic defect but permits registration and breeding of such animals. This trait has been present for many generations.

The Highland has an appealing and picturesque head. Short but broad, the head is crowned by lovely horns. The long horns of bulls usually grow out level from the side of the head, inclining slightly forward and rising upward. Some breeders favor a downward curve. Cows are horned in two different patterns.

The Highland bull does not have a heavy dewlap under the neck. The neck forms a straight line to the

shoulder in the cow. Bulls can have a masculine crest. In both sexes the body is well rounded, deep, and long. The legs are short but strong, broad, and well feathered. The long tail is hairy.

In Scotland, the Highland remains smaller in harsher environments and larger on lowland pasture. In spite of its slow growth and smaller size, producers like the Highland's economical production on marginal land. Grass-fed steers finish up to 1,000 pounds at two years. Because of their heavy hair coat, Highland cattle deposit less fat under the skin. Highland beef is considered distinctive and lean and is the choice of Britain's royal family, who raise them at Balmoral Castle. In North America, bulls can sometimes weigh 1,500 to 1,800 pounds and cows 900 to 1,100. Grain is sometimes used to finish off the steers.

Highland cattle were exported to Manitoba, Canada, in 1882. Although they may have made their way to the United States earlier, the first recorded American imports were made in the early 1900s to ranches in Wyoming and Montana. Four bulls and 45 cows were included in the first American herd book, all from the Montana herd. In the 1920s, there were more imports to the eastern states, and further imports have occurred more recently.

The American Scotch Highland Breeder's Association was founded in 1948, registering purebred cattle only. The descriptive "Scotch" was dropped in the 1990s. Highland cattle are now present across the United States, even in some warmer states. The Canadian Highland Cattle Society was founded in 1964. Although upgrading was allowed before 1994, partbred cattle are no longer eligible for registration. Highland cattle are most numerous in Alberta, British Columbia, Ontario, Quebec, and Saskatchewan.

Highland cattle have done especially well in the northern areas of North America, employing the same strong traits that have served them so well in the rugged conditions of Scotland. Highland cattle have an almost legendary hardiness and are excellent wintering cattle, doing well in harsh weather even without shelter. They are a very long-lived breed, with average cows raising 12 or more calves. Highland cattle are noted for their intelligence and self-reliance. Some breeders feel

that this confidence borders on indifference to humans. The long hair also provides protection from flying insects, although they can have a greater problem than other breeds with lice and fly-strike in hot weather. The cow's mothering instinct is highly developed, and birth is generally easy. Highland hides are desirable as floor rugs, and the horns are valued as decorations. The lovely and unique Highland also makes an attractive oxen team.

Able to handle tough terrain, the Highland is known as a browser. Although Highland cattle need access to pasture, they are able to suppress brushy invaders such as thistle, blackberry, gooseberry, raspberry, alder, sumac, aspen, pigweed, cherry, willow, and milkweed. The Highland will work on the underbrush, converting woodland into parklike areas over a few years.

Because the Highland is genetically different and pure, this breed imparts great hybrid vigor in crossbreeding. Dairy farmers can use Highland bulls to father small calves for easier births. Calves can tolerate late winter storms and thrive the next winter on minimal feed and attention. Crossbred calves are also hearty, with less external carcass fat. Highland-Hereford crosses have a higher weaning weight and percentage of calves weaned than either parent breed.

In Britain, the traditional Shorthorn-Highland cross has been developed into a recognized breed called the Luining. Originating on the island of Luining off the western Scottish coast in the 1940s, this breed has been exported to Canada and other countries. Unfortunately, the Luining has not fared well in Canada and failed to register a single animal by 1993.

Although the Highland population in the United Kingdom may be as high as 15,000, there is importance in preserving the breed in separate places. Highland cattle have been exported from Britain to Argentina, Australia, Sweden, Germany, South Africa, New Zealand, and elsewhere. In 1970, there were about 500 registrations annually in the United States and 124 in Canada. Twenty years later, the American numbers had increased to more than 750 and the Canadian registrations to 500 to 600. The ALBC estimates the total Northern American population at about 10,000. Some

of the breed's success in North America is due to the Highland's exotic and highly recognizable appearance.

North American breeders are now enjoying an export market for Highland cattle. Canadian Highland cattle breeders are sending about 100 animals each year into the United States and elsewhere. Frozen embryos have been exported from the United States to Argentina. Both Canada and the United States have exported purebred cattle to Europe.

The importance of preserving the Highland as a pure breed in North America may become more crucial with the European Union requirement requiring that herd book rules be compatible from nation to nation. Some European registries allow upgrading and so have introduced outside blood into their cattle. If other registries are forced to accept these crossbred cattle, the Highland breed will be genetically diluted. The traditional Highland is a genetically separate breed formed through centuries of isolation and is valuable because of that purity.

In the United Kingdom, the Highland Cattle Society has always allowed unregistered female cattle into an appendix section of the herd book if they are physically inspected and judged to be of "true Highland type" by experienced fieldworkers. This would apply to any cattle coming from other herd books as well. Both males and females would have to comply with the society's appendix rules. This situation is somewhat different from recognized programs of upgrading as practiced by other cattle registries.

Highland breeders face additional concerns. In North America, most Highland cattle are raised without stimulants on natural grazing. The Highland is well suited to the natural, lean, or custom meat markets, and the value of this product can compensate the raiser despite the breed's slower growth rate and smaller size. If Highland raisers choose not to raise and market naturally lean beef, they are forced to finish out on grain to meet the market grading requirements for fat. The Highland horns and hair can also be a disadvantage at sale barns where buyers do not want horned and hairy animals even though they serve a valuable purpose in harsh climates or for protection from predators. The alternative is to dehorn and shear the hair.

North American breeders accept a variety of appearance in their stock, and the associations use a breed description, not a breed standard. There is increasing pressure to select for faster-growing young stock or cattle that conform to accepted market conformation. Some breeders feel that this emphasis is creating problems with feet, udders, and diminished mothering instincts. It is most important that the hardy functional traits of the Highland are not damaged in pursuit of show cattle or marketing trends.



Recovering

### *Kerry (pl. 69)*

The Kerry cow may trace part of its origin back to the small central Asian cattle of the Celtic peoples who came to Britain and Ireland around 300 B.C. The Celts were cattle raisers whose animals were integral to their culture. The Kerry also seems to be related to the White Park and other longhorn cattle that may have been in Britain for at least four thousand years.

In Ireland, these cattle essentially remained undisturbed, unimproved, and distinct. The Kerry is an extremely good example of those ancient Irish Celtic cattle and is a valuable part of Ireland's national identity. Often the common family cow of the poor, the Kerry is an extremely attractive, elegant cow that is also hardy and thrifty.

Outsiders did not recognize the little Kerry cow from County Cork until the late 1700s. The Kerry was already noted as a uniform type of small and good milking cow, praised for its ability to milk heavily on scanty fare. Today the Kerry is traditionally black with touches of white markings on the underside or udder, but in the eighteenth century, the Kerry could also be red or brown. Cows with white markings, either white line-backed, streaked, speckled, or brindled, were called Drimmon. Drimmon cattle may have represented a specific Kerry strain.

The Kerry was first shown at the Royal Dublin Show of 1844. The Kerry was soon the most important dairy breed in western Ireland, yielding 12 to 16 quarts of milk daily. Kerry steers fattened slowly but

were noted for their fine quality. British royalty and the aristocracy took notice of this dainty, graceful breed and took the Kerry home to their estates. At the turn of the twentieth century, the Kerry enjoyed considerable popularity as a house cow.

In 1887, the Royal Dublin Society organized the first herd book, which included 118 bulls and 943 cows. At this time the Dexter was believed to be a smaller version of the Kerry, and so they were included together into societies in England in 1892 and in Ireland in 1917. The two breeds separated into different groups in Ireland two years later. Black was chosen as the official breed color, although red and Drimmon Kerries are still born. Some cattle raisers assert that this has excluded some excellent cattle from the registry strictly on the basis of color.

In Ireland, the Kerry received unusually strong government support. From 1888 to 1902, premiums encouraged breeding to good Kerry bulls. In 1925, the government created the Kerry Cattle Area, where only Kerry bulls were to be used for dairy cow breeding. The export of the best bulls to Britain did become a problem in the area. After World War I, Kerries were exported to France to aid the recovering farmers there.

Kerry exports to North America began officially in the years from 1818 to 1824, and they continued into the mid-nineteenth century. The first American herd book was issued in 1898, and the breed society for the Kerry and Dexter was established in 1911. In North America, the breed never achieved significant popularity, and the last Kerry was registered in 1920. Registrations languished until 1971, when an Ontario farmer imported 11 heifers and a bull to establish a dairy herd that continued for fifteen years.

Unfortunately, even in Britain and Ireland the Kerry rapidly lost ground to the larger dairy breeds. By 1980, the ancient breed was nearly gone. In 1983, fewer than 200 pure Kerries were to be found in the world. The Royal Dublin Society, which had continued to maintain the Kerry herd book, recognized the importance of rescue efforts. Small numbers were reestablished in Britain in 1971, with the import of 20 heifers and 5 bulls. The new British Kerry Cattle Society was cre-

ated in 1986, although British Kerries are registered in the Irish herd book.

By 1992, the breeding population in Ireland and Britain was about 350 cows, located mainly in County Kerry. The Kerry Cattle Society of Ireland and the Royal Dublin Society continue to work together to lessen harmful inbreeding, and they are pursuing a fully computerized registry of genetic relationships. The Irish Department of Agriculture continues a premium for Kerry cattle in Ireland and maintains a herd at Killarney. Through the recent efforts of the RBST, the EU reclassified the Kerry as a dual-purpose breed. This allows owners, who often keep the Kerry as a suckler cow rather than as a purely dairy animal, to receive applicable premiums.

In North America, most Kerries descend from the Ontario herd. In 1990, there were 14 Kerries in Canada and 4 in the United States. The North American Kerry Cattle Society was formed in 1992, assisted by Rare Breeds Canada. By 1993, there were 14 breeders with 52 Kerries, found mostly in Canada. This number has now grown to about 100. Artificial insemination, embryo flushes, and transfers are aiding in this effort.

Through these travails, the Kerry has remained virtually unchanged. The breed description has changed very little and is beloved by its admirers. The Kerry has always been graced by a lovely light head with its classic and elegant white horns tipped with black. The bones are hard, and the typical black coat is shining satin. The cow's udder may be white or partially so. The conformation is long, level, deep, and dairy in character. Cows weigh 800 to 1,000 pounds and bulls up to 1,300 pounds. Although slow growing, the Kerry is long-lived and often calves with ease at fifteen years of age.

The Kerry is still a remarkably frugal animal to keep. The cow is hardy, thrifty, and an economical milk producer. The agile Kerry is very adaptable and will browse as well as graze. For her size, the thrifty Kerry is still an excellent dairy cow. Average cows give about 7,700 pounds of milk annually and good ones up to 9,900 pounds. Butterfat is 4 percent, and the fat globules are smaller than normal, making the milk more

digestible. The milk also has a homogenized appearance because the globules do not rise readily to the surface. In Canada, preliminary research has shown considerable differences in the levels of mono- and polyunsaturated fatty acids in Kerry and Holstein milk. Further work is needed to determine if Kerry milk is indeed higher in unsaturated fatty acids and therefore more nutritionally desirable.

The Kerry has been called the world's first dairy breed. It certainly is an ancient and lovely cow, long linked with Irish heritage and history. Such distinctiveness is priceless.

 Critical  Rare  Vulnerable

### *Dexter (pl. 70)*

The remains of Dexter-sized cattle have been found at Stonehenge and may represent the common size and type of Iron Age cattle in Britain and Ireland. In more recent times, some farmers may have purposefully chosen the smaller Kerry stock, just as choices were made between a dairy or beefy type. A visitor to County Cork in 1810 noted that the local farmers preferred "small beasts" because they were hardier and better suited to the land. The first recorded description of the Dexter breed appeared in 1845. Lord Hawarden's estate agent, or manager, on Valentia Island in County Kerry, a Mr. Dexter, had developed a strain based on the local mountain cattle. As a breeder, Dexter's goal was a small, dual-purpose household cow. There have been suggestions that Devon cattle were also used in the breed's development. One observer of the time described these new Dexter cattle as "curious." The Dexter soon established a foothold in southern Ireland.

In 1882, Dexter cattle were brought to England, mainly as a "curiosity." Because the Dexter was believed to be a smaller version of the Kerry, they were included together in the Kerry and Dexter cattle societies and their respective herd books in Ireland, England, and North America. The two breeds would not have separate registries until 1919 in Ireland. Meanwhile,

little distinction was made between the two breeds, and Kerry cows were frequently mated to Dexter bulls.

The Irish government never supported Dexter breeding efforts as it did the Kerry, but the Dexter was an attractive and practical cow that found favor in the country and abroad. By 1925 in Britain, there were more than 1,100 registered cows in almost 70 herds. The breed suffered setbacks in the 1930s and 1940s but has made a comeback. The British population is now about 2,800. An official upgrading procedure is allowed in the registry. In recent years, some breeders used outside blood from the Aberdeen Angus and Jersey, and Welsh Black may have been introduced in the past.

The first recorded American imports of Dexter cattle, numbering about 200, were made from 1905 to 1915. Because the Kerry had made its way to North America much earlier, it is possible that the Dexter came as well, especially since the conveniently sized Dexter was also used as a milk-producer aboard ocean-going ships. Three large Dexter herds were established in New York, Minnesota, and Kentucky early in the twentieth century. Two modern herds can trace their roots directly back to two of these foundation herds. When the Kerry no longer recorded new registrations after 1920, the registry name was changed to the American Dexter Cattle Association. Additional Dexters were imported after 1950. Although only 75 Dexters were registered in 1970, numbers have steadily grown since then. There were 500 registrations in 1990, and the United States population may be as high as 3,000 today. The American registry does not allow upgrading, but registers by pedigree only.

The first 55 Dexters were brought into Canada after 1960. Doris Crowe of Canada made another significant import in 1982, and these cattle made important contributions to the breed in North America. The Canadian Dexter Cattle Association was founded in 1986, quickly registering 400 cattle. The Canadian registry now receives about 110 to 120 animals a year. The population is estimated at 600 to 700.

Dexters have also been exported to Australia, Argentina, Europe, New Zealand, and South Africa.

South African breeders favor the taller dairy-type animal and they now have a population of about 1,200 dun or black Dexters.

In Britain and North America, Dexters can be black, red, or dun. Small amounts of white on the udder or bull's underside are allowed. Dexters are a horned breed. The white horns arc upward to black tips. In the United States, the breed standard ideal describes a three-year-old bull as 38 to 44 inches in height and weighing less than 1,000 pounds. A cow of the same age is slightly shorter and weighs less than 750 pounds. In Britain, the average cow is shorter than 40 inches and weighs about 650 pounds.

The average Dexter cow will give 1 or 2 gallons of 4 to 5 percent butterfat milk a day, which is often more appropriate for a family cow than a larger breed. Like the Kerry's milk, the fat globules in the Dexter's milk are small. Where dairy character has been encouraged the Dexter seems to be capable of producing 4 or 5 gallons of milk daily. The Dexter also produces a good, family-sized carcass, since it is blockier in conformation than the Kerry. Retaining its hardiness, the long-lived Dexter is a good forager and browser.

A concern exists in the Dexter community concerning the dwarfing factor that is present in the breed. Two types of Dexters have long been described, the long-legged and the short-legged. Some short-legged Dexter cattle exhibit such dwarf features as heavy, misshapen head and forequarters, higher tail-head, shorter body, neck hump, malformed joints, and increased problems with conception or calving. Other short-legged Dexters are perfectly formed miniature animals of proper proportions. There can be a gradation between these two types. There are also longer-legged Dexters that are almost Kerry in appearance.

Breeders have long felt that if both parents have the dwarf factor, believed to be a partially dominant achondroplastic gene, then about 25 percent of their offspring will be long-legged, about 50 percent will be short-legged Dexters, and the remaining 25 percent will be "bulldog calves," so deformed that they are usually spontaneously aborted. Other authorities believe that the dwarfing problem is more complex and that individual animals cannot be cleanly divided

into long- or short-legged types. A study under way at the University of Illinois hopes to identify the DNA markers for the bulldog trait.

Unfortunately, the dwarf, sometimes freakish animal was a curiosity in Victorian Britain, and the genetic defect was perpetuated. Show-ring infatuations with extremely small size have also favored the dwarf type at times. The recent popularity and resultant higher prices of Dexter stock have led some to view the breed as a moneymaking venture. Some breeders are willing to accept a certain number of bulldog calves in the pursuit of small size, and so they continue to use the dwarf factor in order to produce fashionable animals.

Other breeders have seriously addressed the dwarfing problem and almost entirely eliminated it from their herds through careful identification and selection of breeding animals. These breeders have successfully produced true breeding, healthy miniatures. In addition, many breeders have scrupulously avoided outside breeding in their bloodlines. In summary, the Dexter buyer needs to be well informed in making a choice of breeding stock.

Dexter bulls have been used in the past for crossbreeding with Shorthorns, Herefords, or Aberdeen Angus, producing nice, small, beefy stock. The use of Dexter cows for crossbreeding, like those of any rare breed, is not recommended because it wastes the genetic breeding potential of that cow during her relatively short reproductive life. Similarly, the efforts of miniature cattle breeders who seek only to produce smaller and smaller animals is somewhat senseless. Cattle are not pets.

Dexters are perfectly suited for family uses. Their size makes them easier to handle and cheaper to feed. Producing family-sized amounts of milk and meat, two Dexters can be bred at different times and thus supply milk year-round for about the same amount of money and care as one much larger cow. The Dexter cow is a good forager and excellent mother. Long-time Canadian breeder Doris Crowe asserts, "When we build space stations and people live in them all the time, they are going to take a Dexter cow with them."

Because of these positive traits, the Dexter population has continued to grow in the United Kingdom,

North America, and elsewhere. Although the worldwide number of Dexters has grown to around 10,000, this population is varied in type and separated by health regulations. The first World Dexter Congress met in 1998, helping to insure that responsible breeders will remain committed to the Dexter's healthy future.



### *English Longhorn (pl. 71)*

By the beginning of the eighteenth century, large, long-horned cattle were being used for draft work in the west-central shires of Lancashire, Staffordshire, Yorkshire, Derbyshire, and Westmorland. The type known as the Old English or Craven Longhorns were described as lean, flat-sided, heavier in the fore and neck than other breeds, slow-growing, and fair producers of both meat and milk. In Lancashire, Longhorns also produced milk used for butter and a local creamy, crumbly cheese. Although long-horned cattle were described as black in Yorkshire, others were often “finched,” or linebacked in white.

The eighteenth-century livestock breeder Robert Bakewell is credited with the improvement and recognition of the English Longhorn. Bakewell's goal matched his work with Leicester Longwool sheep. Recognizing the need for increased meat production to feed growing urban populations, Bakewell looked for small-boned, short-legged, rapid-growing cattle who laid on larger amounts of meat and fat. He was not at all interested in milking ability, and consequently the breed's ability diminished. He was often quoted as saying, “All is useless that is not beef.”

Bakewell's improvement of the Longhorn began in about 1760 on the family farm at Dishley Grange in Leicester. He selected cattle that fit his purpose from many sources, including the Midland drovers who passed through the area and other breeders who had been working with long-horned cattle. In addition to the Craven area of Yorkshire, attention had been paid to the Longhorn in Derbyshire and Coventry. Bakewell used the technique of inbreeding the cattle that met his standards and culling any offspring that did not.

He also used modern feeding techniques and practiced progeny testing. Bakewell's Improved Longhorns were also called Dishley cattle or New Longhorns. Other Longhorns were named for their place of origin and called Craven, Lancashire, Leicestershire, or Warwickshire cattle.

The long-bodied, barrel-chested Dishley Longhorn grew rapidly for market, weighing up to about 840 pounds. The horns, which could reach a length of 30 inches, grew in different patterns. Some grew outward, downward, and back in toward the face, which often required trimming to prevent injury to the cheeks. Some horns grew out to the sides and then upward. Other cows had two differently patterned horns. The Longhorns had varied coat colors: red, black, and white or yellow often spotted or brindled but more frequently linebacked.

This Improved Longhorn enjoyed stunning success. Bakewell and his enthusiastic followers actively popularized the breed, and by 1810, the Improved Longhorn dominated cattle breeding in the Midlands, especially in Derbyshire, Leicestershire, and Staffordshire. The breed's influence was also felt beyond these counties. The Longhorn was briefly the most popular breed in Britain, but the fortunes of the breed began to falter without Bakewell's guidance following his death in 1795.

Longhorns were taken to Australia, and a few came to the United States in 1817. Old English Longhorns probably made their way to the New World earlier but without documentation. They did not succeed as a breed in the New World, and the English Longhorn is not related to the Texas Longhorn, except perhaps through their ancient ancestor the Hamitic Longhorn.

The newly improved Shorthorn breed rapidly superseded the Longhorn in popularity. The Longhorn did suffer from several problems. Some were perhaps related to Bakewell's rapid selection techniques. There were both fertility and hardiness difficulties, and it seemed that the ability to fatten more quickly had come at the expense of other important traits. The oddly shaped horns were a problem when cattle were kept together for close feeding, at slaughter yards, or taken to market.

In the areas where they survived, Longhorns often reverted to their original type. They were again a slow-growing, hardy breed able to gain on grass. Steers were again used as oxen, cows were milked by the farmers of Cheshire and Lancashire, and the breed won beef prizes. But mostly the Longhorn faded away. Even on Bakewell's old farm there were no Longhorns by the 1840s. By 1880, many felt that the breed was almost extinct.

In 1899, admirers of the striking English Longhorn formed a breed society. Soon after the turn of the century, 400 were registered, mainly from the Midlands and on the Isle of Man. During the twentieth century, the breed managed to hang on in small numbers. One important conservationist was Robert Wales, who started the Stoke herd in Wiltshire in 1939. Today, English Nature maintains a Longhorn herd on Wales's original farm, now part of the Parsonage Down National Nature Reserve.

In 1973, the RBST found only 120 breeding females. The entire world population was down to about 800 animals at one point. In 1981, two representatives of the Longhorn breed won a major beef award, but the desire to focus on beef production and more rapid weight gain narrowed the genetic pool of bulls used for breeding. In a small population, great care must be taken to preserve diverse genetics.

The large-framed English Longhorn bulls are still used for crossbreeding, and Longhorn cows are noted for their ease of parturition. The milky cows are useful in suckler herds. Longhorns are crossed on breeds such as the Welsh Black to produce crossbred beef. Some cattle raisers believe that the Longhorn can be competitive with the recently imported Continental beef breeds. Longhorns do tend to lay down fat, but in an outer layer rather than heavy marbling in the meat. This can be useful in producing leaner cuts for market, and Longhorn beef is often marketed as a naturally fed product with high flavor and quality.

The Longhorn body is long and can be well muscled. Some breeders select for the less cumbersome downward-growing horns. The favored color pattern has become a dark to light brindle with white linebacking. There are often white flecks, spots, or a larger patch

on the thighs, brisket, and lower legs. The hair coat can grow longer and thick.

Admirers of the breed enjoy its decorative appearance, and a well-matched pair of docile Longhorn oxen is indeed striking. British Longhorns have been exported to Germany for use in extensive beef operations, where the herds do well outdoors even in winter and receive minimal attention.



Minor

### *Ayrshire (pl. 72)*

The Ayrshire is the native dairy cow of Scotland and the successful survivor of several types that were still present in the early nineteenth century in the Scottish Lowlands. By the mid-1600s in the northern area of Ayrshire known as Cunningham, there was a type of cattle used for cheese making called either the Duntlop, for the name of the cheese, or the Cunningham. In 1783, these cattle were described as "mostly black, with large stripes of white along the chine or ridge of the back, about their flanks, and on their faces." The unknown writer also remarked that they were generally ill fed and therefore small in size and production of milk. The now extinct Fife or Fifeshire was also a large, black, dual-purpose breed that had an excellent reputation as a milker.

Beginning about 1770, brown or brown-and-white Dutch cattle were imported into the area. Crossed on the local cattle, they had a positive effect on the dairy breed that would eventually be called the Ayrshire. Although there still are some black-and-white cattle in the breed, Ayrshires became standardized to a brown-and-white or red-and-white pattern.

Ayrshire breeders developed an efficient grazing cow that produced milk for butter and cheese. Careful attention was paid to udder conformation. Some breeders were interested mainly in show-ring cattle that became extremely refined in appearance, while others pursued commercial milk production herds. Eventually these two goals would be merged in the early twentieth century.

The Ayrshire was officially recognized by the High-

[To view this image, refer to the print version of this title.]

land and Agricultural Society in 1814, although a herd book was not issued until 1877, when the Ayrshire Cattle Society was founded. Cattle from Holland, Germany, and Denmark flooded into Scotland in the mid-nineteenth century. During this time, the Ayrshire may have incorporated some crosses of Shorthorn or Channel Island cattle as well.

The Ayrshire was also being exported. The first Ayrshires made their way to the United States in 1822 and were taken to Connecticut and other parts of New England. The breed suffered from a belief that it would not succeed as well in the United States as in Scotland. A farm handbook of 1885 suggested, “They do not yield so large a quantity of milk in this country as they do in Scotland. The chief reason for this is found in the difference of climate. Ayrshire has a moist climate—an almost continuous drizzle of rains or moisture pervading it—making fresh green pastures; a cooler and more

Fig. 39 Lady Kate, a lovely Ayrshire cow, illustrated the cover of *Country Gentleman* in 1886. Courtesy of the IAB and Hans Peter Jorgensen.

equable temperature in summer, and warmer in winter than ours” (Jones 1885, 764). Some farmers also felt the Ayrshire was more nervous than other cows. These prejudices may have prevented its more widespread acceptance (fig. 39).

The American Ayrshire breed association was founded in 1875. In the 1920s and 1930s, the association ran a milk labeling program called Approved Ayrshire Milk, which was marketed directly to consumers. To demonstrate the breed’s hardiness, two cows were walked from the association headquarters in Vermont to the 1929 National Dairy Show in St. Louis. Afterward they calved and produced outstanding milk records. Eventually the Ayrshire spread beyond New

England, and today the breed's areas of popularity include New York, Pennsylvania, Ohio, Wisconsin, Minnesota, and Iowa.

Since the Holstein ascendancy, Ayrshire numbers have been declining steadily in the United States. Annual registrations have been cut in half since 1970, and the breed now numbers about 28,000 nationwide. Appraisals and the numbers of herds and cows on milk test programs are all lessening. The Ayrshire now accounts for about 0.3 percent of the American dairy herd. At the same time, the average milk production and solids percentage per Ayrshire cow is steadily increasing. The average cow is producing more than 15,000 pounds. The modern American Ayrshire has been influenced by the genetics now available from Canada.

Scottish settlers brought the Ayrshire to Canada about the same time they arrived in New England. The Ayrshire became established in the central provinces of Quebec and Ontario, and the breed association was established in 1898. Canada continued to import Ayrshires into the twentieth century, and the government authorities promoted them even at the expense of the native Canadian.

In Canada today, the Ayrshire is second in popularity to the Holstein, although the population is much smaller. Ayrshire breeders have actively pursued breed improvement through performance testing, type classification, and the promotion of artificial insemination. The Ayrshire Breeder's Association of Canada allows upgrading, and red-and-white Holstein additions are believed to be responsible in part for the increased height, length, weight, and productivity of the Canadian Ayrshire. Many Canadian Ayrshires are producing 22,000 pounds of milk, with 3.5 percent protein. In Canada, milk producers are paid according to milk components of fat, protein, and lactose, so that Ayrshire milk can provide greater revenues than Holstein milk. Ayrshire registrations in Canada remain stable at around 10,000 a year. The Canadian Ayrshire is the most productive branch of the Ayrshire family but is probably also the most removed from the original type.

Canada has become an important and aggressive exporter of Ayrshire genetics worldwide, including back to Scotland and Britain. Several hundred cattle are

exported annually, and 40,000 to 50,000 semen doses are also sent abroad, primarily to the United States but also to Australia, Great Britain, Sweden, Cuba, India, New Zealand, Mexico, Switzerland, South Africa, and Colombia.

The Ayrshire was also exported in large numbers from Scotland to Finland and Sweden from 1847 to 1923. The Finnish Ayrshire is the most numerous breed in that country. Finland now has the world's largest population of Ayrshires and exports them elsewhere. Finnish Ayrshires were also very popular in the former Soviet Union. The Swedish Red and White, a result of crossing Sweden's native red cattle with the Ayrshire, is the most popular breed in Sweden but is more of a dual-purpose cow.

In Scotland, the breed society employed milk production statistics very early. Scottish breeders also adopted testing for tuberculosis earlier than in Britain and could then sell their stock to British farmers, who were anxious to establish tuberculosis-tested herds in Britain. This contributed to the success of the breed in the mid-twentieth century. In Scotland, the Ayrshire continued to hold its own against the Holstein-Friesian until recently. At present, only about 1 percent of British dairy artificial insemination is drawn from Ayrshire bulls, compared to 95 percent from the Holstein.

The traditional Ayrshire is a breed that does well as a grazer and is still valued for its low-cost conversion of feedstuffs into milk. The cow produces a milk with 4 percent fat, 8.8 percent nonfat solids, a color midway between white and yellow, and small, easily digestible fat globules. Ayrshires are known for their good udder conformation and sound feet and legs. Both qualities contribute to longevity and lower replacement costs for dairy farmers. Unlike the Guernsey and Jersey, the Ayrshire does not produce a yellow-colored fat, so that its carcass value is higher.

The Ayrshire is a medium-sized breed weighing about 1,200 pounds and standing 50 to 53 inches tall. The Ayrshire coat is a red-and-white combination that can vary from mostly white with red spots to nearly all red. The red color may be dark mahogany to very light. Brindle or roan coloring is rarer today. Ayrshires have

distinctive lyre-shaped horns. In the past, the horns were carefully trained to achieve a graceful, correct shape and then polished before cattle shows. Today most Ayrshires are dehorned as calves.

In spite of the Ayrshire's success in continental Europe and in Canada, the RBST is concerned about the falling population in the United Kingdom. Similarly, in the United States the ALBC is concerned about the decline of the Ayrshire, which can be so useful in grass-based dairy operations. The Canadian Ayrshire, though much improved for production needs, has diverged from its Scottish roots. The Finnish Ayrshires have also followed their own path. Finnish and Canadian genetics have become very important in the worldwide population, including the United States and Great Britain. This influence is also a concern for the traditional Scottish Ayrshire.



### *Shetland (pl. 73)*

One hundred and thirty miles northeast of the Scottish mainland lie the Shetland Islands. Colonized by the Vikings, these small islands with long, harsh winters have long been the home of hardy crofters and their animals. Because of their isolation, over time the crofters' animals became distinct breeds. Although the ponies, sheep, and dogs have become well known far from their home, the small Shetland cattle almost disappeared.

Shetland cattle are Scandinavian in origin and probably once included various types that were lyre-horned, polled, dun, or white with black points. In the traditional Shetland society, the crofter's wife generally cared for and milked the house cow, which often lived under the same roof as the family and became very attached to her caretaker. These cows were frequently called "clouty cows" because they were often sold with a piece of the wife's *clout*, or apron, to sooth the cow in a new home. The house cow was typically milked three times a day. The cow provided milk that was used as a whey drink called *blaand*, butter, and *kirn* milk, which was actually a soft cottage cheese. Kept in the byre at night, the cow was tethered nearby or turned out near

the house to feed on such poor forages as heather or seaweed. Calves were generally slaughtered at a young age. Some cattle were also used for plowing. When winters were especially harsh, animals could become so starved and weak that they could not stand alone. Cattle, or *kye*, were then "inlifted," or kept alive suspended in slings.

Serious attention was not paid to the common Shetland cow until the twentieth century. Although Red Poll and Shorthorn cattle had been brought to the islands in the 1880s for use in crossbreeding, the Shetland cattle spread throughout the islands remained largely isolated. And the smaller Shetland cow was easier to house and to transport in boats and needed less food than a larger animal. In 1911, the Shetland Cattle Herd Book Society was established to preserve the native breed. When the first herd book was published the following year, 120 owners registered 380 cows and 39 bulls.

Two types of Shetland cattle were noted, one more dairy and the other more beefy in purpose, although most were still dual-purpose house cows. The average cow at that time was about 40 inches tall and weighed about 630 to 640 pounds. The short-horned Shetlands were likened to Channel Island cattle in appearance and often in color. The cattle in the herd book were described as dun, red, gray, black, and brindle. Some displayed the ancient color pattern of a brown stripe down the back and around the muzzle.

In 1923, two Friesian bulls were brought into the islands to help the crofters increase milk production and calf size. The popular black-and-white coloring was also in greater demand when cattle were sold on the mainland. At this time, the herd book revealed about 550 purebred cows spread throughout the isolated islands. During the Depression there was an increased use of Aberdeen Angus, Red Poll, and Shorthorn cattle in crossbreeding. During World War II, the government's subsidy was not available for purebred calves but only for the larger crossbreds. This crossbreeding almost eliminated the Shetland, and the value of retaining a sufficient purebred population was not recognized until the 1950s. At one point, there were only 35 purebred cows and 2 bulls.

In 1958, Scotland's Department of Agriculture and Fisheries established a breeding herd of 7 cows and 9

bulls near Inverness. Besides preservation, the Knocknagael herd was used to promote the use of superior bulls through artificial insemination services to island farmers. The Knocknagael bulls were selected to be somewhat heavier-boned, beefier Shetlands, which has influenced breeding throughout the islands. This small national herd has been maintained and is used to produce crossbred calves.

In 1972, the Shetland herd book was revived. With the continued efforts of breeders and financial incentives from the RBST, the numbers of purebred cattle grew slowly. The RBST provided financial assistance for the herd books, purchased cattle to establish herds in England and Scotland, provided free AI semen to island crofters, and acted as a liaison between mainland and island breeders. The Shetland Islands Council also paid premiums to owners of Shetland cows and bulls. Magnus Burgus preserved the Collafirth herd, which included rare lines of Shetland cattle.

In the 1980s, the herd book was averaging about 67 registrations each year, but this grew to 105 by 1989. In 1983, a small herd was sent to the Falkland Islands after the war to aid in the recovery efforts, and it is still maintained there. In 1992, 18 bulls from 4 lines and about 150 cows were being actively bred. One hundred and seventy-one calves were born in 1995. The use of artificial insemination has been valuable to the far-flung cattle, but care must be taken to avoid overreliance on a few bulls.

Beginning in the 1930s, the Shetland population began to lose many of the traditional colors as black and the black-and-white pattern became almost universal. The recessive red-and-white pattern is still present in the population. It is hoped that the other old color varieties will reemerge.

Today, Shetlands are generally fine-boned, short-legged, and deep in body. Their horns are fine and small, curving upward and inward. On the islands, a wide range of size is still seen, perhaps linked to specific strains. When taken to a better climate and forage, Shetland cattle grow larger. Farmers have noticed that the breed converts feed so efficiently that Shetlands can easily become too fat on good pasture. There is a ten-

dency to select for larger size, but cows should not exceed 50 inches in height at the withers.

The Shetland has earned its reputation for hardiness and thriftiness. Calves raised for meat attain a slaughter weight of about 650 pounds at about two and a half years, but this is economical production on marginal land. The early maturing Shetland cows have proven to have almost no difficult births and yet still have a high ratio of dam to calf body weights. Shetland cows are noted for their long, flat lactation patterns, and some cows have given up to 6 gallons daily. Cows may continue to milk for years. One sixteen-year-old cow was still giving 4 to 6 pints of milk daily eight years after calving. Longevity is a strong Shetland trait.

Dual-purpose breeds continue to struggle in today's specialized agriculture. Yet the Shetland still has considerable commercial potential because it remains a hardy, economical, self-sufficient cow. With their long lactation and milkiness, Shetland cows are also successful as suckler cows, able to raise large crossbred calves. Further, the Shetland is one of a few breeds that is completely free of BSE. And, of course, the Shetland remains a marvelous smallholding or house cow.

The Shetland's long history is intertwined with the traditional life of the islands and richly deserves the nation's attention.

 Critical

### *Red Poll (pl. 74)*

Norfolk and Suffolk Counties lie on the large East Anglian peninsula on the eastern coast of England. This area includes dark, rich farmland, the reclaimed marshland of the Broadland, and the sandy heath of the Breckland. After Roman control of Britain ended, Saxons from the Danish and northern German coast settled throughout eastern England. Viking raiders later came from Norway, and these invaders owned both red and dun-colored polled cattle, which they probably introduced to the country. Combined with the native cattle, local breed types arose that were well suited to the needs of the farmers and dairymen.

The now extinct Suffolk Dun was a cow of exceptional milking ability. Even with minimal feeding and care, the Suffolk Dun was thought to be the greatest producer in England. The polled Suffolk Dun was a small cow with lean dairy conformation, a large belly to accommodate large amounts of poor roughage, a large udder, and a ridged backbone. Although the breed was named for the traditional dun color, in shades of yellowish brown to mouse gray, the Suffolk Dun was also colored cream, brindle, or red. The dun color was not especially striking, and that may have affected its loss of popularity in favor of such colors as the dramatic reds. Had it survived, the Suffolk Dun would have been very useful to dairy farmers and breeders.

In Norfolk, the descendants of old middle-horned cattle were often colored red with a white face. Although some writers in the eighteenth century disparaged the local Norfolk Red, others noted the breed's hardiness and ability to grow beef.

Guided by the belief that their local cattle were the most suited to the land, dual-purpose breeders began to merge the best of the two breeds around the beginning of the nineteenth century. One breeder named Jonas Reeve displayed his New Red Polled cattle at the Norfolk Show even earlier. The two counties of Norfolk and Suffolk merged their agricultural societies in 1846 and classes for the new breed, called the Improved Norfolk and Suffolk Red Polled, were seen at the Royal Agricultural Society show by 1862. The first herd book was published in 1874, and the name was changed to Red Poll in 1882. There was no provision for upgrading. Milking records were included ten years later.

The first herd book established red as the official color of the breed. The deep, rich red remains the preferred color. White is seen in the hair on the tail switch and in front of the udder. The udder is large and prominent. Any trace of horns or scurs has become unacceptable. The Red Poll gives the impression of a short cow, but it is heavy and sturdily built. Bulls weigh about 2,000 pounds and cows about 1,250 pounds.

The 1940s and 1950s were the height of the Red Poll's popularity, especially in East Anglia, where it was the dominant breed. Red Poll owners admit that the de-

mand for breeding stock caused unsuitable animals to be used, which affected the breed's reputation.

Facing increased pressure from the Friesian in dairying, the society introduced Danish Red cattle and created a more productive British Red or Danish Red section in the herd book. Some longtime breeders were so offended that they removed themselves from the society. Others saw the breed's most admirable traits slipping away. The Red Poll was an early maturing, hardy, long-lived breed that did not need large amounts of concentrates to produce beef and milk. There was also concern that Danish cattle introduced fertility problems into the breed.

With the failure of this experiment, breed numbers fell until the society was reorganized in 1980. At that time, there were some 20 herds and 148 registered cows. Only 13 herds were being milked. Additional Red Polls may have been present in milking or suckler herds.

The Red Poll Cattle Society and the RBST have encouraged the traditional traits and uses of the breed, and there are now about 1,000 breeding females. Red Polls are used equally in dairy and suckler herds, with cows often able to nurse a second adoptive calf as well. Their milk has small, easily digestible fat globules. Cows average about 8,800 pounds of milk annually, with some dairy farmers achieving even higher yields while still using farm-raised forages. The society and RBST are also promoting a milk-recording program to assist breeders in breeding choices. Bull calves and heifers not needed as replacements can be raised for excellent returns as beef.

Many British breeders feel that the Red Poll's future lies in preserving its dual nature, feeling that it cannot compete with the fashionable breeds in either milk or beef production. A solid, economical dual-purpose breed will continue to find a place on farms.

The Red Poll actually achieved greater popularity in the United States before it did in Britain. The old Norfolk and Suffolk cattle had made their way to the United States during colonial times but did not survive as breeds. From 1873 to 1887, more than 300 Improved Norfolk and Suffolk Red Polled cattle were imported

from England. The American Red Poll Cattle Association was formed in 1883. With the development of the railroads, western ranches began looking toward the beefy polled breeds of Britain, including the Angus, Galloway, and Red Poll.

Canadian ranches also imported the Red Poll, which were often called moolies or mulies, from the Celtic word for polled. In eastern Canada, the government of New Brunswick was in possession of a small herd by 1873. The most successful breed promoter was H. C. Clendening of Manitoba, who assisted in the formation of the Canadian Red Poll Association in 1906. The breed became very popular in the 1950s but has decreased significantly since then. Canadian registrations average about 220 annually. Although commercial dairy herds were in existence until the early 1980s, the breed is also promoted for cow-calf beef production. The greatest number of herds is now in Alberta and Ontario. The association has maintained a closed herd book, and purebred cattle can be traced back to the English imports.

In the United States, the Red Poll was regarded at first as a dual-purpose breed, displaying the variation in type from a dairy to beefy appearance. Mainly building on the stock present in the country, the numbers of Red Poll cattle increased until the American association was registering about 6,000 head each year by the late 1920s. The Depression years caused a slight setback in numbers, but registrations resumed at about the same numbers by the 1950s. At about this time, the beef production traits began to be encouraged until the Red Poll was officially declared a beef breed in 1972, and soon after, the name was changed to the American Red Poll Association.

Unfortunately, the population was also decreasing. Since the 1960s the breed has averaged fewer than 2,000 registrations annually. In 1990, this number was about 1,400 with only one milking herd remaining in production. Upgrading is allowed in the registry.

Red Polls are early maturing cattle that produce a choice carcass at fourteen months of about 650 to 700 pounds. Mature bulls weigh 1,800 to 2,200 pounds and cows 1,100 to 1,300 pounds. The darker red color is more popular, but Red Polls are seen in various shades

of red. White is often seen on the underline, udder, and tail switch.

Red Polls are still abundant milkers and therefore do well in crossbred calf operations. Breeders report that, because the cows are so milky, they lose weight dramatically during nursing and regain it after weaning. Herd owners also appreciate the Red Poll's maternal traits and easy-to-handle temperament. As crossbreeding use increases, the challenge will be to maintain sufficient purebred animals. Breeders also need to retain the breed's excellent milking ability. Red Polls are notably long-lived, hardy, and gentle. Their feet are especially strong, and their pigmented skin affords them excellent protection against sunburn.

The American Red Poll has demonstrated its excellent crossbreeding possibilities in specific situations. The Red Poll has contributed to the Senepol, developed in St. Croix, by crossings with the African N'Dama. Senepols are growing in popularity on the U.S. mainland as well. The Red Poll has also performed well in Jamaica, originally as a dairy animal but later shifting its focus to beef production. A small introduction of Zebu genetics has given these cattle, now known as the Jamaica Red, additional tropical strengths but has not overwhelmed the breed. The Jamaica Red is very popular and successful on Jamaica, and they enjoy a tremendous export market that actually exceeds supply. The Red Poll has also been crossed on Pitanqueiras and Velazquez cattle in South America.

British and American Red Polls have been exported to Australia, New Zealand, South America, and parts of Africa, where they are used for dairy, suckler, and beef herds.



Rare



Watch



Vulnerable

### *Irish Moiled (pl. 75)*

Polled cattle have been present in Britain and Ireland for three or four thousand years. Scandinavian polled cattle were probably introduced with the Viking raids of the ninth and tenth centuries in southern and eastern Ireland. The Polled Irish Breed and the Irish Dun resembled both these Scandinavian cattle and the Suf-

folk Dun of Britain. Both Dun breeds are now extinct, perhaps because they did not have a striking color that made them stand out.

In Irish, *moal* means bald or hornless, and *moalai* is the affectionate and teasing word for “baldy.” These words were eventually used to describe the *moiley* cow. Moiley or moiled cattle were widespread in Ireland in various colors and regional types. The Irish Donns or Duns were light brown, whereas the Donegal Reds were reddish cattle with brown noses and ears. Drimmon or Droimeann cattle were linebacked, brindled, spotted, or streaked. Polled Irish cattle could also be roan or black.

Linebacked cattle have a white stripe down the back and tail and up the underside. The stripe may be narrow or wide. There is dark color on the sides, and the legs may be dark or white with dark spotting. The face may also have white markings. Linebacking is also described as finching or ring-straked.

In the mid-nineteenth century, moiled cattle were found throughout Ireland, especially around the River Shannon, where they functioned as a dual-purpose breed of medium size. In Britain, they were called the Polled Irish Breed. At the end of the century, the native Irish polled cattle had lost favor and were mainly to be found in Sligo and Ulster in Northern Ireland. These cattle of northwest Ireland were mainly red.

In 1926, a group of interested breeders decided to promote and develop these dual-purpose cattle for the benefit of the small hill farmers of Northern Ireland. They formed the Irish Moiled Cattle Society. The society’s members sought to isolate the breed from the general nondescript cattle population and to retain all the positive traits of the original hardy Irish cattle in both dairy and meat production. A herd book was organized, and by 1932, there were 525 cattle entered. The society favored a red or roan color with a traditional finching or linebacked pattern.

The Irish Moiled was considered a new breed when it was first exhibited at the Royal Ulster Show in 1939. Unfortunately, dual-purpose breeds found it increasingly hard to compete in the scheme of modern agriculture, although dedicated breeders remained. In 1948, the breed was strengthened by the formation of a major

new herd and a reorganized breed society. Government agricultural policies nearly dealt the Irish Moiled a deathblow when the guidelines for licensing bulls mandated that their dams possess high milk records.

In 1950, a polled Finnish bull named Hakku was imported and used to improve the breed, based on the belief that the breed was related to Irish polled cattle. Lincoln Red and Shorthorn cattle may also have been introduced. Although these introductions may have been necessary for the breed to survive in the modern agricultural scheme, they have reduced its distinctive genetic value as a representative of the old polled Irish cow.

By the 1970s, the Irish Moiled was near extinction, with only 13 female and 6 male cattle in the hands of two breeders. Again the breed society was revived, and a new herd book was established in 1983 with the encouragement of the RBST. Ian Gill of Liverpool University created a coordinated program for the remaining dedicated breeders. An upgrading program is allowed, and the use of modern techniques such as artificial insemination, semen storage, and embryo transfer may help the small population to survive. To date, the results are encouraging.

The ideal Irish Moiled cow remains a rich red color with white linebacking and a white udder. Color varies from white with red ears to linebacked animals with dun to red coloring and spots. The head should not be completely white but should have some dark color above the eye and around the muzzle. The face should be pleasant and docile in appearance with large ears. The conformation should reflect the breed’s dual nature. The Irish Moiled has notably good feet and legs and is strongly polled.

The Irish Moiled is still a reliable dairy cow with an excellent temperament. The cows are also useful for producing crossbred calves and will suckle a second calf. The crossbred heifers also make good suckler cows. The Irish Moiled cow produces a very successful and competitive cross from modern Charolais or Limousin bulls. Moiled bulls are also excellent stock sires. The Moiled is an efficient grazer and requires fewer concentrates than other breeds.

The Irish Moiled remains one of the rarest breeds

of cattle, with fewer than 100 breeding animals. It is also the only surviving breed of old Irish polled cattle. The cows are located mainly in the Ulster area, and a few animals are in England. The large Springfield herd, owned by Libby Clarke, is located in Lurgan, County Armagh. There has also been a successful embryo transfer at the Isle of Wight Rare Breeds Park.



Critical

### *Galloway (pl. 76)*

The land known as Galloway lies north and east over the border of the Cheviot Hills, dividing England from Scotland. Once covered in dense oak forests, today the land is varied with green glens, moors, and high hills. Three breeds were once most numerous in Scotland: the Ayrshire, the horned Highland or Kyloe, and the polled Galloway. Of the three, the Galloway was the most popular. The Galloway shares a mutual ancestor with the polled Angus, which would later become important worldwide. Many sixteenth-century writers remarked on the large numbers and excellent quality of the “black cattle” of Galloway. Although the cattle were called “black,” they were also dun, red, brindled, line-backed, or marked with white.

Galloway cattle were raised mainly for beef, especially in the hills, where the cattle grazed all winter. On the green lowlands, the calves shared their mothers’ rich milk with the dairymaids. The cattle were generally grazed until the age of three, when they were ready to be driven south to England. After walking the long distance to Norfolk, the cattle were fattened and then sold on the London market. Galloway beef was renowned for its fine marbling, which makes the beef tender and juicy. Like the Highland, it lacked an excessive layer of fat under the skin.

The Scottish cattle-driving trade flourished for about one hundred years. After the cattle trade ended in the 1840s, Galloways were kept mainly in the hills. Their survival was insured by the success of crossbreeding Galloway cows with Whitebred Shorthorn bulls, which contributed a more rapid maturity. Com-

bined with the excellent beef qualities, longevity, and hardiness of the Galloway, the resultant crossbred cows produced calves economically in the borderlands. This crossbred was known as the Blue-Grey, and it remains popular today in Scotland and England.

The medium-sized Galloway resembles the Highland somewhat in the face, ears, and coat but also the Angus in compactness and shortness of leg. The breed has always been polled, and any appearance of horns was seen as proof of crossbreeding. The coat has long been the Galloway’s distinguishing feature, and the breed is said to have more hairs per square inch than any other domestic cattle breed. The long, shaggy overcoat fringes the face and ears and covers the tail. The dense, soft undercoat is described as mossy and has a texture similar to sealskin. This double coat keeps the Galloway warm and dry in wet and cold weather. The outer coat is shed out in hot summers. The Galloway’s furry hide has been used for coats or blankets.

Scottish farmers traditionally believed that black-colored Galloways were especially hardy through the winter, and the other traditional colors grew rarer. By the 1880s, the belted Galloway was less common than in the early years of the century, and the brindled and linebacked Galloways disappeared.

The original pedigrees and records of the breed were lost in a fire in Edinburgh in 1851. Ten years later a herd book for the polled Angus and Galloway breeds was published, and in 1878, a separate herd book for the Galloway Cattle Society was issued. Black was the favored color, although dun was accepted. All other colors were excluded.

In Britain and Scotland, the Galloway was used for the production of the Blue-Grey and on hill grazings. Although it was well known, the Galloway never achieved strength in numbers. In the twentieth century, it was difficult to raise the Galloway profitably on marginal land without a significant government subsidy. Breeding of the Blue-Grey for suckler herds has been the primary use of the breed through the present.

Galloways were first imported to North America in 1853 to Ontario, Canada. Four years later, 40 Galloways were exhibited at a local fair, where they were

[To view this image, refer to the print version of this title.]

described as “full, round and hearty; [with] thick and wavy long hair; and calm.” They were mostly black, although there were one or two dull reds or duns, and one brindle (fig. 40).

In 1866, Michigan State College purchased a group of the Canadian cattle. For a time, the two Scottish breeds, the Angus and the Galloway, were confused by many agricultural writers as a single polled, black breed. The advantages of polled cattle were quickly acknowledged, however. Promoters claimed that although horns had once been important for defense on the range, horned cattle also injured each other when closely confined. The prediction was made that polled cattle would become permanently established in the United States.

More Galloways were imported from Scotland in the 1880s. By 1882, a united North American registry was formed, and a herd book was published the next year. Twenty years later, breeders in the United States separated into their own registry and were registering

Fig. 40 This engraving from the *Prairie Farmer* depicted a top Galloway bull named Harden who was a prize-winner in Britain. Courtesy of the IAB and Hans Peter Jorgensen.

about 2,000 calves yearly. These figures were comparable with the two other major beef breeds. In 1902, black Galloway coats were advertised for sale in the Sears catalogue and hides were made into rugs.

Galloways were found first on Midwestern farms but were carried westward to the rangelands of the Dakotas, Montana, and Wyoming. This westward pattern was duplicated in Canada. Yet although the popularity of the Angus continued to boom, the Galloway's fortunes ultimately did not fare so well. A portion of the blame can be laid on two cattle-dealing brothers in Missouri who imported more than 1,000 Galloway culls from Scotland and sold them as breeding stock. In addition, dissent in the breeder's association and the formation of splinter groups led to a failure to promote the breed as successfully as the Angus. Other breed-

ers concentrated only on cattle for the show ring, often following the fickle nature of fads.

The breed declined in Canada, too, and the breeder's association became inactive in 1931. Records continued to be kept by the Canadian National Live Stock Records Committee until the Canadian Galloway Association was reactivated in 1957.

New stock, both black and dun, was imported to North America from Scotland in the 1950s, and the breed experienced a renewed popularity. By 1970, there were more than 3,000 registrations in the United States. In 1973, the American Galloway Breeders Association became the umbrella registry for Galloways, Belted Galloways, and White Galloways. Unfortunately, the Galloway again lost favor with cattle raisers, and registrations had fallen to about 100 by 1990. The story was similar in Canada, with 600 registrations in 1970. After a decline, current registrations have increased to more than 300. Galloways, Belted Galloways, and White Galloways are registered in separate sections.

Today's North American Galloways again have strong feet and legs, hardiness, longevity, thriftiness, high-grading carcasses, and that magnificent coat, which serves as natural insulation against winter cold and summer insects. Black is still the prevalent color, while dun, red, and white cattle are rarer. The black coat can appear tipped with brown, but this is due to the effects of sun and weather. Ranchers have observed that Galloways are strongly maternal, cautious toward strange events, and protective of the herd when faced with a predator. Cows weigh 1,000 to 1,400 pounds, and bulls average about 1,800 pounds. The American Galloways Breeders Association allows upgrading to "certified" status but not "purebred."

The Galloway calf is born small but matures quickly. The Galloway is also able to produce superior beef directly from grass. In crosses, the Galloway transmits a high level of hybrid vigor and polled calves. Numerous studies have proven that the Galloway and Galloway cross can be fed up to 30 percent less grain while producing a more profitable lean carcass. The meat tends to be well marbled but with a wide, fat rim, giving it both consumer appeal and tenderness. The

Galloway can also produce excellent, dark, flavorful lean beef under natural conditions.

All Galloway breeders are facing the challenge of preserving their breed while resisting the demands of the show ring, which can place too much emphasis on visual appraisal without concern for functional traits. The commercial market is also placing pressure on breeders to conform to its current preferences.

In 1990, the American Galloway population was estimated at about 650, and there was increased interest in the breed. In Canada, 333 Galloways were registered in 1995, in addition to Belted Galloways and White Galloways. The number of breeders continues to increase. Galloways are generally found in Ontario, Alberta, and Saskatchewan.

The British and Scottish Galloway population is estimated at about 2,500. Although Galloways have been exported from the United Kingdom and Canada to many other countries, they are most numerous in Germany and Australia, followed by the nations of the former Soviet Union, New Zealand, and Chile. In Germany, the hardy Galloway can be left outdoors in the winter and produces well on federally subsidized, marginal land, which has led to its increased popularity. The German population was estimated at 4,000 in 1990.



Watch

### *White Galloway (pl. 77)*

In the late 1700s, several writers mentioned park or ornamental Galloway herds, describing them as beautiful white cattle with black or red spots. Herds of White Park cattle were also kept in Scotland, including a feral herd at Ardrossan that was polled. Although the ancient White Park coloration may have been passed onto the Galloway at some point, the origin of the White Galloway remains a mystery. In the nineteenth century, the presence of white-colored Galloways was often mentioned. The Whites were considered pure Galloways but rare.

The White is completely Galloway in its physical form, hardiness, ability to raise a large calf, and pro-

duction of a good carcass with excellent flavor and appeal. Although there is some variation, black coloring is found around the eyes and on the ears, nose, hooves, socks, and teats. Frequently there is freckling on the poll, neck, and shoulders. The skin pigment color is usually dark, though occasionally the points are red or dun. White cattle are extremely attractive, highly visible in the pasture, and more comfortable than black Galloways in the heat.

In the United States, Montana rancher Grant Bisher purchased a shipment of Galloways from Nebraska in 1912. One black-pointed white heifer was included in this group. Bred to black Galloway bulls, she produced many white calves and served as the family's milk cow for several years. The Bishers developed a group of White Galloways that their daughter and son-in-law continued as the Anchor Galloway herd. This herd became the source of all the White Galloways in North America, Australia, and New Zealand. In 1970, the White Galloways were registered with the new organization Galloway Performance International. This group would merge with the American Galloway Breeders Association three years later. In Canada, the Whites were eventually registered in a separate section of the herd book.

In 1979, Derek Pruitt obtained two White Galloways, and four years he later assumed responsibility for the Anchor herd. Using black-colored Galloways from Canada and Scotland, the new Lazer Galloway herd was selected for the production of quality beef, as well as hardiness, good temperament, and calving ease. White Galloway calves can result from homozygous or heterozygous White parents crossed with either a White or black Galloway. By 1987, there were about 200 White Galloways in North America, mainly descendants of the Lazer or Anchor cattle.

In Scotland, the Wilson family of Kirkmabreck Galloway Farm began breeding for White Galloways in 1919. White Galloways in Britain and the exports to Europe are descended from this herd. The registry was organized in 1981 through the Belted Galloway Society.

### *Belted Galloway (pl. 78)*

This attractive Galloway has been kept as an ornamental or park breed since at least the mid-eighteenth century. The Dutch Lakenvelder is believed to be the source of the belted pattern. Belted Galloways had an excellent reputation as good milkers and were maintained in a few dairy herds. In 1883, the first North American Galloway Association herd book noted that the Belted Galloway was not as common in Britain as it had been fifty years before. The Beltie, as it is affectionately known, has made a strong recovery in popularity due to both its excellent traits and its distinctive looks. In Britain, the Belted Galloway breeders formed their own society in 1921.

The first recognized import of Belties to Ontario, Canada, was made in 1939. Ten years later, Henry Prock imported more Belties to Pennsylvania and fostered the establishment of an association in 1951, later renamed the Belted Galloway Society. The Prock foundation herd was augmented by further imports from the United Kingdom. In both Canada and the United States, the Belties were eventually accepted into the national Galloway associations. Crossbred calves can be admitted to an appendix registry in both Canada and the United States. The Belted Galloway Society continues as the primary registrar of Belted Galloways in the United States.

The Beltie has found a strong following in North America from breeders attracted to its striking appearance and good Galloway qualities. By 1980, the national registries were recording about 80 calves. Ten years later, that number had grown to 375. The registered population in the United States now numbers about 8,000.

The breed's hallmark, the broad, white belt, lies around the midsection from the shoulders to the hocks. Sometimes the udder is also colored. Although Belted Galloways are usually black, dun is also permitted and varies from a silver dun to chocolate. Red is also possible, though not accepted in the Belted Galloway Society in the United States. The belted trait is dominant and thus easily transmitted to crossbred calves. The Beltie is also still noted for its milking ability.

Belted Galloway breeders do face several challenges. The inheritance of the belted pattern is varied and not fully understood. Also, the belted pattern is not uniformly fixed in the breed, which requires breeders to select in each generation. Some pattern variations have been restricted in the registries, and the small population complicates the situation. The breeders have begun to reexamine the pattern variations allowed in the registries in hopes of improving the color pattern characteristics of the Belted Galloway based on sound genetic reasoning while maintaining the breed's excellent beef qualities. The Canadian Galloway Association is working with the University of Saskatchewan to study some of the factors involved with the color genetics. Belted Galloway breeders in North America, Germany, New Zealand, and Australia are also beginning to work together toward preserving and improving their cattle.

The survival of the Beltie and the White Galloway is perhaps more assured than the traditional black, dun, and red breed. This is unfortunate, because all three varieties share the same strong physical and temperamental qualities. The Galloways are rugged cattle suited to harsh winter grazings.

 Watch  Insecure  Minor

### *British White (pl. 79)*

The British White was long considered a polled version of the White Park. The relation between the two breeds in North America remains unclear. Both are white cattle with dark points, and White Park cattle have been used in the British White's background. But genetic studies have revealed the White Park's distinctiveness. In addition, the White Park color pattern is dominant when crossed on other breeds. When British White cattle are crossed, the bulls often sire overmarked calves. This overmarking builds up to a linebacked pattern. British White breeders have also used the contributions of the Shorthorn, Galloway, and Swedish Polled breeds.

Polled calves occur naturally in about one of every 50,000 births. Because oxen traditionally needed their horns, the polled trait was not particularly desirable

until cattle were being kept in close quarters or raised exclusively for beef or milk. The trait is usually dominant in cattle and is controlled by one pair of genes. In transmitting this trait, some breeds are more strongly or weakly polled. The British White is a weakly polled breed.

Polled cattle have been present in Britain since the Iron Age. The white color pattern with dark points is also ancient. The Vikings may have brought polled cattle to Britain, including the white color-pointed Fjall.

Several historic herds of white polled cattle are well documented. A herd of polled white cattle was kept at Whalley Abbey in Lancashire in the west of England until 1697. It is possible that White Park-type cattle from the Bowland Forest were a source for the herd, which was then selected for polledness. Another white polled herd was at Guisborough Priory in Cleveland to the east. In 1700, "wild" polled white cattle were noted in Middleton Park, belonging to Sir Ralph Ashton. It is believed that cattle from the Whalley Abbey herd were sent to Middleton Park, and perhaps from Middleton to Gisburne Park in Yorkshire, and to Somerford in Cheshire. After Sir Ralph's death in 1765, some of the Middleton Park cattle came to his daughter's home in Gunton Park, in Norwich, Norfolk. About 1812, Gunton Park cattle were used to form a new herd at Blickling Park in Norfolk. This herd continued until 1924 and contributed animals to the Bawdeswell and Bolwick herds, which survive to the present. These cattle, which were called the White Poll, remained at Gunton Park until about the mid-nineteenth century. Albermarle Cator bought two Gunton Park cows to add to his Woodbastwick herd. The large Woodbastwick herd is still owned by the Cator family today.

In Cheshire, Sir Walter Shakerly established his Somerford herd in 1725. Shakerly used Shorthorn, Galloway, and White Park bulls in his breeding program. Bulls from his herd became very influential in the British White breed. Other outside blood was brought in, including two similarly colored Swedish Mountain bulls beginning in 1949. White Galloways were also used in the 1960s and 1970s.

These herds were the foundation for the modern British White cattle breed. The breed was originally dual in purpose, and they were used as dairy producers for many years at Gunton Park, Woodbastwick, Bolwick, Bawdeswell, and other herds. The Park Cattle Association included the breed in 1918, registering 6 polled herds. In 1946, a distinction was made between the two breeds. The White Poll became the British White and formed its own organization.

No longer able to compete with the popular dairy or beef breeds, the British White struggled to survive. By the 1950s, there were only 11 herds and fewer than 650 registered animals. By the 1960s, the focus of breeding had shifted to supplying beef-type animals for crossbreeding and single-suckle herds. By the mid-1970s, only 100 to 150 registered females were recorded. Through the efforts of the breed promoters and the RBST, the population has reversed this decline. By 1994, there were about 1,200 registered females and the number of herds had more than tripled.

The British White has concentrated on beef production and suckling herds. British White cattle have enjoyed an export market to the United States, Australia, and elsewhere. The breed's combination of white coat and dark skin has proved beneficial in hot climates. There has been a gradual increase in requests for British White bulls for artificial insemination in Britain as well.

Today the British White is a medium-sized breed, with mature cows weighing up to 1,200 pounds. Dark gray skin lies under the white coat. Black or red points occur on the ears, eyelids, nose, muzzle, teats, and lower legs. Freckling is common, and overmarking seems to be increasing.

British White cattle were imported to the United States in the years before World War II. At that time, the British White was still registered with the Park Cattle Association in Britain and called the White Poll, so both breeds were confused together in America and called the Polled White Park and the Horned White Park. Their separate histories were often meshed together, just as the cattle were bred together in some herds. This confusion remains, along with several sug-

gestions as to how to label the breeds in the United States.

An early herd of Polled White Park cattle, which were called English Park, was kept at a federal penitentiary in Lewisburg, Pennsylvania. The foundation for this group was claimed to be a bull and 5 cows with Cadzow White Park bloodlines, although it is unknown how this could have occurred. Some Holstein blood was added in the 1950s, and in the 1960s, the Shorthorn was also used. Cattle from this herd passed through several hands.

In 1975, the White Park Cattle Association of America was organized to register these Polled White Park cattle. When the herd book was opened, advertisements were published in the cattle journals in an attempt to locate polled white cattle. Three hundred or more cattle with correct appearance but with varying levels of documentation or none at all were admitted. The upgrading program allowed seven-eighths cattle to be registered as purebred.

Because it was sheltering the bulk of the true White Park cattle in the United States, the Moeckley family farm was able to use some White Park cattle in their upgrading to the Polled White Park. Polled White cattle without documentation were also used in the upgrading. British White cattle were also exported from the United Kingdom beginning in the 1970s. A syndicate has been formed to purchase cows and bulls to be kept in Britain with the frozen embryos and semen being shipped to the United States.

The British White Cattle Association was formed in 1988 in the United States. Most breeders have accepted the new name of British White for their cattle. By 1990, about 2,500 cattle were being registered yearly. Upgrading is still practiced by the association, which believes that breeders should be allowed to determine the most appropriate cattle for their geographic area and needs. Angus cattle in particular have been heavily used in the upgrading. Overmarked and undermarked cattle are registrable. The breed association recognizes the general tendency for overmarking due to outcrossings. Scurs are acceptable on bulls but limit cows to half-blood registration. Black or red color-pointing are both

acceptable and help identify the breed to the public. Bulls weigh 2,200 pounds or more. The association strives to keep birth weights low to facilitate ease in calving.

The American British White must be considered a separate breed from the British White by virtue of its history and separate genetic makeup. The American version of the British White does possess many fine attributes. The steers are heavy and beefy. The cows are good, milky mothers that are docile and easy to handle. Over one hundred breeders are having great success in all parts of country and climate with this hardy outdoor breed.

The Australian White breed was based on an import of British White cows in calve to White Galloway bulls in 1958.



Minor

### *Devon (pl. 80)*

The Celts, Romans, Vikings, and Saxons all brought cattle to England, and so it is nearly impossible to discover who brought the old red, middle-horned cattle to southern England. By the mid-eighteenth century, red cattle did indeed dominate Devon, Sussex, and Kent. These triple-purpose cattle gave rise to the lowland beef breeds: the Devon, Hereford, and Sussex. Today the Hereford has become a dominant beef breed around the world, while the Devon and Sussex have both become minor breeds.

Devonshire farmers were especially devoted to their Red Rubies, never forsaking them for more fashionable breeds. Devons contributed milk to the famous Devonshire clotted cream, and in the London markets, Devon beef usually brought a higher price than other beef. The Devon was sometimes called the North Devon to distinguish it from the very different breed known as the South Devon.

The first improver of the breed was Francis Quartly of North Devon. When he took over his father's Devon herd in 1793, he observed that his neighbors were selling their best stock to feed the English troops during the wars with France and the United States. Quartly

kept his best animals and paid more than the butcher for other superior stock. Eventually, his herd became the source for the best of the Devon breed. Another Devonshire family, the Davys, also kept and promoted the breed. Colonel Davy published the first herd book in 1851. The aristocracy was also fond of the Devon and transplanted it to other parts of England. Thomas William Coke, earl of Leicester, bred a well-known herd of Devons in Norfolk that continued for about one hundred years.

Long before the Quartly and Davy herds, the small triple-purpose Devon had made its way to the New World with the Pilgrims. This original Devon type is still represented in America by the Milking Devon breed, but it no longer exists in Britain. Devon cattle were certainly well known and common by the end of the eighteenth century. It is believed that George Washington, like many colonists, raised Devons for draft, beef, and milk. The first official seal of Vermont was designed in 1778 and prominently features a Red Devon cow. The state's coat of arms also depicts the beloved "old red cow." Milking Devons were brought into Canada in the early 1800s and were reimported in the 1960s.

In Britain, this old triple-purpose Devon was raised for meat, milked, and widely used as a draft animal. Known as good "walkers," these cattle also counted among their assets as work animals agility, docility and intelligence. Eventually, the beef aspects of the breed became commercially more important.

The modern British Devon is decidedly meatier and heavier on the backquarters. British breeders have recently decided to accept the Salers, a Continental beef breed, in crosses for registration as Devons. The Sussex, Lincoln Red, and South Devon are also being altered by similar crosses in an effort to compete with the tremendously large and meaty European breeds.

In the United States, the Devon Cattle Association was founded in 1881, although herd books had been published much earlier. Competition from other breeds reduced the Devon to small numbers, mainly in New England. In the early twentieth century, there was renewed interest in British Devons. In 1929, 5 Devon bulls and 18 cows were imported to New Hampshire

[To view this image, refer to the print version of this title.]

and another bull and 2 cows were brought to Maryland. In 1930, Henry Ford also imported a bull and 6 heifers to Massachusetts. In the next thirty years, another 21 bulls and 46 cows were imported (fig. 41).

After World War II, most Devon breeders in the United States began to work toward enhancing beef conformation and accelerating maturity. The modern Devon is very much a beef breed today. Breeders who wished to preserve the old triple-purpose type formed the Milking Devon Cattle Association.

Unfortunately, the excellent qualities of the Devon remained unpromoted, and so the breed did not enjoy greater popularity. Under the leadership of Dr. Stewart Fowler, the breed reached its greatest number of registrations from 1979 to 1981. At present, fewer than 200 cattle are registered annually. Most are being used in crossbreeding operations, with perhaps 20 breeders producing purebred Devons. The Devon Cattle Association has begun to accept an upgrading program, and they will continue to register calves sired by Devon bulls on Milking Devon cows. A polled strain of

Fig. 41 Carlos 2013 was a Devon bull from Wisconsin in the 1880s. Courtesy of the IAB and Hans Peter Jorgensen.

Devons traces back to a hornless bull born in 1915. First fostered at the Gird Ranch in California and later at Devonshire Farm in Mississippi, Polled Devons have been introduced into many American herds and exported to Brazil, Australia, and back to England.

The American Devon, sometimes called the Beef Devon, is noted for its ability to gain and grow on grass alone. The breed also tolerates heat, especially the bulls, which maintain excellent fertility even in high temperatures. The cows are good mothers that still produce ample milk. For a beef breed, Devons are unusually refined in the head and bone. Mature cows weigh 1,000 to 1,500 pounds, with bulls growing heavier and larger.

Color may vary from the desirable rich ruby red to a lighter red or chestnut. The skin is an orange-yellow, especially rich in color around the eyes and muzzle. A small amount of white is allowed in the underside on

the udder or in front of the scrotum. Sometimes the tail switch of older cattle gradually turns white. The Devon can grow a long and curly coat in winter but sheds out to a sleek, sometimes dappled coat in summer.

Purebred genetics are proven transmitters of hybrid vigor. Heat tolerance and grass-fed ability are all positive traits of the attractive Devon. A carefully developed new breed, the Texon, combines this grazing ability and the meatiness of the Devon with the browsing leanness of the Texas Longhorn. This development illustrates the possible future uses of old and rare breeds. The Texon and breeds like it could produce healthy, lean meat under sustainable conditions for a lower cost of production.

The Devon has been exported to Australia, Brazil, New Zealand, and South Africa. It has also contributed to the improvement and creation of other breeds.



Critical

### *Milking Devon (pl. 81)*

The first Devons in North America were shipped aboard the *Charity* to the Pilgrim colony at Plymouth, Massachusetts, in 1623. One bull and 3 heifers were consigned from Devonshire by Edward Winslow, agent for the colony. Although the Devon or North Devon was desirable as triple-purpose animal, other cattle were also imported. Four years later, the formal record of the Plimoth cattle division noted the presence of a red cow, a great black cow, black heifers, and a great white-backed cow (fig. 42).

More Devons were undoubtedly brought into the colonies. One hundred years later, the Devon stamp was clearly present on the common New England cattle, both in color and conformation. The Devon appeared on Vermont's state seal and coat of arms, both designed in 1778. Devons were more numerous in New England than anywhere else in North America, but they were found throughout the new nation.

The Devons in New England may have found the climate and landscape similar to their homeland. For their part, New Englanders became devoted to the

[To view this image, refer to the print version of this title.]

Fig. 42 A Milking Devon cow and her calf. Courtesy of the Colonial Williamsburg Foundation.

use of the ox. The ox team was well suited to clearing forestland, hauling logs and stones, and performing other heavy jobs. As many farmers have remarked, not only are oxen less costly to purchase or maintain than horses, but when their working life is over, they are still useful to eat. As late as 1890, oxen made up over 30 percent of the draft animals in states such as Connecticut and New Hampshire. The Devon steer was a long-legged, big-framed animal that moved with greater speed and had more endurance and intelligence than many other breeds.

Oxen were also used on the frontier. After oxen transported settlers to their new homes, they cleared the land. By the end of the nineteenth century, the Devon had been taken to the Great Plains. Oxen were used the longest where farming was conducted on rough terrain and the farmers were not raising cash crops but were engaged in subsistence farming. However, the De-

von's ability to tolerate heat became a positive trait in the western beef herds. The need to travel greater distances on western pastures has also favored longer legs on American Devons.

Oxen were also used longer in the southern Atlantic states and the Deep South. Devons in particular were able to deal with the hot, humid southern climate better than many other working cattle. Planters in rice-growing areas preferred the ox, which was able to work even in the wettest conditions. In 1890, rice-growing counties were still using the ox 40 to 50 percent of the time.

During the first half of the nineteenth century, there were fifteen recorded shipments of Devons from Britain to Vermont, Massachusetts, Connecticut, Rhode Island, Maryland, New York, Pennsylvania, Illinois, and Georgia. In 1817, 6 heifers and a bull named *Taurus 197* came as a gift from Thomas William Coke, earl of Leicester, who was an avid promoter of the Devon in England. Daniel Webster was also an importer of Devons in 1842. These imports became the foundation animals in the American Devon Record when it was published in 1881. More imports occurred sporadically for the next forty years, but some experts believed that American Devons were equal to or better than Devons in Britain. Agricultural writers noted that the size of Devon cattle had increased in England during the nineteenth century. It can be assumed that the Devons in America were more representative of the original triple-purpose Devon, and indeed, they would remain that way into the next century.

By the 1880s, the Devon enjoyed an excellent reputation in America: "In fineness of limb, uniformity of color, delicacy of proportion, and purity of breeding they are unsurpassed by any other race of cattle. In localities where oxen are largely used, the Devons are highly esteemed for this purpose, as they rank among cattle as the thorough-bred among horses. According to their size they combine more fineness of bone, more muscular power, intelligence, activity, and bottom, than any other breed" (Jones 1885, 761).

The Devon steer of this era weighed 1,400 to 1,600 pounds and cows 800 to 1,000 pounds. Where the

farmer bred for dairy qualities, the milk was said to be medium in quantity but superior in quality. The dairy cow was viewed as "docile in temper, easy to keep, and readily managed" (Jones 1885, 863). Devon beef was also highly regarded. The Devon matured early, and its meat was fine, flavorful, juicy, and nicely marbled.

Unfortunately, the popularity of multipurpose cattle was soon to end. Beef and dairy specialization replaced breeds such as the Devon. In a remarkably short time, the Devon was rare outside New England.

After the end of World War II, Devon breeders in the United States separated into two groups. One set of breeders, mainly in New England, continued to breed triple-purpose cattle, including their milking ability. Most other breeders concentrated on the beef-producing potential of the Devon. The Milking Devon Cattle Association was formed in 1970, but suffered from low numbers. The association was reformed in 1978 and now continues with renewed interest in the traditional Devon type. In 1985, only 15 calves were registered, but in 1990, there were 120 registrations. There are now about 220 breeding females, mainly in small herds of 3 to 4 animals. The Milking Devon was imported to Canada in 1964 but remains in very small numbers.

The Milking Devon is a hardy breed, able to flourish on a poor-quality forage diet. Devon breeders report few birthing problems, for the calves are a nice, small size. The cow is a good mother with plenty of milk. Under dairy conditions, Milking Devons can produce up to 12,000 pounds of milk annually with 5 percent butterfat. The Devon also remains a fine beef producer. As herd members or oxen, they are long-lived with good temperaments. Some teamsters do advise that a Milking Devon team is not for the novice, for the intelligent Devon will not tolerate abuse or poor training. Experienced teamsters enjoy that intelligence as well as the Devon's snappy walk. The Milking Devon must be shown with its horns.

The Milking Devon has been rescued by both devoted breeders and living history sites. Besides preserving the historical type now gone in Britain, the Milking Devon remains an ideal breed for the small farm. Milk-

ing Devon enthusiasts have noted that their breed cannot compete with the Holstein or Hereford in their specialties, but for rough pastures or hilly land that needs to be worked the breed will produce very well.



Critical

### *Gloucester (pl. 82)*

Gloucester was once the site of the Roman town of Glevum, which continued as a market center after the Roman occupation. For centuries cattle were driven to town to be bought and sold. As early as the 1200s, dairy cattle were raised in the area specifically for cheese. By the 1500s, Gloucester was holding a regular butter and cheese fair. The milk of the local dairy cows, especially the brown linebacked type, was already noted for its qualities of richness and small fat globules. Gloucester was home to its own famous Gloucester and Double Gloucester cheeses, which in later centuries were exported as far as the New England colonies.

Because Gloucester was involved in the cattle trade, many types or breeds passed through the area, adding to the uncertainty about the origin of the linebacked Gloucester cow. Some observers have noted that the head and horns of the Gloucester bears some resemblance to the ancient Kerry cattle. Linebacked cattle were certainly common; Herefords and Longhorns showed this color, as did the now extinct Welsh breeds the Glamorgan and old Castlemartin. A wealthy Norman baron of the twelfth century also imported cattle from Normandy into the area. More recently, blood typing has revealed that the Gloucester is related to the Devon red cattle family. Whatever their ancestry, by the 1600s, the richly brown, linebacked dairy cows known as Gloucesters were common throughout Gloucestershire, southern Wales, and nearby northern Somerset and Wiltshire.

It was a Gloucester cow named Blossom that was partly responsible for one of the greatest medical advances. In 1796, a milkmaid named Sarah Nelmes contracted cowpox from Blossom. The physician Edward Jenner, noting that milkmaids rarely caught smallpox, inoculated a young boy named James Phillips with Sarah's milder cowpox virus. This injection proved to

be a protection against the dreaded smallpox. Jenner named this process *vaccination*, from the Latin *vacca*, or cow, and *vaccinus*, meaning of the cow.

Although Gloucester cows were the traditional local breed, the "improved" Longhorn and later the Shorthorn began to replace them in the area's dairy barns. In the early 1800s, the duke of Beaufort established his famous Gloucester dairy herd at Badminton. This large herd would be the most important Gloucester reservoir for the next hundred years because so few herds were maintained. The duke may also have included the non-extinct Welsh Glamorgans in the Badminton herd. At the end of the nineteenth century, there were only two major Gloucester breeders left, but after a large sale from the Badminton herd, a group of new owners revived interest in the breed. In 1919, they organized the Gloucester Cattle Society and issued a herd book. This first herd book recorded 14 herds totaling 130 animals, but the numbers doubled rapidly. Unfortunately, an outbreak of foot-and-mouth disease drastically affected the herds and sent them into decline. By 1930, there were only 4 herds left. In 1950, the long-held herd at Badminton and another herd dissolved, and the breed was again reduced to just 2 herds at Cirencester Park and Wickcourt.

The herd at Cirencester Park, founded in 1922, was owned by Lord Bathurst. Faced with fertility problems in the breeding group, Bathurst sought a way to improve the milking ability of the breed while keeping its old characteristics. Over the years, he made crosses with Shorthorns, Dynevour White Parks, and later Friesians. This herd was dispersed in 1966.

The old Dodeswell family herd at Wickcourt was maintained until 1972. Because this herd, too, was battling fertility problems, a Jersey bull was used for a time, but the Gloucester traits were more strictly maintained in a selection toward a somewhat dual-purpose, beefier cow.

These remnants of the Gloucester were saved by the actions of rare breed conservators. At the Wickcourt dispersal sale, this group bought all the breeding females. In 1973, the Gloucester Cattle Society was reorganized, and 70 cows were entered into the herd book following an inspection. Upgrading was allowed

until 1986. There are now at least 350 breeding females and 40 males. About 600 Gloucesters are being kept in more than 90 herds, with both numbers steadily increasing. The foundation bulls Wickcourt Gloucester, Wickcourt Bovril, and Bathurst Brewer started three male lines. Artificial insemination and embryo-flushing techniques have been used in the preservation effort.

The herd book sought out and accepted only correctly marked cattle of the proper type. The Gloucester is a medium-sized breed with short horns tipped in black. The body color is traditionally a dark black-brown, although it can vary to light red. The head, muzzle, and legs are dark. The cows are often deeply mahogany colored with almost black faces, and the white linebacking is distinctive. The white color extends down the back, including the entire tail, udder, and belly. Individual animals can reflect either a dairy or a beef tendency. Gloucesters are renowned for their even temperament.

The Gloucester is more than a very attractive and striking breed. Gloucester milk is still well suited for cheese making, although most herds are used mainly to produce suckler calves. In the past, the Gloucester was also used for draft work. Gloucester teams are again being trained, and they are easily matched into a distinctive pair of oxen.

Although they are now found elsewhere in Britain, most of the cows are still found in Gloucestershire, maintaining their long historical link to the area.

 Endangered

### *Shorthorn*

Short-horned cattle have been in Britain since the Iron Age. Germanic red short-horned cattle and Dutch short-horned cattle were introduced in the late 1600s. These very large Dutch cattle were found in the northeast of England in Yorkshire and were sometimes known as Holderness cattle. Shorthorns of this type were often called Teeswater or Durham cattle by the late 1700s.

Several cattlemen in the area began to practice selective breeding techniques for conformation, fleshiness,

milking ability, or size. Beginning about 1780, two Yorkshire brothers, Charles and Robert Colling, employed close-breeding techniques similar to those used by Robert Bakewell. The Colling brothers bred two of the most famous Shorthorn cattle. Bought and sold for tremendous sums, the Durham Ox weighed about 3,200 pounds and spent most of his life on display to the public, which popularized the breed. The Collings' bred Comet became the most famous bull of the nineteenth century and greatly influenced Shorthorn breeding. Comet's daughter Duchess was owned by another Yorkshire Shorthorn breeder named Thomas Bates. The Duchess line would become very important in both Britain and North America. The Booth family of Yorkshire also bred influential Shorthorns using the Collings' stock. Thomas Bates, John Booth, the Colling brothers, and several others spurred the research work of George Coates in 1822. The first Coates Herdbook included 721 bulls and 1,000 cows (figs. 43, 44).

The Shorthorn was the tallest British cattle breed, but different breeders concentrated on their own priorities: Booth for flesh, Bates for milkiness, and Amos Cruickshank of Aberdeen, Scotland, for heavy meat production. The Collings' Shorthorns became wider, heavier, shorter legged, and faster growers. By 1916, several varieties of Shorthorns were recognized in the herd book.

The successes of these early breeders made the dual-purpose Shorthorn the most numerous breed in Britain and led to its eventual dissemination around the world. By the time the Shorthorn Society was organized in 1875, the breed had eclipsed the Longhorn in popularity. Prices for Shorthorn cattle soared as they were sold both domestically and to North and South America. The Shorthorn population around the world numbered in the millions, and it contributed to more than forty other breeds.

The Shorthorn would maintain its dominance until the mid-twentieth century, when such European breeds as the Holstein-Friesian and the Continental beef types would take their turn as the King of the Hill. Today there are but a few thousand purebred Shorthorns in Britain.

[To view this image, refer to  
the print version of this title.]

Figs. 43 and 44 Ketton and Duchess were both bred by Charles Colling and illustrated by stone lithographs in *The History of Short-Horn Cattle*, written by Lewis F. Allen in 1874.  
Courtesy of the IAB and Hans Peter Jorgensen.

The Coates Herdbook and Shorthorn Society continue, registering both Beef Shorthorn and Northern Dairy Shorthorns. The accepted colors include red, red and white, and white and red roan. As with some other white-colored breeds, the white color is associated with fertility problems in about 10 percent of the cattle. It remains permissible to upgrade through the use of pedigree bulls in four generations.

### *Beef Shorthorn (pl. 83)*

In Yorkshire, Thomas Booth and his family began improving their Shorthorns in 1790. Very soon the Booth strain of Shorthorns was known for its meat-producing qualities. Eighty years later, Booth cattle were still well known and very valuable.

In Scotland, Amos Cruickshank and his brother, Anthony, were raising heavy, meaty Shorthorns, often called the Great Improvers, which were in demand by breeders of beef cattle in Ireland, Australia, and North and South America. The Cruickshanks and other Scottish farmers sent their cattle by steamship to London, where they were sold as “Prime Scotch” beef. In 1889, the entire Cruickshank herd was nearly lost to Argentine buyers but was fortuitously retained in Britain. The Cruickshank strain became the foundation of the Scotch Shorthorn, and in the years after World War I, these cattle sold for tremendous prices.

The Scotch Shorthorn stock was incorporated into the Beef Shorthorn section when the Coates Herdbook was divided into two sections for dairy and beef in 1958. The Beef Shorthorn of the 1950s was most definitely bred for specialist beef production. This Shorthorn was short, blocky, compact, and matured early to produce “baby beef.” The breed’s popularity severely declined as market demands changed and such European breeds as the Limousin and Charolais were imported to produce larger, leaner, faster-growing cattle. Ironically, many of these Continental breeds have Shorthorn in their ancestry.

The swift decline of a breed that had once numbered in the millions was stunning. By 1985, the RBST could find only 94 bulls and 185 females of pure breeding. Two years later, the breed was placed on the Pri-

ority List with the hope that future outbreeding could be avoided. Breeders are convinced that the Beef Shorthorn has a future in a return to less-intensive systems and suckler herds.

In order to deal with the market demand for leaner beef and to compete with cheaper imported beef, Shorthorn breeders have worked toward modernizing their breed. They have selected toward increased height and smoother and leaner fleshing while retaining the easy keeping qualities of a good suckler cow. Beef Shorthorn bulls are now mainly used as crossing sires. The beef section of the Coates Herdbook has opened an experimental registry for those using outside red breeds, including the Maine Anjou, to create Blended Shorthorns. A polled subregistry has also been opened in Britain and the United States.

The Shorthorn has been successful in many countries, including the United States, Canada, Russia, South Africa, New Zealand, Australia, Argentina, and Uruguay. Although the population is very high in some of these countries, the breed is different in its new homes, often due to upgrading programs.

The Beef Shorthorn is also changed in its native land, where outcrossings have modernized the breed and begun to reverse its decline but have also changed its genetic makeup. The Beef Shorthorn registers about 400 to 500 cattle annually, although the RBST estimates that only a portion of those numbers represents pure Shorthorn breeding without outside blood.



Vulnerable

### *Northern Dairy Shorthorn*

The Thomas Bates-bred Shorthorns would form the basis of the dual-purpose Dairy Shorthorn type. The Duchess line, in particular, would be much sought-after in both North America and Britain. In 1905, the Shorthorn Society began to award prizes at county fairs for pedigree cows with outstanding dairy traits. The Dairy Shorthorn Association was also organized that year and they instituted a milk recording program. This group ultimately joined the Shorthorn Society in 1936.

The Northern Dairy Shorthorn Society was formed eight years later to promote specifically the dairy-type Shorthorn cattle long found in the dales of the Pennine Hills in northern England, including the six counties of Cumberland, Northumberland, Durham, Cleveland, and East and West Yorkshire. Although based on the same old Durham and Teeswater cattle of the area, this Dales Shorthorn had been selected for dairy purposes. In the 1920s and 1930s, Ayrshire and other dairy breeds were added to the cattle to help the native breed compete with the Holstein-Friesian.

At the time, the Northern Dairy Shorthorn was a fine-boned, stylish, and active cow with distinctive horns. Light roan was the favored color. The cattle were hardy through the northern winters because they retained the dual-purpose nature of the Shorthorn. The cows produced good yields of milk, and their calves were raised for beef on grass with a good growth rate.

In 1973, the Northern Dairy Shorthorn was added to the RBST's Priority List, although there was some disagreement about whether these cattle were a separate breed or a variety of the Dairy Shorthorn. The independent organization of the Northern Dairy Shorthorn ceased to function in 1989, and the breed is no longer promoted for its distinctive appearance and qualities. The cattle are now registered under the Dairy Shorthorn section of the Coates Herdbook, denoted by the letters ND. Because a larger-framed, more modern type of dairy cow is now preferred, there is a real danger that the Northern Dairy Shorthorn stock will be completely absorbed into the dairy section unless action is taken to preserve the bloodlines.

The Dairy Shorthorn section of the herd book registers about 3,000 cattle each year, although it allows the use of outside red breeds to increase milk yields. The Dairy Shorthorn itself is threatened as the Holstein-Friesian generally replaces the native breeds.



Minor

### *Whitebred Shorthorn*

Before the turn of the century, breeders in Cumberland were developing a beefy Shorthorn type to be

used for crossing on Galloway cows. These Shorthorns were known as the Cumberland White, the Cumberland Shorthorn, or simply the White. These white bulls became famous for siring rapidly maturing beef calves called Blue-Greys. The system evolved with separate breeders raising the Cumberland Whites, the Galloways, and the Blue-Greys.

In 1962, more than 200 breeders formed the Whitebred Shorthorn Association to preserve and promote the breeding of the old White bull. After an inspection period, about 700 cattle were entered in the first herd book. Today there are about 200 registered females in 50 herds.

Still located primarily in the borderlands, the Whitebred Shorthorn is also found in western Scotland, Wales, Yorkshire, Devon, and Cornwall. Farmers in the English-Scottish borderland use the hardy, long-lived Blue-Grey as a suckler cow on poor land, where they raise calves sired by Continental beef breeds. The Whitebred is also used in crosses with the Highland and other breeds for suckler herds.



Minor

### *Lincoln Red (pl. 84)*

By the nineteenth century in Lincolnshire and some other areas of Britain, the traditional feeding of cattle on grass was changing to a more intensive system. The native Old Lincolnshire cattle were now housed and fed on oilcake, which is the ground residue obtained from the pressing of such oily seeds as cottonseed or linseed. Shorthorn cattle adapted well to this agricultural system when they were brought into the county. They were also crossed onto the native Lincolnshire cattle, which were a large, drafty breed splotched in color and short-horned. The new Lincolnshire Shorthorns were red or red and white in color. They were a hardy, dual-purpose type but tended to be large, heavy, and beefy. The red dual-purpose Shorthorns bred by Thomas Turnell of Wragby were especially favored.

In 1822, the Lincolnshire Red was recognized as a Shorthorn variety in the Coates Herdbook, but the breed remained primarily in the Lincolnshire area. In

1896, the breeders of the Lincoln Red Shorthorn Society established a separate herd book. Although the breeders kept the large frame and heaviness, the Lincoln Red still produced an acceptable amount of milk, averaging at least 7,000 to 8,000 pounds of milk annually. With a good milk supply and an ample frame, the Lincoln Red cow was a good mother with few calving difficulties.

The Lincoln Red breed society was very active in promoting and improving its cattle. The society was one of the first to keep records of beef production. Eric Pentecost began developing a polled strain in the late 1930s, using crosses of the polled Angus on the Lincoln Red and then backcrossing until the Polled Lincoln Red was recognized by the society. In 1960, the society dropped the word Shorthorn from the breed's name, and the polled variety rapidly replaced many of the horned Lincoln Reds. In 1977, the society also decided to introduce a controlled amount of crossings with such Continental beef breeds as the Maine Anjou, Charolais, Chianana, and Limousin. Unfortunately, this has diluted the original breed genetics. With the Continental introductions, the Lincoln Red is now the largest native beef breed, and the favored color remains cherry red.

The Lincoln Red was exported to Canada in 1825. The Lincoln Red Society of Canada was quickly organized, and soon there were 5 pedigree herds. The Lincoln Red adapted readily to the climate in Canada, where they were used for crossbreeding and to produce feeder cattle. More recently, the Lincoln's fortunes have dimmed. By 1977, only about 600 Lincoln Reds were registered in the Shorthorn herd book. A handful of dedicated breeders continued to promote and use the Lincoln Red, but its purebred numbers have declined. Lincoln Reds are now found mainly in Ontario.

In 1959, a shipment of Lincoln Red cattle was en route to Cuba from Canada. As the ship passed through the United States, a trade embargo was enacted against Cuba. After being sold in the United States, the Lincolns attracted a great deal of interest, and more Lincoln Red cattle were imported from Britain. Unfortunately, they have not survived as a breed.

The Lincoln Red has made its way from Britain

to Australia, New Zealand, South Africa, Argentina, Uruguay, Germany, and Hungary, where they are present in significant numbers, although often in an up-graded form. Semen is also exported from Britain.

In Britain, Lincoln Red numbers continue to decline, and the breed has been added to the RBST Native Breeds category. The decline in this breed's popularity is truly unfortunate because the Lincoln Red remains an excellent beef animal, while the cows are excellent sucklers, docile, and hardy. The RBST is extending help to those who conserve pure Lincolns and recognizes them as a Traditional Breed.



Vulnerable

### *Milking Shorthorn (pl. 85)*

Often called Durhams, Shorthorns were brought to the New World very early and valued for meat, milk, and draft. The first documented import occurred in 1783 to Virginia, where the cows were praised as remarkable milkers. Durham steers were especially valued as oxen. Shorthorns were frequently imported for the next fifty years, although the first import to Canada was not made until 1825.

In North America, a distinction was often made between English Shorthorns of Bates or Booth breeding and Scottish Shorthorns of Cruickshank bloodlines. In 1852, there was an important importation of Duchess line Bates cattle, known for their milking ability, followed by continued selections from the best of the English Shorthorns. Later in the nineteenth century, the emphasis was on the Cruickshank or Scotch Shorthorn, known for its heavy meat production.

Among the progressive Shorthorn breeders were the Shaker communities in Kentucky and Ohio who sought to improve the local cattle. In 1811, the Shakers purchased a valuable, purebred Shorthorn bull aptly renamed Shaker. Twenty years later, Henry Clay and the Shakers imported the bull Orizimbo for the staggering sum of one thousand dollars. The first American herd book was issued in 1846. Just ten years later, the Shakers at Pleasant Hill, Kentucky, owned the largest registered herd of Shorthorns in the United States.

These cows were milked and averaged 8 gallons daily. Butter and cheese were shipped by river to city markets. Beef calves were also raised for community use and for market.

The American Shorthorn Breeder's Association was formed in 1882, registering and promoting both the meat and milk types, although the Scottish Shorthorns were coming into greater demand to increase meatiness. Solid red became the fashionable color, perhaps because roan or speckled cows resembled the much-maligned Texas Longhorn. *The Peoples' Farm and Stock Cyclopedia of 1885* decried this trend as "foolish," especially castigating the breeders who castrated "animals that possessed every valuable point except the one of color." Unfortunately, many of the dairy-type Shorthorns were not solid red in color.

The impact of the Shorthorn was unquestionably large upon the general stock of the country. Shorthorns of both types enjoyed great popularity until the late 1800s, when the Aberdeen Angus and Hereford began to challenge their dominance.

As beef production became more important, owners and breeders of the dairy type grew concerned about maintaining the good milking qualities of the Shorthorn. In 1912, they began to work within the Shorthorn association to keep official milk records and promote improvements. Eventually, as their goals for the breed changed, the factions found it harder to work together. In 1948, the breed organization was split, and the American Milking Shorthorn Society began to register and promote the Milking Shorthorn. Twenty years later, the Milking Shorthorn was declared a dairy breed, and it soon joined the Purebred Dairy Cattle Association.

Since the mid-twentieth century, the breed has become more dairy and angular in character and conformation. These changes have been made in part by the inclusion of outside genetics and upgrading. Besides a widely used Norwegian Red bull, there were many imports of the New Zealand Milking Shorthorn and an Australian Dairy Shorthorn breed called the Illawarra. The official genetic expansion program allows upgrading and crosses with red-and-white Holsteins, black Holsteins, or any recognized dairy breed. Milk-

ing Shorthorn breeders regularly exchange genetics across the Canadian-American border.

Milking Shorthorns are still red, red and white, white, roan, or speckled. Black is not allowed. The breed can be horned or polled. Size has increased somewhat to 1,350 to 1,400 pounds for cows.

Milking Shorthorns can also be double-registered in the American Shorthorn Association (formerly the American Shorthorn Breeder's Association), where their milking ability is valuable to Beef Shorthorn producers. Milking Shorthorn breeders have participated in both dairy herd improvement and growth and gain performance-testing of calves to encourage beef production.

Although increased milk production is important to dairy farmers, actual cost of production is truly more important. The Milking Shorthorn is renowned for more unassisted calvings, higher protein levels, better feed efficiency, and greater longevity than many other dairy breeds. Good carcass quality is also still possible. Although registrations have dropped somewhat from the 1970s, they have been holding steady at about 3,500 annually.

The ALBC is most concerned about the relatively few Milking Shorthorns that are free of outcrossing. Besides dilution of the breed's genetic pool, outcrossing can bring increased milk production at the cost of other potentially valuable traits. Improvements made within the breed may come slower, but 100 percent pure Milking Shorthorn breeders have achieved 14,000-to-16,000-pound milk and high protein averages without outcrosses. Lifelong dairy farmers in Illinois, the Kenneth Hoffman family has also demonstrated that the pure Milking Shorthorn is eminently suited to grass-based dairying. Greater hybrid vigor will also be realized if the breed is not diluted with widespread outcrossings.



Watch



Watch

### *Guernsey (pl. 86)*

The lovely Channel Islands are the home of three famous breeds of dairy cows that bear their names: Al-

derney, Guernsey, and Jersey. From the early 1700s, when they were first exported, these famous milk cows were often collectively called Alderneys, perhaps because that island was the closest to Britain. These island breeds differed from each other but were alike in one unusual way. Along with the South Devon, they possess a specific allele that is common in African and Asian cattle but is not present in any other British breed.

Island isolation shaped these cattle. The nine islands that make up the chain together have an area of just 75 square miles. The islands enjoy a mild Mediterranean climate, and the residents have traditionally used all the available land to cultivate fruits, vegetables, and flowers and to pasture cattle and other livestock. In the Middle Ages, Guernsey was under the protection of Robert, duke of Normandy, who sent a group of monks to the island to help the residents defend and support themselves. The first monks came to the island in A.D. 960, bringing cattle from Brittany with them. In the eleventh century, another monastery was founded, and these monks imported brindled cattle from France. The Guernsey cow does resemble some French breeds, including the extinct Isigny and the gravely endangered Froment du Léon. All Channel Island cattle were used for dairy production as well as draft and meat production.

The first Channel Island cattle were imported to Britain in 1724. Within fifty years, hundreds of cattle were being imported annually. Two-thirds of the cattle came from Jersey, and the remainder came from the other islands. At first the "Alderneys" in England and Scotland were kept mainly by the rich and supplied butter for the table. Refined in appearance and light in color, they also decorated the aristocracy's estates. Channel Island cattle were exhibited in Britain by 1844, and they were separated into their different breed classes in 1871.

Jersey and Guernsey placed self-imposed restrictions on their breeds around the beginning of the nineteenth century to prevent French cattle from being imported to the islands and mixing with the native cattle. On Jersey, the breed standard was established in 1834. The herd book was established in 1866, and a

society was organized twelve years later. The recording of Guernsey pedigrees began on that island in 1881, and by 1901, milk recording was undertaken by the Royal Guernsey Agricultural and Horticultural Society.

At the beginning of the twentieth century, there were about 100,000 Jersey and Guernsey cows in Britain. They continued to grow in popularity in commercial dairies as providers of bottled milk and cream. Guernseys were also widely exported to Ireland, North America, Australia, New Zealand, South Africa, Rhodesia (now Zimbabwe), Kenya, Japan, and South America. In 1955, the Guernsey represented about 5 percent of the dairy herd in England and Wales, with more than 130,000 cows, or twice the number of Jersey cows.

Guernseys were first imported to the United States by two schooner captains in the 1830s and 1840s. Impressed by the quality of the breed's dairy products, Captain Prince brought the first Guernseys back to his home in Boston. Three "Alderneys" brought to New York and Captain Prince's two heifers and bull from Guernsey became the basis of the American Guernsey herd. Large imports were made about 1850 and then again from 1870 to 1880. The first Guernsey association was founded in 1877.

The Guernsey, with its greater than average cream and butter production, initially found greatest popularity as a house cow. Keeping a few Jersey or Guernsey cows in the herd or using a purebred Guernsey bull on the herd was also profitable for the dairy farmer, for it increased the richness of the herd's milk. By the 1880s, butter dairies were commercially successful near population centers. Sweet, fragrant "gilt-edged" butter was especially valuable and sold for as much as a dollar a pound.

The Guernsey breed established a solid reputation, and the name "Golden Guernsey" was trademarked for Guernsey milk sales. Joseph France, a doctor, was the first owner of a well-known Guernsey farm and dairy called Mt. Ararat, in Maryland. Interestingly, France was also an unsuccessful candidate for president against Herbert Hoover.

In 1920, the USDA recorded the Guernsey population at nearly 2 million head. Through the identifi-

cation of excellent bulls and cows, the Guernsey was improved in both size and milking ability. By 1970, although Guernseys were already being affected by the growing dominance of the Holstein in the milk business, the breed still registered more than 40,000 calves each year in the United States. American Guernsey semen was exported back to Britain for herd improvement.

Sir John Abott, a Canadian minister of agriculture, imported the first Guernseys to Canada in 1878. First popular in the Maritimes and far across the country in British Columbia, three-quarters of the Canadian Guernseys are now raised in Ontario. The breed society was founded in 1905.

In Britain, Canada, and the United States, the Holstein-Friesian revolution drastically changed dairy farming. The large Holstein can deliver high volumes of milk. Wherever government quotas or premiums rewarded volume more than high solids, the Guernsey suffered.

The rate of decline has been rapid and continual. The American Guernsey Association now registers less than one-third the number of cows than it did twenty years ago. Today only about 1,000 Guernseys are registered in Canada, and slightly more than 6,000 are registered in the United States. In Britain, the Guernsey accounts for only about 1 percent of the annual artificial insemination requests, about equal to that of the Ayrshire. In contrast, the Holstein accounts for at least 95 percent of the dairy cattle in all three countries. The Jersey has held its own as the second most popular dairy breed in the world, with a global population of about 6 million. This compares to the 9 or 10 million Holsteins in the United States alone.

The Guernsey and Jersey are very different cows in appearance, although they are still mistaken for each other. The Guernsey is usually white-and-fawn colored or "broken colored" in various shades from yellow to brown to red. The end of the tail, legs, and underside are usually white. The Guernsey can also be solid colored. The yellow color in the ears is believed to indicate the richness of the milk. Yellowish color is also seen around the eyes and on the skin. The muzzle is cream colored and the feet are amber in color. Although

the Guernsey has lovely short, arching horns, there is a polled variety in North America. At 54 inches tall or more, the Guernsey is usually larger than the Jersey, although the average cow may be smaller. The desirable minimum weight is 1,200 pounds for cows. The Guernsey also provides a better beef calf than the Jersey.

The calm, docile Guernsey gives a golden-colored milk. This color comes from high levels of beta-carotene, believed to reduce the risk of certain cancers in humans. The American Guernsey Association promotes Guernsey milk under the Beta Life trademark. Guernsey milk is also very high in solids, both protein and fat. In the dairy solids market or when milk pricing is based on multiple components, the Guernsey produces a very profitable milk. American Guernseys now average 14,667 pounds of milk, 659 pounds of butterfat, and 510 pounds of protein yearly. The top-producing herds have achieved more than 19,000 pounds of milk. Even when the fat is removed, Guernsey milk is especially flavorful.

Because the Guernsey cow is smaller than a Holstein-Friesian, she eats 20 to 30 percent less feed and then converts it into higher protein and fat levels, often resulting in an economic advantage for the dairy farmer. The Guernsey's white-and-fawn coat increases heat tolerance and reduces heat stress, which affects milk production. Management costs are also lower. The Guernsey also calves earlier, more frequently, and with fewer difficulties than a Holstein. The breed is free of recessive genetic disorders. Studies at the North Carolina Dairy Processing Center have confirmed these positive advantages. Dairy farmers who kept both Guernseys and Holsteins reported not only that the Guernseys handled the heat better and had better udder health and fewer calving problems but that the solid components and milk production rates did not drop as much in the summer.

The World Guernsey Cattle Federation is promoting the breed's positive traits. The Guernsey is an excellent choice for grass-based dairying or other less-intensive farming techniques. The federation stresses the improved welfare standards of these systems, which can also be important to consumers. The affiliated national organizations will continue to stress the health-

ful aspects of Guernsey milk and promote the image of the breed. There is really no reason for the Guernsey's decline other than breed blindness.

Guernsey Island breeders are still producing excellent stock for export. There has also been an interesting crossbreeding project in Brazil using the Guernsey on the Zebu, producing cattle with docile temperaments, high lactations, and tropical tolerance.

The original Alderney, the cow with the "crumpled" horn that also resembled the Guernsey more than the Jersey, is extinct. The last of the native Alderney cattle were taken to Guernsey just before the German occupation of World War II, where unfortunately they were slaughtered for food. For a time it was hoped that the "Alderneys" in New England were indeed true Alderneys, but they proved to be Jerseys or Guerneys still called by that collective name.



Watch



Watch

### *Florida Cracker and Pineywoods (pls. 87, 88)*

Fewer than 300 Spanish cattle were brought to the New World. Disembarking in several locations, these cattle would eventually give rise to the numerous breeds of criollo cattle that would establish themselves in the millions in the United States and South America. The exact breeds of these founder cattle are unknown, but speculations can be made. Andalusian cattle were found near the port cities of southwestern Spain. Many were long-horned, humpless, dark, wiry animals called "black cattle" and famed for bullfighting. Other breeds in Spain included the red Retinta and the roan or multi-colored Berrenda.

Christopher Columbus brought the first load of cattle to Hispaniola in 1493. He obtained these cattle in the Canary Islands soon after leaving Spain. These islands were home to northern Spanish colonists who owned Asturian and Galician Blond cattle. The old cream to red-colored Galician Blond was more lightly built than the popular modern breed of the same name. The Asturian types were darker, multipurpose cattle that were also used for bullfighting.

By the 1520s, Hernán Cortés had taken cattle into

Mexico. In the following years imported cattle would come from both Spain and the Canary Islands. As the cattle population multiplied in the Caribbean Islands, however, their criollo descendents accompanied future explorers and settlers.

In 1565, the first cattle were brought to Florida from Cuba. Better-quality breeding stock was shipped from Cuba in 1640. By 1700, the cattle population in the Spanish-controlled area was estimated at 15,000 to 20,000 head. Cattle raising was mainly located in the Florida Panhandle and across the southern Spanish areas of Georgia, Alabama, and Mississippi. Native Americans had also adopted the cattle culture. As the American settlers drove the Indian peoples out, they kept some of their cattle for meat, dairy, and work as oxen.

Along with the American settlers came cattle with British origins but not pedigrees. The Shorthorn, the Hereford, the Devon, and perhaps other dairy types were all brought into the Deep South and Florida in the late nineteenth and early twentieth centuries. Some French cattle from Louisiana were also found in neighboring Mississippi. For the most part, all of these cattle ran loose and were rounded up only when needed. The weather was hot and humid but subject to winter chills. Parasites thrived in this climate, and the forage was poor and subtropical. Rangeland was often swamp or timberland. As a result, the cattle that survived were tough and hardy. The settlers' cattle were crossed into the native cattle, but the effect was not strong.

In this situation, two different geographic types evolved. In Alabama, Georgia, and Mississippi the native cattle were known as Southern Woods or Pineywoods. In Florida, the names Florida Scrub or Florida Cracker were used. The word *cracker* referred to the cracking of whips used to herd the cattle, and the native Spanish horses were also called Crackers. These native horse and cattle breeds remained agriculturally successful and important until the introduction of the Zebu breed, the Americanized Brahman, and the Quarter horse.

The Brahman did not make its way into the southern states until the 1930s. The Brahman were a hot-weather, insect-resistant breed. Brahman crossbreed-

ing rapidly changed the subtropical cattle herds and almost totally eliminated the criollo breeds. Their crossbred calves were large and grew rapidly. New strains or composite breeds were developed, and some have been very successful. Pockets of native cattle survived only in isolated areas or because their breeders remained loyal to the cattle that had been kept in their families for a hundred years or more.

By the late 1930s, only a few herds of native cattle remained, and their numbers had fallen to about 300 head. In 1970 in Florida, the commissioner of agriculture, Doyle Conner, became concerned about the loss of the state's historical breed. With a small herd of cattle from the Durrance family, preservation herds were established in Tallahassee and later at the Withlacoochee State Forest. Payne's Prairie State Preserve also established a herd from Durrance and Chaires family cattle. Cattle from this herd were also placed at Lake Kissimmee State Park.

The Florida Cracker Cattle Association was founded in 1989. After inspection, 700 foundation animals were approved and registered. Dr. T. A. Olson of the University of Florida has continued to provide technical support and guidance in this process. The cattle in the preservation herds are carefully culled using blood typing, the knowledge of longtime breeders, and references to historical photographs. Fewer than a dozen private breeders have established herds of Florida Cracker cattle.

The Pineywoods cattle breeders have begun this same process with the formation of the Pineywoods Cattle Registry and Breeders Association in 1999. They face the challenge of identifying the remaining cattle and organizing a registry. Six distinct, family-owned strains have been identified: Barnes, Bayliss, Carter, Conway, Griffin, and Holt. The Carter strain, which has thrived without outside blood for more than a hundred years, has a particularly fascinating history dating to the 1860s. Sixteen-year-old Civil War veteran Print Carter swam a herd of red cows across the Pearl River, which forms the Mississippi-Louisiana border. The Bayliss strain and red-and-white Conway strain are also found in Mississippi. The Holt family of Georgia has developed a black color-sided roan strain, while the

[To view this image, refer to the print version of this title.]

Fig. 45 Bovina, a red Guinea Florida Cracker cow. Photography by Harold F. Mailand.

Griffin cattle are usually yellow. Although some Pineywoods cattle were entered in the Florida Cracker registry, the Pineywoods and Florida Cracker are separate populations, and they should not be classified together for preservation purposes. Each native breed has a population of 1,000 to 1,500 individuals, though many are not in breeding situations.

The Cracker and Pineywoods cattle are smaller than the Texas criollo breed the Longhorn. Cows weigh 600 to 800 pounds, with bulls somewhat larger. Like the Longhorn, muscling is not generally heavy. Some of these cattle were bred for use as oxen, and their muscling is more massive in the forequarters than the hind. The horns are less widespread than the Longhorn and tend to curve upward. Some cattle have downward-curving horns, others are longer, smaller, or incurving, and there are some polled animals.

A dwarfing gene is present in these cattle. These smaller cattle were often called Guineas and were definitely preferred by some owners, especially in the coastal areas, where they were used as milk cows. The Guineas were healthy animals and known as easy keepers. Guinea-type cattle are now extremely rare but should not be bred together to prevent the lethal bulldog dwarf calf (fig. 45).

There is great variety in Florida Cracker and Pineywoods coat color. The main solid colors are red, black,

dark brown, and black with a tan ring around the muzzle and dorsal stripe. These calves are born reddish brown and darken gradually over several months. Fewer numbers of cattle are seen in colors or patterns of light red, yellow, brindle, dun, tan, roan, line-backed, speckled, spotted, color-sided, and reverse color-sided. There are also white cattle with color points. Among isolated herds these color patterns occur at different rates. Some of the Pineywoods family strains have definite color or color pattern preferences.

Feral cattle are still present in Florida and Louisiana. In Florida, the Okefenokee Swamp was long used as a cattle range. After the wildlife refuge was created, grazing was stopped but feral cattle remained and are occasionally captured for use in herds of native cattle. There are also about 200 feral cattle in the Atchafalaya Basin in Louisiana, although most are on land belonging to a hunting club.

The work of dedicated family breeders and the preservation efforts of the Florida Cattle Cracker Association and the state of Florida demonstrate the foresight needed to save a historical breed, the success of planned breeding programs, and the cooperation that is needed between individuals and groups. The Florida Cracker breed is now stable. The individual strains of Cracker cattle are also identified and can now be preserved as well.



Critical

### *Texas Longhorn (pl. 89)*

The Texas Longhorn is no longer an endangered breed, although it was snatched from the edge of extinction. The Longhorn has now experienced a spectacular recovery and success that may serve as a model or inspiration for other breeds. And without a doubt, no other cattle breed is more closely linked to the character and essence of the American West (fig. 46).

The stocking cattle brought to the New World by the Spanish came mainly from western Spain and the Canary Islands. The breeds that would have been available at that time included the famous Black and the rarer Grey Andalusian. The dual-purpose Retinta was

colored in shades of red to yellow, and there were also two colorful varieties of the Berrenda cattle, a white with roan or red markings and a black and white. The cattle found on the Canary Islands had come with colonists from northern Spain and resembled their native breeds, including the cream to red, triple-purpose Galician Blond and the chestnut Asturian. All these breeds carried traits that would serve them well in their new home—agility, hardiness, good mothering instincts, the ability to walk long distances, and the canniness to survive in tough conditions and on poor fodder.

The descendents of the cattle that Columbus brought to Hispaniola in 1493 were not taken to the mainland until 1521, when Captain Gregorio de Villalobos violated the prohibition of cattle trading in Mexico. Hernán Cortés also brought in cattle to feed his expedition that same year. In 1690, the first herd of cattle was driven north into the land that would become Texas. These 200 cattle were the foundation of a population that would come to number in the millions.

First the *vaquero* and then the cowboy herded these criollo cattle. They ranged in the Spanish tradition—unfenced—and many escaped human control to roam wild in the brush. After two hundred years in New Spain, the Longhorn was a rough and tough “critter.” Long-legged and self-reliant, the Longhorn was not mature until eight or ten years of age, with a weight averaging 1,200 pounds. Longhorns were fertile in the hot weather, resistant to disease and pests, and especially long-lived. The Longhorn’s large, long head was characterized by the trademark handlebar horns, which spanned at least 40 inches from tip to tip but were capable of growing up to 108 inches long.

A wave of American settlers made their way to Texas by 1820. Besides the use of free-roaming stock, these new ranchers were able to buy herds of cattle in Mexico to drive up into Texas. By the Civil War, the Texas Longhorn was a recognized type with a population of several million in Texas alone, including many unbranded, feral cattle. Longhorns were also found over an even larger area of the Southwest.

The first cattle drives began even well before the war, both to New Orleans in Louisiana and to California during the Gold Rush. The first Longhorns to reach

[To view this image, refer to the print version of this title.]

Fig. 46 A Texas Longhorn breeding herd owned by the Dickinson Cattle Company in Barnesville, Ohio. Courtesy Dickinson Cattle Co.

New York City arrived in 1854, after a trek that lasted about a year. The early cattle drives faced many obstacles both natural and manmade. The ever-advancing farmers were angry when the tough, immune Texas Longhorns shed ticks that could carry Texas fever to their barnyard cattle, and so the cattle drives were sometimes met by armed confrontations. The cattle drives largely halted during the Civil War, although some herds were delivered to Confederate troops.

After the Civil War, the era of the great cattle drives began. Cattle worth about four dollars in Texas could be sold for forty dollars in Chicago or Cincinnati. By 1867, the railhead at Abilene, Kansas, had opened. The cowboys and the brush poppers drove herds averaging 2,000 head to Kansas or Missouri on drives as long as 1,500 miles. The record cattle drive left Texas in 1869

with 15,000 head. By 1889, it was estimated that 10 million cattle had made the drive out of Texas.

The land the cattle crossed was dry, hilly, and sometimes wooded. The streams were steeply banked and prone to flooding. Herds could make about 10 miles a day under good conditions. The Longhorns needed about 30 gallons of water each day, so watering sources were crucial. The herd had to be protected from rustlers, angry settlers, and Indians, so the cowboys followed established routes such as the Shawnee Trail, the Goodnight Loving Trail, and the famous Chisholm Trail. When the railroad moved further west, Dodge City became the wild and famous terminus of the Great Western Trail. Trail-drive cattle were usually four years old, but occasionally they were younger. Some herds were mixed groups of bulls, steers, and “she stuff,” or cows. The cowboys preferred herds of steers because they were calmer, better walkers, and less likely to stampede. A lead steer that rose to dominate the herd was valued and brought back to Texas to guide more herds

to market. In spite of walking for at least four months, a Longhorn usually put on weight while on the trail.

“Stampede!” was a dreaded cry. Strange smells, unusual noises, lightning, hail, or the deliberate actions of rustlers could incite stampedes of hundreds of cattle. Stamping cattle did not bellow, but the hooves thundered and the horns clashed. The advice to a new cattelman was deceptively calm: “Should your cattle get the start of you and go off on a mad run, keep cool, think fast, and act promptly. If you have room, get your horse as quickly as possible a rod or so in front of your herd and a little to the right or left as the case may be (have all your help with you), which will cause the cattle to crowd from you, and in a little while you will have made a complete circle. . . . Better drift a mile or two than, as sometimes happens, have a run of twenty-five or thirty miles, and not get back for three or four days, and then with a share of your stock lame or foot-sore” (Jones 1885, 884).

The herd could indeed run for many miles unless stopped by a natural barrier that itself might cause many deaths. The worst stampede disaster occurred in 1876, when an entire herd leaped into a gully near the Brazos River, killing more than 2,000 cattle.

The great profits to be made from cattle led to a ranching boom throughout the West. Lured by the potential fortunes, ranches were established throughout the Southwest and on the grasslands as far north as Montana, the Dakotas, and into Canada, where the cattle could fatten on good grass if they survived the droughts or blizzards. Many of these large ranches were funded by English or Scottish investors. These owners imported Angus, Herefords, and Shorthorns to increase both the meatiness and the fatness of the cattle. Wells were dug to provide water for the new shorter-legged cattle. Barbed wire was first introduced in 1874 and was gradually adopted by ranchers to protect both their cattle and their land. Range wars erupted as the result of conflicts between the powerful ranchers, the homesteaders, and the cattlemen who believed that rangelands should be open for grazing and driving.

In 1876, George Emerson brought the first small herd of Longhorns from Montana into southern Alberta, Canada, to form a breeding herd. In 1879, he

imported another 1,000 head. With more imports and deliberate breeding efforts, the Canadian Longhorn population was estimated at 40,000 by 1884. Unfortunately, the Canadian Longhorns began to disappear as homesteaders fenced the rangeland.

By 1885, crossbred cattle were beginning to dominate the American market. In 1900, the USDA estimated that the U.S. cattle population was 60 million head and that most of these cattle contained Longhorn blood. However, by 1930, most of the open American range was gone, and even the southwestern ranchers were breeding fatter cattle from British, Brahman, and eventually the Continental breeds. Only a few dedicated Longhorn cattle raisers kept their traditional breed.

In 1927, fearing a Longhorn extinction, the federal government provided three thousand dollars for the establishment of a Texas Longhorn herd at the Wichita Mountains Wildlife Refuge at Cache, Oklahoma. This first herd was composed of 20 cows, 4 calves, and 3 bulls. Later, another herd was sent to the Fort Niobrara National Wildlife Refuge near Valentine, Nebraska. These preservation herds were based on long-held ranch herds and supplemented by Ira “Cap” Yates, whose cattle had the most genetically pure old Longhorn blood. In the early 1930s, the state of Texas also formed a Longhorn herd. By 1960, only some 2,500 purebred Texas Longhorns could be found in the government herds, the Texas state herd, private herds, and zoos or parks. The Texas Longhorn Breeder’s Association was formed in 1964, when the purebred numbers had fallen to 1,500. After reaching that low point, the Longhorn breed has recovered dramatically. Today, there is a population of about 100,000 registered Texas Longhorns, with some 13,000 new registrations annually.

The Longhorn has succeeded because it has again found economic worth. Longhorns have dense bones, hard feet, and a strong, free-moving walk. The Longhorn is famed for its longevity, high fertility, ease in calving, resistance to parasites and disease, and vigorous and efficient browsing ability. With the increased interest in grass-fed beef and where herds are forced onto increasingly marginal grazing land, the Longhorn will

continue to excel. The Longhorn produces a naturally lean beef that now regularly wins carcass contests. The Longhorn has also proven to be resistant to the deadly tansy ragwort found in northwestern pastureland. The Longhorn is also immune to pinkeye and highly resistant to bloat. Many cows live and produce until twenty years of age, with some reaching thirty years, which translates into fewer replacement heifers. Additionally, the U.S. Meat Animal Research Center has reported that in comparative tests, the Longhorn had the highest rate of unassisted births and the lowest birth weights. More live calves at lower expense again translates to more profit.

The breed is still slow to mature, with cattle not achieving full adult size until about eight years old. Cows weigh 750 to 1,000 pounds, with bulls under 2,000 pounds. With better feed and breeder selection, today's Longhorn has more muscle on the body and heavier forequarters. The horns continue to grow throughout the Longhorn's lifetime. There is no breeder preference to color, and they are all gloriously expressed, including some unusual types like the various blue *grullas* and dorsal-striped cattle.

Longhorn bulls are often used to sire the calves of first-time heifers. Texas Longhorns are also used in producing crossbred calves with breeds like the Hereford. The Longhorn parent brings the positive breed characteristics and hybrid vigor. Longhorn and Longhorn-cross calves are widely used in rodeo events. Longhorns have also contributed to several new composite breeds, such as the Salorn, Texon, El Monterey, and Geltex. In addition, Texas Longhorns are still being bred at the two national wildlife refuges.

In 1969, Texas Longhorns were reimported to Alberta from the United States. Still found mainly in Alberta, the Longhorn is also raised in Canada in Saskatchewan, British Columbia, and Ontario. The Longhorn is proving itself successful in the Canadian beef industry as well.

The Texas Longhorn breed still faces some challenges. Eight different bloodlines, or "families," are present in the Texas Longhorn breed, including the Wichita Mountains Wildlife Refuge herd. The vast majority of the Longhorns contain a mixture of these lines.

Six of the old family or sire lines survive intact but are being maintained by only a few breeders. These lines may contain especially valuable traits or distinct, unrelated genetic material. Some breeders have also observed two types of Longhorns beginning to emerge — "show Longhorns" and "range Longhorns." A disagreement among members of the original breeder's association has led to the formation of a second group called the International Texas Longhorn Association. A third group, the Cattlemen's Texas Longhorn Registry, was also founded in 1990.

The story of the Texas Longhorn clearly illustrates the possible comeback of a once unfashionable breed. The Longhorn was rescued to become commercially valuable and successful. The history of this breed is deeply woven into the American fabric. An entire culture arose from the mystique of the Longhorn and the cowboy and has been expressed in art, song, story, and film. The western way of life still contributes to modern North American culture and represents much of what its citizens regard as exciting, brave, and even noble.



Insecure

### *Canadienne (pl. 90)*

No one knows when cattle first made their way to Canada. The Vikings may have brought their red-and-white cattle with them to Vinland in northern Newfoundland in A.D. 1004. Within a very few years, however, the colonists and their livestock either perished or returned home. In 1598, French colonists on an island off Nova Scotia discovered feral cattle and sheep, but these animals seemed to be a result of a Spanish shipwreck rather than the offspring of Viking livestock.

Although cattle were landed at Mexico by 1521, their descendants were not taken north to Texas until 1690. Meanwhile, the French explorer Jacques Cartier brought cattle with him to Canada in 1541. By that time, fishermen and whalers were already summering and sometimes wintering on Newfoundland and in Nova Scotia.

The French settlement at Quebec was founded in 1608. For the next two years, Samuel de Champlain,

the founder and commander of the colony, imported cattle from Normandy to help the colonists. It was difficult to thrive in Quebec, and at the time of Champlain's death, twenty-seven years later, there were still only 300 colonists. As colonizing continued, settlers from Brittany and Normandy brought additional cattle with them. By 1663, there were 3,000 settlers in New France. To help them, Louis XIV instructed his minister Colbert to send excellent animals to the colonists. The first shipment of cattle came from northwestern France and was followed by shiploads from Gascogne.

In 1665, visitors recorded that the cattle found in New France were mostly all fawn or black. The old cattle breeds of Normandy and Brittany are believed to be related to the cattle found on the Channel Islands—in particular the Jersey and Guernsey. The extinct Froment du Léon was a dairy breed from Breton that gave butter-rich milk. Closely related to the Guernsey, this breed had a wheaten-colored coat. Breton cattle are also linked with the ancient horned cattle of Cornwall, much like the small black Kerry. These influences are seen in the breed that would arise in New France known as the Canadian or French Canadienne. Because the cattle of France are now changed, the Canadienne may more closely resemble these old ancestors.

In 1681, most of the settlers to New France were immigrating from western France or provinces near the Atlantic. Although the colonists were poor, they were literate and generally from towns rather than the countryside. More than half the men had a trade or craft. There was no shortage of good farmland, but colonists usually raised only enough for their own families. Cattle, sheep, and poultry provided milk products, wool, and eggs. The colonists were pleased with their lives in the New World—even as subsistence farmers, they were better fed than were the peasants in Europe.

Although there may have been a few additional imports of French stock, the cattle in New France evolved basically on their own. They adapted to the difficult winters and the care that was available. Almost two hundred years later, all the cattle of Quebec were known to be the native Canadienne except for a few herds of Ayrshires in the cities and along the eastern border with the United States.

In 1853, the government established the Board of Agriculture, and it immediately began to “improve” the native Canadienne using the Ayrshire and other imported breeds. In 1880, several men in charge of agriculture for the province and a Dr. J. A. Coulture reassessed this misguided program and determined that three-quarters of the cattle in Quebec were fortunately still free of crossbreeding. By 1886, record books were established for the Canadienne, whose population now numbered about 800,000.

These promoters worked hard to establish the credibility of the native cattle. At agricultural trials in Canada, the Canadienne was judged the most profitable dairy breed. During the Pan-American Exhibition in Buffalo, New York, in 1901, the Canadienne was accorded the honor of the “most economical milk-producing breed.” Soon afterward the Société des Éleveurs de Bovins Canadiens, or the Canadienne Cattle Breeder's Association, was established.

At this time, the Canadienne was described as an attractive and docile cow. The color ranged from black to brown to fawn. The preferred color was dark brown with a fawn or orange stripe down the back and around the muzzle. The calves were born solid red, but their distinctive markings began to appear at about one year of age. Cows weighed 700 to 900 pounds and bulls about 1,400 pounds.

The Canadienne was renowned for its thriftiness and health even through the cold winters in Quebec. Cows were capable of lactating almost the entire year and gave a milk rich in butterfat. The claim to profitability was based on trials that proved that the Canadienne gave more profit in the form of butter for each dollar spent on feed than any other breed.

In spite of this verification, the Canadienne again became the victim of the desire to “improve” and change. The imported Holstein-Friesian revolution was almost unstoppable, and the Ayrshire was also heavily promoted. It was hard for farmers to resist the authorities, who pushed the adoption of “modern” breeds even though they might not be the most economical solution in all situations. By the 1960s, only a small group of farmers in Quebec continued to breed and use their traditional cow.

Between 1968 and 1971, Canada instituted a quota system for milk production. This system rewarded cows that did not produce milk with high solid levels of protein and butterfat, although the payment modifications of 1992 have since helped the Canadienne. The breed organization also failed to embrace the use of artificial insemination as rapidly as the Holstein and Ayrshire breeders, and AI rapidly came to dominate the dairy breeding industry. The absence of Canadienne genetics through the AI system adversely affected the breed.

Although various governmental demonstration herds of Canadiennes had existed through the twentieth century, the most influential was located at the dairy school in Saint-Hyacinthe in Quebec. This herd produced some of the most important cows and bulls in the breed. Tragically, a fire destroyed the herd in 1983. This loss was another major blow to Canadienne breeders.

The breed association began to allow the use of American Brown Swiss genetics in the 1970s, when the population number had fallen very low. This has resulted in improvements of size, milk production and udder conformation and has lessened the use of inbreeding. Average lactation over 305 days is now 10,073 pounds of milk, 424 pounds of butterfat, and a ratio of 4.21 percent. While the Brown Swiss has some physical resemblance to the Canadienne, the two breeds are not related and so the use of this crossing has diminished Canadienne genetic purity.

The Canadienne cow now weighs about 1,000 to 1,100 pounds and the bull up to 1,800 pounds. Color ranges from black, brown, red, or fawn with the distinctive lighter color on the muzzle, back, and underline. Under the shiny short hair is a dark pigmented skin, which is very advantageous in hot or sunny climates.

The breed society is now actively promoting the many positive qualities of the Canadienne. Sadly, registrations have continued to decline. In 1970, there were about 900 registrations, sliding to about 400 fifteen years later and to a low of 74 in 1985. Registrations increased in the 1990s to 200 to 300 yearly, though less than 10 percent of these registrations are purebred Canadiennes. In 1993, the government withdrew monetary assistance to support the Canadienne asso-

ciation. The number of purebred Canadiennes is now believed to be about 100 to 200, out of a population of about 1,500 registered Canadienne cows.

RBC owns a small herd of Canadiennes and maintains a gene bank of frozen semen from 18 purebred bulls. RBC founder Jy Chiperzak believes that several actions could still save the Canadienne. Besides enlarging RBC's own herd, more small purebred herds need to be established in production situations. Public awareness could also increase with the development of specialty dairy products from Canadienne cows.

The Quebec Department of Agriculture, Food, and Fisheries is now supportive of Canadienne genetic conservation. By the end of 1999, 120 frozen embryos from 22 cows and 19 sires were in genetic storage. The conservation plan includes future embryo implantations and embryo flushing or semen collection from these offspring.

In 1995 in France, a small herd of purebred Canadienne cattle was created through the use of transferred embryos. As a return gesture, the French conservationists have returned semen from their bulls back to Canada. The French government has also recognized the Canadienne with rare breed status.

The Canadienne is still among the hardiest and most productive of dairy breeds, especially in grass- or forage-based dairying. Canadienne enthusiasts boast that their breed is the oldest in North America and the only native dairy breed. The current crisis requires the continued dedication of breeders as well as a renewed interest in this valuable old breed. The Canadienne deserves both official recognition for its historic importance to Quebec and governmental support for conservation.



Critical



Insecure

### *Dutch Belt or Dutch Belted (pl. 91)*

The mild climate and lush grass of Holland have helped make this small nation the source of prime cattle that have influenced breeds around the world. The Holstein-Friesian has quite literally become the very image of a dairy cow. So pervasive is the influence of the black-

and-white Holstein that the other breeds of Dutch cattle are scarcely known.

The Lakenvelder, which means sheeted field, was a black or red dairy cow with a broad white belt. These cattle were known in Holland by the 1600s, where their attractive and striking color pattern was a favorite of the wealthy and the nobility. The same color pattern was repeated in other farm animals such as Dutch rabbits and Lakenvelder chickens. Lakenvelder cattle owners treasured their rare animals and so did not cooperate well in maintaining a herd book or exchanging stock. In 1930, mandatory tuberculosis testing and government control of milk production was instituted, both of which were hard on this minority breed. After World War II, only 5 known Lakenvelder herds remained. Soon afterward, the government enacted regulations forbidding the use of bulls other than from three other recognized breeds.

With the development of interest in preserving rare breeds, an association of Lakenvelder breeders has been established. The remaining Lakenvelders were closely related, and only 75 showed an acceptable pattern. The breeders were in desperate need of rejuvenation, so they turned toward the adoptive home of their native cattle—the United States.

The first import of Lakenvelder cattle was made in 1838, by D. H. Haight, who was serving as the U.S. consul to Holland. Two years later, the famous showman P. T. Barnum purchased several Lakenvelders from a member of the Dutch nobility. Billed as “a rare and aristocratic breed,” the cattle traveled on exhibit with Barnum’s circus. Eventually they were placed on his farm in New York, where they proved to be excellent milkers. Additional small imports of Lakenvelders or Dutch Belts were made over the next fifty years. The Dutch Belt population was found mainly in New Jersey and New York until the early twentieth century, when they began to appear in many states.

The Dutch Belted Cattle Association was founded in the 1860s, and the herd book has been kept continuously since then. The members of the association were knowledgeable dairy farmers who actively promoted their breed and encouraged scientific testing. The Dutch Belts performed well in various dairy tests

across the United States for many years. In 1925, a Dutch Belt cow produced 17,285 pounds of milk and 634 pounds of butterfat on a standard trial. The USDA yearly production figures for 1930 listed only the Holstein and Brown Swiss ahead of the Dutch Belt, followed by the Ayrshire, Guernsey, and Jersey (fig. 47).

Dutch Belted cattle were recognized by the Dairy Science Association and the USDA as a viable dairy breed. Individual Dutch Belt dairy owners found that their customers enjoyed their specialty milk. Dutch Belt milk contained small fat globules that did not separate as quickly and were easier to digest than other breeds’ milk. The milk also contained high levels of beta carotene and butterfat. In addition, the Dutch Belt had a long lactation. One high-production Dutch Belt cow was milked continuously from her first freshening at two years of age through her twelfth year and beyond.

Unfortunately, the numbers of Dutch Belt cattle were lower than the other dairy breeds. In 1920, the USDA estimated the Dutch Belt population at about 157,000 head. Because even the more numerous breeds would suffer under the Holstein onslaught, the Dutch Belt found it almost impossible to compete in spite of its excellent credentials.

Dedicated individuals such as the O’Neill family in Illinois preserved the breed. More than a curiosity, the Dutch Belted cattle continued to be milked on a few farms. John G. DuPuis founded one large, outstanding herd in the twentieth century. Tragically, this herd was slaughtered in the 1985 dairy buy-out program.

Kenneth and Winifred Hoffman of Bestyret Farm in Illinois own a herd mainly built from the O’Neill herd. The Hoffmans have demonstrated that Dutch Belted cattle are a profitable dairy breed, especially when coupled with grass-based farming practices. The Hoffmans have also employed semen conservation and embryo transfers in preserving the breed.

The Dutch Belt is an exceptional milker that can compete with the Holstein under low-input management. With good management, a cow can produce more than 20,000 pounds of milk with a butterfat range of 3.5 to 5.5 percent, useful for cheese and butter making. The valuable qualities of the milk have been preserved. The fat globules are very small, and the milk

[To view this image, refer to the print version of this title.]

Fig. 47 This Dutch Belt cow named Lady Aldine illustrated an article on livestock in *Scientific American* in the 1880s. Courtesy of the IAB and Hans Peter Jorgensen.

is easily digested. Along with its high beta-carotene content, the milk has an excellent flavor.

The Dutch Belt cow weighs 900 to 1,500 pounds and has a well-attached udder, well-placed teats, and a lovely disposition. With her high volume, she is primarily a dairy herd cow, not a home milker. The breed has no special calving difficulties and is especially suited to pasturing. Owners report that the Dutch Belt is intelligent, hardy, and long-lived. Because they remain naturally horned, Dutch Belted steers are striking as oxen teams.

Dutch Belted cattle are either jet black or red. The white belt starts at the back of the shoulder and extends almost to the hips, wrapping entirely around the body. At times there is some white on the lower legs.

This belted pattern is a dominant characteristic that is stamped on crossbred offspring.

The ALBC has determined that the global population is critically low for the Dutch Belt. From 1973–74 to 1981, an average of only 17 males and 71 females was registered each year. These numbers decreased from 1981 to 1995, when an average of 7 males was registered each year, for a total of 100 males. The average yearly registration of females was 21, for a total of 300. The estimated U.S. population has now fallen below 300. The herd book is now maintained by the ALBC under an agreement whereby the secretary of the Dutch Belt Cattle Association of America delegates register duties.

When the number of purebred breeders fell, it became necessary to initiate a recovery program by using registered bulls on grade Dutch Belted cows. A breeding-up program is also allowed using other cows with Dutch Belted bulls. In 1995, 34 purebred cattle were registered and 80 cattle were under the breeding-up

program. Breeding-up herds were established in Canada in the early 1990s. Purebred cows now number about 200 in the United States, and there are still significant numbers of purebred yet unregistered cattle. Because crossbred cattle may also be marked with the characteristic belt, the ALBC warns potential buyers to check pedigree records with care.

Semen from American Dutch Belted bulls has been sent back to Holland for use by the Lakenvelders Breeding Association and has been successful in injecting vitality back into the breed. The American Dutch Belt is actually closer to the original type than those still available in Holland.

Except for a shortage in numbers, there is no reason why the Dutch Belted cow should not flourish. It is a competitive and profitable breed that actually produces a higher-quality milk than the Holstein. The Dutch Belt is a proven producer in low-input or grass-based systems. The breed is built somewhat heavier than other dairy breeds, which holds potential for crossbred beef calf production. The Dutch Belt also transmits a high percentage of color, making the breeding-up program attractive. And the sight of Dutch Belted cattle grazing on a green pasture is nearly incomparable.

 Critical  Rare

### *Lineback*

As evidenced by their representations on the walls of prehistoric caves in Europe, linebacked cattle have long captured the imagination. This color pattern has been seen around the world in many breeds, occurring sometimes randomly and at other times as a favored trait. Linebacking is also known as finching, finchbacking, or *rigget*. Linebacked cattle are from the color-sided group, in which there is a gradual transition from white cattle with color points of red or black to freckling or spotting that builds up on the neck and front and sides until it becomes clear color-sided, leaving only the white striping down the back from the withers over the tail and rear and along the underside. The head and legs also become colored except for an occasional white band or garter on the hind leg above the

hocks. Dr. Phillip Sponenberg, ALBC technical coordinator, believes that the sharply marked cattle with less roan coloring are actually a second lineback pattern type. This clearer pattern is seen in such breeds as the Gloucester.

In North America, the first mention of a linebacked cow is found in the recorded Plimoth Colony cattle division of 1627, which mentions a great white-backed cow. At that time in the British Isles, lineback cattle could be found in several breeds, including the English Longhorn, the Gloucester, the Irish Moiled, and the now extinct Welsh Glamorgan. In addition, Dutch colonists to New York most probably brought along their Witrick cattle. At that time Witrick, Lakenvelder, and Groningen cattle far outnumbered the Friesian in Holland. Other cattle that can exhibit color-sidedness were also brought to the United States, including the Milking Shorthorn, Durham, Ayrshire, Hereford, and Friesian.

At the beginning of the 1800s in New England, a recognized type of cattle were commonly called Linebacks. Lineback cattle tended to be more numerous in certain areas. Herds of Lineback cattle were found in the Midwestern and eastern states, including New York and northern Vermont, and across the border in nearby Canada. Lineback cattle were also among the stock taken westward by the pioneers and used for meat, dairy, and draft.

In the 1830s, linebacked Holderness cattle were imported to New England. Holderness cattle came from Yorkshire and were a regional type of unimproved Shorthorn. The Holderness may have been based on short-horned Dutch cattle that came to England in the late 1600s. The Holderness was an excellent milker and was used in dairy herds in New York and elsewhere well into the 1890s. Recognized as a breed, the white linebacked Holderness was dark brown to black color-sided with dark-colored legs. The striking Holderness was medium-sized and fine-boned, with excellent dairy conformation. Eventually there was a Holderness registry, and these cattle are still found in areas of New England, although they are often called Lineback cattle.

Beginning about 1906 in New York and other eastern states, a strain of the Holderness was promoted as

the Columbian. The Columbian was touted as an economic and hardy milk cow well-suited to this area. The dark color-sided Columbian was an especially good butterfat producer in low-input systems. An article about the Columbian in the *Rural New Yorker* of 1912 explained that whereas Holsteins gave larger milk yields and the Jersey's milk was richer, neither could compare to the Columbian, which could "return so large a percentage of their feed to the pail and so small a percentage to the trenches." Columbian strain cattle may still exist in two small herds in Connecticut, and Columbian steers are occasionally seen at ox pulls. The Columbian registry functioned until the early 1940s.

In the twentieth century, as triple-purpose cattle lost their battle with the specialist breeds and as the minor dairy breeds continued to lose ground to the Holstein-Friesian, linebacked or color-sided breeds were kept only on the occasional family farm. In addition, most of the unregistered dairy herds were "improved" by crossbreeding with the Holstein.

In 1985 in Vermont, the American Lineback Cattle Registry was formed by a handful of farmers who were breeding and milking various Lineback cattle, including the Holderness. Within two years, more than 500 cattle were entered in the herd book. The herd book accepts cattle that are marked in either a clear, distinctive "Gloucester" pattern or a variety of "Witrick" patterns. The "Gloucester" may be colored red, brown, or black with a white linebacking pattern. "Classic White Witrick" cattle may be white with some color around the ears, eyes, and nose. "Dark-speckled Witrick" cattle have speckles, spots, and patches of color on the sides, and "Dark-sided Witricks" are colored black or red on the side, often with a speckled line down the back and a roan face.

Most of the identified cattle have been of the Witrick type. Today in the Netherlands, Witrick cattle are called Witrug or Witrik. They are mainly black or red spotted or roan on the sides with a white linebacked stripe. Many have a black tongue and black hooves. There are few purebred Witrick cattle left in Holland because, like the Lakenvelder or Dutch Belt, the government discouraged their breeding.

It is felt by some cattle raisers that these two broad types, the Gloucester and the Witrick, represent the American version of their original ancestors. There is, however, no documented connection between these cattle and the Gloucester breed in Britain. The use of these pattern names is somewhat confusing and misleading.

Owners report that their Lineback cattle are long-lived and good milk producers. Some of the cattle are more dairy in appearance, while others are beefier. Some of these Lineback cattle are larger than Holsteins and very heavy milkers. The Carlson herd in New York averages 21,000 pounds of milk annually. The Van Gheem herd in Wisconsin also has cows in the 20,000-pound milk range. The butterfat and protein levels are higher than in the Holstein's milk. Owners also report that the Lineback is capable of high production on whatever feed is available (fig. 48).

Several states now allow production records to be recognized from Lineback herds. The association is seeking USDA breed recognition and dairy production recognition in more states. In 1996, the association changed its name to the American Lineback Dairy Cattle Registry. They will soon close their open herd book but still provide for upgraded cattle. There are possibly 2,000 to 4,000 Lineback cattle in North America, including those that are unregistered. About 200 calves are registered yearly by breeders who are located primarily in the Northeast.

Although many of the American Linebacks lack documentation, their preservation is important. Blood typing and genetic testing have not been conducted on most of this herd book, so it remains uncertain exactly what is present. The remnants of the Holderness and Columbian could possibly still be isolated. Some registered Linebacks do include Holstein, Ayrshire, or Shorthorn breeding, and the continued acceptance of Holstein crosses is troublesome. Although the Linebacks have been criticized as primarily a color breed mainly composed of grade Ayrshire, Shorthorns, and others, it is important to maintain different types of dairy cattle other than the ubiquitous Holstein.

[To view this image, refer to the print version of this title.]

### *Randall Blue Lineback (pl. 92)*

A few herds of Lineback cattle were long held or closed. The Randall family of Arlington, Vermont, maintained a closed dairy herd of Lineback cattle for more than eighty years. The family had originally owned a Guernsey milking herd, and some Guernsey breeding was incorporated into the Randall strain of Lineback cattle early in its existence. However, it is believed that Randall Lineback cattle represent the original New England Lineback type that was multipurpose in use for dairy, meat, and draft.

After Everett Randall retired from dairying, the entire herd of bulls, cows, and calves was pastured together for about fifteen years. Following the herd's dispersal in 1985, the cattle could have easily been lost to slaughter. Through the efforts of Robert Gear, Cynthia Creech, and other ALBC members, most of these cattle are now safely in the hands of a small group of like-minded breeders.

Fig. 48 Lineback heifers on Diamond-Heart Farm, Daniels Farm Road, Irasburg, Vermont.  
Courtesy Paul and Mary Daniels.

Blood-typing studies have revealed that this herd is uniquely isolated from other dairy breeds. These studies indicate a Dutch origin to the cattle with some addition of English and Channel Island or Brittany cattle, which is consistent with the history of the strain.

The ALBC regards these cattle as a landrace breed now called the Randall Blue Lineback. Some Randall Linebacks were originally also registered in the American Lineback herd book. The current owners of Randall Blue cattle are following a coordinated breeding program designed by Dr. Phillip Sponenberg, and the registry is maintained by the ALBC. The total breeding population was about 47 animals in 1995 but today numbers about 90. Cynthia Creech of Tennessee owns the largest herd, but small breeding groups are being established elsewhere, including Canada.

Fortunately, this small breeding group shows great variability and has maintained vigor, soundness, and fertility. The owners are encouraging hardiness, forage efficiency, and self-reliance through their management practices. The Randall Blue is an excellent low-input or grass-based dairy cow with a good udder. Although these cows are capable of greater production, one Randall Blue cow averaged 10,000 pounds of milk on pasture in the summer and hay in the winter with absolutely no supplementary feeding. Randall Blues are also noticeably friendly, good-natured cows that also exhibit a strong native intelligence.

Randall Blue cattle are color-sided with spotting, or *brockling*. Most were dark or blue-black in color when Cynthia Creech began managing the herd. A range from light to dark is now appearing, including a solid black calf. An orange-red color similar to the Guernsey also historically appeared in the herd but is not currently expressed. There are two types or families within the population and a third type that exhibits traits from each family. The blue-colored animals tend to be larger with good dairy conformation similar to an Ayrshire or a Milking Shorthorn. The white horns of this type are long and tipped in black. A smaller, fine-boned type is also dairy in appearance with shorter, elegantly curved horns. The remaining cattle tend to appear more dual-purpose in conformation, though small in size. Their horns are shorter, and the face is shorter and broader. Randall Blue steers are also attractive working oxen.

The Randall Lineback, or just Randall Blue as some breeders prefer, is a unique group well deserving of preservation efforts. A more formal organization of owners would benefit this breed and will probably evolve as more individuals are able to purchase cattle for breeding herds. Randall Blue breeders are stressing that the main attribute of their breed is functionality, although owners are mainly using them in cow-calf operations. There is only one dairy herd, owned by Phillip Lang of Connecticut. There is a need for more owners to both breed and use these cattle for their original dairy purpose. The Randall Blue can certainly make a contribution to alternative agricultural systems.



Critical

### *Ankole Watusi (pl. 93)*

The cattle of ancient Egypt were humpless and long-horned. As they are pictured on paintings and statues, these Hamitic Longhorn cattle came in a rainbow of colors and patterns: black, red, white, and gray, with tiny spots and huge splotches. About 2000 B.C., Zebu also found their way to Africa. The tough Zebu has large, drooping ears, a pendulous dewlap, and an energy-storing hump that contributes to its great powers of recuperation. The Zebu can survive on limited water and almost inedible food. It is also resistant to most diseases in the tropical environment, though it gives very little milk.

It has been generally thought that when these two types of cattle interbred, they gave rise to the Sanga cattle, represented by many breeds in Africa; further DNA studies are needed to reveal more about the origin of the Sanga and the African domestication of cattle. Sanga cattle are usually long-horned and long-legged. The ears and humps of Sanga cattle are usually not as large as a Zebu, and although the carcass is somewhat meatier, they still do not give much milk.

Sanga cattle are well adapted to their native climate. It is thought that their large horns disperse excess heat. They are able to survive on poor feed and less water via an efficient digestive system that produces an extremely dry manure. Sanga cattle also secrete a sebaceous oil that seems to repel Warble flies and other pests. They are also extremely resistant to many tropical diseases. These cattle are long-legged, agile, and able to travel long distances.

Cattle are of great importance in many African cultures. Traditionally, cattle were considered both sacred and symbolic of the owner's wealth, and beef was generally eaten only on ceremonial occasions. Cows were milked and, among some peoples, bled. The blood was mixed with milk before consumption.

The Ankole tribes moved from Ethiopia down into eastern Africa in the thirteenth to fifteenth centuries. These tribal groups developed different cattle breeds mainly based on appearance preferences. The Bahima were the tallest, with lovely black-tipped horns. The Bashi and Kigezi were both smaller, with shorter horns.

The cattle of the Tutsi tribe were called the Watusi, Burundi, Kivu, or Rwanda. This Watusi type was especially noted for its spectacular upswept horns. The Nkole tribal cattle were called Ankole. In Rwanda, the common Ankole cattle were also called Inkuku. An especially giant-horned variety of Inkuku, called Inyambo, was owned only by royalty but may now be extinct. Besides these breeds, there are still many other large-horned cattle in Africa as well.

During the nineteenth century, many exotic animals were taken to European zoos and game parks. Sanga cattle, sometimes called Ankole or Ankole Watusi, were imported to Britain, Germany, and Sweden. These cattle were not specifically identified as separate breeds or types, and they were interbred. In the 1920s and 1930s, a German animal exporter who lived in Tanzania brought 42 more long-horned cattle to German zoos. Another 7 were exported in 1939.

Eventually, private individuals were able to purchase these cattle, and the animals made their way to Canada and the United States after World War II. These early imports were mostly found in game parks, wild animal parks, rare animal centers, and zoos. In 1960, two bulls born in Sweden were also imported. A female from an English zoo was imported in 1963. In more recent years, there have been some additional imports from Britain and Sweden.

In 1983, North American owners of Ankole Watusi cattle organized the Ankole Watusi Breeder's Registry. Today there are 1,000 to 1,500 Ankole Watusi cattle outside of Africa, and about 80 percent of these are in the United States. The Ankole never became commercially successful in Britain.

In North America, these cattle can be described as medium in size, with cows weighing 900 to 1,200 pounds and the bulls 1,000 to 1,600 pounds. The body tends to be slender or narrow. The most striking feature of these Sanga cattle is their huge horns. The horn base can be up to 24 inches in circumference, and the horn spread can be as long as 96 inches. Ideally, the symmetrical horns grow in a dramatic upswept arch known as a lyre. Other horns grow in a circular shape or outward, both straighter and flatter. These tremendous horns can appear almost unreal.

Ankole Watusi cattle are sometimes described as elegant, regal, or graceful. They generally have a neck hump, but not so large as the Brahma and placed further forward on the neck. Ankole Watusi cattle also have a very long tail. Their coat is smooth, but they still tolerate extreme temperature variations well. Ankole cattle come in several colors, or they can be spotted. The deep red color is especially dramatic.

Ankole Watusi cattle maintain strong herd instincts while grazing and resting. Some breeders call this behavior "glumming together." This trait also helps to protect the young from predators. The whole herd watches over the calves of other cows and will protect them by forming a circle made of those long horns. The calves also have a low birth weight, which makes for easy birthings.

Ankole Watusi cattle have several valuable traits. Although Sanga cows are not known as heavy milkers, their milk does have a very high 10 percent fat content, which can boost the fat levels in a dairy herd production. Ankole Watusi meat studies have demonstrated that the breed group is lower in fat than commercial beef. The genetic difference of the Ankole Watusi also imparts great hybrid vigor to crossbred calves. Ankole Watusi crossbred calves and steers are used in rodeo events, and their skulls and huge horns are sold for decorations.

As a rare breed, the Ankole Watusi has commanded very high prices, which seem to be coming down in recent years. Following a disagreement between members, some breeders established a second registry known as the World Watusi Association. Both organizations have upgrading programs, and Texas Longhorn cattle are frequently used in this crossbreeding. Cattle that are fifteen-sixteenths Ankole Watusi are considered Native Pure. Foundation Pure cattle are not a result of the upgrading program and must be traced back to the original imports. The original registry and breeder's group, the Ankole Watusi International Registry, follows a breed standard and requires blood typing of the Native and Foundation cattle to help prevent fraud. The AWIR is also fostering relationships with the cattle research programs of American universities. In 1999, they registered 77 cattle.

There is some question about the danger to the original Ankole, Watusi, and other Sanga breeds in their homelands in Africa. There have been local government efforts to “improve” the meatiness and milking ability of the native breeds, but imported cattle generally do not fare well in Africa. The native cattle breeds are also vulnerable to civil unrest, slaughter by bandits or soldiers, and the threat of starvation in the populations of some areas.

Although the Ankole and Watusi cattle are not at immediate risk, it is not inconceivable that these Sanga genetics could become very valuable preserved outside Africa. It is most likely that more cattle will not be exported to the United States because of the risk of disease transmission. Thus, it is encouraging that many Ankole Watusi breeders are dedicated to preserving their cattle. The hardy Ankole Watusi cattle certainly possess very different genetics that can be useful to the crossbred beef industry.



Rare

### *Feral, Including Hawaiian and Enderby Island*

In British Columbia, feral cattle have ranged on eastern Graham Island in the Queen Charlottes since their import by the Hudson’s Bay Company sometime before 1850. The stock was basically Shorthorn, but settlers later introduced Jersey and Angus cattle. This mix evolved into a long-legged, hardy group. At the beginning of the twentieth century, the cattle numbers became destructive to crops and a hazard to the islanders, who then complained to the provincial government. An attempt was made to exterminate them, but after the homesteaders abandoned the forested island in the early 1980s, the cattle remained. Additional groups of feral cattle no doubt exist in the western cattle-raising provinces as well.

In the southern and western United States, areas of free-ranging cattle remained into the mid-twentieth century. The presence of feral cattle has declined as more control has been extended over federal grazing lands.

With the growth of the population in the southern states, more land has been developed. The use of the land for timber production has also increased. Both have contributed to a decrease in feral southern cattle. Some feral cattle can probably still be found in the Okefenokee Swamp in Georgia, and they are sometimes incorporated into the scrub cattle herds. In Louisiana, feral cattle are still found in river basins such as the Atchafalaya and Ouachita.

In Hawaii, feral cattle were once found on most of the islands, where they had a destructive impact on the native forests. The feral cattle were gradually exterminated on Maui and Oahu, where they posed a tuberculosis threat to domestic herds. New herds were reported on Molokai in the 1980s, some thirty years after they were all believed removed by hunting. On Kauai, the existing feral cattle are believed to be mostly stray ranch cattle of Hereford and Shorthorn ancestry.

In the 1960s, there were at least 2,000 feral cattle on the Big Island of Hawaii. Most were described as scrub cattle of Hereford ancestry. On mountain land on the south side of Mauna Loa, unusual “wild-type” cattle were found in the late 1960s. Twelve attractive cows and one bull were released back into the area to run isolated from ranch herds. The feral bull was replaced with a Texas Longhorn in 1971. In 1983, 34 head were still present in the release area, and another uncounted number was running on the slopes of Mauna Loa above South Kona. Kahuku Ranch had no plans to manage these cattle. This group is probably of the most genetic interest.

Other ranches report the presence of feral cattle that also roam some adjacent forest reserves. In 1965, the McCandless Ranch reported 1,500 head, the Yee Hop Ranch reported 200, and the Dillingham Ranch reported another 200. Some of the feral cattle found on these ranches are loosely managed. Males are often castrated, and some cattle are sent to market. Bulls weigh about 1,000 pounds and cows about 600 pounds.

On remote, subarctic Enderby Island off New Zealand, a small group of cattle was left when former colonists abandoned the island in 1890. These cattle were believed to be mainly old, dual-purpose Shorthorns. They survived a century without human interference or

care. The population fluctuated but remained healthy. In 1991, these cattle were tragically destroyed by an order of the New Zealand Department of Conservation, which felt that the cattle were damaging native plants. Before the cattle were killed, the department did collect sperm and egg samples in the belief that with these samples they could re-create the breed for conservation elsewhere.

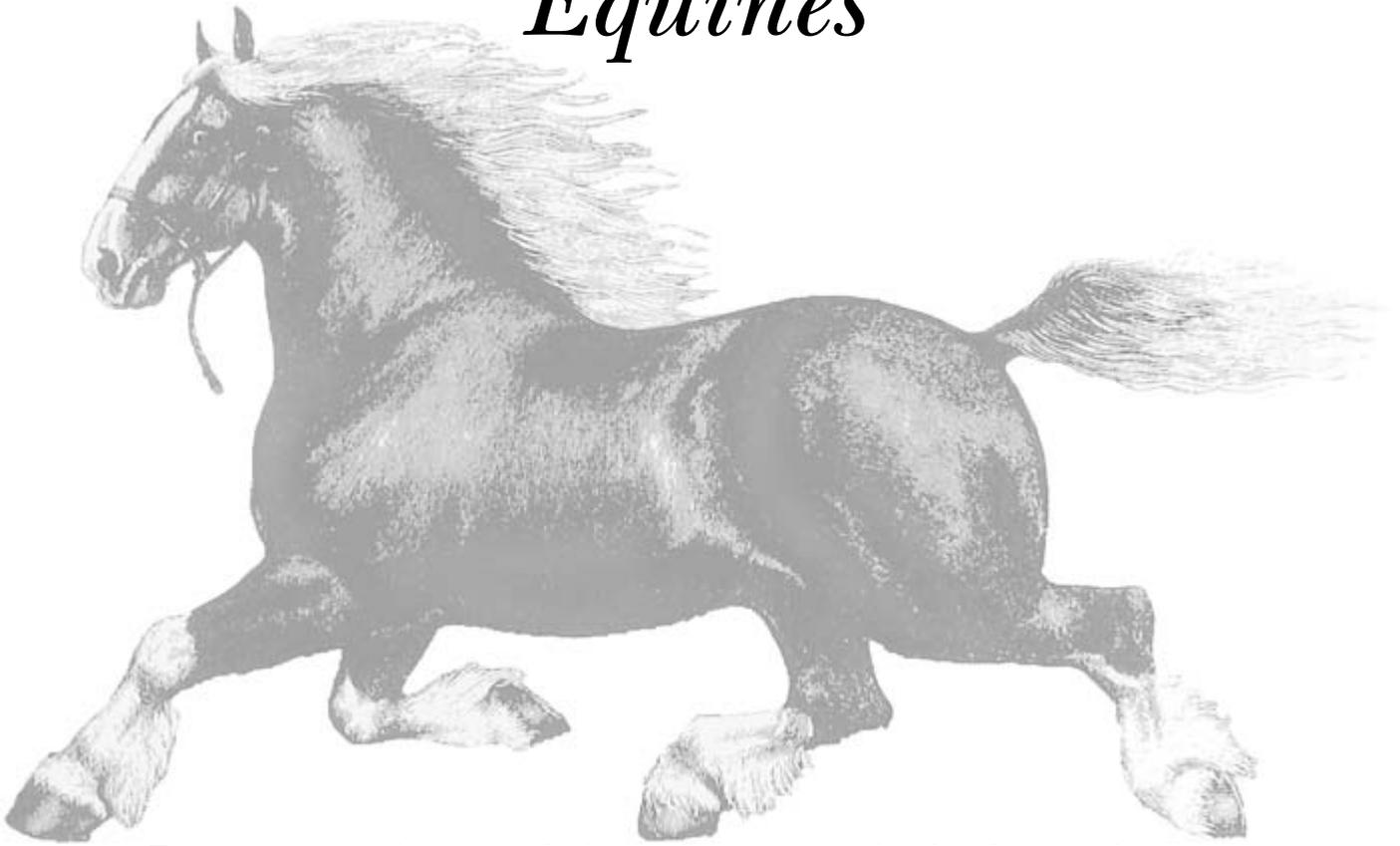
This incident illustrates the fallacy of relying on one method of conservation. Despite all efforts to use the sperm and eggs, no offspring were produced. Unexpectedly, one Enderby cow, later named Lady, was discovered to have survived alone on the island. She was placed under the care of the New Zealand Rare Breeds

Conservation Society and the scientists at AgResearch Ruakura. In 1998, Lady was impregnated with the preserved frozen sperm and gave birth to a bull calf. A female calf, which was cloned from Lady, was also born that year. The scientists hope to establish a small research herd from these calves and Lady.

It is most unfortunate that the original Enderby Island group was lost because they would have been invaluable in studies of genetics and feral adaptation. The conservation of live animals would also have been far less expensive than the technological efforts that have been mustered to save the last remnants of the Enderby Island Shorthorns.

CHAPTER SEVEN

# *Equines*



For eminent moral reasons, the horse deserves to be bred with scrupulous care.

— Henry Ward Beecher, *The Perfect Horse*

## Natural History

Most schoolchildren learn the theorized evolution of the horse beginning with tiny *Eohippus*, the Dawn horse, more correctly known as *Hyracotherium*, which appeared fifty to sixty million years ago, and evolving through the millennia to modern *Equus*. Yet the evolutionary story of the horse is a much more complex tale.

With four toes on the front and three on the rear, tiny *Eohippus* left fossil remains that have been uncovered in North America, Britain, continental Europe, and eastern Asia. *Eohippus* would evolve through many branching species to become *Equus*, yet many divergent lines would also develop only to become extinct. From eight to fifteen million years ago, at least sixteen equid species were living at the same time in North America. Waves of immigrations to Asia occurred, but they eventually died out. In Europe, for a time there were species such as *Megahippus*, a 20-hand-tall giant, and *Archaeohippus*, which was a dwarf. In North and Central America, slender *Nannippus* was a three-toed, miniature-sized genus that survived until two million years ago, while *Hippidion*, with its large nose and prehensile lip, was extinct by eight million years ago. Most of the various horse species became extinct by seven million years ago.

The surviving equine, the true horse *Equus*, was taller than its ancestors. Its toes were reduced to hooves that were more suited to hard ground, and its teeth were developed to deal with a diet that consisted primarily of grass rather than leaves. *Equus* evolved in North America about two million years ago and crossed back and forth to Asia. For a span of about one hundred thousand years, *Equus* actually disappeared from North America, only to return about five hundred thousand years ago. To date, North American fossil remains of *Equus* have been found from Alaska south to Texas and east to Kansas. The fossil record also suggests that horses, along with asses, Onagers, and even zebras, were plentiful. Three to four equid species also made their way to South America. Horse fossils dating from fifteen thousand years ago in New Mexico reveal a

bone structure extremely similar to Przewalski's horse (*Equus przewalskii*).

Beginning about fifty thousand years ago, *Equus* spread out from Asia to Europe. In addition to fossil evidence, Paleolithic cave art depicting horses is found at many sites and different times. After bison, horses are the animal most often depicted by the ancient artists. These horses are usually quite detailed and generally similar in appearance. France's Chauvet-Pont d'Arc is the oldest known cave, dating back thirty-two thousand years. The Chauvet horses are mostly similar to the rare Przewalski's horse, although one engraved horse has two stripes on its shoulder. The horses have large heads, and the necks are short and thick, topped by a short, stiff mane. The underbelly is lighter in color. At Lascaux, also in France, there is a horse with a black mane, yellow flanks and back, and a white belly. There is also a painting of an ass in Lascaux. The spotted horses at Pech Merle, France, are famous, yet a closer examination reveals that the spots are not only on the horse but also on the area around them. These spots therefore may not be scientific evidence of true spotted horses but may simply be a symbolic decoration. At the Ekain Cave, in Spain's Basque region, besides the Przewalski type, there are horses with leg and shoulder stripes. The cave of Trois Frères in southern France has two engravings of asses with long ears and necks.

The family Equidae belongs to the order Perissodactyla, or odd-toed ungulates, and their only living relatives are the rhinoceros and tapir. *Equus* was not a particularly successful genus, especially when compared to the richness and numbers of the bovines. Over the past ten million years, the equine trend was definitely toward extinction. As the eminent biologist Stephen Jay Gould has noted in *Full House: The Spread of Excellence from Plato to Darwin*, "Eurasia was an outpost of equine survival, not a center for an expanding trend" (1996, 66). Asses and Onagers were browsers that could feed in the encroaching forestland, but as the grassland retreated, so did the horse. Nine *Equus* species survived into the modern era.

The horse may very well owe its survival to domestication, as the state of the few wild equines left in the world today strongly suggests, although humans are

*ass* From Middle English *asse* and Old English *assa*, from Latin *asinus*; the common American use of *ass* actually comes from the British word *arse*, buttocks

*donkey* A combination of English *dun*, grayish brown, and *key*, little, as in *monkey*

*filly* From Norse *fylia*, little

*colt* Old English *colt*

*horse* From Old English *hors*, akin to Old High German *hros*, horse

*mare* From Old English *mere*

*mule* From Old French *mul*, from Latin *mulus*

*pony* From French *poulenet* or *poulain*, foal, from Latin *pullus*, young animal

*caballus* Latin for horse

*equine* From Latin *equus*, horse

*hippos* Greek for horse

also responsible for the elimination of many equids. Until the expansion of hunting and farming in Africa in the recent past, the zebra was possibly the most successful of the entire equine genus. Zebras were eminently suited to their environment and successfully occupied a vast region. The primary reasons for the zebra's decline have been human encroachment on their habitat and hunting.

Zebras were once found in large numbers across the grasslands of eastern and southern Africa. The zebra resembles the ass, with a tuft of hair at the tip of the tail and an erect mane. Unlike asses, however, the zebra's muzzle is dark. Zebras have very large ears and a keen sense of hearing. They escape their predators chiefly through their speed in fleeing. The three surviving species of zebra and their subspecies are distinguishable by their arrangement of stripes, which may serve as camouflage in the waves of heat that rise from the sun-baked ground. When a herd is on the run, the mass of moving stripes may also confuse their predators. The pattern of each zebra's stripes is as unique as a finger-

print. Two of the zebra species form small family groups of mares and foals, usually with their stallion. The small groups may come together in huge herds to graze, but they retain their group identity and will search for a missing member.

The most numerous zebra is known variously as the Common, Plains, or Steppe zebra (*Equus burchelli*). The Common zebra was once found throughout eastern Africa south to the Cape of Good Hope. Four subspecies include the Burchell's, Grant's or Boehm's, Selous's, and Chapman's zebras. There are still large numbers of this zebra, but mainly in protected wildlife reserves and national parks. Monitored hunting is allowed in some African countries. The Common zebra is about 13 hands tall and often shows a pattern of lighter colored shadow stripes between the main dark stripes. The dark stripes tend to be wide and may be black, brown, or dark gray-brown in color. The background color is white to buff.

The Quagga (*Equus quagga*) was once regarded as another subspecies of the Plains or Common zebra. At one time Quaggas roamed southern Africa in large herds. But Boer settlers viewed them as pests because they competed for pastureland, and hunters killed them for meat and hides. By 1878, Quaggas had been exterminated in the wild. The last Quagga died in an Amsterdam zoo in 1883. The chestnut-colored Quagga was more horselike in appearance than other zebras. Brown stripes were found only on the front of the body. The hindquarters were pale to dark brown with a dorsal stripe, and the legs were white. The Quagga was reputedly the most trainable of the zebras. The name Quagga was based on its vocalization, "qua-ha." There is an effort in South Africa to re-create the appearance of the Quagga from selective breeding of Plains zebras.

Mountain zebras (*Equus zebra*) live in southern Africa. The Mountain zebra is the smallest of the zebras, and it possesses an unusual small dewlap on the throat. Mountain zebras are silver-white in color striped with black. Although there were 50,000 Mountain zebras in 1950, they now number only about 13,000, almost all in Namibia. The zebras are frustrated by fences and roads that block their traditional mi-

gration routes. Farmers shoot the zebras that damage their crops, and they are hunted as well. In their native arid habitat, Mountain zebras do not form large herds, which has made their conservation difficult in captivity.

One subspecies, the Cape Mountain zebra, has been saved from extinction in a wildlife sanctuary in Cape Province, South Africa, and now numbers about 1,200. The subspecies Hartmann's zebra is more numerous at about 7,300 animals. On Hartmann's zebra, the stripes are narrow and irregular except on the thighs, where they are wide. The white areas are also broader.

Grevy's zebra (*Equus grevyi*) is also threatened by habitat loss, especially when the herds are prevented from reaching their water holes or the water is diverted for agriculture. Until the mid-1970s, Grevy's zebra was hunted extensively for its beautiful hide, and they are still shot for meat by local populations. The Grevy's zebra population has fallen from 14,000 in 1977 to about 5,000 today. They are still found in Ethiopia, although their numbers may have now decreased to only 500, and in northern Kenya, where they number about 4,000. Fortunately, Grevy's zebra reproduces well in captive preservation programs.

The Grevy's is the largest zebra species, standing up to 15 hands tall. It has enormous ears and narrow, closely spaced stripes. There is also a distinct V-shaped, brown-colored patch on the nose. Grevy's zebra is believed to be more primitive and less closely related to the other zebras. Its voice resembles that of the ass, and like the ass, the stallion defends a territory rather than his mares. The adults form unstable groups, and the only strong bond is between mare and foal. Grevy's zebra is considered by some to be the most trainable of the surviving zebras.

Zebras can be successfully crossed on all horse species. Hybrids such as Zebra mules, or Zedonks, have been created in zoos and by private breeders. These hybrids can be more tractable and trainable than purebred zebras.

Another well-known member of the equine family is the ass. All the wild ass species have large heads, long ears, a short mane without a forelock, a wispy tail, slen-

der legs, and small feet. The African ass, the Kiang, and the Onager can all interbreed, but their offspring are infertile. All of the wild asses are in danger of extinction.

There were once several races of African ass (*Equus africanus*). At one time, the African ass ranged over most of northern Africa into Sudan and Somalia. Muslim hunters have long pursued the ass because the Koran prescribes its flesh as a cure for disease. Like Grevy's zebra, the African wild ass is territorial. The stallions defend large areas and their valuable water supply. Adults tend to live alone or in variable groups, with the male and females coming together only during breeding season.

The domestic donkey is thought to be descended in part from a subspecies, the Algerian wild ass, that has been extinct since the Roman era. The Algerian ass is depicted on Roman mosaics with a long shoulder stripe and leg stripes. It is believed that the Romans imported the Algerian ass into Europe. Another subspecies of the African ass, the Eritrean, is also extinct.

The domesticated donkey is believed to descend mainly from another subspecies, the Nubian wild ass, probably initially bred by the Egyptians or other peoples in its traditional range. Wild Nubian asses were last seen in the 1930s, and the Nubian ass became extinct in 1960 when the last individuals held in zoos died. This elegant ass had long, slim legs and gracefully pointed ears. The Nubian ass also had a short, dark stripe across its shoulders and a dark dorsal stripe. Christian tradition held that these stripes were the sign of the cross and a recognition of the donkey's work in carrying Christ during the week before his crucifixion.

The Somalian wild ass is the only surviving wild member of the African asses. The body is gray, with lighter areas on the muzzle and underparts. There are dark stripes on the legs as well as a dorsal stripe. The tail is tipped by a tuft of hair. The Somalian ass weighs about 450 to 500 pounds and stands about 12 to 13 hands tall.

There may be 3,000 Somalian asses in the Ethiopian desert and another 4,000 to 6,000 in Somalia, though some researchers believe that the Somalian population may be as low as 400. Both countries are

deeply troubled by political unrest and starvation. The wild asses remain in serious danger and are hard to protect. Herds of feral donkeys are common over much of this region. The Somalian wild ass will breed with these donkeys, producing fertile offspring that can dilute the genetics of the wild ass groups. There are 12 Somalian wild asses in captivity in two zoological collections.

Asian wild asses include the Kulan, Onager, Kiang, and their subspecies. Asian asses are more horselike in behavior and redder in color than African asses. The legs are more slender, and the ears are slightly shorter. Their voices are a mix of braying and neighing. Asian asses were once found from the Black Sea region eastward into China and Mongolia. To the south, they were found in Arabia and from Iran into India. Today, Asian wild asses are found mainly in Tibet and Mongolia.

The Kulan (*Equus hemionus*) is still found in reserves in Turkmenistan and Kazakhstan. The population today numbers about 2,000, with 93 individuals in two captive collections. Kulans stand 11 to 12 hands tall and weigh 350 to 400 pounds. The coat is yellow to reddish brown with a dark muzzle, a short brown mane, and a dorsal stripe.

The closely related fawn-colored Persian onager (*Equus onager*) is nearly extinct in the wild, and those found in two reserves are subject to poaching. Another small group lives on a reserve in Israel. There may be only 400 Onagers alive today in the world, including 44 individuals in seven collections. Attempts were made to tame Onagers in ancient Near Eastern cultures, and they were crossed with donkeys or horses. Representations of the Onager are found on artifacts from these cultures. Onagers were also hunted for sport and meat. The small Syrian onager is extinct.

The Kiang (*Equus kiang*), or Tibetan wild ass, is the largest member of the group at over 14 hands tall. Kiangs are chestnut to grayish brown with nearly white underparts and muzzle. The short mane is black, as is the dorsal stripe. About 2,000 Kiangs live in herds of up to 200 on high mountain plateaus in Tibet. Although they are considered sacred, both hunting and habitat encroachment continue. In 1993, the huge Chang Tang Nature Reserve was created to protect Kiang, Argali sheep, and other threatened native animals. Kiang are

also found in the Xinjiang mountain reserves in China. There are only 8 captive Kiangs in the West in two zoological collections.

The disappearance of the horse in North America remains a mystery. Whether by disease, climate change, or the recent arrival of human beings, the horse was gone by 8,000 to 12,000 years ago. It is also not clearly understood how the horse evolved in Asia. Many variations likely existed, some successful and some not. In truth, there is insufficient evidence to resolve the details of horse evolution just before domestication, including the riddle of the Tarpan and Przewalski's horse, and new fossil information likely awaits discovery. French and British explorers have discovered the Rioche horse, possibly a relic population of an ancient type. Standing about 4 feet tall, the Rioche were found in an extremely isolated 17-mile-long valley in Tibet. The horses somewhat resemble a Przewalski type, although DNA studies are still being conducted.

Przewalski's horse (pronounced sha-val-ski), or the Asiatic wild horse, closely resembles the horse representations seen on the walls of prehistoric caves. Either the Przewalski or a related species once inhabited large areas of Europe across the Eurasian continent to Mongolia and China. The head of the Asiatic wild horse is large and heavy. The straight profile ends in a large, light-colored muzzle. The ears are also fairly large, the jaw is strong and deep, and the neck is short and thick, with a dark upright mane. Przewalski's horses stand from 12 to 14 hands tall and weigh about 450 to 650 pounds. The body is colored yellow dun to reddish brown, while the underparts are paler in color. There is a thin, dark dorsal stripe down the back and sometimes light zebra striping is visible on the legs. The long, low-set tail grows coarser black hairs on the lower half. Przewalski's horse is traditionally called *taki* in Mongolian (pl. 94).

Przewalski's horse is the only surviving truly wild horse species, but it possesses a different number of chromosomes than the modern domesticated horse (*Equus caballus*), sixty-six as opposed to sixty-four. Technically, Przewalski's horse could be considered a separate species, though one that is closely related to

the domestic horse. In spite of this difference, Przewalski's horse has been regarded by many as a direct ancestor of the modern horse. Although it is much rarer in animals than in plants, it is possible for a new species to be created in a single genetic step through a process known as Robertsonian translocation. If this did not occur, Przewalski's horse may in fact be a once very common *Equus* offshoot that survived to the present in Mongolia.

Other genetic differences between Przewalski's horse and the modern horse have been noted. For example, Przewalski's horse possesses several blood markers not found in domestic horses. In addition, the comparison of mitochondrial DNA suggests that Przewalski's horse and *Equus caballus* diverged at least 250,000 years ago.

Przewalski's horse may have figured in horse breed development through interbreeding, especially in China. The domestic cross is fertile, although the first-generation offspring has sixty-five chromosomes. The second generation cross has sixty-four chromosomes but does not strongly resemble Przewalski's horse.

As early as A.D. 1427, European travelers to Mongolia described an Asiatic wild horse living on a harsh and cold desert steppe. Pressured by human populations, the herds had already retreated to this inhospitable region yet were still hunted by Mongolian herders who wanted the grazing and water for their stock. In 1879, the Russian explorer and emissary Colonel Nikolai Przhevalsky obtained a hide and skull, which he passed along to the zoological museum in St. Petersburg. Scientists there classified this horse as a new species of *Equus* and named it for the explorer. The first live Przewalski's horses were not captured by westerners until 1889, but eventually 53 were placed in zoos and private preserves. In 1902, a pair arrived at the New York Zoological Society. A number of horses were killed in these capture attempts, and unusually harsh weather and border conflicts further reduced the herds' populations. Przewalski's horses were last seen in the wild on the southwest borderland of Mongolia and China in 1968. There was an unconfirmed sighting of a stallion in 1996 in the Mongolian portion of

the Gobi Desert, but in this area domestic horses sometimes possess some Przewalski coloration and physical characteristics.

The number of Przewalski's horses in zoos and parks remained fairly constant until World War II. Two horses were killed on a train to Germany when it was bombed, and a Przewalski's reserve in the Ukraine was bombed during the war. Only 31 horses survived the war, although additional mares were captured from the wild in 1947. Unfortunately, in 1976 it was determined that the total captive population was based on just 13 founder animals. Because this inbreeding was adversely affecting reproduction and mortality, the Foundation for the Preservation and Protection of the Przewalski Horse was organized to coordinate the preservation of this rare animal.

International cooperation and scientific breeding efforts have increased the population to about 1,500 horses. Another goal of the foundation has been to return the horses to their natural home. A joint Mongolian and foundation project has created a reserve on the Hustain Nuruu Steppe in Mongolia, where small groups have been released after acclimatization. In the wild, the herds have successfully defended themselves against wolves. Przewalski's horse has never been domesticated and remains difficult to handle despite its many years in captivity.

The word *tarpan* has long been used to describe true wild horses in Europe and western Asia. Indeed, the word means "wild horse" in Russian, and Przewalski's horse was sometimes mistakenly referred to as the Mongolian tarpan. The now extinct Tarpan may have been a subspecies of the true wild horse and a representative primitive horse from which domestic horse stocks developed, or it may have been an ancient feral population. There is no genetic evidence of the number of its chromosomes.

Different types of wild Tarpans were recognized in Europe and Russia. The Steppe tarpan lived in the Black and Caspian Sea regions. In the early eighteenth century, these Tarpans were described as small, mouse-colored horses with curly manes. In southern Russia, Tarpan stallions were known to capture domestic mares, which no doubt resulted in some mixing of do-

mestic and wild Tarpan blood. Tarpans may have contributed to the foundation stock for the steppe horse-men. Another type of Forest tarpan was found in central and eastern Europe. This Tarpan may have contributed to many breeds such as the Iberian Sorraia pony or the Hucul and Konik breeds from Poland, but it was also hunted for meat.

By the early nineteenth century, only a few groups of Tarpans remained in the wild. Some had been gathered into private reserves, such as those belonging to one Count Zamijski in Poland. The local peasants were allowed to use some of these Tarpans, and they crossbred them with their horses. The last purebred Tarpan herd disappeared by the 1870s. Sometime between 1875 and 1890, the last known wild Tarpan mare was killed accidentally when she was chased off a cliff during an attempted capture. Another purebred Tarpan survived in a Russian zoo until 1909.

At the end of World War I, the Polish zoologist Tadeusz Vetulani became interested in the Tarpan. He gathered horses that resembled the extinct Tarpan from the village of Zamość and turned them loose in the Białoweiza Forest. Many of these horses were Koniks, the ancient Polish breed probably descended from the Tarpan. The Konik is mouse-gray or dun with black dorsal stripes and transverse stripes over the withers and thighs. The Konik is still bred today at two state stud farms and a national park in Poland. Two of Vetulani's horses, a mare and stallion, exhibited the unusual trait of growing a pure white winter coat.

Vetulani culled the herd and kept those that more closely resembled the extinct Tarpan. During World War II, Hermann Göring used Białoweiza as a hunting preserve, and the Nazi army confiscated many of the horses. After the war, Vetulani resumed his work, and during the 1950s, a reconstruction program was also started at the Institute of Genetics and Animal Breeding at Popielno, Poland. This herd was based on selected Koniks obtained from Vetulani, and it is still maintained today.

In Germany during the 1920s and 1930s, two zoologists had attempted to reconstruct the Tarpan using selected Gotlands, Icelandic ponies, and Fjords. This stock was then crossed with a Przewalski's stallion and

some of Vetulani's Konik stock. This reconstructed breed is called the Tarpan.

In 1954, Brookfield Zoo in Chicago purchased a Tarpan stallion from the Munich zoo and another two mares the next year. Catskill Game Farm in New York also imported a stallion and a mare from the German stock. Another Tarpan mare was imported to the Fort Worth Zoo in Texas. All of the Tarpans in the United States are descended from these 6 animals. Surplus stock was eventually sold to private individuals, and a registry was established in 1971 through the American Tarpan Studbook Association. Private individuals now own most of the Tarpans in North America. There are fewer than 60 in the United States and 100 to 200 worldwide. The Canadian Rustic pony breed was developed by crossing Tarpan, Welsh, and Arabian horses (fig. 49).

Tarpans are mouse to brown dun in color with a dorsal stripe running down the mane, back, and tail. Zebra striping is present on the legs above the dark points. Foals are often born with unusual coloration, such as silver-gray, dusky blue, or pale pink, which later changes to a golden shade with brown points. When this coat is shed, the mouse-dun color appears. The mane is semierect, and the long winter coat is whitish in color. The head is long and broad, as are the ears. The Tarpan stands between 12 and 14 hands tall.

The Tarpan is considered a re-creation of an extinct type because it is impossible to reconstruct what is truly lost, although through selective breeding the modern Tarpan has come to resemble the ancient type. The Tarpan is a small, primitive horse with an undeniable attractiveness and unrefined beauty. In North America, Tarpans are not sold but placed for adoption by the association. Mares are not to be crossbred, but stallions are crossed on Morgan, Arabian, Appaloosa, Thoroughbred, and Welsh mares.

The great equine expansion took place on the grassy steppes, savannas, and prairies of the Miocene era. These habitats were the natural home of the equine, which had evolved from browsers. The other browsers and grazers, the artiodactyls, or even-toed ungulates, have been very successful animals, but ruminants make

[To view this image, refer to the print version of this title.]

up the largest subgroup of ungulates, and horses are not ruminants. This has been both an advantage and a disadvantage. Over time, the ruminant species certainly have increased, whereas the equines have decreased. The survival advantage of ruminant behavior is obvious: the ruminant can fill its stomach quickly and then retreat to a place of safety to chew its cud. One disadvantage of ruminant digestion can be the greater quantities of water needed to aid this long digestive process; nonruminants digest their food more rapidly. In the horse, which does not have ruminant digestion, bacteria work on the fibrous food parts in the long intestines. Unfortunately, this digestive system is inefficient, and much food passes through whole. Digestive upsets trouble the horse; colic is the greatest killer of domestic horses.

Equines search out high-quality green grasses and seeds to build their fat reserves, but they can survive readily on dry vegetation. Horses, asses, and zebras can make do with low-quality food and travel many miles daily to find it. The ass is better able to adapt to a lack of

Fig. 49 Czajka, a five-year-old Tarpan mare, and her foal.  
Courtesy American Tarpan Studbook Association.

water or poor food than the horse, which may explain its greater survivability over the horse until the rapid encroachment and hunting by humans in the past two centuries. Equines have adapted to many different climates and environments, from high, cold Tibet to the blazing deserts of the Sahara. Human beings have taken their domesticated horses and asses to nearly every part of the earth.

Unlike cattle, sheep, and goats, equines have incisors on both the top and bottom of their mouths. This enables them to cut grasses closely and selectively. The mobile upper lip gathers in pieces of grass to bite. The equine's long face also holds many large, highly crowned teeth that grow throughout life, allowing equines to chew and grind their food thoroughly. Deep enamel ridges strengthen the teeth, although a lifetime of chewing can wear down the long crowns. Adult horses have forty teeth—twelve incisors, four

canines, and twenty-four molars. Conveniently for domestication, there is an empty space between the molars and incisors called the diastema or bars, which can hold a bit.

Equines differ from bovids in other ways that benefit people. Horses have more pairs of ribs, the joints in the lumbosacral area have many more areas of movement, and the neck is also much longer and more flexible. These physical characteristics make riding a horse a more comfortable, rolling experience and allow the rider to collect up the horse's movements and power.

Equines do need to spend more hours grazing in the open than ruminants. Because they have small stomachs, equines naturally function better on continuous amounts of food than on two large feedings per day. Rather than retiring to chew their cud in a safe location, equines developed great speed and stamina as their defense. A horse's legs are specialized for efficiency at forward motion, which people have used in developing horses for pure speed, great strength, or jumping ability. Hooves and teeth took the place of horns for close protection, and the senses of sight, hearing, and smell serve as an early warning system.

The equine's eyes are placed on the sides of its head, giving horses a unique combination of monocular and binocular vision. Monocular vision, or the ability to see separately from each eye, is an advantage for an animal that grazes on an open plain. Although the horse cannot see directly behind itself, it can move its head and neck from side to side while grazing in order to enlarge its field of vision. When something attracts its attention, the equine turns its head to focus on the object. This change from monocular to binocular vision causes the object to jump, and this action, along with the horse's reaction to movement, often causes a horse to spook or startle. Spooking is the bane of equestrians, but it serves an undeniable survival function. Experienced horse handlers never approach a horse from the front or back without speaking to the horse. Speaking while working around horses is also a good practice because a horse's sense of hearing is acute and often better at locating objects than its vision. Rather than expressing frustration with the horse's natural responses, people would be better off learning to deal with them.

Although equines have this broad range of vision, horses do not focus well on objects. Unlike the round retina possessed by human beings and most other mammals, the equine retina is irregularly concave. It is not clearly understood how the equine eye focuses. It was once believed that horses moved their head up and down to find a focal point. Objects in front of the horse are probably not sharp or clear, and the horse cannot see any object closer than four feet. Just before a horse jumps over an obstacle, it has actually lost sight of that hurdle and is jumping blind. It is possible that the horse focuses on the object and keeps the image alive in its memory as it jumps. Horses are thought to see some colors, especially reds and blues. Although equines have less depth perception than humans, they do have better night vision.

Equine ears are more mobile than those of most other domesticated animals. The equine can rotate its ears 180 degrees and move them constantly and independently. When a horse hears something, it moves one or both ears in that direction, then the head or even the entire body. When horses are seen looking at a disturbance, they are actually listening intently to identify it. Horses hear better than people in both the higher and lower ranges.

A horse's ears are also important tools for communication. The position of the ears indicates where the horse's attention is focused. Relaxed ears belong to a sleepy or tired horse, drooping ears are a sign of pain, and when a horse lays its ears flat against the head, it is angry. Fortunately, people can readily understand this language of the ears.

Other equine body positions also communicate emotions. A tail high in the air can indicate a challenge or high spirits, whereas a wringing or swishing tail denotes irritation. When the tail is clamped tight against the body, something is wrong. A horse with a clenched mouth is upset, but chewing motions indicate submission or acknowledgment. A cocked foot, bared teeth, or a kick is a definite threat. Horses also paw the ground in excitement or restlessness.

Because a system of ligaments takes the weight off their muscles, equines can sleep and rest while standing. Sleeping horses close their eyes, drop their head,

and usually rest a hind foot. If a horse feels secure, it may lie down either on the sternum or laterally, although horses are more vulnerable to predators when lying down.

The horse opens its nostrils the better to catch a whiff of an odor. Equines also open their lips in what is known as the Flehman response to gather in more smell. Stallions can detect a mare in heat at a great distance, and they mark their range or territory with feces and urine as an olfactory warning. When they have sufficient space, the rest of the herd will deposit feces in areas they do not graze, which is a natural protection against internal parasites. Horses identify each other by smell, often nose to nose. A horse will also nuzzle or smell a person to aid in identification. Mares and foals use smells as identification and to aid bonding.

Equines also communicate through vocalizations. Horses nicker in greeting or in anticipation, and they whinny in greeting, fright, distress, panic, or to locate each other. They scream or squeal in challenge or anger. And they huff, blow, grunt, or snort in warning.

On average, equines live twenty to thirty years, with some individuals living longer. Horse gestation averages 338 days, and a single foal is generally born. Mares are more likely to get pregnant in the lengthening days of late spring so that their foals will be born the next year in warm weather and with abundant food to fortify themselves against the coming winter. Domestic mares can conceive year-round, increasingly with the assistance of hormonal or light treatments and artificial insemination.

Horse behavior has probably been studied more than that of any other domesticated livestock animal. Scientists have access to many feral horse populations as well as to such close relatives as Przewalski's horse. Research is continuing to reveal more about the social structure of the herd and the individuals within it.

Free-ranging horses are extremely social animals. Their relationships are complex and well-defined, complete with ranking orders. Domestic horses, too, are gregarious and do not always fare well alone. Horses form intense social bonds, especially with one individual, sometimes a best friend. These friendships can last for years, although strong dislikes can also be en-

during. Horses also exhibit personal differences in their need for friendships and social groups. They can transfer this bonding ability and affection to humans, overriding their natural reactions of fear or flight. This loyalty can also be abused, for a horse will try hard to follow commands to the point of overwork or injury. Herd mates and friends engage in mutual grooming, which people duplicate in their grooming of the horse.

Horse bands are usually composed of 4 to 10 animals, consisting of a dominant stallion, mares, foals, and juveniles. Bachelor bands of stallions also exist. Nondominant stallions may attach themselves to traditional bands. The stallion protects his mares and leads or herds the band away from threats. When the band is not threatened, the stallion often becomes passive, and the dominant or alpha mare initiates movement. Mares are very protective of their young foals.

Some wild equine stallions, such as Grevy's zebra and the asses, are strongly territorial in nature. It is thought that this more primitive behavior is a response to a harsher environment. Wild and feral horses are not territorial, except rarely in unusual environments. Rather, most stallions protect a zone of intolerance around the band. This allows bands to come together to form large herds or to travel long distances while still maintaining the integrity of their band. Bands may also be dominant or submissive in their relationships with other bands.

Individual equines also have complex relationships within the band. Social rank is acknowledged over matters such as access to food and water. Dominance seems to be based on age and size, but elements of inheritance and personality also affect rank. Horses tend to be either leaders or followers in their individual personalities. Trainers recognize the differences in personalities in handling and teaching horses. Small, stable bands have greater harmony than large bands, unless stressed by inadequate space, food, or water. New members in the band cause disruptions until the social order is re-established.

Stallions establish dominance over other stallions through fighting, which consists of kicking, striking, and biting. Mares assert dominance through threats of

biting or kicking. Stallions also threaten their mares to herd them.

Although human beings have made great use of the horse's loyalty and ability to form attachments, they need to remain aware of the horse's social nature. A horse under saddle or in harness no longer responds to strange horses in the same way as horses at liberty, but if a strange horse invades its personal space, it will still react. The placing of horses in human-selected groups requires an understanding of the group's social structure in order to reduce stress and injuries. Stallions can be difficult to manage in mixed groups, hence the popularity of geldings, or castrated males. Geldings are more passive and docile, although they do participate in the social structure of a herd.

Horses have many traits that can be used to people's advantage. The equine has an excellent memory that is used in the wild to maneuver around their home range and remember the location of water and food. They are creatures of habit, expecting food and activities at specific times. People use this desire for habit in training horses, using the same cues, rewards, and punishments to habituate them to new routines. Equines also mimic each other as a survival advantage against predators, and horse handlers can make use of this group behavior when driving teams of horses, riding in groups, or trailing large strings of packhorses.

Horsemanship is a complex combination of knowledge and skill in each and every interaction. By exerting a dominant personality, a rider will be accepted as a leader by most horses. Strong leadership can usually overrule the flight response, but some horses need a light touch. More intelligent or dominant alpha personalities respond better to respect or cooperative efforts in work or training. Good horsemen and women use their learned sensitivity to sort out the best way to work with each horse's personality. The horse's senses also allow it to respond to a wide range of subtle cues in riding or driving. The famed "horse whisperers" are actually employing their knowledge of horse behavior, observations of body language, and response to personalities to obtain the horse's cooperation and work in a gentle manner. In addition, foals experience a period of intense bonding with their mother shortly after birth,

which people have learned to use by imprinting themselves and their handling on the newborn.

People have to overcome or cope with some natural responses of the horse even in domestication. Horses fear restraint or confinement, yet they become reconciled to tying, stabling, having their feet handled or hobbled, and being hauled in a trailer. They fear a predator leaping on to their back, yet they come to accept the harness and saddle. Their vision and depth perception is reconciled to human expectations. Experienced riders can even ride stallions in the presence of mares.

## Domestication

Early humans used the horse as they did any other prey animal, to supply meat, hides, hair, and other by-products. The famous kill site at Solutre in France reveals the bones of at least 10,000 wild horses and possibly many more. Most of these horses seem to be of a short-legged, coarse-headed type and from five to seven years old.

The next step on the road to domestication would have posed many of the same difficulties as the large cow. Although the bull is a dangerous animal, the horse has great speed in combination with flighty or unpredictable behavior. People's experience with handling cattle would certainly have helped them in working with horses, but the horse was probably domesticated further toward the central Asian steppes by people who lacked cattle.

Domestication gave horses things they sought, such as security, shelter, protection, and food. More important, domestication gave horses survival rather than extinction. By the end of the last Ice Age in Europe, about 8000 B.C., there were no wild horses in Europe and few surviving horses at all, except far to the east on the Asian steppes.

At about the time of the North American horse extinction, people had begun to transform the central Asian steppes, grazing their livestock and plowing under the grasses for agriculture. In return for domestication, the horse gave people meat, milk, and

hides. The horse also provided milk for fermented fiery koumiss, cheese, and butter, and the manure could be dried for fuel. Horse bones are found in the refuse heaps of the Neolithic farmers of the steppes beginning about 4000 B.C. and for the next two thousand years, until the farmers became seminomadic pastoralists, taking their herd animals with them.

On the steppes, the horse was probably first used not for transportation but for its products. But foals that are imprinted by people early in their lives and handled often do not object wildly to a harness and rider, unlike the popular image of the wild bronco. It is easy to imagine the herdsman who guarded the stock eventually leaning or sitting on an especially tame horse. It would not be difficult to use a horse to drag a type of travois or sled. The greatest difficulty would be control, for a horse would not tolerate a ring in the nose like cattle or hogs and the horse moved so much faster.

In the area now known as Ukraine, the earliest known use of a bit has been dated to about 4000 B.C., implying an earlier date for domestication. Anthropologist David Anthony has identified the mark of such a bit on the teeth of horses and determined that the bit was probably made of bone. A bit is used to direct a horse from behind, and because the wheel had not yet been invented, the user of the bit was probably riding. Horses dragging sleds or drags were usually led from the side. Horsemen may have ridden even earlier, controlling horses from a simple noseband and leaving no evidence for the future. One curious artifact found in the Pyrenees, dating back fourteen thousand years, shows the head of a Przewalski-type horse with an etched cording pattern that resembles a rope halter, but no other substantiation has yet been unearthed for such an early domestication.

There is great controversy over the theorized development of early horse types. Some experts have described both the Tarpan and Przewalski's horse as progenitors of the domestic horse, but other authorities disagree. Several experts have postulated the existence of significantly different horse types that gave rise to the varying domestic breeds of horses after the Ice Age. In 1907, J. C. Ewart suggested three types: the Steppe or Przewalski, the heavy Forest, and the Plateau. F. E.

Zeuner suggested the Tarpan, the Forest horse, and the Przewalski. Hermann Ebhardt postulated four ancestral types: Pony Type 1, the Northern pony, similar to the Exmoor pony; Pony Type 2, similar to Przewalski's horse; Horse Type 3, similar to the Akhal-Teke; and Horse Type 4, the delicate, finely boned proto-Arab.

Other experts contend that separate ancestors are not necessary to explain the immense variety present in the domestic horse. A combination of natural and artificial selection could be responsible for the many breeds of horses, just as it is the breeds of domestic dogs. Geographic location and isolation also played roles in the development of different varieties.

Researchers at the University of Stockholm revealed their latest work with horse DNA in early 2001. In this study, researchers used DNA from Przewalski's horse, remains from Viking-era horses and prehistoric horses found in Alaska, and ten contemporary horse breeds, including such older breeds as the Icelandic, Gotland Russ, and Exmoor. The contemporary breeds reveal surprisingly diverse genetics, suggesting that different wild horses contributed to their makeup. This finding suggests that there were several domestications or influxes of different wild stocks instead of one center of horse domestication in the central Asian steppes. The researchers theorize that the technology of horse domestication was transferred to Europeans, who then may have turned to native types ("Widespread Origins," 2001, 474-477).

Traces of wagon wheels have been found in five-thousand-year-old burial mounds on the Asian steppes. The earliest direct evidence of chariots or two-wheeled carts with spoked wheels has also been found on the steppes, dating back four thousand years. The first hint of chariots in the ancient Near East has been found on clay seals dating a century or two later than the chariots found in burial sites in Asia. Chariots on the steppes were at least contemporary with those used in the Near East. Around 2000 B.C., horse remains begin to be found throughout Europe from Greece to Britain, most probably from horses reintroduced by humans.

Both riding and driving horses gave humans enormous power. Speed was an invaluable gift; it gave the mounted warrior an overwhelming advantage over an

opponent on foot and the trader the ability to make the commercial trip faster. The use of the horse revolutionized society almost as much as agriculture itself. This societal change could also be extremely rapid, as attested by the Native American adoption of the horse after it was introduced by the Spanish.

By 2000 B.C., the horse-riding peoples of central Asia, the Scythians, emerged from the steppes and were followed through the centuries by the nomadic Sarmatian, Yueh-Chi, Hsiung-Nu, Hun, and Mongol people. The Scythians were skilled equestrians able to shoot arrows from horseback at a gallop. The Scythians were well adapted to riding, wearing trousers instead of the robes worn in Near Eastern cultures. The horses of the Scythians were pony-sized, with coarse heads and necks but with well-developed hindquarters and finer tails than Przewalski's horse. The manes were clipped short so that they would not interfere with weapons.

Because the wild horse was probably no longer found in the Near East or Europe after the last Ice Age, its reintroduction, probably in the third millennium B.C., was as a domesticated animal. Near Eastern peoples first called the horse the "ass of the mountain" or the "ass from foreign lands," and the origin of the mythical beast known as the centaur may have been these people's first sight of a man on horseback. Gradually both Near Eastern and Chinese cultures began to adopt the horse for use in warfare. The horse's spread into Africa was halted by its lack of resistance to diseases carried by the Tsetse fly.

The domestication of the wild ass in Africa is likewise lacking in strong evidence because the remains of wild asses and early domesticated asses are virtually the same. The ass may have been used and bred by the Egyptians as early as 3000 B.C., though they were not depicted carrying loads or saddlecloths until 2500 B.C. Since domestication, the ass has remained the common working equine in the Middle East into the present.

Mules and hinnies are also seen in Mesopotamian art beginning in the first millennium B.C. Perhaps the result of an accidental breeding at first, mules are the result of a jack, or male ass, bred to a mare, while hinnies are obtained from breeding a stallion to a jennet, or

female ass. Mules and hinnies are generally sterile because horses have sixty-four chromosomes and asses have fifty-six chromosomes.

The inability of the mule to reproduce itself was offset by its excellent strength and hardiness. The horse parent contributed size, strength, and speed, whereas the ass parent bestowed longer ears, smaller hoofs, and a narrower body. The mule also has the tail of a horse, not the tufted tail of an ass. A strict interpretation of Leviticus prohibited the breeding of mules by the early Hebrews, but they were widely used nonetheless. King Solomon rode a mule to his coronation.

Hinnies are smaller and appear more horselike but with long ears. Jennets do not conceive as easily when bred to stallions as mares do when bred to a jack, making hinnies harder to produce. Confusingly, in Britain, a hinny is called a jennet, although in North America, a jennet has always been a female ass.

The ass was the beast of burden in the Bible. Jesus Christ rode an ass into Jerusalem, but equine historians argue whether this symbolized his humbleness or his anointment as a king in the image of Solomon. In the ancient Near East, the milk and blood of the ass were also believed to be curative, and asses' milk was used as a cosmetic.

The horse was definitely regarded as special and valuable, not generally used for common work. In the Book of Job in the Old Testament, the horse is described not as a placid worker but as a symbol of power:

Do you give the horse his might?  
 Do you clothe his neck with strength?  
 Do you make him leap like the locust?  
 His majestic snorting is terrible.  
 He paws in the valley, and exults in his  
 strength; he goes out to meet the weapons.  
 He laughs at fear, and is not dismayed; he does  
 not turn back from the sword.  
 Upon him rattle the quiver, the flashing spear  
 and the javelin.  
 With fierceness and rage he swallows the  
 ground; he cannot stand still at the sound  
 of the trumpet.

The horse has long been associated with power, and white horses especially have been associated with magical powers. This power was seen in two aspects: the power the horse conveys on its owner, and the supernatural powers the horse itself possesses. The steppe peoples of Central Asia who domesticated the horse often sacrificed a highly decorated horse on the death of its master, perhaps to accompany the master into the next world. Horse sacrifices took place in many cultures, including the Greek, Teutonic, Indian, and Celtic civilizations.

Ancient Egyptians called the horse “the beautiful one.” The Greeks also considered the horse a symbol of perfection in movement. In Greek mythology, the horses of the gods were often winged. Pegasus was born out of the blood of the Gorgon Medusa, decapitated by Perseus. With the help of a magic bridle, the legendary hero Bellerophon tamed Pegasus, but later he freely chose to remain with Bellerophon. In many parts of Asia and Europe, it was believed that a horse could find a water spring by stamping the ground just as Pegasus created the Hippocrene fountain, the source of poetic inspiration. Pegasus also carried the thunderbolt of Zeus, and a northern constellation was named for him.

The lightning-fast and immortal stallion Arion, the horse of Adrastus, king of Argos, was the son of the sea god Poseidon and the earth mother Demeter. The hippogriff had the wings, claws, and head of a griffin and the body of a horse. Balius and Xanthus were the immortal horses of Achilles.

Several other mythological horses are worthy of note. The Japanese winged horse Ki-rin lives in paradise and appears only when a wise philosopher is born. In Hindu mythology, the winged horse Dadhikra represents the rising sun, but another horse, Kalki, an avatar of Vishnu, will one day end the world with one strike of his hoof.

The gigantic outline of a white horse was carved into the chalk hillside at Uffington, Berkshire, in the first century B.C. The Celtic horse goddess Epona, who accompanied the soul on its last journey after death, was worshiped throughout Gaul. Her cult eventually spread to Roman cavalry units and horsemen throughout Europe, who placed her likeness in stables to seek her protection.

In a Nordic tale, Loki the trickster took the form of a mare and mated with a swift and intelligent stallion named Svadilfari, producing Sleipnir, the eight-legged horse that Odin rode on his journeys across the sky to the land of the dead. Farmers offered sheaves of grain for Odin’s horse on this death ride. The horse Skinfaxi personified the day, and his shining mane spread out the golden streaks of sun. Hrimfaxi was the wild and dark horse of nighttime.

In the New Testament, the four horsemen of the apocalypse came to symbolize war, famine, pestilence, and death. Black or pale horses have been associated with death since ancient times.

The legendary unicorn, a popular medieval symbol of perfect good and purity, was originally depicted as a goatlike creature but evolved into a beautiful white horse. This symbol remains very popular today.

The poor ass or donkey was considered unclean by ancient Egyptians, Hebrews, and Muslims, although many peoples attributed the meat and milk of an ass with healing properties. Donkeys are featured in the New Testament from the stories of Christ’s nativity to his ride into Jerusalem on Palm Sunday. The Romans mocked Christ by comparing him to a donkey. It remains an insult in many cultures today to compare someone to an ass or a mule, although in the Middle Ages, members of the judiciary and clergy, including the pope, considered a fine mule the appropriate riding animal.

*stallion* An intact adult male horse  
*mare* An adult female horse  
*gelding* A castrated male horse  
*foal* A newborn horse until weaning  
*weanling* A horse of either sex after weaning  
*filly* A young female horse after weaning  
*colt* A young male horse after weaning; the terms *filly foal* and *colt foal* are sometimes also used  
*yearling* A young horse from one to two years old  
*jennet, jenny* A female ass; in Britain, a *jennet* is called a *mare*  
*jack* A male ass; in Britain, a *jack* is called a *stallion*  
*jack colt, jennet filly* Asses under three years of age  
*jennet jack* A male ass used to breed asses  
*mule* The offspring of a jack and a mare  
*mule jack* A male ass used to breed mules  
*molly mule, mare mule* A female mule  
*horse mule* A male mule, usually gelded; stallion mules are uncommon and unnecessarily dangerous  
*Spanish Jack* A large ass that is not American Mammoth Jackstock  
*hinny* The offspring of a stallion and a jennet; in Britain, a *hinny* is called a *jennet*  
*pony* A horse that is generally less than 14.2 or 14 hands tall; a pony is not only smaller than a horse but is deeper in the body relative to the leg length and longer in the head  
*gait* The sequence in which a horse places its feet; different gaits have specific names, among them *walk, trot, canter, gallop, pace, amble, and singlefoot*  
*hand* The standard of measurement for equines, equaling 4 inches

When the trumpet sounds, he say "Aha!"  
 He smells the battle from afar, the thunder of  
 the captains, and the shouting.

At that time in Mesopotamia, the ox and the Onager were also used for draft work. Both were controlled by a nose ring. The horse, even pony-sized, was stronger and faster at pulling chariots than the Onager. The Onager was also difficult to raise and control. Although Onagers continued to be used for a while longer, they were always described as bad tempered. The ass and horse were also occasionally bred to the Onager, producing another hybrid.

The spoked wheel had appeared in Mesopotamia around 1700 B.C., but bits were not incorporated into the noseband and reins to control the horse until later. The first depiction of a rider on an Egyptian tomb

wall dates to 1350 B.C., but such images are not commonly seen for another fifty years. In comparison to the Scythians, Egyptian riders rode poorly. The men are shown sitting far back on the horse's rump, as the ass was ridden. Because the rider could not control his horse very well, an aide rode alongside, guiding both horses, so that the warrior could concentrate on fighting. This technique continued until the eighth century B.C. The practice of slitting the nostrils of horses and asses appeared about the same time as horseback riding in Egypt. Believed to give the horse more air, this highly questionable tradition has continued to the present in some areas.

The horsemen of ancient Greece made written records on their use and types of horses. Chariots were drawn by Thracian and Thessalian horses, but it was noted that although Thracian horses had stronger

bones, the smaller Thessalian horses were swifter. Chariot racing, horse racing, and a pololike game of the early Olympics were held in a special horse arena called a hippodrome. In the fourth century B.C., the Athenian general Xenophon penned famous works of horsemanship. Much of his advice remains valuable today, especially his recommendations on grooming, gentling colts, and winning a horse's trust. His book *On the Art of Horsemanship* defined the fundamentals of classical riding, which would be refined further during the Renaissance.

Although used for war, the horse also continued its life as a pampered animal linked with both mystical and actual power. Horses were decorated and then sacrificed in the graves of warriors on the steppes of central Asia. Horses were also linked with the power of gods in India, Greece, Rome, and among the Germanic tribes. Celtic war chariots and harnesses were ornately decorated in bronze work. The horse was generally not used to perform work in agriculture until the Middle Ages in northern Europe. Horses were simply too valuable as the powerful tool of armies.

Roman armies tended to rely on the foot soldier, but they adopted such Greek sports as chariot racing (though it appears that they were more interested in the action than the skill). The Romans used horses, mules, and asses for carrying cargo and pulling vehicles. By 45 B.C., the streets of Rome were so crowded with vehicles that they were banned inside the city limits and restricted to nighttime use in other Roman cities. The Romans also noted the difference between the smooth-gaited horse, or *ambulator*, and the rougher, trotting horse, or *cussator*.

Mules were especially favored among Romans, and they were used for riding, driving, carrying cargo, and plowing. The agricultural writer Columella carefully described the breeding of both *mulus* and *hinnus*.

When the Romans arrived in Britain, they noted the presence of small, hardy horses, similar in appearance to the modern Exmoor pony, both ridden by excellent horsemen and harnessed to chariots. The Romans used the native ponies but also brought both asses and mules to Britain.

Although some experts believe that the Exmoor

is the remnant population of the wild horse in Britain, others feel that horses were not brought to Britain until shortly before 2000 B.C., when horse remains begin to be found at archaeological sites. At that time, horses ran wild in the forests and were hunted for meat, which was probably the origin of the bones at early sites. After 700 B.C., evidence exists that horses were used for riding or driving. Horsemeat was eaten less frequently as the value of horses increased, and when the Romans invaded, they discouraged the eating of horses, generally ending the practice in Britain.

The development of tack, or equipment for riding, was a gradual process. For many centuries, horsemen rode bareback or with a woven pad to protect their thighs. Although the contoured saddle was first seen in the fourth century A.D., the stirrup did not reach western Europe until the eighth century A.D. Ancient Greek horses first wore boots of rawhide and, later, rawhide and metal on their hooves, both fastened with leather thongs. The Romans used an iron *hipposandal*, which clamped to the hoof. Nailed horseshoes did not become common until the early Middle Ages in Europe. The horseshoe not only protected the horse's hoof from excess wear and stony ground but also increased the animal's traction on wet ground.

For many centuries, the neck strap or breast collar, despite its flaw in choking the horse of air, was the only known way to harness the horse. The invention of the horse collar almost quadrupled the horse's draft efficiency. The horse collar was invented by the Turks and was carried into southern Europe by the Arabs by the eighth century A.D. The collar is pear-shaped and lies along the shoulder line with heavy padding and metal hames to distribute the pressure of pulling.

In the warmer weather of southern Europe, the ass and mule remained in favor as work animals after the decline of the Roman Empire. The Spanish word *burro*, which means "reddish color," was used to describe the common ass. Even after the Roman introduction, neither asses nor mules became as numerous in Britain. The ass, or *donkey*, the name it acquired in Britain, was found in London but was little seen in the countryside. The native pack ponies performed the work that donkeys did in other countries, although

The taboo most associated with horses involves the eating of horsemeat. Early humans certainly hunted and ate all equines. Among the steppe peoples of Central Asia, who domesticated the horse, the eating of horsemeat and the drinking of both milk and blood from horses continues today. Although the peoples most commonly ate sheep and goats, they ate horses far more often than cattle, yaks, or camels. Mare's milk supplies four times the vitamin C of cow's milk and twice that of human milk. This source of this essential vitamin was important in the diet of many nomadic peoples, who had little access to fresh fruits and vegetables. Besides producing yogurt and butter, naturally sweet mare's milk was used to create the fermented liquor koumiss.

The acceptability of horsemeat varies from culture to culture. The ancient Greeks and Romans did not routinely eat horses, avoiding it unless necessary. The Hebrews and the Muslim peoples have never approved of eating horses. One reason for this traditional taboo was the value of a horse for transportation and warfare. Horses reproduce and grow slowly in comparison to pigs, sheep, goats, and even cattle. The horse also requires considerable training to become a good mount. Perhaps when it could no longer work or died, the horse would be eaten, but certainly not before then.

In pre-Christian Europe, the Teutonic tribes ate horsemeat, often in association with the worship of Odin, the supreme god and creator. As early as A.D. 732, the Christian church began efforts to stop the eating of horsemeat because of its links to pagan religion. In Britain, the Angles regarded the horse as special but ate horsemeat at communion meals. The Church continued to exert pressure against the eating of horses through the ninth century, when the practice was generally eliminated. Until that time, older horses of fifteen to twenty years were butchered and eaten.

In the Middle Ages, many European kings also discouraged the eating of horses to protect the potential supply of horses for war, although horses were eaten in England and on the Continent in times of famine. In Paris, it was illegal to sell horsemeat until 1830. In Britain and much of North America, horses are often regarded as companion animals or pets, and the eating of such animals is a powerful social taboo.

Swedes today consume more horsemeat than lamb and mutton. In France, horsemeat is sold in butcher shops known as *boucheries chevalines* and prepared as beef. Horses are bred and raised specifically for meat, although the demand for horsemeat far exceeds the supply. Mule, donkey, and donkey foal meat is consumed in some countries. Young donkey meat is regarded as more flavorful than horse and is often used in *pâtes*. In Spain, horse foals are also eaten. In China and Japan, horsemeat is regarded the same as any other meat.

Unwanted horses sold at auction in the United States inevitably end up at the slaughter market. After World War II, horsemeat was used for domestic pet food or sent overseas. Today much of the meat is sent on to Europe. It is difficult to locate horsemeat for sale in the United States, although it can be found in a few areas in the Northeast and French-speaking Canada.

mule trains were occasionally used. Donkey dung was made into medical poultices, and the donkey or its hair was believed to be a remedy against whooping cough. Donkeys were occasionally milked to provide food for babies or invalids, especially around London in the mid-nineteenth century. Small donkeys were also kept

as pets by the wealthy for their children. Welsh gypsies called the donkey a *moke*, while some Scots called it a *cuddy*.

In Ireland during the eighteenth century, the British appropriated great numbers of horses for use by the army, leading to the greater use of the small, shaggy

*ass, asinine* Clumsy, stupid, foolish  
*donkey* The symbol of the Democratic party  
*donkey engine* A small engine or a small switching locomotive used in the switchyard  
*donkeywork* Boring or monotonous work  
*jackass* Someone who acts like an idiot  
*mule, mulish, stubborn as a mule* Obstinate

[To view this image, refer to the print version of this title.]

donkey. There were an estimated 200,000 donkeys at work on Ireland's farms before the twentieth century.

Mules provided mounts for church officials in England until the Reformation, and then they became rare, appearing generally as the result of an accidental mating. Mules did not become important pack animals for the British army until the 1800s. Imported large Spanish jacks were bred to cart mares to produce army stock, but most of the army's mules were actually purchased from the United States. The English and Irish donkey simply did not have the size of the European asses (fig. 50).

The Domesday Book of 1086 reveals the widespread use of the ox in Britain for agriculture, especially on heavy or wet ground. Horses were being used for heavy work as early as the eighth century, but generally on smallholdings, where the native, pony-sized horses were more versatile for such necessary jobs as plowing, harrowing, carting, and riding. Oxen were a source of power on large holdings, where eight-animal teams were common.

By the twelfth century, oxen and horses were sometimes harnessed together for plowing. Harrowing became the province of horses, because they could finish the work faster. Horses also powered presses and grinding mills, spinning machines, and water pumps. The horse replaced the ox for heavy work in France by the twelfth century, and Spain shifted to widespread use of the mule in agriculture.

Of course, the horse still conferred great status on its rider. For knights and nobles, the *destriers* (war-horses), chargers, riding palfreys, and coursers or hunting horses had to appear majestic, spirited, and re-

Fig. 50 A large, fine mule as illustrated in the woodcuts gathered by Edward Topsell in 1607. From *Curious Woodcuts of Fanciful and Real Beasts* (Dover, 1971).

fined. Stallions were symbolically powerful and more aggressive, so mares and geldings were generally not used for riding or in battle. The gelding of horses was rare before the reign of Henry VIII in the early sixteenth century. As Britain's population became increasingly urban, geldings became more popular for riding and coaching teams, although the operation was not performed until after the colt was fully grown. Riding horses were limited to the wealthy until the later Middle Ages, when small, easy-gaited riding horses were used by women, farmers, and tradespeople (fig. 51).

Horses were frequently grazed on common land. They were often belled or hobbled so that they could be located, and ownership was often indicated by branding or earmarking. Because there were so many stallions in the population, the sire of most foals was unknown. When high-quality stallions were run with mares, it was felt that the stallion was of overwhelming importance and that the mare contributed very little. A minimum height standard for stallions was repeatedly promoted to increase the size of the nation's horses.

Horses remained of great importance to armies. The small size of the native British horses became a problem as the weight of armor and weapons increased. Beginning in the thirteenth century, British breeders

[To view this image, refer to the print version of this title.]

Fig. 51 A sixteenth-century woodcut of the horse. From *Curious Woodcuts of Fanciful and Real Beasts* (Dover, 1971).

sought out the heavy horses of the Low Countries, where the value of larger and taller horses had been recognized as early as the eighth century. The most desirable imported horses also included the Spanish horse and the Arab, Barb, or Turk (whose names and origins were often confused) for the speed and refinement they offered.

The light horse cavalry again became a strong attacking force in England beginning about the seventeenth century and many of the important battles in European wars were won by famous cavalry commanders. The cavalry schools played a major role in revolutionizing equestrian thought and practice. The increasingly heavy field guns also required the use of artillery horses on the battlefields.

British ladies demanded the finest palfreys, such as Irish Hobbies, and certain colors were more highly valued than others. Black was considered the best, but a touch of white was needed. Completely white horses were both mistrusted and associated with powerful owners. Gray horses were believed to be temperamental, but dappled gray was especially desired in a military horse. Piebald (black and white) or skewbald (brown and white) horses were also viewed with suspicion. The hair from light-colored horses was more visible

on clothing, which many women disliked. Practically speaking, bays, duns, and roans showed less dirt. Finally, long manes and tails were also desirable on horses for the wealthy, probably because they were impractical for the hardworking horse, which probably had a docked, banged, or shortened tail.

Packhorses carried virtually everything: ore, wool, mail, and foodstuffs. In the sixteenth century, the development of roads, public carriages, and heavy road transport all increased the demand for fast-trotting horses, sturdy harness horses, and heavier drafters. From simple carts and wagons, a multitude of stage wagons, carriages, coaches, landaus, and light vehicles such as governess carts, dog carts, gigs, phaetons, wagonettes, and brakes were developed. Long-distance hauling wagons were imported from Germany in the sixteenth century, leading to the development of stage wagons capable of carrying 8 tons. In the eighteenth century, box wagons and bandwagons were developed for farm use. Because a horse could deliver a load twice as rapidly as an ox, the extra cost of the horse's feed was increasingly justified. The development of rotation cropping and the growing of better animal feedstuffs also encouraged the more widespread use of the horse over oxen.

The introduction of the Oriental breeds—the Arab, Barb, and Turk—had a dramatic effect on European horse breeding and forever changed the light or riding horses around much of the world. The uniqueness and separateness of Oriental blood had a powerful effect in crossbreeding.

The Oriental breeds also changed horse racing. Racing is one of the oldest spectator sports, and horses have been pitted against each other since ancient times. The British raced English and Irish horses before Oriental stallions were imported, but crossing these new breeds on native mares produced larger, faster horses. In 1750, the Jockey Club was formed to oversee English racing. The first General Stud Book was published in 1791 and recorded the pedigrees of all racing horses of the time. All Thoroughbreds, as they came to be called, can be traced to one of three foundation sires: the Byerley Turk, the Darley Arabian, and the Godol-

The pastime of horse racing has engendered many colorful expressions:

<i>across the board</i>	<i>off and running</i>
<i>also ran</i>	<i>sport of kings</i>
<i>back the wrong horse</i>	<i>sprinter</i>
<i>bookie</i>	<i>start from scratch</i>
<i>dark horse</i>	<i>stayer</i>
<i>front runner</i>	<i>sure thing</i>
<i>inside track</i>	<i>track record</i>
<i>mudder</i>	<i>walkover</i>
<i>neck and neck</i>	<i>win hands down</i>

phin Arab. Thoroughbreds are now found throughout Europe, North America, New Zealand, Australia, and the Middle East.

In the eighteenth century, the new livestock improvement techniques were also directed toward the horse. Many of the old regional types were standardized into breeds, sometimes with additions of the powerful Oriental or new Thoroughbred blood. The careful selection of both mares and stallions was now practiced with better results than the haphazard methods of the past. Racing was an important incentive to scientific horse breeding, and as a side effect, it improved the quality of horses used for pleasure activities. Unfortunately, some of the foundation breeds and other old types were lost in this process: the immortal Galloway, the sturdy Chapman horse, the large Vardy horse, and the intriguing Cushendale, Goonhilly, Long Mynd, Manx, and Tiree. Some of these losses occurred in the twentieth century when certain native breeds were ignored and allowed to become extinct.

At the end of their working lives, horses were not as valuable for slaughter as oxen, but their hides furnished a fine, smooth leather that was used for shoes, clothing, and furnishings. Horsehair was perhaps more valuable, because it is durable, resists rot, does not stretch out of shape, and, because it is nonporous, dries quickly. Horsehair was used for making ropes, cordage, and a

durable upholstery fabric. In addition, it was and still is used to string the bows of musical instruments. Last, rendering reduced dead horses and other animals into lubricants, soap, and glue.

As Britain entered the modern age, the numbers and types of horses changed. At the beginning of the nineteenth century, there were an estimated 10,000 horses at work in London and more in the surrounding areas. During the first half of the century, however, the railroad began to knit Britain together, reducing the need for horsepower to move heavy cargo. Light horses continued to be used in the cities for transportation and light delivery. Ironically, mines demanded larger numbers of pit ponies to replace the child laborers, who were now beginning to receive protection under child labor legislation. Farmers used horses well into the twentieth century, and the military used great numbers of horses up through World War I.

The horse came back to the New World with Columbus on his second voyage. Following the initial arrival of 24 stallions and 10 mares, subsequent imports were bred in large numbers to supply the conquistadors and missionaries in South America, Mexico, and southwestern North America. Horses were brought to the mainland of North America in 1539 by Hernando de Soto, who traveled from Florida throughout the South, and a year later by Francisco Vázquez de Coronado, who explored from Mexico north to Kansas and Nebraska. Spanish horses quickly found their way to freedom, and they were adopted by the Plains and southern Indian tribes, forever changing their way of life. Three hundred years later, millions of feral mustangs were to be found in North America.

The European colonists on the East Coast brought both light riding and heavier working horses to their new homes. In 1609, the first 6 mares and 2 stallions were brought to Jamestown, Virginia, and three years later there were 17 horses in the colony. In the early years, the ox was a more practical work animal, especially in the New England area, but the horse population grew rapidly. By 1700 in Massachusetts, horses under 14 hands were banned from the common graz-

*beat a dead horse* As far back as the Romans, people have known that it makes no sense to do this

*beggars on horseback* People who are not really poor because they can afford a horse

*charley horse* A muscle pain; Charley was an old lame horse, which is how an old baseball player felt when a muscle hurt

*could eat a horse* Hungry enough to eat a huge animal and break a social taboo

*don't change horses in midstream* Paraphrase of a statement Abraham Lincoln made regarding his re-nomination for the presidency

*don't look a gift horse in the mouth* This is ancient advice; checking the horse's teeth would reveal its age

*eat like a horse* To have a big appetite

*filly* A young woman or girl

*free rein* Unrestricted action

*get a leg up* Getting a boost up to mount a horse

*get off your high horse, come off it, ride a high horse* Knights and other powerful people did ride a tall horse; the phrase describes their arrogance

*hack* Either a horse or cab for hire; by the eighteenth century, a disreputable person for hire; now a writer for hire or a taxicab; *hackneyed* was originally something hired, but now means something that is trite

*too late to shut the stable door after the horse is stolen* Advice dating back to the sixteenth century; variants include locking the barn door after the horse is stolen or gone or has run away

*hell bent for leather* Riding recklessly and in a hurry

*hobbyhorse* A *hobby* was a small riding horse from Ireland; the word came to mean a child's wooden rocking horse and a trivial pursuit, later simply a *hobby*

*hold your horses* Control yourself, as a driver does a team of horses

*horse and buggy days* Old-fashioned, or in the past

*horse around, horseplay* To fool around

*horsefeathers* Nonsense

*horse latitudes* Either of two ocean regions where ships could become becalmed; if a ship was delayed too long, the horses would be thrown overboard

*horse laugh* A loud laugh

*horse of another color* Something entirely different

*horse opera* A cowboy movie or a B western

*horsepower* A unit of power

*horse sense* Practical or common sense

*horse trade* A negotiation accompanied by shrewd bargaining or dickering

*if wishes were horses, than beggars would ride* Instead of walking

*iron horse* A steam locomotive

*kick over the traces* A horse that got his foot stuck in the traces, acting independently

*knockdown price* A British expression, the knacker's price for a horse bound for slaughter

*long in the tooth* Like an old horse

*mare's nest* A fraud or deception; also a mess or confusion

*nightmare* Perhaps from *Mahrt*, the nasty German mare-devil

*off your feed* Horses that are sick do not eat

*out to pasture, put out to pasture* Where old horses who do not have to work are put

*pale horse* The steed that Death rides in Revelation 6.8

*pommel horse, side horse* A piece of gymnastic equipment resembling a horse, also the front part of a western saddle

*one-horse town* A really small town

*pony* To lead one horse while riding another horse

*ponytail* A hairstyle that looks like a horse's tail

*put on the feed bag* As horses were fed

*put the cart before the horse* To do something in the wrong order

*put through your paces* An exhibition or test of skills, from the method of training a horse

*remuda* A herd or string of working horses on a western cattle ranch, also called a *cavy*

*riding for a fall* A reckless person inviting trouble

*ride herd on* To control as cowboys on horseback herd cattle

*ride roughshod* Roughshod horses wear cleated shoes so that they can be ridden forcefully or recklessly on dangerous ground

*ride the horse you came in on* A western expression meaning get out of town

*rode hard and put up wet* Someone who has worked hard but is not appreciated or cared for

*shank's mare* One's own legs, as in being forced to walk

*stalking-horse* A horse or horse figure behind which a hunter hides; anything that hides its true purpose

*straight from the horse's mouth* Checking the horse's teeth would reveal its true age

*stud* A stallion used for breeding, now a virile or handsome man

*stud poker* Poker played with cards face up in a fearless manner

*thorough-paced* Taught to pace by use of hobbles

*tacky* In the South, this once described an inferior horse, now it refers to anything shabby or in poor taste

*take the bit between your teeth* When a horse takes the bit, the rider loses control of the mount

*Trojan horse* Something not to be trusted

*well-groomed* As in horses that are both good-looking and well fed

*wheelhorse* The horse hitched closest to the wheels, which needed to be the strongest

*wild horses couldn't drag me* To refuse to go somewhere

*workhorse* Someone who works very hard

*you can lead a horse to water, but you can't make him drink* A proverb that is definitely true

ing land, where privately owned horses were usually hobbled to prevent their wandering. Horses and mules were also raised in large numbers to sell to the West Indian sugar plantations.

In Rhode Island, easy-gaited or ambling horses such as the Galloway and Hobby were crossed with Spanish Jennets to produce the famous Narragansett Pacer. The Spanish Jennet was also a highly refined,

gaited riding horse, and the Narragansett Pacer inherited these traits. Very popular by the mid-1600s, the sturdy little Narragansett Pacer with its four-beat gait was used throughout the colonies, and it was also exported to the West Indies. After the Revolutionary War, road building progressed and the demand grew for fast-trotting horses such as the Canadian, the Morgan, and the developing Standardbred. In Kentucky

and Tennessee, the Narragansett Pacer and Spanish gaited stock still found in the South were combined with imported English Thoroughbreds to produce fine, gaited saddle horses such as the Saddlebred, Tennessee Walker, and other local breeds. The sorrel-colored Narragansett Pacer itself was absorbed into these new breeds and was lost by the nineteenth century.

The possession of high-quality riding horses was important to successful farmers, plantation owners, and townspeople. Racing and fox hunting were enjoyable pastimes that also required certain kinds of horses. As a result, the skill of horsemanship was highly regarded, and George Washington typified the importance of this ability. A French officer commented that Washington was an "excellent and bold horseman, leaping the highest fences and going extremely quick without standing in his stirrups, bearing on the bridle or letting his horse run wild." Thomas Jefferson also wrote that the general was "the best horseman of his age and the most graceful figure that could be seen on horseback" (Koch and Peden 1944, 174). The commander of the Continental Army thought nothing of traveling 45 miles a day in the saddle, much to the dismay of his officers. His favorite mounts during the Revolution were a light sorrel named Old Nelson, who usually carried him in battle, a blue roan named Blue-skin, who was fiery but not steady, and a pure white horse known simply as Jack. He was also proud of his valuable Arabian stallion, Magnolia. President Washington owned many finely bred horses in his life, but it was one of his two favorite Narragansett Pacer mares who spooked on a night ride in 1799, throwing him to the ground. He never quite recovered his health, and another ride in a cold rain led ultimately to his death at age sixty-seven.

In this growing country, horses were at work everywhere. As the Euro-American settlers pushed their way west into the frontier, horses were ridden and used as pack animals in the thick forests. In the southern states, saddle and racing horses were being carefully bred. In Pennsylvania, New York, and Massachusetts, heavier Flemish horses were imported to work on farms and then were crossed on English stock to provide wagon

horses. Freight wagons hauled cargo to the cities and to barges on the rivers.

The settlers used big Conestoga wagons and horses as they moved ever westward. The German settlements in the Conestoga Valley and in Lancaster County, Pennsylvania, were the home of the Conestoga horse, a true American breed. Shortly after the Revolutionary War, George Washington purchased breeding stock of his own from these farmers. The Conestoga was long in the leg and back, with a well-arched neck. Usually dark in color and clean legged, the Conestoga horse stood up to 17 hands tall and weighed 1,400 to 1,700 pounds. The popular Conestogas were active, docile, hard-working horses, and they sold for high prices. Six horses were teamed in pairs to heavy wagons, and more finely built Conestogas were used for coach horses. The Conestoga horse was eventually lost in the Midwest due to crossbreeding and the introduction of French and Flemish draft breeds. This once-popular American working horse was nearly gone by the 1880s, and no breed registry had ever been established to mourn its passing.

The Conestoga wagon drivers also gave North Americans the custom of driving on the right side of the road. Teamsters sat either on the left wheel horse or on the left side of the wagon seat and held their whip in their right hand, and they passed each other on the right so that they could see each other's wheels.

In the East, the heavy Concord coaches carried mail and passengers. They were often drawn by speedy Morgan or Canadian horses. Originating in Quebec from French stock, the Canadian horse contributed a different ancestry and hardiness to American horses. This versatile Canadian horse gained fame far into the United States. The Canadian Pacer was also renowned, but like the St. Lawrence draft breed, it disappeared into the horse melting pot of the New World.

British racehorses were also early imports to the colonies, and the first racetrack was established on Long Island by 1665. Match racing and quarter-mile racing were especially popular. The Kentucky bluegrass country eventually became the heart of American Thoroughbred breeding. The American Stud Book was organized in 1868, and in 1894, the American

The tallest and heaviest horse was a Shire gelding named Samson foaled in 1846. He measured 21.25 hands tall and weighed 3,360 pounds.

The smallest horse, named Little Pumpkin, was foaled in 1973. In adulthood, he stood 14 inches tall and weighed 20 pounds.

The longest-lived horse was a Cleveland Bay cross named Old Billy who lived from 1760 to 1822, or sixty-two years.

The largest mule was a Mammoth Jack–Belgian cross named Apollo foaled in 1977. He stood 19.1 hands and weighed 2,200 pounds.

The highest price paid for a yearling horse was \$13.1 million in 1985 for Seattle Dancer.

The long jump record is held by Something, who cleared 27 feet, 6.75 inches in 1975. In the high jump, Huasso jumped 8 feet, 1.25 inches high in 1949.

At the Kentucky Derby in 1973, Secretariat ran 1.25 miles in 1 minute, 59.4 seconds. At the Belmont Stakes that same year, he ran 1.5 miles in 2 minutes, 24 seconds.

At the English Derby in 1936, Mahmoud ran 1.5 miles in 2 minutes, 33.8 seconds.

At the 1990 Grand National Steeplechase, Mr. Fisk ran 4.5 miles in 8 minutes, 47.8 seconds.

The world record for team pulling is 4,625 pounds for 27 feet, 10 inches on the dynamometer.

Jockey Club was formed, primarily to eliminate corruption in racing.

Harness racing was a more informal but popular pastime by the end of the eighteenth century. Morgan and Canadian trotting mares were crossed with Thoroughbreds to produce the Standardbred trotter and pacer that was used in harness racing. The founding sire of the Standardbred—the name derives from the “standard” race distance of one mile—was an English Thoroughbred named Messenger who was brought to the United States in 1788. By the late nineteenth century, harness racing had become tremendously successful, and races were held at county fairs across the country. The Standardbred, called the poor man’s racehorse, was often raised and used on the family farm as well.

The American Quarter horse had its beginnings in Virginia and nearby states when Indian breeds of Spanish ancestry, such as the Chickasaw, were crossed with the Thoroughbred. Compact and muscular, the Quarter horse possessed an explosive ability to sprint faster straightaway over a quarter mile than any other breed. Taken westward with the settlers and bred to the mustang, the Quarter horse became the ultimate

cow horse. The Quarter horse was also the basis for many other stock horse breeds: the Appaloosa, Buckskin, Colorado Rangerbred, Paint or Pinto, and Palomino. American cowboys adopted the Spanish *vaquero* ranching techniques, horses, and equipment. The sixteenth-century conquistadors had brought this older, different style of riding to the Americas, and the Western saddle and hackamore closely resembled those of the Spanish knight.

Horses were vital to communication and transportation in the period of America’s great westward expansion. After 1850, as American settlers pushed ever further west, they made use of the mustangs they found on the Great Plains. These migrants often traveled by the smaller prairie schooner or covered box wagon, drawn by either oxen or horses, instead of the larger Conestoga wagon and horses favored by earlier generations. In 1861, the Pony Express was organized between St. Joseph, Missouri, and California. Though this messenger system of relay riders mounted on horses lasted just eighteen months before telegraph lines were built, the Pony Express enabled information to be passed from the eastern states to the western territories in just a few days, especially valuable during the early years of the

Civil War. Also important in this period were the Wells Fargo coaches, which carried silver, passengers, and supplies between the Comstock Lode in Virginia City, Nevada, and California. Overland stagecoaches later carried passengers, mail, money, and valuable cargo, also linking east and West before the railroads.

In addition to horses, the Spanish brought asses or burros to the New World, beginning with Columbus, who carried 6 burros on his second voyage of exploration. Entering Texas with the colonizer Juan de Oñate, burros hauled salt, water, ore, and precious metals. The burro became the favorite pack animal of western prospectors, miners, wood haulers, and sheep ranchers. Burros hauled supplies and lumber to remote mines and carried gold, silver, or other ores back from the mines. Burros also labored in the Yukon gold rush of 1898. Not only did they carry supplies for the prospectors along the Klondike River, but they hauled provisions in pack trains from Edmonton, Alberta, a trip of 1,500 miles. Burros established large feral populations in the Southwest, and in the 1920s, they were rounded up and sold for dog food, especially in the Grand Canyon region.

The early Spanish colonizers also used mules, and these hardy animals were common in the western missions. During the California gold rush, mules were used to transport prospectors and supplies across Panama. In the western territories, mule skinnners drove mule pack trains. These famous 20-mule teams hauled huge loads of borax out of Death Valley in the 1880s. Mules also worked in coal, lead, and zinc mines, hauled timber and railroad supplies, and served as reliable saddle mounts.

Back East, mules were in great demand for agriculture, especially in the South, where they worked both on small farms and in the large cotton industry. Mule teams were used in the middle states on both farms and city streets, but they became rarer northward, where they were less suited to the climate. Mules also hauled barges on canals, and they remained in great demand by the army through World War II.

Mules had several advantages over horses. They endured the heat better than horses and required less quality feed. Mules were also very sound, long-lived,

surefooted, more careful, and generally healthier. They could also be placed together in large groups with less fighting. The breeding of quality mules was accomplished by importing large Spanish and other European jacks. The huge American Mammoth Jack eventually became the finest mule-breeding ass in the world and was used to produce excellent draft mules. American-bred mules were exported to Cuba and Europe.

The development of improved farm implements necessitated larger teams of heavy horses and mules on the big Midwestern farms. In the Midwest and West, smaller mustangs and multipurpose horses were gradually replaced by heavy draft horses or crosses known as farm chunks. Farmers calculated that they needed one mule or workhorse for each 20 to 25 acres they farmed.

Tremendous quantities of timber were also cut and hauled out of the vast forests of North America. By 1909, there were more than forty-six thousand sawmills in the United States alone. In New England and parts of Canada, oxen were used to haul logs out of the woods, but as lumberjacks moved westward, big cross-bred western horses were used in multiple-horse teams to pull huge wagons or sledge loads of timber.

Along with prosperity and a higher standard of living for the middle class, the Industrial Revolution contributed significantly to a growing horse population. Great quantities of raw materials and manufactured goods needed to be moved to market, and the growing urban population required larger amounts of agricultural products. This was easier to accomplish now that the eastern half of the continent was linked by a network of roads that allowed for speedier transportation of people and goods.

In urban areas, horses often led hard lives, being stabled in unsanitary conditions and working long hours even in bad weather. Cities also had to deal with the problems of manure and even dead horses in the streets. The development of streetcars, cable cars, and subway trains were considered great improvements that solved many of the sanitation problems of city life. Despite the advent of modern transportation, the numbers of horses and mules in the United States continued to grow from 18 million in 1900 to a peak of 26 million in 1920. Horses and mules used for draft or harness work

[To view this image, refer to the print version of this title.]

were more numerous than riding horses, with about 2 million working in cities.

The formation of breed organizations in the 1880s in the United States paralleled their development in Britain at the same time. Interest in imported horses also soared. Several British breeds, such as the Clydesdale, Shire, Suffolk Punch, Cleveland Bay, and Hackney, were brought to North America. The French Norman or Percheron and Flemish or Belgian breeds were highly promoted. The Percheron soon became the

Fig. 52 The *Orange Judd Farmer* carried these advertisements for Shires, Clydesdales, and Cleveland Bays in 1885. Courtesy of the IAB and Hans Peter Jorgensen.

dominant draft breed and was widely crossed on the mustang or bronco. Draft horses were often released to run with feral horses on the Plains (fig. 52).

In spite of this new interest in registries and associations, types of horses were often more important than breeds. Workhorses were divided into such types

as heavy draft, wagon, or farm chunks, while orchard owners favored short, low-headed “apple” horses. Mules were advertised as draft, farm, cotton, pack, or mine. The wealthy preferred stylish horses for their gigs or carriages and specialized park hacks, polo, and hunting horses. Some riders also favored Plantation and other easy-gaited horses. Driving horses varied from heavy harness for coaches to speedy roadsters. Color and appearance further subdivided horses. City services, such as fire departments, and merchants often required that their horses match in color, height, and appearance. The army was another huge market for specific horse types, for horses or mules moved everything soldiers needed or used.

Riding fashions, harness, tack, supplies, health remedies, and vehicles were all important market goods in the American economy. The Studebaker Carriage Company was the world’s largest manufacturer of horse-drawn vehicles. Clement Studebaker and many other carriage makers eventually transferred their wagon-making skills to making automobile bodies.

In 1914, New York City was home to more than 110,000 horses. In cities large and small, hay, straw, and grain were all hauled into the city and manure was hauled out to the country. Large quantities of cargo were moved on the docks and to railheads. Merchants used their delivery wagons and horses as advertising. Milk, ice, coal, beer, and garbage were all hauled by horses. Horses pulled the city trolley, the ambulance, the hearse, and the fire engine. Everything moved over roads that were maintained by horse-drawn road graders, snow scrapers, and sprinkler wagons. In northern climes, sleighs and bobsleds of different sizes were needed to provide many of these services in winter. Livery stables existed even in very small towns for the benefit of travelers, and inns provided for the horses of their overnight guests. Every village needed the services of a farrier or perhaps a wheelwright, and hitching posts and water troughs were found on all main streets.

For many centuries, the knowledge of how to drive, ride, and care for a horse, ass, or mule was as essential to everyday life as the knowledge of automobiles is today. Virtually everyone knew how to ride or drive, and the stable stood where the garage does today. Only the very

rich, who could hire others to do their work, did not know how to perform all the necessary daily tasks. The pride in ownership of the horse was also comparable to that of the car, for the horse was just as much an extension of the rider as the car is to many drivers. Children itched to move up from riding a pony or an old farm horse to driving the family buggy or wagon or owning a fine horse of their own. And there were many models, colors, and options in choosing a horse and vehicle. Just as people talk about cars today, horses and their strengths and foibles were a main topic of discussion. Neighbors, relatives, and friends all knew each other’s horses. And perhaps more important, the horse was also a living companion, not just a machine. In just a very short time, most members of modern society have lost this knowledge, skill, and special bond.

The breeding, purchase, supply, and care of cavalry horses was a tremendous undertaking. Every cavalry company had its own farrier, who often doubled as a veterinary surgeon. Volunteer units often arrived with their own horses but soon required replacement mounts. Horses were lost through ignorance and improper care perhaps more often than in battle, although well-disciplined cavalry units cared for their horses before themselves and cavalrymen could be punished for ill-kept or sore horses.

Cavalry units were used during the Revolution, the War of 1812, the Mexican War, and on the frontier, but a staggering number of horses took part in the American Civil War. The main Union cavalry depot at Giesboro in the District of Columbia, one of six such units, had stabling for 6,000 horses. In 1864 alone, more than 170,000 riding horses passed through the depot, in addition to 12,000 or more artillery horses. Horses were generally purchased directly from stock raisers. Union Army standards called for mares or geldings standing 14 to 16 hands tall, weighing between 750 and 1,100 pounds, and between the ages of five and eight. Cavalrymen preferred dark-colored horses not only because they were less visible on the field but because they showed less dirt. Cavalry horses were branded with the letters “US” on the shoulder. The Confederacy was well mounted on quality horses at the beginning of the war, but their numbers were seriously depleted near the

Small horses were bred as long as three thousand years ago and kept as pets by royalty in both Europe and East Asia. Little horses were also popular performers at fairs and circuses. The miniature horse in Britain and North America is descended mainly from the Shetland pony with the addition of other exceptionally small individuals from other breeds. Originally crofters' ponies, Shetlands began to work in the mines as pit ponies when children were banned from mine work in the mid-nineteenth century. The Shetland also gained popularity as a child's mount and harness pony. Hobby breeders eventually became interested in breeding smaller, correctly formed animals in many countries, including Britain, Canada, and the United States.

The first small ponies brought to North America came to work in the mines of Virginia and surrounding areas. Shetlands also became popular as riding ponies for children, but they have been changed considerably to become fine halter and harness animals. The hobby of breeding miniature horses became a profitable business in the 1960s.

The Falabella family of Argentina has been breeding miniature horses since 1853. The Falabella miniature horse breeds true to type and has been exported to both Britain and North America. Falabellas stand 6.1 to 7 hands, or about 25 to 28 inches tall. Falabellas are bred purely and have been introduced into other miniature horse breeding projects.

In North America, breeders strive to produce miniatures that stand 34 inches or less. A second division registers horses ranging from 34 inches to 38 inches. The goal is to produce a well-formed, proportional horse. Every color and pattern is seen in the miniature. Miniatures vary in type between the refined, dainty variety to heavier draft types. Breeders prefer the term *miniature horse* to *pony*, but many backyard little ones are definitely ponylike in appearance.

There is also competition among some breeders to create smaller and smaller animals. Reproductive and birthing problems do increase with smaller horses. The temptation to use dwarfish stock or poorly conformed stock must be avoided. In the past, too many colts have not been gelded, because many pet owners wanted to breed their own foals. Proper nutrition, tooth, and hoof care are essential for miniatures.

Miniature horses are popular pets and visitors to schools and nursing homes. They are shown at halter, as harness animals, and in obstacle jumping classes. Miniatures are used in research because they are easier to manage and less expensive to maintain than standard-sized horses. Miniatures are also popular mascots for schools or teams. Like the pony, the miniature horse must be handled responsibly for its delightful nature as a companion to be maintained.

end, leaving the defeated South stripped of its working stock.

After the Civil War ended, the cavalry remained important in patrolling the West and in fighting the Indian wars and the Spanish-American War. Although well-bred horses were still desired, mustangs were also used. Later, when the federal government began extensively to breed its own horses for the cavalry, the Morgan was popular. The British also bought large numbers of American horses and mules for their cavalry units.

Cavalry horses were also a part of twentieth-century warfare. During World War I, the Allied forces consumed large numbers of horses, with about half a million horses and mules killed. Horses and their riders could not be protected against the fire from newly developed machine guns, field guns, and rapid-fire rifles. During World War II, the Germans had 2,750,000 equines, used mostly for pack or draft. As the German army evacuated the Crimea, soldiers shot tens of thousands of horses rather than allow them to fall into Rus-

sian hands. For its part, the Russian army used about 3,500,000 horses in its cavalry, artillery, and supply transport, and the Russian cavalry played a decisive role in the defense of Stalingrad and Moscow. In the siege of Stalingrad alone, 52,000 horses lost their lives. Altogether, many finely bred European horses were killed in World War II, and many old breeds were nearly forced into extinction.

On the Pacific front, the Japanese army used cavalry and draft forces in China. Notably, the last charge of the British cavalry occurred in Burma in March 1942. The Burmese Frontier Forces, mounted on small but sturdy native horses and commanded by British officers, operated as a reconnaissance unit. When the 2d Column fell into an ambush, the troops under attack by machine gun fire galloped bravely toward the enemy, though none survived.

By World War II, the United States Army possessed only about 25,000 cavalry horses and 12,000 draft or pack animals. The American army was the first fully motorized force in the world, but even so, the cavalry contributed vital assistance in Luzon, Burma, and Italy. During the war, three horses received the Dickin Medal of Valor for their service. There were seven horse-mechanized corps reconnaissance regiments, which were equipped with horses and both light and heavy guns. Everything was loaded into trucks and trailers. If the reconnaissance groups encountered impassable terrain, the horses were unloaded to continue the scouting mission. The "Philippine Scouts" of the 26th Cavalry were the only actual mounted U.S. cavalry regiment. The actions of the 26th Cavalry, often against Japanese tanks during the long battle for Luzon in the Philippines, are little known but stirring. As the starving American soldiers held out on the Bataan peninsula, the 26th Cavalry horses provided one last service. The 250 surviving horses and 48 baggage mules were slaughtered and eaten.

The American Remount Service was dissolved in 1948, but the U.S. Army continued to need pack mules in areas of rugged combat and to this day trains a small unit of mules and handlers. The Caisson Platoon is the only full-time horse unit in the U.S. Army. The Caisson

Platoon performs the final act of respect for soldiers, veterans, and honored citizens at Arlington National Cemetery.

Horses were brought to the Hawaiian Islands beginning in 1803. Mainly purchased in Spanish California, these horses rapidly became plentiful. Hawaiians quickly took to riding horses, which they called *lio*, but they did not use them for draft labor. The horses were only loosely controlled, and by midcentury, many people complained that half of the horse population was never ridden but roamed freely and destructively. This lack of control over breeding also resulted in many poor-quality horses. Eventually the horse population was brought under control, and they were widely used on cattle ranches, a use that continues today. Recreational riding has also increased, along with the importation of quality horses. Feral or loosely controlled horses today are found only in small numbers.

Donkeys arrived from England in Hawaii in 1825. *Kekake*, or donkey, numbers did not grow large. Donkeys were used mainly in agriculture or as pack animals carrying rice or taro, and mules eventually took over much of this work. On the Big Island of Hawaii, donkeys were used to carry coffee beans in the Kona area. When they were later abandoned, feral donkeys survived on the rough lava fields and gained the nickname Kona Nightingales. Highway signs warning of donkey crossings are still seen on the road to Keahole Airport. The small numbers of domestic donkeys in Hawaii are kept as pets or as workers on small farms.

Mules, also known as *hoki*, *muila*, or *puila*, were bred in Hawaii before the mid-nineteenth century. The word *hoki* has also come to describe a barren woman in modern Hawaiian. Hundreds of mules were eventually employed on the sugar-cane plantations, but the local supply could not keep up with the demand for quality mules. In 1908, 750 mules were imported, with about 100 destined for use by the military. Mules have been found running among feral horse bands, but never in large numbers. Today in Hawaii, mules are found mainly as riding animals.

Horses are not numerous in Alaska, although some

are used for pleasure riding or draft work on farms. Prospectors used burros during the gold rush years.

By the 1930s, automobiles and tractors began seriously to replace horses and mules, which for the first time were sent to slaughter in large numbers. The market for light delivery stock plummeted. Mule numbers decreased more slowly than horses because southern farms were smaller in size and had the labor needed to use the mules. Mule numbers had peaked at 5.4 million in 1920.

The years of hardship through the Depression and World War II slowed the loss of horses and mules, but in the years after the war, slaughter rates rose to an all-time high as much horsemeat was sent to Europe. These high rates of slaughter continued through the 1950s as the horse was replaced almost completely on farms and in cities. By the 1960s, the horse population was reduced to 3 million in the United States. Some 23 million horses and mules had been eliminated in just forty years.

Many experts predicted the complete demise of the horse, but growing affluence and increased leisure time revived the use of pleasure horses for both riding and driving. In the early 1960s, the much-admired Jacqueline Bouvier Kennedy brought attention to equestrian activities. The First Lady was an accomplished horsewoman who kept a pony named Macaroni at the White House for her young children to ride. Since the 1960s, the equine population in the United States has climbed to at least 7 million animals. Most horses are used for recreation or showing, but more than a million are considered gainfully employed in farming, police, or other work. Another 700,000 are involved in the racing industry. The horse population in Canada is now about 300,000.

In Britain, there were about 1 million farm horses at their peak in 1910. Twenty years later, there were still about 40,000 draft horses at work in the greater London area, although motor transport and farm tractors were rapidly beginning to replace horses. Of the 500,000 horses still working in the country in 1947,

about 100,000 went to slaughter each year thereafter until their numbers were greatly reduced. By 1960, there were only some 60,000 horses at work on farms, used mainly for sugar beet and potato cultivation in the eastern counties.

Today there are about 500,000 horses and ponies in Britain, most of them used for recreation. Riding is a popular activity, though only about one of every four riders own his or her own horse. There is a greater public interest in Britain than in North America for preserving the native heritage breeds from draft horses to ponies. Yet Britain still produces about 6,000 tons of horsemeat, shipped mainly to continental Europe.

Donkeys still work on some small British farms, but they are found mainly as pets, as companions for foals or horses, as workers providing rides on the beach, or as driving animals. The Donkey Breed Society promotes the welfare, registry, and showing of donkeys. It estimates a population of 10,000 to 20,000 donkeys in Britain. British donkeys are now found in colors other than the traditional gray. They are not very tall, and as a result, most British mules are also small, at 13.2 hands or shorter. A few larger standard donkeys, Poitou, and American Mammoth Jacks have been imported for breeding larger mules, which are in demand. There are an estimated 3,000 to 4,000 mules in Britain, and they are generally used for driving or riding. Interest in mules is on the rise, and in 1978, the British Mule Society was founded for breeders and aficionados. The most common color for mules is dark bay with light points and dorsal and leg stripes. Lighter bays, chestnuts, and blacks are less common, and white, roan, and spotted mules are rare.

## Husbandry

Largely unknown to the public, the horse has made many important contributions to human health. Because of their large plasma supply, horses have been used for immunity research since the nineteenth century. Emil Behring received the Nobel Prize in 1901 for developing the human tetanus antitoxin in horse

plasma. Horses infected with diphtheria have produced a serum used as an antitoxin to immunize children against the disease, and in the 1920s, drug companies used large herds of horses to produce this antitoxin. First Flight, a retired Thoroughbred racehorse, has long been the world's only source of antitoxin for all seven known strains of botulism. Antitoxin from First Flight is still used to save human lives in botulism outbreaks. Research into the Ebola virus has also used horse plasma. New technologies will eventually replace the need for live horses to serve as antitoxin producers, but their contributions have been invaluable.

Because they are so large and reproduce so slowly, horses are generally not good laboratory animals. Occasionally an equine condition corresponds to a human research requirement. Equine motor neuron disease has strong similarities to Lou Gehrig's disease in humans, and one equine parasite is related to the parasite that causes river blindness in humans. Horses are also used in research situations to help veterinarians discover more about equine health. Studies of the musculoskeletal system, anesthesiology, bacteriology, parasitology, pharmacology, and other areas primarily benefit horses themselves.

Horses are used for the production of natural estrogens through the pregnant mare urine, or PMU, industry. In this process, urine from pregnant mares is treated to collect natural estrogens that are used to alleviate menopausal symptoms, treat hormonal imbalances and some cancers, prevent osteoporosis, and reduce the risk of heart disease in women. Although some estrogens can be obtained from plants or synthesized in a laboratory, PMU remains the primary source. Premarin, marketed by Wyeth-Ayerst Laboratories, is the most prescribed drug in the world today.

This use of horses in estrogen production has become controversial. About 500 private farms in Canada and a few in the United States produce PMU, using from 45,000 to 80,000 horses. These farms are located mainly in Alberta, Saskatchewan, Manitoba, and North Dakota. Welfare concerns have centered around the collecting harnesses the mares wear, the amount of drinking water they are given, their overall care and

comfort, and the eventual fate of their foals. In 1995, an independent international team of animal welfare and equine organizations inspected PMU farms with the cooperation of Wyeth-Ayerst. They concluded that the standard of care among PMU horses compared favorably with other areas of the horse industry and farm animals in general. Their suggestions for continued concern included stall design, under watering to increase estrogen concentration and sufficient exercise and medical care.

One major concern is the ultimate fate of the foals, which may be weaned early or end up on the surplus horse market bound for slaughter. PMU mares are often draft breeds or types because they produce a greater quantity of urine. The use of quality stallions, either draft or Thoroughbred, increases the potential value and uses of the foals. Some PMU farms do indeed raise purebred draft horses.

The overproduction of horses, the declining demand for harness or racehorses, and the existence of incapacitated, unattractive, neglected, untrained, or ill-tempered horses all contribute to the horse slaughter market. The alternatives to slaughter are euthanasia and rendering. It must also be noted that in many areas it is impossible or illegal to bury a horse on personal property.

There is scarcely any demand for horsemeat in North America, because most Americans regard horses as pets and are repulsed by the idea of eating horses, but there are large markets overseas. Three dozen slaughter facilities in the United States and others in Canada export horsemeat to Europe, Asia, and South America. France, Belgium, and Holland account for almost 75 percent of this market, while Mexico, Japan, Southeast Asia, and Latin America are smaller markets. The Japanese market pays a premium for draft horsemeat. Horsemeat is generally sent chilled to Europe, but Japan often imports live animals for slaughter. In North America, horsemeat is also used in domestic pet food. Ironically, although two facilities in Texas kill about half of the slaughtered horses in the United States, it is illegal to sell horsemeat for human consumption in that state.

Dealers in slaughter horses usually buy their stock

at auctions for prices ranging from three hundred dollars to a thousand dollars, depending on size and condition. The killer price, as it is known, sets the bottom price for the value of all horses, directly affecting the purchase price of pleasure or grade horses. Slaughter prices are also the primary motive for horse stealing. While the slaughterhouse pays only ten to sixty-five cents per pound, the customer in a European butcher shop spends around fifteen dollars a pound for *cheval*. In the past few years, the annual slaughter numbers in the United States have fluctuated between 72,000 and 370,000 horses. The Humane and Safe Commercial Transportation of Horses to Slaughter Act of 1996 regulates the commercial shipment of horses to processing facilities, ending many but not all of the troublesome aspects of the horsemeat industry.

It is difficult to import horses into the United States but not impossible. The cost of transport, required medical testing, and the quarantine period usually limits importations to valuable performing or breeding horses. Many minor breeds would benefit from an expanded genetic pool, but breeders cannot afford the expense. Although the American livestock industry needs to be protected from foreign disease, it may be possible to establish less expensive mechanisms to guarantee disease-free stock.

As mentioned, almost 2 million horses in the United States are still considered working animals. Standard-breds, Thoroughbreds, and some Quarter horses comprise the basis of the racing industry. Although racing remains one of the largest spectator sports, flat and harness racing have both declined in the face of many other forms of legalized gambling. Conversely, the use of police horses, ranger mounts, and sheriff patrols is growing, providing increased visibility of duty officers, positive public relations, and crowd control. Ceremonial horses, parade units, and caisson duty require specific colors, types, and breeds, and the Royal Canadian Mounted Police actively breeds horses for duty. Most important, the horse has never been replaced on the ranch for working with cattle.

Draft horses, mules, and smaller farm or chunk horses are all still working, even in this high-tech age.

The Amish and Old Order Mennonites, who never stopped farming with horses or mules, have served as a valuable source of stock, equipment, and knowledge for those who are returning to using working horses. Fortunately, dedicated breeders of purebred drafters and Mammoth Jacks have continued to raise and show their stock.

In addition, some farmers kept and worked their horses throughout the era of farm mechanization. For these farmers, horses might provide the most economical power on their farm, or the use of horses allows them to keep their independence on a small family farm. Some farmers who practice organic or sustainable agriculture believe that horses are part of the whole farm, returning fertility to the soil. Finally, some farmers just enjoy working in partnership with horses.

Horsepower is well suited to wet, steep, or heavily wooded land. Logging with horses is regarded as more ecological than the use of mechanized equipment because it doesn't require as much road building, allows for very selective cutting, and causes less damage to the groundcover and topsoil. Orchard, vineyard, and nursery owners often find that horsepower is completely adequate and well suited for their needs as well. Teams also give hayrides in apple orchards, pumpkin patches, and Christmas tree farms. Quite a few cattle ranchers still use horses to pull feed wagons or sleds in winter. Owners of draft teams can compete in plowing matches or field demonstrations, breed classes, and driving. Pulling contests use teams of draft horses, mules, or ponies in different weight classes pitted against a dynamometer, skid, or stone boat.

Horse shows began with displays of equestrian abilities in ancient times. Classical horsemanship, jousting matches, foxhunting, driving, and daily cowboy life all contributed to the modern forms of the horse show and rodeo. Horses and riders now compete in breed classes and hunter, western, or English equitation. Skills and sporting events include dressage, jumping, three-day eventing, endurance riding, driving, western reining, cutting, team penning, and games or gymkhana.

Recreation uses such as riding lessons and trekking or trail riding have also grown in popularity. Families who own draft teams join others for wagon-train

vacations. The Pony Club provides thousands of young people with education and showing opportunities in Britain and North America. In the United States, 4-H horse projects now far outnumber beef cattle and are continuing to grow. Several hundred thousand young people participate in 4-H horse clubs. High school and collegiate team competitions in rodeo and equestrian activities are also popular. And volunteers have proved that handicapped riding programs bring great therapeutic and esteem-building benefits.

Unfortunately, some horse abuse issues are linked to these recreational or sport uses of horses in the public eye. Animal welfare groups voice concerns over the early racing of Thoroughbreds and the use of illegal drugs and legal medications that allow injured or ill horses to continue to run. Cross-country and steeplechase events are viewed negatively by some who see the spectacular wrecks as dangerous. Fox hunting has become an emotional issue for some protesters, especially in Britain. City carriage horses come in for their share of criticism, too. Each of these groups must deal frankly with the abuses committed by some in their sports or professions, and they must continue to inform the public about their genuine care and concern for their horses. Professional rodeo has become very proactive in demonstrating the good care of its animals and educating the public. Professional rodeo also worked to ban horse tripping, a traditional *charreada*, or Mexican rodeo event, in which a galloping horse is roped by the front or hind legs.

The Horse Protection Act of 1970 prohibited the soring of show horses with irritating substance and devices, but these practices cannot be completely eliminated until the involved groups work harder at policing themselves. Heavy shoes, rattler chains, thick pads, longer show feet, and draw reins are also used on some show breeds. Although some of these training devices are used intelligently and properly, other riders who seek shortcuts can abuse their horses. Training can be intellectually challenging, progressive, and conditioning to the horse partner, or it can become relentlessly numbing to the horse's spirit.

Tail docking, nicking, or setting is still practiced in the United States. Tail docking and setting, which

were both originally practiced on European carriage and workhorses, is still used on such breeds as the American Saddlebred horse, Saddlebred pony, Hackney, American Shetland, and some draft breeds. To achieve a set tail, the lateral ventral sacrocaudal muscle is cut on each side of the tail with the use of a local anesthetic. The horse then wears a tail set with a crupper under the tail to keep the tail in position. While being shown, the horse's tail is tied or fixed in place with a small brace. Some western pleasure riders use a different, illegal tactic, injecting deadening agents into the tail to prevent undesirable movement. Docking or nicking tails has been illegal in Great Britain since 1949. It is also illegal to import a docked horse into Britain unless special permission is granted and the animal is to be used only for breeding.

Horse owners need to pay attention to animal welfare issues. Public perception of horse owners and those participating in sporting events needs to be positive, especially as trail riders battle to retain access to many areas and suburban horse owners fight encroaching development. Something that non-horse people do not understand is that horses often enjoy their work or competition. The anticipation of two-ton draft horse teams before their attempt at a pull, the attention-seeking behavior of some show horses, or the eager welcome of a horse to its rider proves this fact. Many horses enjoy their riding time, actively looking forward to physical exercise, attention, and learning new skills.

Not to be ignored are the large numbers of backyard horses who are thoroughly enjoyed and loved by their families. For this purpose, many of the rare horse breeds excel. Owners of many less-common breeds praise the good nature and level-headedness of their horses. Temperament is most important in working horse breeds or those that have been carefully bred in small numbers and not overproduced to supply a fad. Hardiness and soundness have not been abandoned for flash or a popular color. Yet the popularity of breeds can be based on fads or fashion, rather than authentic appraisal of abilities. As but one example, in North America the Paint horse, which is a color breed, is en-

joying the current flush of popularity formerly occupied by the Arab and the Appaloosa, both of which have seen their numbers plunge.

Some traditional breeds are disappearing with the widespread addition of outside blood. The Quarter horse and other stock breeds allow the liberal use of Thoroughbreds in their breeding programs, which has essentially created different types within one breed. Some European and American warmblood breeders, in their quest to develop perfect sport horses, have blended many breeds since the end of World War II. Warmbloods were originally created through crossing hot-blooded Thoroughbred or Arab horses with cold-blooded heavy draft or carriage horses. Specific warmblood associations have now stabilized appearance and ability to create breeds, although most still allow outside blood through inspection and/or performance. Although crossbreeding between breeds can produce an outstanding individual animal, if these horses are used for further breeding, they clearly dilute the genetic strengths and special characteristics of a specific breed. Neither color nor performance breeds should be confused with the genetic potential of pure, distinct breeds, which remain reservoirs of hardiness and abilities.

In the 1950s, it was believed that the Age of the Horse was long past. Although the numbers are now lower, the world population of horses is about 65 million at present. The countries with the largest populations of horses are Brazil, the United States, China, the multiple nations of the former USSR, Mexico, Argentina, Poland, Mongolia, and Ethiopia. There are an estimated 40 million asses worldwide. In North America, the Quarter horse association registers 114,000 horses annually, more than twice as many horses as the second most popular breeds, the Paint and the Thoroughbred. The Standardbred, Arabian, Appaloosa, and Tennessee Walker all register at least 10,000 horses annually. The Morgan, Saddlebred, and Half-Arab associations each register 3,000 to 4,000 foals yearly.

Instead of the predicted demise of the horse, there has been a dramatic renewal of interest in seemingly outdated uses such as draft horses, driving equines of all types, and the old art of dressage. The easy-gaited horses of the past are now treasured and gaining in

popularity. It is obvious that it is impossible to predict which breeds will become important in the future.

Perhaps equally unexpected, the breeding of saddle mules has eclipsed that of draft mules. Saddle mules are now bred specifically for certain uses by using different horse breeds: Arabs for endurance, gaited breeds for pleasure riding, saddle breeds for refined mules, stock mares for western mules. Finely bred mules are used in trail or endurance riding, western and English riding, driving, flat and chariot racing, dressage, gaming, racing, working cattle, and packing. Donkeys or burros are also used as guard animals in sheep or goat flocks, riding, and driving. The American Donkey and Mule Association promotes and registers donkeys, mules, and even zebra hybrids.

There are also renewed uses for old breeds, especially in dressage and driving. Older breeds such as the Cleveland Bay and Irish Draught can easily compete against the imported warmblood breeds from Europe. Many of the old pony or horse breeds are eminently suited for driving and harness. Sport horses can also be produced using the native breeds of Britain, Canada, and the United States.

## Breed Profiles

### *Akhal-Teke (pl. 95)*

The Akhal-Teke is directly descended from the ancient breed of horse known as the Turkoman. Before the first millennium, Indo-European immigrants moved south into the area of present-day Iran from the grasslands and deserts of old Turkestan, bringing their horses with them. Greek geographers who knew of their capital, Persis, later mistakenly called these peoples Persians. There were 30,000 horsemen in the cavalry of King Darius the Great in the sixth century B.C. At this time, the Arabs were still mounted on camels.

Under Darius III, the Persians were eventually defeated by the great Macedonian conqueror Alexander the Great in 333 B.C. Alexander and his horsemen were mounted on excellent fast horses obtained from Fergana, Turkestan. Alexander confiscated 50,000 Persian horses, some of which must have returned with him

to Macedonia because every ancient writer thereafter noted or praised the horses of the Persians.

After Alexander's empire faltered, the small kingdom of Parthia conquered a new Persian empire that would endure until the second century A.D. The nomadic Parthians were famed for their splendid horses. These horses were tall, strong, fast, and possessed of excellent endurance. People from many cultures desired to own these unique and exceptional horses. Emperor Wu Ti of the Han dynasty in China equipped two expeditions to Fergana around 100 B.C. on a mission to acquire these "heavenly horses." The Arabs obtained breeding stock from Persia during raids in the sixth century A.D. From the eighth to the eleventh centuries, the Baghdad guards were mounted on Turkoman *atti*. Turkoman horses were also bred in the Ottoman Empire in the thirteenth century. The European Crusaders no doubt returned home with some of these native horses. The horses from the Middle East achieved an almost mystical fame among the Europeans because their own horses were very different. Confusion began when many horses, Turkoman, Arab, and African Barb, were all called "Oriental." Later these three names—Turk, Arab, and Barb—were also used interchangeably.

In reality, many of the horses that made their way to Europe were Turkomans. The Russian czars had Turkoman stallions in their breeding stables by the fourteenth century. Soon afterward, the Turkoman was imported to western Europe and Britain, where they were used in breeding the English Thoroughbred. The famous Byerley Turk was probably a Turkoman horse. When the General Stud Book was first issued in 1793, 174 "foreign sires" were listed and described variously as Arabs, Barbs, Turks, and Persians. More Turkoman horses were brought to England during the years of British presence in Egypt and the Middle East.

The Akhal-Teke is the native Turkoman horse of the Teke tribe of Turkestan. *Akhal* means "pure," for these tribesmen kept oral pedigrees and carefully bred their horses. The stallions were tethered outside the home, pampered, hand fed alfalfa pellets, and wrapped in seven layers of felt to sweat off fat and insulate against the cold. The Tekes were relentless raiders of their

neighbors' cattle, horses, and slaves. Every Teke horseman was mounted on his swift, durable horse. The Tekes were also mercenaries for the Mongols, receiving payment for the heads of the khan's enemies.

The Russian Empire began a series of border skirmishes with the Turkmen in the eighteenth century in an effort to control the trade routes to the East. The Turkmen warriors bred their horses in great numbers for these running battles. Russia finally annexed Turkestan by 1881, after a major battle by the Teke cavalry against the Russians. The Teke fugitives fled into the desert and Iran, and Russian colonists moved into Turkestan.

The Akhal-Teke horses were no longer needed for warfare, and many were reduced to agricultural labor. Some proud owners preferred to turn their horses loose in the mountains to run feral, and other horses were sent out of the country. Some Akhal-Teke horses were gathered into collective stud farms, and the best were sent to Moscow. In Russia, the powerful genetic value of this ancient breed was used to improve native breeds or to produce warmblood cavalry horses. The Tersk Stud in the Caucasus was the center of crossbreeding efforts.

Racing grew in popularity, and the Akhal-Teke became the predominant racing breed in Turkmenistan, where horses were raced as young as a year old. The Akhal-Teke was also crossed with the Russian Thoroughbred to produce the Anglo-Teke for racing and cavalry purposes. Although the cross was fast over long distances, it was not as tall as the Thoroughbred or as distinctive as the Akhal-Teke. The efforts of the stud farms eventually returned to producing purebred horses for other purposes.

In 1935, in an effort to demonstrate the Akhal-Teke's value as a cavalry horse, 28 Turkmen riders on purebred Akhal-Teke, Yomud, and crossbred Anglo-Teke stallions rode 2,666 miles from Ashkhabad to Moscow in eighty-four days. The crossbred Anglo-Tekes did not fare as well, proving the value of the purebred horses. The Yomud, or Iomud, is another very old descendant of the Turkoman, bred by the Iomud tribe. The Yomud is less rangy and more solid in appearance than the Akhal-Teke.

During the push for farm mechanization in the 1930s, Joseph Stalin took the opportunity to subdue the culture of Turkestan. In an act of repression, large numbers of the honored Teke horses were slaughtered and eaten. In 1937, the Soviet government also tried to confiscate all horses from private individuals. Ownership of a horse was made punishable by death. Again in the 1950s, Nikita Khrushchev's efforts "to catch up and surpass the West" resulted in the slaughter of more horses to improve the Soviet Union's meat production statistics. To the Turkmen, this was a sacrilegious insult.

When the value of the purebred Akhal-Teke was finally recognized, many of the remaining quality horses from the Komsomol Stud in Ashkhabad, Turkmenistan, were sent to Moscow to be sold for export. Horses were sold into Italy, Britain, Germany, and France. By 1973, the numbers of purebred stock were dangerously small.

In 1991, after the Soviet Union disintegrated, the Republic of Turkmenistan declared its independence. Soon it was announced that a government ministry would control breeding and sales of the Akhal-Teke, although independent breeding farms remain in existence. Breeding is continuing at the Komsomol national stud farm. Turkmenistan is also trying to recover the control of the Akhal-Teke studbook, which was under central government control in Russia. With the political upheaval, food shortages, and economic troubles, the sale of horses to Western buyers has become very attractive. Although there have been periodic bans on exports, Turkmenistan held its first major auction in 1997. It is hoped that annual auctions will help to support the horse breeding industry. The Akhal-Teke has become a symbol of national pride in its homeland—depicted on the nation's seal, paper currency, and statuary. The annual holiday of the Turkmen horse is celebrated with racing and galas.

The Akhal-Teke remains a most unusual and striking horse. The Turkmen describe their traditional and ancient horse as "dry," meaning that they have little excess mass on their frame. The face is long, narrow, and dished. The breed has long ears for hearing in the desert. The hooded eyes are set wide apart and appear

almost slanted. The neck is long and set high. The legs are also long and lean, while the chest is narrow and the shoulders are set far forward on the chest. The croup is long and sloping, the body is long, and the withers are sharp. The skin is very thin, and the hair is short and fine. The narrow body and thin skin dissipate heat quickly. Like every other aspect of the breed, the stride is long and fluid, almost gliding in action.

Like the Arab, the Akhal-Teke is intelligent, sensitive, and people-oriented. Partnership rather than dominance is the key to working with this bold, alert horse. Many owners report that the Akhal-Teke is a one-person horse that takes time to bond with its owner or rider. Turkmen breeders believe that the reason the great horse Absent never repeated his first victory at the 1960 Olympics was that the Soviets thought the horse was a machine and that riders were interchangeable. Absent was assigned to different riders, but they never won his loyalty to the same extent as his original Olympic rider.

The Turkmen relished exotic colors such as the metallic, shining gold dun, bay, or chestnut as well as a silver-gray, cream, or gleaming black. Some horses also have a white stripe down the face and white feet or socks. This combination is especially striking on bay-colored horses. The mane, forelock, and tail are sparse and short. The Akhal-Teke stands 15 to 16 hands tall and weighs 900 to 1,000 pounds.

The speed and endurance of the Akhal-Teke is legendary. The Akhal-Teke was bred not as a short-distance runner like the Thoroughbred but for endurance. Endurance riding and three-day eventing come naturally to the breed. The Akhal-Teke does not look like the modern image of a warmblood, but it excels at many of its functions.

Occasionally, Akhal-Tekes have appeared in the West, generally as gifts to foreign leaders. Khrushchev gave Prince Philip of Great Britain an Akhal-Teke stallion in 1956. This horse, Mele-Kush, was a perfect example of the breed and iridescent gold in color. Prime Minister John Major of Great Britain also received a stallion named Maksat, who eventually came into the guardianship of an endurance rider named Lorna Winn. At present there are 14 purebred and

11 partbred Akhal-Tekes in Britain. The Akhal-Teke Society of Great Britain was formed in 1990 and is the official representative to the International Association of Akhal-Teke Breeding, based in Russia.

In 1978, Phil and Margot Case of Virginia purchased their first Akhal-Teke horses from Moscow and began an ambitious breeding program. More imports followed. In 1982, several more Akhal-Tekes were imported from Germany when the Sprandel brothers relocated their breeding program to Fort Collins, Colorado. The Akhal-Teke Association of America was founded in 1983 to register and promote purebred horses. The Sprandel farm held a dispersal sale in 1990, which increased the number of owners in the United States. In the 1990s, Dr. Tito Pontecorvo also imported 51 Akhal-Tekes from Russia. There are now more than 150 purebred Akhal-Tekes in the United States. New registrations in 1990 totaled 38.

The Akhal-Teke Sporthorse Registry was formed not to create a new breed but to record the accomplishments of crossbreds. American riders have readily accepted crosses with Thoroughbreds, Quarter horses, Morgans, and others because they appear more conventional.

It is estimated that the global population of the Akhal-Teke is about 2,000. In recent years, the population has increased significantly. In 1992, the official studbook in Russia recorded 144 registered stallions, 1,062 mares, and 836 foals. Many of these horses were at the Komsomol national stud farm in Turkmenistan. Akhal-Teke horses are bred in Russia primarily at the Tersk Stud near Pyatigorsk. Besides Great Britain and North America, small numbers of Akhal-Tekes are also found in Germany, Switzerland, Sweden, France, Italy, and Iran.

The Akhal-Teke faces the future with a history that stretches back thousands of years. At present, most of the European and Russian horses are being used in purebred breeding programs, but that could change with market demands. The concern over crossbreeding has been somewhat relieved since the Institute of Horsebreeding in Russia decided that only the presence of Thoroughbred blood before 1932 would be accepted as purebred. It could also become more difficult

to import horses from Turkmenistan in the future. The economic situation of the primary stud farm is uncertain and unstable because the Soviet Union formerly funded it. The veterinary care is rudimentary at best. The population in North America is now extremely valuable as a genetic source for the future and must be carefully preserved.



Critical

### *Caspian (pl. 96)*

The history and development of the modern horse remains difficult to decipher, and part of this story includes the mysterious origins of the Caspian horse. Clues are found in ancient records of small horses that resemble the modern Caspian horse. Artifacts from ancient Egypt and Mesopotamia depict small, refined horses, and there are many images of very small horses on stone carvings from ancient Persia. Three artifacts are especially famous. The earliest, the royal seal of King Darius the Great, dates to about 550 B.C. On this seal, two small horses are pulling the king's chariot as he proves his worthiness in a confrontation with a lion. Small horses are also seen in harness on a wall frieze in the palace of Persepolis, dating to about 500 B.C. Later, the investiture ceremony of King Yazdegerd III was depicted on a rock relief. The king is mounted on a proud charger, but his feet are nearly touching the ground.

In the sixth century A.D., Thomas of Gaza wrote about the small breed of horses to be found in the area of Kermanshah, where the bones of small, refined horses have actually been found. Thomas commented that the heads and ears of these local horses were not like those of other horses. The heads of the horses seen in the seal and the rock relief are also different. The forehead bulges and the area below dips to the nose, reminiscent of the fine desert Arab that would appear later.

After the seventh-century Muslim conquest of Persia, the small royal Persian horse was not seen again. The people of the Kermanshah region were driven out of their land, moving eastward over the high Elburz Mountains to the remote land bordering the southern Caspian Sea. The villagers used the small horses, called

Mouleki or Pouseki, both for riding and to pull farm carts. Small herds also ran feral in the mountains and were occasionally hunted for meat. The urbanization of Tehran and modernization of Iran in the twentieth century mainly affected the lives of the wealthy and educated citizens; in rural areas, many people still lived much like their ancestors.

In the late 1950s, an American woman at Cornell University married a fellow student who happened to be a member of an aristocratic Iranian family. Louise Firouz came to live in Tehran, where she and her husband opened a riding school for children. Looking for child-sized horses and hearing stories of the small horses to be found in the mountains near the Caspian Sea, Louise Firouz organized an expedition in 1965. In Amol, she found unkempt little workhorses loaded with parasites. Close examination revealed them to be nimble horses, not stocky, slow-moving ponies. They had large eyes on a protruding forehead, a dished face, and nostrils placed low on a small muzzle. Louise Firouz brought three horses back to Tehran.

In the next few years, she was able to locate about 50 of these small horses, which were called Caspians. She purchased 6 stallions and 7 mares to establish a breeding center in Norouzabad, Iran. With good management and food they did not become taller but rather revealed their true refinement. In 1970, the Royal Horse Society was organized to preserve and improve the native breeds of Iran. The society purchased the 23 horses in the breeding herd and continued to manage them at Norouzabad. Louise Firouz began a new private herd of Caspians based on stock taken from the wild.

The Caspians were also used at the children's riding school, where even the stallions proved to be extremely gentle and willing mounts that were sized properly for a small rider. Their tractability was universally admired. The Caspians proved to have the desirable "floating gaits" similar to an Arab, and they were animated and speedy. They enjoyed each other's company enormously even in mixed-sex groups. The Caspians also excelled at jumping and gymkhana games.

Since their discovery in 1965, small groups of Caspian horses have found their way out of Iran. A stallion

was imported to Virginia in 1966, surviving until 1993 but unfortunately never siring purebred offspring. In 1970, three Caspians were brought to Bermuda, where their owner organized a registry and bred Caspians. The first two offspring went to England in 1972, followed by the rest of the little herd to Europe three years later. Another two horses made their way to the United States and Canada, but neither had offspring. Their owners enjoyed them for many years mainly as little harness horses. One other Caspian went to Venezuela.

One group of Caspians came to England under special circumstances. When Prince Philip of Great Britain traveled to Iran in 1971 and visited the Firouz farm, he became enthusiastic about placing some of these unique horses out of the country for safekeeping. Three Caspians came to live in the queen's royal stables. Prince Philip enjoyed driving the Caspians, but they also were kept busy in the Riding for the Disabled Program and involved in a breeding program. The Caspian Pony Society fostered the careful breeding of the 26 Caspians that eventually came out of Iran to Europe. These 9 stallions and 17 mares represented nineteen bloodlines. Today there are about 300 Caspians in Britain.

These exports were fortuitous because the situation in Iran rapidly changed. By 1977, discontent had spread throughout Iran in opposition to the shah. The Firouz breeding farm was closed, and the Royal Horse Society declared a ban on Caspian exports and confiscated all the Caspians that could be located. Louise Firouz was allowed to keep one horse. The rest were placed in a national stud to be bred according to a single standard. The Firouz family was harassed and arrested repeatedly during the years of the revolution. The Iran-Iraq War also disrupted the countryside.

Eventually, Louise Firouz was able to establish yet another breeding center near the Turkmenistan border. She gathered a few horses from the wild and purchased others from the Revolutionary Guard. By 1992, in Iran there were an additional 38 Caspians listed in the International Caspian Stud Book.

That same year, there were 112 mares and 30 stallions in Europe, mostly in England. For eight months, 3 stallions and 4 mares traveled a circuitous route

through the Azeri-Armenian war zone and Russia, finally making their way from Belarus to England in 1994. The government purchased Louise Firouz's horses, but she remains involved with Caspian research.

In 1994, a small group of Caspians from Australia was imported to the Monastery of St. Clare in Brenham, Texas. The monastery had bred miniature horses for many years as a source of income. The Caspians were first imported to improve the monastery's miniatures, but the monastery became involved in organizing Caspian breeding through a partnership corporation called ProtoArabian Horses. This breeding program is now known as Texana Farms. American breeders have also imported large numbers of British and Australian young stock to add to the available breeding lines. Felix and Joyce Covington of MCC Farms in Brenham, Texas, now own 121 Caspians, which is the largest breeding group. By 1996, the population numbered 54 but had grown to about 231 by 2001; of these, 127 were North American-bred and 104 were imported. The Caspian Horse Society of the Americas maintains a pure and partbred registry. Blood typing and microchip implantation are required.

An International Caspian Society has also been formed to coordinate registrations and promote purebred breeding through the International Caspian Stud Book. Caspians are now found in the United Kingdom, Iran, the United States, Canada, Belgium, France, Australia, New Zealand, Venezuela, and Japan.

Meanwhile, there has been much scientific study of the Caspian horse. As part of his extensive blood-typing project, Professor Gus Cothran was able to test 70 Caspians outside Iran and another 41 in Iran. He has determined that the Caspian is a unique population and may be ancestral to the Arabian horse. The Caspian also possesses several unique traits: its hoof is oval-shaped much like the donkey, its scapula, the large bone of the sloping shoulder, is shaped differently than other breeds, and the thoracic vertebrae of the withers are longer than other horses. Caspians also have an extra molar in their upper jaw.

The Caspian is a lovely and unusual horse. Foals

clearly show the distinctively vaulted forehead called the *jibbah* and the dished face known as the *afnas*. The large nostrils are placed very low on the tapered muzzle, the eyes are prominent and widely spaced, the ears are very small, and the neck is long. The skin is thin and fine like the Akhal-Teke or the Arab. Caspians generally measure between 10 and 12 hands, but the body is slim, not cobby like a pony. Angled hocks give the Caspian its rapid acceleration and jumping prowess. Caspians mature quickly and reach nearly their adult height in the first six months.

Caspians are usually chestnut, bay, gray, or roan in color, often with small white markings. Black or cream is more rare. Caspians are not piebald or Appaloosa patterned.

Some authorities suggest that the Caspian is the proto-Arab or the original small, refined desert horse known as Type 4. Others believe that the Caspian is the remnant of the small, hot-blooded horse of three thousand years ago. Whatever its history, the Caspian is also a delightful horse, well suited for both child riders and harness work. Small Caspian stallions are also crossed on miniature horses to encourage refinement. In Europe, Caspians have been crossed on Arabs, Thoroughbreds, and Welsh ponies to produce small, refined offspring.

The Caspian deserves careful stewardship to preserve its small genetic pool. The worldwide population is approximately 650 horses. The situation in the Caspian's native land will remain uncertain at best in the near future, and at present exports are banned. The populations in Europe, Australia, New Zealand, and North America should be treasured.



Critical

### *Friesian (pl. 97)*

Once at the brink of extinction, this distinctive and dramatic horse recently finished seventh in an American popularity poll among forty-two breeds, ahead of the Tennessee Walker and American Saddlebred. Beloved in its native Holland, the Friesian's comeback has been

carefully guided by a highly disciplined breeding organization.

The Friesian is an ancient breed. In the first century A.D., when the Romans made their way to the northern seacoast of what would later become Holland and Germany, they found the area long settled by Germanic seafaring people who spoke Frisian, a language closer to English than Dutch. As protection from flooding, the Frisians created *terps*, or mounds, and built their villages on the top. The Romans recognized the value of the large, powerful horses found in this frontier territory and incorporated them into their armies. Some of these horses are believed to have made their way to Britain with the Romans and their Frisian workers. The ancestor of this black Friesian horse is not known, but it has been suggested that they descend from the primitive Forest horse of Europe.

The Friesian horse was well known throughout the Middle Ages, when it was in great demand by European rulers eager to improve the size and substance of their warhorses. Many references are made to the "great horse," Frisian, or Dutch horse. The breed had a major impact on the horses in many countries.

In Friesland, monasteries bred and refined the Friesian horse. For a time during the fifteenth and sixteenth centuries, first Austria and then Spain controlled the Low Countries. Although the Spaniards were driven out of the region in 1568, Andalusian horses were used in Friesian breeding, giving the breed a lighter frame, a higher knee action, and a smaller head on an upstanding neck. The Friesian then became a desirable coach horse throughout much of Europe. The courts of France, Austria, and Prussia all possessed Friesians. The classical riding schools of Spain and France also used the Friesian. Friesians often performed in circuses.

In the Netherlands, the Friesian was very important as an agricultural worker, a saddle horse, and a harness trotter. In the sixteenth century, William I of Orange started the first trotting races, awarding the winners gold or silver whips as prizes. Friesians also served as funeral horses and pulled the traditional *sjees*, which was a cart with two large wheels drawn by one or two

horses. The driver sat on the left with his lady on the right. Costumed *sjees* events are still popular in the Netherlands, as are contests and quadrilles. Friesians also pull four-in-hand carriages and sleighs in winter.

The Friesian studbook was founded in 1879, when the breed was first threatened by extensive crossbreeding to develop coach horses. The first studbook entered only horses with one hundred years' purity of breeding. Fortunately, the breed had avoided the ubiquitous introduction of the Thoroughbred and Arab. The Friesian had influences of its own on many other breeds including the Fell pony, Dales pony, Old English Black, Orlov Trotter, Oldenburg, Norfolk Trotter, and perhaps even the Morgan in faraway America. The current breed society was established in 1913.

Mechanization gradually reduced the need for coach horses, and eventually the Dutch farmers abandoned their long practice of using the Friesian in pasture maintenance chores. After the devastation of World War I, there were only three qualified stallions and a small number of mares to be found in Friesland. The breed was not in existence elsewhere, having been absorbed into the improvement of other breeds. In the mid-1960s, when there were about 500 Friesians, a band of dedicated owners came together to inspire the nation to save Holland's only native horse breed. The resulting renaissance has been nothing short of astounding, with an estimated global population of almost 6,000 horses.

Even with the rapid increase in numbers, the traits and character of the Friesian have been preserved through the strict breeding guidelines of the Royal Society Het Friesch Paarden-Stamboek, which is managed by the Dutch government. The studbook is completely closed. When a foal is born it is entered in the foal book and a registration number is tattooed under its tongue. At the age of three, mares are again inspected and branded with an *F* on the left side of neck if accepted. Excellent-quality mares may also receive a *Ster* rating, exceptional mares a *Model* rating, and only if she produces superior foals is she given a *Preferent* designation. Only qualified stallions are permitted to breed, generally numbering less than 1 percent of the

male colts that are born. Stallions must come from a Ster or Model mare, meet strict pedigree and conformation requirements, and undergo testing of disposition, training, and performance. If they qualify, they receive the *F* brand. After some years of breeding, stallions are checked again by examining their offspring. A less than desirable rating will result in disqualification. The use of Friesians in crossbreeding is strongly discouraged.

The Friesian is a truly black horse, and only a small white star on the forehead is permissible. A few gray or white hairs are allowed on the lips. No white markings on the legs are allowed even in the pedigrees of qualified stallions. Indeed, the horses look so much alike that breeders remark that they tell them apart by their personalities. In the past, it is known that gray and bay-colored horses occurred, and King Henry VIII of England owned a bay Friesian. However, black has been the only acceptable color for a long time. The exceptionally long, heavy mane and tail are never trimmed, nor are the feathers on the fetlocks.

Stallions and mares have specific height requirements depending on their classification. The average height is 16 hands, and the weight varies between 1,250 to 1,450 pounds. Horses cannot be too small or too tall in order to maintain the true Friesian character.

The upstanding neck gives the horse a noble bearing and the illusion of greater height. The head is noble but not heavy, and the tips of the small ears point slightly inward. The long neck continues into the withers. The back should not be too long, and the barrel is well rounded. The legs are strong and sturdy in appearance. The animated, high-stepping gait is completely natural, and the Friesian trot is active and fast. Individual horses are more suited toward either harness or riding. The Friesian is also renowned for its gentle and willing disposition.

The Friesian made its appearance early in the New World colonization. Dutch settlers began arriving in New Amsterdam in the 1630s. The authorities encouraged the colonists to settle along the Hudson River, away from Manhattan Island. The Friesian was probably part of the colonization effort but was largely lost through crossbreeding. The Friesian influence may have continued longer in New England, where

“Dutch” horses were often mentioned. Friesian blood may have figured in the Morgan breed.

Friesians were not reimported until 1974, but their new admirers enthusiastically embraced them. By 1990, the ALBC estimated that 60 foals were registered each year, and the national population is now more than 1,000 horses. Part of the explosion of interest in the Friesian has been due to its distinctive appearance and roles in several motion pictures such as *Ladyhawke* (1985). Friesians are shown in hand and used for driving, performances, competitions, and dressage. The Friesian Horse Association of North America is a protectorate of the Royal Society in the Netherlands. Registered Friesians in North America are subject to the same strict breeding guidelines by Dutch inspectors who travel to inspect the horses yearly. There are about a dozen approved Friesian stallions in North America.

Back in its native land, the Friesian is a cherished part of Dutch culture and deeply appreciated. Members of the official breed organizations are concerned about the use of Friesians for crossbreeding, because the successful preservation of the breed was accomplished through the adherence to strict standards. This loyalty to the traditional Friesian has made it possible for the world to delight again at the sight of these elegant and majestic horses.



Watch

### *Exmoor (pl. 98)*

The riddle of horse evolution is certainly not solved, and future paleontological or genetic evidence will shed more light on the subject, but some facts are known and relevant to the story of the Exmoor pony. A pony-type equine did exist in Alaska some 100,000 years ago with the same highly unusual jaw development of the Exmoor pony and no other living horse breed. In the Mendip Hills, not far east of Exmoor, more bones have been found dating to 60,000 B.C., and they, too, resemble the Exmoor. In addition, the Exmoor possesses an unusual and primitive blood type not at all related to the Arab or breeds influenced by eastern blood. Most

[To view this image, refer to the print version of this title.]

visibly, the Exmoor carries the primitive coloration also seen in Przewalski's horse.

Was the ancestor of the Exmoor present in Britain before human settlement, or was it brought to Britain with the Celts or earlier Neolithic immigrants? Sue Baker, author of *Survival of the Fittest*, the story of the Exmoor, argues that the Exmoor is not only the oldest pure native breed of pony in Britain but perhaps even a separate race. The mystery will not be solved soon, but this much is certain—the Exmoor is the living representative of the more primitive past of the horse and as such should be cherished (fig. 53).

During the era of Norman conquest, the open moorland of Exmoor became a royal forest. The ponies likely ran in the protected forest throughout the next eight hundred years, for the Exmoor was widely recognized there and elsewhere. The Exmoor was also a working pony and figured in the pedigrees of some of the early English Thoroughbreds.

The detailed history of the Exmoor began in 1818, when the royal forest was sold to an industrialist named John Knight. The last warden of the forest, Sir Thomas Acland, failed in his attempt to obtain the forest but

Fig. 53 Free-roaming ponies on Exmoor blend in with their native moorland. Photograph by Marlyn Exmoors. Courtesy of the Canadian Mountain and Moorland Society.

did remove a large breeding group of the Exmoors to his property at Winsford Hill. Sir Thomas was dedicated to breeding the pure Exmoor and inspired many of the farmers who worked for him in Withypool and Hawkridge to buy more Exmoors at the dispersal sale. Their stock was turned loose on the common moorland, which marked the beginning of the husbandry system that has continued into the present. The ponies are owned privately but are free to roam on the moor in large enclosures except for the once-a-year gathering.

John Knight had also purchased about 30 Exmoor ponies when he bought the forest. Knight and a few friends decided to “improve” the Exmoor. Knight crossed several Exmoor mares on a Dongola Arab stallion, but the resultant crossbreds were never able to survive on the harsh moors.

Fortunately, Sir Thomas's Exmoors were preserved through the years. The herd acquired the name of Anchor, and the ponies were branded with that symbol.

The herd passed into the hands of Frank Green and remained in his family down through the present owner, Mrs. R. Wallace. The herd is still found on Winsford Hill and Ashway Side. Four other herds have continued intact: Herd 23 on Withypool Common, Herd 12 on Codsend, Herd 44, and Herd 10.

Although breeders had been keeping their own records since the 1820s, formal recording began with the studbook of the National Pony Society. The Exmoor Pony Society itself was not formed until 1921. By the end of World War II, economic conditions and the slaughter market had hurt the Exmoor. Exmoor numbers were dangerously low, with only some 50 ponies and three stallion lines. Between 1945 and 1961, the studbook was opened to previously unregistered ponies if they passed an inspection.

The dedicated members of the Exmoor Pony Society are responsible for the breed's survival. Important new herds were started, and the RBST lent its support. The Exmoor National Park has also established two conservation herds. By the early 1980s, publicity had brought the Exmoor national and international attention.

On Exmoor, the foals are usually born in April or May. The ponies live on their own in small groups except for the annual gathering in October. Surprisingly, the Exmoors trot right down the lanes to their home farms after the roundup, where society inspectors examine the foals, or suckers. Only foals from purebred parents are eligible. If accepted, they are branded with the society's star, their individual number, and their herd number, which all serve as permanent identification because the ponies look so much alike.

Prospective buyers also attend the inspection. To prevent the possibility of Exmoors ending up on the meat market, most sales of registered foals, unregistered foals, and surplus mares are made privately. The breeding stock is then returned to the moor. Two-year-old colts must be inspected again and pass a health exam to be licensed as a stallion.

The inspectors are looking for true Exmoor type, good conformation, and a good mouth. The forehead is wide, and the ears are short. The head is slightly larger,

to allow for the longer nasal passages that warm cold air. The deep jaw provides room for the large, long-rooted molars. There is a thick, raised fleshy pad over each eye that forms a hood over the prominent eye itself. This unique trait is known as "toad" eye, and it protects the Exmoor's eyes from harsh weather. The Exmoor has good pony conformation with strong legs and feet. Stallions and geldings may be as tall as 12.3 hands and mares 12.2 hands. Some observers believe that Exmoors away from their moor are growing taller.

Exmoors are colored bay, brown, or dun with black points. There is mealy or pale color on the muzzle, around the eyes (known as the *cingle*), and on the insides of the flanks and belly. White hair or white soles on the feet are unacceptable. In winter, the Exmoor grows a long overcoat to protect itself from cold rain and a downy undercoat to keep itself warm. The short, stiff hairs at the top of the dock form a bushy "ice tail." The forelock and mane are heavy.

The Exmoor was used as a pack animal and by farmers for herding sheep. More recently, owners have successfully shown the Exmoor as a riding and driving pony. The ponies exhibit a comfortable long, low action, and as trekking ponies they are strong enough to carry adults.

In recent years, the numbers of ponies away from the moor have been increasing as more ponies have found homes "upcountry" or have been exported. Exmoor foals settle down with gentle handling, but they are intelligent and demand considerate training. Exmoor herds have also been established on several nature reserves and National Trust lands because they actually help manage the moor by eating winter gorse, rushes, and other plants. Exmoors have found new homes in Belgium, Denmark, the Falkland Islands, Sweden, Germany, Canada, and the United States.

In the 1950s, Exmoors were imported to Canada, and there was a small burst of popularity, but the population rapidly declined. In California, Melissa Coyner imported a small breeding herd beginning in 1980, and she formed the first American registry under the aegis of the ALBC in 1987. Following more imports, by 1999, there were 50 Exmoors in North America. In

1993, breeder Anne Holmes, who owned 18 Exmoors, formed the Canadian Mountain and Moorland Society as a registry for both Exmoor and Dales ponies. Following the society's dissolution in 2000, owners can register Exmoors with the Canadian Livestock Records Corporation or the New England Heritage Breeds Conservancy, which will hold papers while breed enthusiasts explore the option of establishing a new breed registry.

Because some authorities believe that the Exmoor loses type away from the moor, the native home of the breed must be preserved as a reservoir for the ponies' survival. The breed's right to this homeland was threatened when the moor itself was declared an environmentally sensitive area. Although farmers are encouraged to remove their domestic stock from the moor in winter, the Exmoor ponies are still permitted to remain because they serve an ecological function and have lived on the moor for thousands of years. The Exmoor pony is fully capable of living outdoors without shelter or additional food and water on the moor. This hardiness and self-sufficiency is legendary.

The society does encourage a significant population away from the moors as a form of insurance against natural disaster. A greater market for the ponies would encourage the farmers and breeders to continue to breed Exmoors. Blood-typing studies should assist the planning of breeding strategies. Three strains are identifiable in the Exmoor, with the Anchor herd remaining central to the whole breed. Herd 12 is also extremely pure, and the Withypool Exmoors seem to be a stronger type.

The worldwide population of the Exmoor is about 800, but there are only about 250 breeding mares and 40 stallions. About 100 of the purebred mares are free on Exmoor in such areas as Withypool, Winsford Hill, Waren Farm, Molland, Brendon Common, and Haddon Hill. These ponies hold great genetic value, unavailable anywhere else in the world. They are also a British national treasure and a true link with the past.

 Critical  Rare  Endangered

### *Eriskay (pl. 99)*

The original Highland pony type may have been present in the Scottish Highlands since the end of the last Ice Age. The Highland ponies worked on the croft, carried loads on the hills, and served as the riding horse for grown men. By the early sixteenth century, heavy draft horses were crossed on the ponies to increase their size. Some time later, Arab blood was introduced to refine the Highland pony.

Breeders began to keep pedigree records in 1896. Although the breed society acknowledged the existence of different regional types or varieties, it chose not to register these animals under separate sections, as the Welsh Pony and Cob Society did. This resulted in a great deal of crossbreeding, so that the distinct regional subtypes have mainly been lost, except in one far corner of Scotland, where a smaller, finer Western Isles pony remained.

On the Island of Eriskay in the Hebrides, the crofters continued to use their traditional pony. Eriskay is about 20,000 acres in size with a population of about 200. Although the Western Isles ponies differed from those of the mainland, they also differed among themselves, for until the nineteenth century, the islands were quite isolated by the sea. On Eriskay itself the ponies worked the farms and carried many loads of peat, seaweed, and fish in their panniers. They were also ridden by the islanders. Raised in such long and close association with people, they became uncommonly fond of their owners and were often called "viceless."

The ponies also developed distinctive characteristics. Although most Eriskay foals are born dark, they usually lighten with age to shades of near white or cream to rose, iron, or flea-bitten gray, although some adults remain black or bay in color. The winter coat grows in thick, but it is not shaggy. The head is pony-like, and the body is well-built. Eriskay ponies range from 12 to 13.2 hands in height and are extremely easy keepers.

In the late 1960s, a physician on neighboring Barra Island became aware of the few surviving Eriskay ponies. A small group of islanders soon came together

to preserve the remnants of the native pony, and a breed society was established in 1972. Unfortunately, fewer than 20 mares were located. After a considerable search, a stallion of the Eriskay type was found to the east on the Island of Rhum, which the Nature Conservancy Council owns. An Eriskay mare also delivered a colt that was used in the breeding program. The Eriskay Pony Society was able to monitor the preservation effort and reestablish the ponies. They continue to urge slow but steady progress, as opposed to a rapid increase in the population by the use of outside ponies.

Currently, there are about 100 mares in the population of 300 registered ponies, and 18 foals were registered in 1997. The Eriskay is now found beyond the island on the mainland of Scotland, Kent, and Cornwall. The society sponsors an annual show that displays the many talents of the breed, such as driving, jumping, gymkhana, and pleasure riding. The society advocates that the ponies be shown in their natural state.

Some Highland Pony enthusiasts believe that the Eriskay is not a separate breed, and they have resisted the efforts to define the Eriskay breed apart from the Highland. In addition, the Eriskay Pony Breed Society now maintains a different studbook on the mainland.

The Eriskay remains a docile, willing worker. Eriskays are long-lived, attractive, and most useful ponies. The Eriskay Pony Society has achieved recognition of their breed and made progress toward insuring their future. That such an ancient isolated pony survives is a lovely sight indeed.



Critical

### *Fell (pl. 100)*

When the early Celtic peoples came to Britain, they probably brought their sturdy little ponies with them. These hardy ponies were soon widespread in England, Scotland, and Wales. Divided by geographical features and selected for different needs, the ponies evolved separately. They were essential for farm work and riding. They could also pull a small cart, pack lead and iron ore, and carry game for hunters.

The rugged and massive Pennine Mountains divide northern England right down the middle. To the east

are Northumberland, Durham, and Yorkshire. To the west is the hauntingly beautiful Lake District in Cumbria. The Romans came this far north in their conquest of Britain, building Hadrian's Wall in A.D. 120 to keep the Scottish "barbarians" at bay. About 600 men from Friesland are believed to have worked on this wall, leaving almost 1,000 Friesian horses behind in northern England when they left. In the tenth century, the Vikings controlled the Lakeland, bringing words like *fell* and *dale* for hill and valley. Later, the infamous Scottish border raiders swept through this area mounted on swift Galloway horses, which are now extinct.

From these many contributions the Fell pony was bred. The Fell has a highly distinctive appearance and action. The Fell also breeds very true to type. The old Friesian influence is still visible, especially in the strong knee and hock action at the trot along with the silky feathers flying. Most Fell ponies are colored black or dark brown, but there are a few bays and grays. White markings are minimal, with only a little white star or a touch of white on the heel allowed, although discouraged, by the Fell Pony Society. The mane and tail are luxurious and shown unbraided and unclipped.

By the thirteenth century, the Fell pony and its close relative the Dales pony were used extensively as pack ponies to carry heavy basket loads of lead, coal, and iron ore from the Pennine mines to the coast. They also carried loads as far as London. The Fell was an important worker on the hill farm, where sheep farmers used their ponies to herd their flocks. The Fell was also a fast walker and a snappy trotter. In the desire for greater speed in the late eighteenth century, the popular Norfolk and Yorkshire Roadsters were crossed on the Fell. The early Hackney pony breeders also made use of the Fell.

During the years of livestock improvement, Fell breeders did not attempt to change their ponies very much. A Welsh stallion was used for breeding in the Lake District for a time, and a few farmers crossed their ponies on the Clydesdale. Despite these experiments, the distinctive Fell character remained in the breed, and it remained free of the pervasive Arab influence.

When the railroads ended the need for packhorses, the demand for ponies dropped. Concern eventually

grew that crossbreeding was threatening the purebred Fell. Although the ponies were registered by the National Pony Society, the Fell pony breeders desired stricter rules for registration. The Fell Pony Committee was founded in 1912, becoming the Fell Pony Society two years later. The years between the two world wars were the breed's low point. The interest of Beatrix Potter and King George V did help support the Fell breed. The Fell remained in the royal stables as a favorite driving pony of the young Princess Elizabeth and later her husband, the duke of Edinburgh. Large shipments of British ponies and horses were sent to Europe for horsemeat after World War II, and farm mechanization further eroded the place of the hill farm pony.

In response, the native pony breeders began to promote their charges more aggressively. Ponies remained a favorite of sports hunters for packing out their game, but they found a new mission with the growing popularity of pony trekking. The Fell is an excellent pony for both child and adult riders, comfortable and surefooted on the trail. They have also found success in hunter and jumper classes. Easy to match in teams, the Fell is a natural, energetic, and flashy harness pony.

Although the Fell and the Dales are closely related, there are specific differences between the breeds. The Fell is slightly shorter, with a height limit of 14 hands, while 13.2 hands is ideal. The Fell's sloping shoulder is more suited for riding and its neck is slightly longer than the Dales. The two breeds are moving farther apart as breeders concentrate on their special qualities.

The Fell pony has strong and large bones. The heavily feathered fetlocks cover hard, sound feet and hooves. The typical round hoof is blue-black in color. The head is attractive, broad across the forehead, with small ears, large nostrils, and no coarseness. The tail and mane are not trimmed.

The Fell pony has been described as "black as pitch and hard as nails." Colors other than black are accepted and even promoted to help maintain a genetically healthy herd. The Fell certainly retains its excellent stamina. It is strong enough to carry an adult with ease and, when crossed with a Thoroughbred mare, produces a good hunter.

All Fell breeders are concerned with Fell foal syn-

drome, an immune deficiency disease that is believed to be the expression of a recessive allele. One copy of this allele makes the Fell a carrier, but two copies cause a failure to thrive in which common infections become fatal. Foals with this syndrome often exhibit muscular weakness, lethargy, anemia, and unexpected death. This syndrome was identified in 1995, and a test is not yet available to identify carriers; breeders need to grapple with the implications of managing this recessive gene and working toward its elimination from the breeding population.

At one point, only about 400 breeding ponies survived, and the group of breeding stallions was very small. A number of ponies were also registered in both the Dales and the Fell studbooks. Fell numbers have increased, and the society registers some 300 foals yearly. The society's strict rules remain in force, such as the inspection of stallions after age two in order to be licensed for breeding. The global population is now estimated at 6,000, found mainly in Britain. The breed's RBST priority rating has dropped from minority to vulnerable. Fell ponies are also found in France, Germany, the Netherlands, Australia, and North America.

Fell ponies have run loose in the Lake District for centuries. The numbers of these semiferrous ponies have decreased in recent years, but they are still to be found in isolated areas away from the tourists. They are rounded up once a year, the surplus is sold, and the best stock is returned to the free-running herd. Some hill farmers still keep their ponies in the old way as well, turned loose on the fells. There are about 200 registered Fell ponies on the open fells, mainly in Cumbria.

A small group of Fell breeding stock was imported to Florida in 1988, and 3 more Fells were brought to Colorado a few years later. By 2000 there were almost 50 Fell ponies in North America. Purebred Fells may be registered with the British Fell Pony Society. The Fell Pony Conservancy of North America has recently been organized. It will remain important for the Fell owners in North America to maintain good communication among one another to foster intelligent use of their limited gene pool.



Vulnerable

### *Dales (pl. 101)*

The Dales pony and the Fell pony share common ancestors. These Pennine ponies carried the blood of Celtic, Highland, and Friesian stock. They performed much of the same work on the hill farms and as pack ponies, but the Dales received a somewhat different set of outside infusions and was bred toward a slightly different purpose. The Dales pony earned its title as the Great Allrounder.

The original job of the Dales was as a pack pony. Large strings of untethered ponies followed each other over the rugged trails of the Pennines and moors, carrying iron, lead, and coal or other items of trade. The ponies had to be exceedingly strong, surefooted, and possessed of great endurance, for they were loaded with over 200 pounds on their journeys to the northeast coastal cities in Tyne and Wear. Eventually the railroads put an end to the pack trains, but fortunately, the Dales had other valuable work to perform.

The Dalesmen had improved their ponies with the Galloway from southern Scotland during the seventeenth century. The Galloway was a fast, strong, and desirable horse. For a time, the pony was even called the Dale Galloway. The Dales pony became the primary provider of power for the hill farmer: rounding up sheep, haying, hunting a little, and pulling the gig to town. As the demand for good trotting ponies increased in the eighteenth century, farmers bred their Dales to Norfolk or Yorkshire Trotters. The Dales began to display a flashy, high-stepping, fast trot.

Toward the end of the nineteenth century, Christopher Wilson created the Hackney pony by adding Yorkshire or Norfolk Roadster and Fell pony to the Hackney horse. These "Wilson" ponies were also bred to the Dales, possibly contributing more to its harness appeal. At the same time, other Dalesmen were adding Clydesdale size and strength to the Dales pony, and criticism began to be heard that the Dales was becoming predominately Clyde. Welsh Cob was also added to the Dales mix.

The Dales Improvement Society was organized in 1916, but some breeders wanted to continue increasing size while others disagreed. World War II hit the

Dales very hard, because the small, compact drafter was ideal for pulling artillery and supplies. Ponies that were not killed in the war were left behind and slaughtered. Mechanization further threatened the ponies at home and still more were sent to Europe's meat markets. The Dales pony had fallen on very hard times. In 1955, only 4 Dales ponies were registered.

The society became more active in 1963. It dropped the word "improvement" from its name and began to search for unregistered Dales pony mares remaining in the country. If the ponies passed an inspection for correct color, height, and type, they were placed in the registry and their offspring could eventually be upgraded. Stallions had to be of pure breeding. Ponies who grew over 14.2 hands tall or displayed incorrect markings were not allowed full status in the studbook. A white star or snip and white on the hind fetlocks was allowed, but more was seen as an indication of excessive Clydesdale influence. The studbook was closed in 1971.

The Dales is usually black in color, but brown, bay, gray, and more rarely roan are all permissible. It is felt that gray coloring may come from the ponies bred in the Yorkshire abbeys. The feet are well feathered, and the mane and tail are long and thick. The Dales pony resembles a small draft horse with strong shoulders, and there is great power in the hindquarters and hocks. The neck is well arched and muscular. The head is carried high but is ponylike, wide between the eyes, with a fine muzzle and small ears. The legs, feet, and hooves are solid, but the Dales displays an animated way of going.

The Dales has found great success as a harness pony. As a riding pony the Dales is sensible and can easily carry adults. The Dales remains an excellent farm worker and is also used in logging, where its small size and great strength are nearly ideal.

The Dales pony has steadily, if slowly, increased its numbers. In 1988, there were fewer than 200 breeding mares. The global population is now about 600. Fortunately, many of the mares are actively used in breeding. The Dales has remained based in northern England but is spreading through the United Kingdom. Dales stallions are used on Thoroughbred or hunter-type mares with great success, but cross-breeding from the small

population of Dales mares is discouraged. The society maintains a partbred register as well.

There are a few Dales in France and Germany, but the largest population outside Britain is in North America. Denise Dunkley of Ontario imported a breeding group of 12 Dales in 1991. They have been fruitful, and the Dales is slowly spreading in Canada and the United States, numbering almost 70 in 2000. The Dales Pony Society of America was organized in 1999 to encourage the breeding of Dales partbred ponies according to British breed standards. The American society is recognized and sanctioned by the Dales Pony Society in the United Kingdom.

Dales owners report that their ponies are full of verve and heart. The Dales should increase their presence in the future, for they are admirably suited to many popular activities. The Dales remains The Great All-rounder.

 Rare  Vulnerable

### *Dartmoor (pl. 102)*

The Dartmoor was bred primarily as a pit and tin ore pack pony. In 1994, when the last pit ponies were released from their underground labors in Britain, a Dartmoor was still among them. Dartmoors have found another calling, however, as lovely and suitable children's riding ponies.

In England's far western peninsula, ponies have roamed Dartmoor and Exmoor since ancient times, yet these two neighboring breeds are very different today. Dartmoor is broad and sweeping, with bare high granite rocks and treacherous swamps. The hardy ponies fended for themselves year-round on the moor. As early as A.D. 1012, the Saxon bishop Awifwold or Aelfwold of Crediton mentioned the Dartmoor ponies in his will. When Dartmoor became a royal forest, King Henry I obtained a Dartmoor stallion to breed to his mares. The Dartmoor ponies were used for sheepherding and general farm work, but their primary use was as pack ponies carrying tin from the mines. Ponies were turned loose much of the year to run on the moors. Two extinct breeds, the Old Devon packhorse and the Cornish

Goonhilly pony, were also native to the area and may have links to the old Dartmoor pony.

In 1820, the agricultural writer William Youatt noted that the Dartmoor ponies were surefooted, hardy, and popular, if even more unattractive than the Exmoor. When Dartmoor Prison was built early in the nineteenth century, the warders began to raise Dartmoor ponies as riding mounts for supervising the prisoners at their work. The guards continued to ride Dartmoors until the early 1960s.

With the nineteenth-century penchant for "improvement," Dartmoor ponies were crossbred with various Roadsters and Welsh ponies. The first attempt to define the various breeds of native ponies was made in 1898 by the organization that would become the National Pony Society. This work was initially an effort to encourage the breeding of native polo ponies through the use of Arab and Thoroughbred crossings. Local committees were established for some of the native pony breeds in Britain, and the description the Dartmoor committee wrote remains strikingly similar to the modern breed.

Further refinement was around the corner, however, despite the attempt by the committee to forbid registration of ponies with more than 25 percent outside blood. After World War I, Shetland pony stallions were brought in to create a supply of pit ponies for work in the mines. Many of these crossbred ponies were turned loose to graze on the moors. Around the same time, the Prince of Wales purchased Dartmoors for use in his breeding program at the Duchy Stud. A small desert-bred Arab stallion named Dwarka was used on the Dartmoor, producing two ponies that would greatly influence the Dartmoor breed. The Arab-Dartmoor crossbred stallion The Leat stood 12.2 hands and was described as magnificent. So great was his influence that The Leat is found in the pedigrees of most modern Dartmoors. Another Arab-cross horse, a mare named Heatherbelle VI, was also an asset to the development of the Dartmoor. Interest grew in breeding and showing the Dartmoor, and the official breed society was formed in 1924.

World War II seriously depleted the Dartmoor pony population, and the number of registered ponies fell

very low. To increase registrations, ponies were accepted either by inspection or by winning at selected shows until 1957, when the studbook was closed. The growing national attention drawn to the native British ponies increased the popularity of the Dartmoor, which was now seen outside of southwestern England. The Dartmoor Pony Society was reorganized, and the upgrading registry was reopened in the 1960s. Fortunately, registrations and exports continued to grow.

The breed standard was rewritten in 1982, with the height limit set at 12.2 hands. William Youatt would probably have a more favorable opinion of the Dartmoor today. Although sturdy, the Dartmoor is not coarse but refined in appearance. The Dartmoor's head is small, as are the ears, which used to be measured by fitting them into a man's hand. The forelock, mane, and tail are full and flowing. The Dartmoor has well-sloped shoulders and a low, straight, free-flowing movement, as opposed to the high knee action of many other pony breeds. Bay, brown, and black are the most common colors, but gray, chestnut, and roan are permissible. Small white markings on the head or legs are allowed, but piebald or skewbald markings are unacceptable.

The Dartmoor's conformation and way of going reflects its use as an excellent riding and jumping mount, although it is also an elegant harness pony. The breed's gentle and willing personality is also noteworthy and makes them very good riding ponies for children. The Dartmoor is widely crossed on small Arab, Thoroughbred, or Welsh ponies to produce very popular show ponies.

The Dartmoor is not as numerous as some of the other native pony breeds, but its exceptional riding traits have increased its global numbers to about 5,000. The relatively large population of Dartmoor ponies may be somewhat misleading to its stability as a breed because so many are showing, working, or being used for crossbreeding. The breeding population is considerably smaller, and so the RBST has placed the Dartmoor in category 3, vulnerable. The Dartmoor has been exported to Belgium, Denmark, France, Germany, Ireland, Italy, the Netherlands, Norway, Sweden, Australia, Canada, and the United States.

Many of the ponies running on Dartmoor itself no

longer resemble the Dartmoor breed. Shetlands and various other ponies were released there, and they now dominate the herds. These ponies are not always suited to survival on the moors, and they often struggle in bitter weather.

In 1988, the Dartmoor Pony Society, Dartmoor National Park, and the duchy of Cornwall began a program to restore the Dartmoor ponies to the moor. The moor farmers and other horse owners who share the common land are encouraged to run their more type-y, unregistered mares with registered Dartmoor stallions during breeding season. After approval by inspection, these mares spend May through September in enclosed areas of the moor called Newtakes. These mares and their filly foals are inspected for possible inclusion in supplementary registers. After inspection, the foals produced in the next generation may be accepted into the studbook.

The Dartmoor was first imported to the United States in the 1930s, and more imports were made in the next thirty years. The Dartmoor was used primarily for breeding polo ponies and show or hunt ponies. The American Dartmoor Pony Association was founded in 1936. It maintains both a purebred and partbred registry for Thoroughbred, Arab, or Anglo-Arab crosses.

The Dartmoor remained concentrated in the eastern states of Virginia and Georgia. Its numbers were never large, and the owners tended to know one another. In 1990, there were 8 purebred registrations. With the increased interest in quality show ponies, dressage, driving, and Pony Club, the Dartmoor has experienced a bit of a resurgence in North America, which has been aided by more recent imports from Britain. However, there are fewer than 200 purebred Dartmoors in the United States.

The original Dartmoor has been altered by the introduction of Arab blood, yet the breed retains the sensibility, hardiness, and soundness of its native pony heritage. The Dartmoor's excellent riding conformation should insure it a role as a safe mount with true performance abilities.



Rare



Vulnerable

*Clydesdale (pl. 103)*

The River Clyde runs through Lanarkshire in the lowlands of Scotland. The “lowlands” are actually quite hilly, and the weather can be snowy and cold in the winter. In the upper river valley, the Scots improved their native horses with imports of Flemish horses, as did the English to the south.

The Flanders horse was long regarded as a superior mount for knights, being larger than most of the native horses in Britain or Scotland. Flanders lay just across the Strait of Dover from southeastern England, and as early as the twelfth century, the import of the Flemish Black horse was encouraged to increase size and substance. Writers frequently described these horses as dark in color with white on the face, feet, and often up the legs. They were tall, muscular, and heavily fringed with long hair on the cannons and fetlocks.

In the mid-eighteenth century, three stallions began to have a great influence on the horses of Lanarkshire. The sixth duke of Hamilton imported a dark brown Flemish stallion and other Flemish horses to his home in the Clyde valley. His tenants were allowed free use of this stallion on their mares, which were generally hearty, good-sized ponies or larger packhorses. Another black Flemish stallion with white points was brought up from England by John Paterson of Lochlyloch. Soon his offspring were found at the local fairs. By 1782, a native stallion named Blaze was highly regarded and sought-after for his form and stylish action. The English Black horse, the ancestor of the Shire, also found its way north to Scotland. Some of these horses were from stock of the famous breeder Robert Bakewell.

The Scots were breeding horses capable of hauling farm equipment, coal from the Lanarkshire mines, and cargo on the streets of Glasgow. Strength was valued, but more important were the fast pace and good legs of the Clyde man’s horses, said to walk five miles an hour. Road haulers took to the Clyde breed, though it was also used for agriculture in Scotland and Ireland. City merchants appreciated the good looks, sharp trots, and energetic natures of these horses.

This native breed was first called the Clydesdale in

1826 at the Glasgow Exhibition. The rapid improvement and establishment of the Clydesdale was the result of a popular premium program begun by the Glasgow Agricultural Society in 1861. Representatives from some thirty to forty districts in Scotland and England came to the fair to select the stallion that would be used to serve their mares for the next year.

Several horses figure prominently in modern Clydesdale breeding. In the early nineteenth century, a mare was bred by a descendant of the Patersons, who were long-time Clydesdale breeders. She became the founder of a family line that included a colt named Glancer, who is still found in modern Clydesdale pedigrees. Lawrence Drew imported two English Shire stallions, Prince of Wales and Lincolnshire Lad, both of whom are important in foundation stock. Other important mares and stallions included the famous Darnley, born in 1872, and Baron of Buchlyvie, born in 1900. The stallion Dunure Footprint was foaled in 1908, and he continues to figure strongly in the pedigrees of modern Clydesdales.

The Clydesdale Horse Society of Britain and Ireland was established in 1877, and the next year more than 100 Clydesdale horses were entered in a single class at the exhibition. The Clydesdale became the workhorse of Scotland and was widely exported to Australia, New Zealand, North America, and elsewhere. In 1911, more than 1,600 stallions were exported from Scotland.

The Clydesdale made its way to Canada with Scottish immigrants, where it remained the most numerous of all the draft breeds until the 1930s. The first import of record was in 1842 to Ontario. By the 1870s, imports of Clydesdales were also finding their way to the United States along with the other draft breeds of England, France, and Belgium. The American Clydesdale Association was organized in 1879. Large numbers of draft horses would be imported to North America through the turn of the twentieth century. From 1912 to 1913, more than 2,500 Clydesdales were brought to Canada alone (fig. 54).

Alex Galbraith of Wisconsin, a former Scotsman, was one of the major importers and promoters of Clydesdales and other breeds from Britain. Although

[To view this image, refer to the print version of this title.]

Fig. 54 The Clydesdale stallion Holyrood was imported to Wisconsin by the Galbraith brothers. Holyrood was bred by Alex McCowan of Dumfries, Scotland, in 1884, out of Auld Reekie and Kate of Banks. Courtesy of the IAB and Hans Peter Jorgensen.

merchants appreciated the Clydesdale's elegance and energetic action, farmers were not so pleased with all those white feathers, and some accused the breed of being "all show and no go." One perhaps forgettable experiment was attempted on western ranchland—the crossing of Clydesdale and Mustang known as the Oregon Lummox. Although large numbers of Clydesdales were imported, the clean-legged Belgian and Percheron breeds ultimately became the favorites of farmers.

Back in Britain, all the draft breeds were pressed into service during the years of World War I. After the war ended, the Clydesdale reached its peak of popularity, but farm mechanization combined with the de-

pression of the horse market and the years of World War II sealed the doom of draft breeds in modern agriculture. By 1949, only 80 Clydesdale stallions were licensed for service in England. The breed population sank to critical levels in the 1960s.

The situation was initially worse in the United States, where the Clyde had never achieved the widespread popularity of the Belgian and Percheron. In the 1950s, the Clydesdale association was registering only about 10 foals a year. A few farming families in Iowa, Michigan, Wisconsin, Indiana, and Illinois and some ranchers in Wyoming and California kept breeding Clydesdales. The breed would probably have suffered near extinction but for one family.

In 1933, shortly after the repeal of Prohibition, August A. Busch, Jr., prepared a surprise for his father to celebrate the first new case of beer produced from the family's Anheuser-Busch brewery in St. Louis, Missouri. Down the street came a hitch of flashy Clydesdales pulling a beer wagon. Soon they were making

ceremonial deliveries around the country, including one to President Franklin Roosevelt at the White House. In the following years, the Budweiser Clydesdales became one of the world's most popular advertising symbols. Beloved by children and adults, the three eight-horse hitches make about six hundred appearances each year and appear in popular television commercials. The official home of the horses remains their historic and ornate stable in St. Louis.

Flashy beer-wagon horses have long been linked with breweries. Horses were needed to haul the grain to the breweries, and in the days before pasteurization and refrigeration, beer deliveries had to be made frequently, and the wagons had to cover a lot of territory. With the success of the Budweiser hitch, August Busch, Jr., realized that the dwindling fortunes of the breed would make it hard to obtain suitable geldings. The family began importing quality horses from Scotland and breeding the horses at its home, Grant's Farm, outside St. Louis. In the opinion of many longtime breeders, the Busch family owned most of the important stallions involved in the rebirth of the breed. Perhaps more important, as a support to other Clydesdale breeders, the farm offered free breedings to Busch stallions for many years. Selected horses were also auctioned at national sales.

Grant's Farm bred for a specific type of gelding standing 18 hands high, weighing 1,800 to 2,300 pounds, bay with a white stocking and blaze, a black mane and tail, and a gentle, calm temperament. This selection has probably affected the composition of the national herd. The high visibility of the hitch has undoubtedly promoted the breed. The relative registrations of the three minor draft breeds—the Clydesdales, Shires, and Suffolks—illustrates the influence of the Budweiser Clydesdales. In 1975, when the Belgian association was registering some 1,200 new horses each year, there were 22 Shire registrations, 17 Suffolks, and 100 Clydesdales. Without the Busch impetus, the Clydesdale would have probably totaled numbers similar to the Shire.

Some of the most important stallions involved in rebuilding the breed in North America were Balgreen Final Command, foaled in 1943, Dunsyre Silver King,

foaled in 1958, Masterman, foaled in 1961, Bardrill Glenlord, foaled in 1965, Master Baron, foaled in 1965, and the legendary Doura Excelsior, foaled in 1964. These horses, except Masterman and Master Baron, who were foaled in Ontario, also left their stamp on the breed on the other side of the Atlantic before their export from Scotland to America.

In Britain, the breed had fallen to such low numbers during the 1960s that the RBST categorized the horses as vulnerable, with fewer than 600 available breeding mares. Much of the best breeding stock had and continues to be exported to North America, although excellent-quality horses are still being produced in England, Scotland, and Ireland. By the early 1980s, registrations were up to about 200 annually.

Today in Britain, the Clydesdale numbers about 80 stallions and 800 breeding mares. The society offers a premium to selected stallions who sire 4 or more foals each year. Stallions, mares, and foals are all blood typed to insure pedigrees. An upgrading registry is available for the offspring of registered mares, and "Clydesdale type" stallions, which generally means Shire. There has been a certain degree of crossing with Shires for size, although blood-typing has revealed that the two breeds are distinctly separate. Irish breeders are campaigning to have the Irish Horse Board accept the Clydesdale as pedigree registered animals.

The largest herd of Clydesdales in the world, approximately 250 horses, is still owned by the Anheuser-Busch Companies. About 5 stallions and 40 mares are kept at the breeding farms, Warm Spring's Ranch in California and Grant's Farm near St. Louis. The horses in the three traveling hitches and the young horses in training make up the rest of the herd. The Seaham Harbour Stud, breeding about 80 mares each year, owns the largest breed operation in Britain. The black-and-white Clydesdales of the James Buchanan and Company's Black and White Whiskey hitch are also well known in Scotland.

In Canada, annual registrations have averaged about 350 since the early 1990s. Ontario remains the primary area of Clydesdale breeding. In the United States, registrations ran about 200 a year in the 1970s and 1980s but increased to more than 400 in the 1990s.

The estimated global population now stands at more than 5,000, more than half found in the United States.

Because North American breeders have selected a taller, hitchier horse and somewhat stabilized the colors and the white markings, there is probably more variety in color and size available in Britain and Ireland. Bay is the most common, but brown, roan, chestnut, gray, and black are also seen. White on the face, feet, and legs is characteristic, including some white splashing on the body. The modern Clydesdale is not as heavy as the other draft breeds but projects an appearance of energy and action.

Clydesdales have attractive heads and well-built bodies with short backs. The shoulder needs to slope enough to prevent a short stride, yet not too much, which would make fitting a collar difficult. Likewise, the withers need to be high enough to seat the collar. The hocks tend to turn inward as in most good draft horses so that pulling power will be maximized. Horses with wider-set legs will spread them when pulling a heavy load. Clydesdales tend to be longer in the leg than Belgians or Percherons. They also have good round, open feet. British judges like to see silky hair on the legs and a nice high step. The foot is lifted so high that a judge standing behind the horse should be able to see the inside of the shoe. Good feet and legs have been stressed in the breed to meet the demands of roadwork. The Clyde tends to have less feather than the Shire, found mainly on the back of the leg and around the foot. Breeders now encourage the feathering that farmers used to find hard to keep clean. The Clyde's reputation among draft horse breeders is for good hocks, pasterns, and action. The average height is 17.2 hands in stallions and 16.2 for mares. The breed is hardy and long-lived.

With the demand for height in North America, most horses fall into the 16.2-to-18-hand range, with mature geldings or stallions often taller and weighing up to 2,200 pounds. Bays with white markings are preferred, but blacks, browns, chestnuts, and roans are also seen. Lack of the "traditional" white legs is not discriminated against in the show ring.

Owners enjoy breed competitions and driving with their Clydesdales decked out in elaborate harness and

wagons. Horses have their manes and tails decorated in ribbons, streamers, silk roses, Aberdeen rolls, or Scotch knots. In 1995, 50 Clydesdale horses were gathered to create the world record hitch in celebration of the fiftieth Navan Fair in Ontario. The breed is also used on ranches in North America to cut hay and haul it to cattle in winter. Individual owners still use the Clyde in general farm chores and for logging.

The Clydesdale remains a premier hitch horse, striking and energetic. It is the dominant draft breed in its native Scotland but is found throughout England. Clydesdales are also bred in Ireland and their immigrant homes of New Zealand and Australia. Although still far behind the Belgian and Percheron in numbers in North America, the Clydesdale is now widely recognized and popular.



Watch



At Risk

### *Shire (pl. 104)*

The sight of the Shire, descended from the old English War horse, Great horse, or Black horse, stirs the English soul with the romance of yesteryear. Although the Shire as it exists today did not carry knights into battle, its roots do lie in that War horse of old.

The Roman legions that invaded Britain spoke of the strength and courage of the native warhorse. In the eleventh century, William the Conqueror and his men also brought warhorses to England. Although the warhorse needed to be strong, medieval tapestries and horse armor of the period reveal that this horse was not nearly as tall or heavy as the modern Shire.

Beginning in 1154, the British monarchs repeatedly strove to increase the size of their Great horse, especially as man and armor approached the 400-pound weight. At the beginning of the thirteenth century, King John imported 100 stallions from Flanders and the surrounding area. These horses were described as generally black with white markings on the face, the heavily fringed legs, and the feet. Most important, Flanders horses were tall and muscular. During the reign of Henry VIII, laws were enacted in 1535 and again in

1541 forbidding the use of horses less than 15 hands tall for breeding purposes. The export of taller horses was also forbidden, even to Scotland.

As heavy armor was abandoned, both the soldier and the equestrian began to look for a lighter riding horse. The heavy horse, with its faster pace, began replacing the ox as a draft animal on both farm and road. At about the same time, in the sixteenth and early seventeenth centuries, the low, swampy land of the Fens in Lincolnshire and Cambridgeshire was being drained for agriculture. Dutch experts were brought in to work on the project, bringing along their Friesian and heavy Flanders horses. As both a riding and driving horse, the black Friesian was tall and well built, combining elegance and showy action with its heavily feathered legs. The feathers served important purposes in the Fens both as protection against the swordlike, sharp sedge grass and as insulation against the moisture. The Fen Blacks or Lincolnshire Blacks bred in the fen counties began to be used for the improvement of draft horses in the nearby shires and eventually over much of England.

Known variously as the Black horse, Heavy Black, or English Black, these horses were soon hard at work in the fields, on the roads, on city streets, and at the docks. Henry VIII is said to have been the first to call this horse the Shire. During the eighteenth century, pioneering breeder Robert Bakewell and other horsemen sought to improve and refine the English Black by breeding imported Dutch mares to native stallions. So great was the demand for these horses that most stallions were gelded for work. The remaining stallions often traveled the countryside to breed mares. In Leicestershire, from 1755 to 1770, the Packington Blind Horse traveled the countryside, leaving "hundreds" of colts. A century later, the Packington Blind Horse was named as a foundation stallion in the first studbook of the Shire.

At that time, the Shire was described as a massive horse, heavier, coarser, and more sluggish than the Clydesdale. Black was the dominant color, but bays, browns, and grays were also seen along with the white markings on the face and the heavily feathered legs. The Shire was the largest draft horse of the time, probably

more popular for heavy hauling than for actual farming. According to the agricultural writer William Youatt, there was more crossing with Flemish or Friesian horses in the nineteenth century, which lightened the forehead and increased the walking gait from 2 to 4 miles an hour. There was also a difference between the Shires of Lincolnshire and Cambridgeshire, which were the heaviest, and the Shires of Lancastershire and Yorkshire, which were viewed as lighter, more rapid walkers. This lighter, more active type would eventually prevail in the modern Shire.

An early influential stallion named Honest Tom was foaled in 1865. Another influential stallion line was started by Lincolnshire Lad, who, before he was moved to Scotland, sired Lincolnshire Lad II, who in turn sired Harold in 1881. Harold figures in the pedigrees of most modern-day Shires.

In 1878, breeders came together to promote the breed and improve its quality, in part to meet the demands of the export market for registered horses. The English Cart Horse Society of Great Britain and Ireland was organized and soon issued its first studbook, which included 2,365 stallions dating back to 1760. Six years later, the group was renamed the Shire Horse Society. It has been estimated that 2 million Shire-type horses were at work in England around the turn of the twentieth century. During the peak years, from 1915 to 1921, mare registrations averaged 4,369 each year. In 1910 alone, 504 stallions were exported.

The first recorded export of a Shire to North America was a stallion named Tamworth who arrived in London, Ontario, in 1836. A gray Shire was imported to Massachusetts some time before 1844, and another stallion, named John Bull, was brought to Aurora, Illinois, in 1853. In the 1880s, additional small numbers of stallions were imported, but in 1887 a record 400 Shires were brought over from England. The American Shire Horse Association had been organized two years earlier, assisted and supported by the English society. By 1939, a total of 21,712 Shires had been registered. The Canadian society published its own studbook in 1901.

The Shire was not as well accepted in America as

many other draft breeds, although for a time the breed ranked third in popularity, ahead of the Clydesdale. Most Shires were found in the Midwest, but farmers generally found the heavy feathering, or bangs, impractical for fieldwork. Early agricultural writers criticized the breed as more suitable for brewery hauling and less productive at farmwork than a smaller, more active farm horse. The Shires were advocated for crossing on American mares to create an excellent farm chunk or general-purpose horse that achieved some popularity in the Midwest. The poor quality of many British horses at the height of their importation also contributed to the overall attitude to the breed.

For a time, the Shire population followed the same pattern as the Clydesdale in America. Although some Shires were still imported in the 1930s, the breed's popularity and numbers plummeted in the years following World War II. By 1953, the association ceased to function for a time, and a Clydesdale breeder saved the records. A few farmers and ranchers hung on to their horses, mainly in West.

A small revival occurred in the 1960s and 1970s. An Idaho rancher imported a Shire stallion in 1967, and several more imports followed to supply the National Brewing Company hitch of Baltimore, Maryland. In 1970, 50 new horses were registered, but when the commercial hitch was abandoned five years later, the breeding numbers soon fell to 22 horses.

The renewed interest in draft horses and new Shire imports built the registration from 60 horses in 1985 to about 250 in 1990. In 1997, the registry entered 158 new horses. About 500 Shires have been imported from England since 1970, and the current American population is now estimated at about 1,500. Fox Valley Farms in Illinois owns the largest breeding group. The greatest demand is for Shire horses colored black, bay, or brown with white feet.

In London during the 1930s, there were about 40,000 working draft horses. From 1931 to 1934, about 750 Shire horses were being registered annually, but the urban draft horse completely disappeared in the next thirty years. Although there were about 500,000 working horses nationwide in 1947, most were rapidly lost, mainly through slaughter. The Shire was pre-

served in a few brewery hitches and among some dedicated breeders, but the number of new registered mares fell to a low of 49 in 1963.

The Shire was soon placed on the Priority List of the RBST. In the early 1970s, potential American importers reported that they could locate only about 600 Shires in all of England. In 1985, there were 86 registrations, but today the Shire Horse Society estimates that they process about 500 registrations each year. The Shire has been moved to the Minority List, where it can still be watched and monitored, but the revival of interest in the breed is heartening.

The Shire Horse Society maintains both pedigree and grading registers. There has been much rumbling about the use of Clydesdales in lessening the amount of feather and improving the action. Some interbreeding between Shires and Clydesdales also occurred during the difficult years of the 1950s and 1960s. The export market shapes the direction of some British breeders, who actively seek four white feet, flashy color, and height.

Today's Shire is usually taller and more massive than the other draft breeds. A stallion born in 1846 reached 21.25 hands, and Shires frequently hold the record for the tallest living horse at about 19.2 hands. Stallions average 17.2 hands, but taller Shires are especially popular now. The mare has shorter legs and averages 16.2 hands and up. Shires can easily weigh a ton or more, up to 2,680 pounds.

A true gentle giant, the reliable and amiable Shire has a work life of about sixteen years. The modern Shire is a more stylish and more active horse, although not as fast as the Clydesdale. The Shire's head can also be slightly heavier and the nose more convex than the Clydesdale. Shire breeders strive for silky feathers on the sides and back of the lower legs and around the fetlock. In Britain, Shires are often shown with shaved tails.

A wide range of colors and markings is seen in Britain, where gray Shires are popular in hitches. Horses colored black with white legs or grays are the easiest to match for hitches. Light or roan colors and large white splashing are not as commercially desirable, although they are authentic, historical patterns that should not

be lost. Although the Shire Horse Society no longer admits piebald horses, piebald Shire teams were common two hundred years ago, and they were registered in the early studbooks of the society. Piebalds certainly make striking hitches and now have their own admirers.

The Shire is the most popular hitch horse in England, both commercial and private. The Shire is again being used for beer and bread deliveries in cities and also for street cleaning and rubbish collection. Whitbreads, Vaux, Bass, and Tetley all have well-known commercial hitches of Shires. Some owners use Shires for farming and logging, and Shires are popular for holiday wagon tours and canal boat rides. Owners enjoy competing in plowing matches. Shires are also used in crossbreeding with Thoroughbreds to create heavy hunters. Exports are running up to 80 horses yearly, mainly to Europe but also to Australia and New Zealand.

In the United States, the American Shire Horse Association continues its record keeping, and the North American Registry of English Shires tracks imported horses that are included in the English society. Both organizations require blood typing to confirm parentage. There is no difference between “American” Shires and “English” Shires in North America. Horses registered with the American Shire Horse Association were accepted into the Shire Horse Society studbook in England, although there has recently been some difficulty between the two associations over standards.

In North America, most Shires are used in private hitches or for breeding. Shires are also being crossed with light horses to create warmblood sport horses. Teams of Shires are used at Arlington National Cemetery by the Caisson Platoon, which owns more than 40 Shires. In the United States, the Shire remains less well known than its cousin the Clydesdale and is often mistaken for it.

The Shire still radiates nobility and regality. This horse is beloved by many in its native land, where several Shire horse centers feature daily parades, musical drives, displays, demonstrations, and souvenirs.

 Watch  Critical  Minor

### *Suffolk (pl. 105)*

The counties of Norfolk and Suffolk in East Anglia have long been densely settled and actively farmed. Isolated on their peninsula, surrounded by the sea except for the once forbidding Breckland and Fens, the farmers have long worked the dark, rich soil of their fertile farms. This isolation allowed much of the livestock of the region to evolve to meet local needs.

The Viking invasions between the eighth and tenth centuries may have influenced the native horses. The Suffolk bears a resemblance to the old Jutland, which is also medium sized and chestnut colored. In turn, the modern Jutland has been greatly influenced by a Suffolk Punch stallion imported to Denmark in 1860.

The first written records of horses remarkably similar to today’s Suffolk were made in the early 1500s. During the sixteenth and seventeenth centuries, Dutch contractors built dykes and reclaimed marshes in the Broadland district. Their Flemish horses were therefore available and may have increased the size and weight of the native horses.

By the eighteenth century, the Suffolk horse, Suffolk Punch, or Suffolk Sorrel was well established. Pulling matches were advertised by 1766, declaring that the winner would be based on the best of twenty pulls. In 1784, the Rev. John Cullum described the Suffolk horse as 15 hands high, short and compact with bony legs, often light sorrel in color, gentle, tractable, strong, with docked tails, and “shoulders loaded with flesh.” When Thomas Crisp of Ufford advertised his stallion’s services in 1773, he simply announced, “Light chestnut horse full 15½ hands, five years old, to set good stock for coach or road” (Hall and Clutton-Brock 1995, 232).

A century later, when the secretary of the Suffolk Horse Society compiled the first studbook, he was able to identify more than 1,200 horses going back 120 years using the records of individual horse breeders. Thomas Crisp’s stallion already dominated the breed, and today all Suffolks trace to that one unnamed stallion, known as Crisp’s horse. The Suffolk Horse Society was also the first heavy horse registry in England. In fact, the

Suffolk is one of the purest breeds in the country, and only the English Thoroughbred exceeds its records. Early in the nineteenth century, there were some experimental crossings with heavy Yorkshire horses, Norfolk Trotters and even the Thoroughbred to increase height and refine the shoulder. The agricultural writer William Youatt complained that this threatened the old Suffolk Punch. These attempts have not affected the breed as a whole, and the modern Suffolk's color, size, conformation, and temperament are much the same as the Suffolk of old.

The Suffolk never spread far beyond the borders of East Anglia. And the region never adopted the Black horse or Shire, relying instead on home-grown stock. The Suffolk mainly worked the land but was also used for road transport. Extra horses to sell for export were few.

Suffolk horses are famous for their chestnut or sorrel color, and when describing the breed the word *chestnut* is spelled without the first "t" in the traditional manner. Chestnut covers a color range from a reddish shade through golden brown to brown. The mane and tail are the same color, though often lighter. The historical descriptions for the shades in the original registry of 1877 are: the dark which can be nearly brown-black, liver or mahogany, dull dark, light mealy, red, golden, lemon, and, the most popular, the bright chestnut. Bright chestnuts often have a flaxen mane and tail. A little white on the face as a star, a blaze, a "reach" or a "shim," is common. The feet and lower legs are lightly feathered, with perhaps a little white or light color near the foot. Foals are often born lighter in color and darken somewhat as they grow.

The Suffolk's conformation is also different from the other drafters. The legs are shorter, almost appearing too short for the body and head but actually giving great strength. The neck and body are large, deep, and strong, or "punched up," perhaps like a short, fat man or a puncheon bowl. The shoulder reaches low for great traction power. This strength was needed on the heavy clay soil of East Anglia. The Suffolk's legs are also set close enough together to walk in a furrow without damaging the crop. The Suffolk barrel is big,

round, and deep. This characteristic, sometimes referred to as a "big breadbasket," allows the horse to work a long day.

According to traditional Anglian practice, the horses were fed very early, before dawn. During their workday, which was a good nine hours long, they took only short breaks, unlike the big midday break and feed of many other drafters. Because of their stamina and fast walk, Suffolk horses worked longer hours and were expected to accomplish more in a day than many other breeds. After work, the horses were not stabled but rather were turned loose in big yards where they ate side by side and slept in the shelter of the wall or in the fields.

The long, straight shoulder of the Suffolk lent great power to the pull, not high action. In days past, breeders tested the heart and strength of the Suffolk by hitching the horse to a tree trunk or another nearly immovable object. The good horse wanted to work and gave the pull its all. The winner of the contest was determined by the numbers of times the horse or horses made a hard-fought attempt, sometimes getting down on their knees. Owners still speak of the Suffolk's great willingness to work, and the modern Suffolk remains calm and tractable as well.

Suffolk mares average 16.1 or 16.2 hands, and the stallions may be almost a hand taller, certainly somewhat smaller when compared to other drafters. They are, however, a good working height for the farmer who has to throw the harness up and over every day. Suffolks usually weigh 1,600 to 1,800 pounds, with some stallions reaching 2,000 pounds or more. Many have commented that the Suffolk is only as big as it needs to be, and the farmer does not need to feed extra size. Suffolks are known as easy-keepers and long-lived horses, often working well into their twenties or longer. The long fertility of the Suffolk mare is also notable.

The Suffolk has good feet. Originally worked more on softer ground than on hard roads, these small feet and hooves were once criticized. To encourage improvement, prizes were offered at Suffolk shows for the best feet, which became another point of pride for the Suffolkman. For show and fair, owners decorated their

horses in traditional ways, braiding the mane with raffia and ribbons in individual colors and patterns. The long tails are braided up for work but are creatively embellished for show.

Before the twentieth century, Suffolks were sold for use in cities and as haulers of light loads but were not used as heavy draught or brewery teams. They were not widely available outside their native counties, although as the demand for draft horses peaked in the years before World War II, a third of all registered Suffolks were exported.

Suffolks were first officially imported to Canada in 1865 and to the United States in the 1880s, mainly into New England, Iowa, and Nebraska. Canadian agricultural publications praised the Suffolk in 1884, and as the *People's Farm and Stock Cyclopaedia* explained the next year, "The term shire horse applies to all heavy horses of England except those of Suffolk County. These are esteemed as a special breed, and are called the SUFFOLK PUNCH." J. T. Jones continued, "The true Suffolk, like the true Cleveland, is nearly extinct. But their virtues in comparison with successors in their former places have called for an effort to save them from becoming extinct from want of care in breeding" (Jones 1885, 498, fig. 55).

More Suffolk imports to North America followed in the years before World War I, and another group of 14 stallions and 62 mares came to the United States right before World War II. In 1937, the American Suffolk Horse Association, which had been founded in 1911, registered 131 Suffolks. Never really imported in significant numbers, the Suffolk did not build up a large enough base to help it survive the great working horse decline. If Suffolks had been available in greater numbers, they may have found the same widespread acceptance as the clean-legged Percherons and Belgians, which became the favorites of American farmers. The only criticisms of the breed were its lighter bone and smaller size as compared to the popular breeds.

The Suffolk population fell off drastically in the 1950s both in England and in North America. The global population of the breed may have fallen as low as 200 or 300.

[To view this image, refer to the print version of this title.]

Fig. 55 The Suffolk Punch, here illustrated in the American press, was introduced to the United States in the late nineteenth century without great success. Courtesy of the IAB and Hans Peter Jorgensen.

In the 1940s, the American Suffolk Horse association registered 420 foals. During the 1950s, registrations dropped to just 44. The American society ceased to function for a decade or so, and the Suffolk population probably fell to about 50 horses, found mainly in northwestern Iowa on three farms. The resurgence began in the early 1960s, when the interest in draft horses began to rebound. The American registry was reorganized in 1961. Eighty-three foals were registered in that decade, and there were 9 imports.

Suffolks began to be imported again in the 1970s, so much so that they provided an impetus and a market for English breeders. American breeders were so successful in attracting new admirers of the Suffolk that the population on the western side of the Atlantic has become greater than that in England. Suffolks are now found in most states and number over 800, with 120 foals registered in 1998. In Canada, Suffolks were originally centered in Ontario but are now found scattered throughout the country. There are about 130 Suffolks in Canada today.

North American Suffolk owners are an enthusiastic group, and care is being taken to avoid breeding difficulties through a computerized registry. The large number of stallions is an asset. There was some outcrossing with Belgians in the 1970s and early 1980s,

but only fillies were registered, and they were clearly identified in the studbook.

The Suffolk was in serious trouble in England in the early 1960s, when approximately 12 foals were being registered yearly, once dropping to a low of 9. At this time the RBST began to take great interest in the breed. By 1985, the breeding population had increased to 118 mares, 32 stallions, and 24 foals in the care of two dozen dedicated breeders. The RBST provides financial support for stallion owners, the costs of mares traveling for breeding, and foal registration costs. To encourage the keeping of stallions, the Suffolk Horse Society also contributes substantial financial support. The society operates a museum in Woodbridge, Suffolk, that portrays these unique horses and the horsemanship of Suffolk itself. The many friends of the breed who belong to the society effectively support this cultural treasure.

In the 1990s, the number of brood mares remained stable, but the foaling rate improved to 30 to 45 each year. The population is approaching 200, with approximately 100 breeding mares, and is still found mainly in the eastern counties. The largest breeding group is found in its longtime home at the Hollesley Bay Colony, a training facility for youthful offenders. Colony Suffolks are well represented in the breed. The Suffolk is also being used to breed hunters and jumpers.

There are complaints that the breed is becoming taller to meet the modern demand, yet small working horses are certainly still to be found. Moderate size is one of the breed's assets and should be protected. A certain amount of inbreeding has been inevitable, and although no ill effects have yet become apparent, the breed needs to be monitored for problems. The Suffolk Horse Society in Britain does not currently accept North American bloodlines.

It is somewhat surprising that more Suffolks are not used in North America as "pullers" because they show such courage and stamina at this task. Suffolks have also proven themselves in hotter climates, on farms, and in timbering. Never glamorized, the Suffolk remains largely unchanged, easy to keep, true to its purpose, full of heart, and the ultimate worker for many people desiring a "using horse."

The Suffolk is critically rare everywhere, with a global population of about 1,000. It remains the rarest horse breed in England today. A few Suffolks are found in Pakistan, Denmark, Italy, Germany, Australia, and New Zealand.



Critical



Critical



Critical

### *Cleveland Bay (pl. 106)*

Before the appearance of the Arab, Barb, and Oriental horse in Britain, English racehorses competed at Smithfield in London. Some horse experts believe that light chariot horses brought to England by the Romans were incorporated into the racing horse breed called the Galloway in Yorkshire. When the Oriental male founders of the English Thoroughbred were brought to England, beginning in 1689, they were bred to the native mares in places like the fertile Bedale valley of Yorkshire.

To the northeast, in Cleveland, farmers had developed their own breed of multipurpose horse from native and Galloway stock. They were often called Chapman horses because the traveling salesman, or chapman, carried his wares on the backs of packhorses. These large horses also packed out heavy loads of raw wool and iron ore to the processing mills. Farmers used the Chapman horse both for work and for riding, often with a passenger on the pillion behind. The Chapman horse was short legged, clean of feathering, and long backed. At some point in time the traditional bay coloring also became established and the Chapman horse became known as the Cleveland Bay.

Some Yorkshire men who were breeding for a taller, faster carriage horse used the nearby Oriental stock on their Chapman horses. Manica, foaled in 1707 and the son of the Darley Arabian, and Jalop, foaled in the 1750s and the grandson of the Godolphin Arab, appear more than any other Thoroughbreds in the pedigrees of the Cleveland Bay. This "racing blood" did contribute to the Cleveland Bay in the eighteenth century, but from that point on the breed has remained remarkably pure.

By the nineteenth century, the Cleveland Bay had

become an important coaching breed, but it was also used for general farm work, riding, and hunting. The Cleveland Bay was noted for its size, substance, and large bone but also its good nature and quietness. The Cleveland Bay was exported to Europe and used in several carriage horse breeds, including the Hanoverian, Holstein, and Oldenburg. The hallmark bay coloring made the matching of teams easy.

Cleveland Bay mares were bred to Thoroughbred stallions to produce the famous Yorkshire Coach horse, which became extremely popular. Thoroughbred-Cleveland Bay crosses also produced excellent hunters and jumpers. This particular cross, or "nick," remains highly successful today, likely due to the purity of the Cleveland Bay and its separateness from Oriental blood, in addition to the similarity in conformation and type between the two breeds based on the original native mares.

By the mid-nineteenth century, the demand for Thoroughbred crosses threatened the Cleveland Bay's existence. The Cleveland Bay Horse Society was formed in 1884 to protect the purebred Cleveland Bay. So carefully had the breed been maintained that many mares were entered into the first studbook showing their previous eight generations or pedigrees going back more than a hundred years. No outcrosses have been allowed since the studbook was organized.

In the breed two types were present, one more agricultural and the other more coach. Unfortunately, the need for both types was drawing to an end. Farmers were discovering that the heavier Shire-type of drafter was somewhat easier to work and to handle. The Irish Draught-Thoroughbred cross was also gaining in popularity in Britain as a riding horse. Cleveland Bays were pressed into artillery service during World War I, and many were lost. Ultimately, farm mechanization and motorized transportation ended the need for this specialized breed.

Fortunately, a few families, including the royal family of Britain, preserved the breed. Cleveland Bays remained at the Royal Mews at Buckingham Palace and were used in both pure and crossbred teams of driving and ceremonial horses. Half-bred Cleveland Bays are now used more often because they are well suited

to the faster, lighter work of the present. Crosses with Oldenburgs, a warmblood German coaching breed, have been especially successful. The duke of Edinburgh has competed with partbred Cleveland Bays in international driving competitions.

By 1960, however, only a handful of Cleveland Bay stallions were available at stud. In support of the breed, Queen Elizabeth II offered the use of her stallion, Mulgrave Supreme, and many of the 17 stallions available by the mid-1970s were his progeny. The Cleveland Bay population has continued to increase but remains critically low. In 1996, there were 35 stallions and 150 mares, although often only about a dozen filly foals are registered yearly. Crossbreeding remains popular, and so the society offers a separate registry for partbreds in order to track their successes. Purebreds are eligible for registration, although stallions are inspected before going to stud and then again at intervals through their lifetime. The best stallions receive monetary premiums each year. Breeders of purebred foals receive monetary benefits. Mares are also graded to encourage the breeding of the best mares.

The Cleveland Bay is a remarkably prepotent breed. Admirers of the breed note that all Clevelands look very much alike. The physical form, color, and disposition is stamped out in each generation. The Cleveland Bay's separateness is also revealed in the presence of a unique blood type in the breed.

The Cleveland Bay stands 16 to 16.2 hands, with some stallions standing a little taller. Weights range from 1,225 to 1,500 pounds. The body is definitely wide and deep, with muscular loins and good sloping shoulders. Clevelands have at least 9 inches of bone beneath the knee, clean legs, and good, hard feet. The Cleveland has a long neck and a large, well-formed head with a straight or slightly convex profile. This breed has a kind eye, and its medium to large ears are alert. The Cleveland moves straight and free but not high. Cleveland Bays are slow-maturing horses that do not finish growing until they are six or seven years old, and so their training needs to be slow and gradual.

And of course, the Cleveland Bay is bay in color. The rims of the ears, the mane, tail, and legs are always black. The body is reddish tending toward dark or ma-

hogany shades. A few gray hairs in the tail are acceptable, because they appear in certain purebred strains. A very small white star is also permitted. The black coloring on the legs generally extends past the knees and hocks. Some breeders believe that more white color should be allowed because the population is too small to exclude otherwise acceptable horses.

Cleveland Bays were brought into Massachusetts, Maryland, and Virginia in the early 1800s. The Cleveland Bay Horse Society of North America was organized in 1885 and by 1907 had entered more than 2,000 horses in its registry. The breed was described in America as “a large, elegant horse, standing sixteen and one quarter to sixteen and three quarters hands, and weighing from 1,350 to 1,500 pounds; a fine head, full, bright eye, long, arched neck, oblique shoulders, deep chest, short back, long quarters, strong, cordy legs, and perfect feet. Their color, bay, full flowing mane and tail, and black legs, usually clear of white” (Jones 1885, 507–8). A century later, modern Cleveland Bay breeders would happily agree with that description.

In North America, Clevelands were first used as general-purpose horses for farming and driving. Later they were imported to cross on Thoroughbreds to produce hunters and to cross on heavy draft mares to create an active farm chunk. Clevelands were also used to improve western range horses. Most imported Cleveland blood was lost in the constant breeding of coach and wagon horses. After the need for farm and carriage horses declined, the Cleveland’s fortune dwindled, although there was a brief surge of interest in the breed in the 1930s.

In 1985, a few enthusiasts resurrected the Cleveland Bay Horse Society of North America, and good things have continued to happen. In 1992, the society conducted a survey to locate the pure and partbred Cleveland Bays in North America. Thirty-one purebreds were found, including 12 mares, 11 stallions, 2 geldings, and 6 foals. These horses were scattered across the country, and 4 were in Canada in the hands of two owners. Also found were 113 partbreds, mostly Thoroughbred crosses.

One year later, British inspectors were able to license American-born stallions, which allowed their

foals to be eligible for the society studbook in Britain. More important, a crucial reconnection was made between two populations of a very rare breed. The North American society is supervised by the British society, registering both pure and partbred Cleveland Bays. The global population is now 500 to 600 horses in Britain, North America, Australia, New Zealand, Japan, and India.

New imports of Cleveland Bay horses have been made to the United States, and there is increased awareness of the breed in the dressage, driving, and eventing communities. Fans of the breed feel that a renaissance of the Cleveland Bay is again possible. The Cleveland Bay–Thoroughbred cross still produces excellent sport horses, although the purebred Cleveland Bay remains more valuable monetarily.

The Cleveland Bay is a substantial, impressive horse. It is also a historic British breed with a long past full of valuable contributions. Cleveland Bays have excelled as Olympic jumpers and competitors at the international level in driving, dressage, and eventing. They also remain excellent heavyweight hunter-type riding horses and a natural warmblood.

 Critical  Rare  Critical

### *Hackney (pl. 107)*

Although the trot is a gait that riders can find uncomfortable on a rough horse or one with high action, it must be said that for some horses the trot seems to come so naturally that they can literally trot on and on and on. Riders have often endured this bumpy ride for the advantage of speed over distance. So it was with the early trotting horses of Norfolk in East Anglia, where farmers, sometimes with their wives sitting behind on a pillion, trotted to market.

The Old Norfolk Trotter was a bit cobby in appearance, but strong and capable of great stamina at the trot. Norfolk Trotters set record after record for speed over considerable distances. When roads were improved, the breed also became known as the Norfolk Roadster. Human nature being what it is, impromptu races on light carts were common. The Norfolk Trotter became

a popular breed, improved by some judicious crossing with English Thoroughbred stallions in the eighteenth century.

Blaze was the grandson of the Darley Arabian, one of the founding stallions of the English Thoroughbred. He was crossed on a hackney—small “h” for a common riding horse. This foal, born in 1755 in East Anglia, has variously been called Shale’s Horse, Original Shale, or Shales the Original. Shale’s Horse was an important improver of the Norfolk Trotter. The English Thoroughbred cross on the Norfolk Trotter was so successful that it was often repeated. One crossed stallion, named Jary’s Bellfounder, was exported to the United States, where it passed on its outstanding trotting ability to the Standardbred.

The improved Norfolk Trotter bloodlines were soon crossed on another outstanding road breed known as the Yorkshire Coach horse or Yorkshire Roadster. This type was actually an offshoot of the Cleveland Bay horse. Originally an agricultural and packhorse known as the Chapman horse, the Cleveland Bay was also transformed by an addition of Thoroughbred blood. Yorkshire Coach horses were based on crosses between the Cleveland Bay and Thoroughbreds. In 1886, two years after the Cleveland Bay Horse Society was organized, the Yorkshire Coach Society was formed to promote this very popular carriage horse. The Yorkshire was sturdy and tall, with a commanding presence. Although this society continued until 1937, when the breed disappeared, the blending of the Yorkshire and Norfolk breeds with the Thoroughbred created the very successful type that became known as the Hackney horse. Retaining the stamina, soundness, and trotting ability of its coaching ancestors along with the speed and refinement of the Thoroughbred, the Hackney was irresistible.

Pulling fast coaches, the Trotters and the Hackney were perfect for the improving road system in England. At first the breed was favored by well-to-do farmers, townspeople, hackney cab drivers, and merchants who enjoyed the breed for its flashy style, but soon the Hackney was also adopted by the wealthy. The first Hackney studbook was published in 1883.

Singly or in matching teams, heads checked and

[To view this image, refer to the print version of this title.]

Fig. 56 This English-bred piebald Hackney mare named Movement was illustrated in 1888. Courtesy of the IAB and Hans Peter Jorgensen.

held high, tails docked, and drawing light gigs, phaetons, larger coaches, or drags, the Hackney was the ultimate glamorous driving machine. Hackneys stood just 14.2 to 15.2 hands high and weighed 900 to 1,100 pounds. Not an impressive coach horse, the Hackney was more like a sports car. Hackneys were also used as “park hacks,” or stylish saddle horses to be ridden in such social gathering spots as Hyde Park in London or Central Park in New York City. Not for the inexperienced rider, the delightful Hackney was a lively, energetic, almost prancing mount (fig. 56).

The Hackney pony was developed in the 1860s by crossing Hackney horses on Welsh ponies. Within ten years, many Hackney owners began breeding for a pony-sized Hackney primarily for use in the show ring. The dividing line between pony and horse was not defined until the society was established in 1883. Ponies are simply any Hackneys shorter than 14 hands. Both are admitted into the same studbook and can be interbred but are shown in different classes.

Both the Norfolk Trotter and the Hackney were exported to Europe, where they were used to improve the trot and action of such breeds as the French Trotter, the Gelderlander, and the Breton Postier. Today Hackneys, mainly ponies, are exported from Britain to Holland, the United States, Malta, Canada, South Africa, Italy, and Ireland.

The arrival of the railroads and later the automobile tolled the death knell for the Norfolk Trotter and Yorkshire Coach horse. The Hackney was saved because many Hackneys belonged to wealthy individuals who could afford to keep them as a hobby. The horse show public also loved the high-stepping elegance and excitement of the Hackney horses and ponies.

The modern Hackney horse has a small head, muzzle, and ears at the top of a long, graceful neck. The shoulders and body are compact, yet strong and powerful in appearance. The tail is carried high, and the action is snappy and high, though the Hackney is noted for its sound feet and legs. Even Hackney owners will admit that at times their horse or pony can be quite a handful. They attribute this personality trait to intelligence, alertness, and a spirited, show-off nature.

The Hackney is registered only in the solid colors of chestnut, bay, brown, and occasionally black or roan. White feet or lower legs are allowed and often desired because they emphasize the foot action. Piebald and skewbald color patterns are not allowed, although they appeared in the nineteenth century. The skin and hair of the Hackney are fine and silky.

Hackney horses were exported to the United States as early as 1801, when a great-grandson of Shale's Horse named Pretender was brought to Virginia. Larger numbers of Hackney horses and ponies were imported beginning in the 1870s. Hackney horses were used as coach and carriage horses but also found their way westward with the settlers. The grade Hackney or Hackney cross became a "buggy horse." In the 1890s, the Hackney became a fashion statement among the well-to-do in the eastern cities, and imports continued until the economic hardships of the Great Depression. This "carriage crowd" formed the American Hackney Horse Society in 1891.

The Hackney pony came to dominate the breed in the United States, accounting for 95 percent of annual registrations, whereas the Hackney horse held on to more popularity in Canada and Britain. The Hackney pony has also become more refined in appearance in the United States. The high-stepping action is schooled and enhanced with pads, longer feet, or heavier shoes for showing.

Hackney horses and ponies are still shown in the traditional way in the United States, with the tail docked to one foot in length and carried high. Tail docking was common on draft and carriage horses in Britain for many years. Docking prevented some tangling in harness and lines and eliminated unsightly or high-maintenance tails. Some owners also believed that the long, sometimes bushy tail was not in keeping with the elegant appearance of the fine harness horse. Tail docking is now illegal in Britain, where horses are shown in a natural tail that looks as attractive and glamorous as a show Morgan.

There are other differences between the English, American, and Canadian Hackney horse. The English studbook allows the registration of Thoroughbred crosses in the second generation for mares and the third generation for stallions. In the past, the Canadian studbook has allowed outside blood such as Clydesdale, Standardbred, and others. The American studbook has remained closed to outside blood and is the purest of the three. The Hackney society in Argentina also protects a closed purebred studbook.

In the United States, Hackney registrations have varied between 600 and 800 for the past twenty years. It is estimated that 5 percent of the national registrations are for the Hackney horse, or about 30 to 40 animals each year. Although the horse size is more popular than the pony in Canada, total Hackney registrations run from only 90 to 125 yearly. In North America, only about ten breeders are producing Hackney horses. In 1994, a small group of the Hackney horse breeders formed a regional association for North America within the American Hackney Horse Society. This new group, the American Hackney Horse Affiliates, is dedicated to the breeding, development, and promotion of the Hackney horse. These breeders are preserving a precious pool of purebred Hackney horses, not diluted by Thoroughbred and other outside breeds. There are fewer than 40 Hackney horse stallions in the United States and Canada.

Argentina has an especially pure population of about 300 Hackneys. The Argentine Hackney herd is based mainly on imports of driving horses from the early nineteenth century. In addition, the saddle strains

of Hackney horses have mainly disappeared except in Argentina.

The greatest number of Hackneys are found in Britain, where the horse is not recognized as endangered, perhaps due to the Thoroughbred dilution of the old gene pool. There are probably fewer than 2,500 Hackney horses worldwide.

Hackney horses are still used in crossbreeding. In Canada, crosses with heavy mares produce the Canadian Cross-bred, which has become a popular competition driving horse. In the Netherlands, the Hackney is crossed on the old Gelderland or Groningen breeds to produce the Dutch Harness horse. There is a popular new crossing with the Arabian to produce a showy harness type. All of these uses are fine as long as a breeding population is preserved and broodmares are not removed from the breeding pool.

Today, Hackneys are mainly used for pleasure driving and competitive driving, although Hackney horses were popular and successful jumpers before World War II and have been used for saddle, polo, dressage, and cutting cattle. The Hackney horse is the last survivor of the great trotting horse families, for both the Yorkshire Coach and the Norfolk Trotter have disappeared. Because both pleasure and competitive driving are rapidly adding new drivers and teams to their ranks, the future for the Hackney horse could be quite bright. The Hackney horses in the United States and Argentina are probably the best source for their future preservation in a form similar to the past.

 Rare  Watch

### *Irish Draught (pl. 108)*

The horse has played an important role in the history, culture, and romance of Ireland. The Irish have always had an eye for a good horse, and then there was Ireland itself, blessed with the lovely combination of westerly winds and lush pastures where the grass grows from limestone-rich soil. Horse enthusiasts still speak reverently about the good bone on an Irish horse. Ballinasloe, County Galway, is the home to one of the oldest horse fairs in the world. By the nineteenth century,

this fair was a center for English, French, and Prussian army suppliers. During the Battle of Waterloo, both Napoleon and Wellington were mounted on Irish-bred horses.

In Ireland of old, the hardy native ponies were at the center of legend and life. By the 1300s, the gaited Irish palfrey, the Hobby, was known far beyond the country and was widely exported. But Irish farms were small, and farmers needed a multipurpose horse to do everything from farm work to pulling the cart to riding. And if a farmer's mare produced a foal for hunters to ride to the hounds, she added to the farm income. This versatile horse had to be sound, easy to keep, and possessed of an admirable temperament. This horse was known as the Irish Draught or Draft, though it was never really a drafter in the European or American sense of the word. As the Thoroughbred replaced the Hobby as a riding horse, the marvelous cross between the Irish horse and the Thoroughbred became almost legendary. The famed Irish hunter was in fact the first warmblood sport horse.

Sales of both the Irish Draught and the Irish Hunter were important sources of income for Ireland. In the 1850s, 4,000 horses and ponies were bought and sold at Ballinasloe, which was just one of many Irish horse fairs. The Irish Draught possessed the right combination of strength and speed to be the ultimate artillery horse, pulling cannons and guns through many European wars, including World War I.

The demands of war and economic hard times in Ireland often led to serious shortages of these horses. There were no registries or associations for this native breed, which was shaped by practical demands. Eventually concern grew over how best to protect and promote this national resource. At the beginning of the twentieth century, the Irish Department of Agriculture developed a premium payment plan for owners of excellent approved stallions and provided for the registration and inspection of mares. World War I interfered with these plans somewhat, although the demand for the Irish Draught increased.

Farm mechanization sent many horses to slaughter in Britain and Ireland, but the Irish Draught mare had found a niche in the production of the famed Irish

hunter on a cross with the Thoroughbred. The Irish hunter and jumper was now an important export market for Ireland. In fact, the production of the crossbred was so valuable that few purebred fillies and colts were being produced. Thoroughbred blood was also used so much that it began to imperil the source of this magnificent sport horse.

The Irish Draught Horse Society was established in Ireland in 1976 and in Great Britain in 1979. Census figures in 1988 revealed that there were only some 630 Irish Draught mares in Ireland and Britain together. This figure revealed a decline from the early 1960s, when there were at least 2,000 mares.

The society's rigorous system of mandatory inspection, performance testing, and progeny testing of stallions has insured quality breeding stock. This registry could not be organized along the traditional lines of foundation horses or pedigrees, since none exist. The Irish Draught horse was a native breed in the truest sense. Stallions are classified as approved and entered into the main studbook or classified as supplementary along with their progeny. Mares are also classified into the main or supplementary studbook. There is a separate sport horse registry for horses with proven Irish Draught ancestry.

The government is heavily involved in the horse business in Ireland. All horses in Ireland can receive an Irish Horse Register number, and the Department of Agriculture appoints three of the ten members of the Irish Horse Board, which runs the registry and promotes the Irish horse overseas. Their promotion efforts are important in order for the Irish horse to compete with the very popular Continental warmbloods.

The Irish Draught Horse Society operates one of the most sophisticated computer systems used in horse breeding in the world. Owners of stallions and mares can access detailed information on conformation, pedigrees, inspections, progeny, performance records, medical conditions, genetic problems, and the predicted coefficients of inbreeding on any potential mating. Predictions for the proposed foal's performance are also possible. Monitoring of the amount of Thoroughbred or unknown breeding is possible, as is tracking of certain bloodlines.

Of great concern is the extent to which Thoroughbred blood is diluting the traditional Irish Draught stock. There is also a large proportion of unknown breeding among mares. The number of old-type mares seems to be decreasing, and care needs to be taken that the traditional attributes are preserved, especially the breed's outstanding temperament. The Irish Draught is already an exceptional warmblood horse with excellent sport abilities. It does not need to be turned into another blended European warmblood and thereby lose its special qualities.

The Irish Draught was traditionally a versatile farm horse that also excelled at jumping, hunting, and the demands of warfare. The Irish Draught, though active, was a short-cannoned, powerful horse with plenty of substance. In its own right, it was an excellent heavy-weight hunter. Stallions stand at 16 hands, with mares slightly shorter. Mares should have 9 inches of bone as measured around just below the knee, and stallions must have at least that much ample bone. The feet are not as large as a draft horse, but they must be exceptionally hard and sound to stand up to the concussion of jumping. The horse should move smoothly and freely, not heavily. The breed's calm, quiet behavior has earned it work as a police or ceremonial horse. The Irish Draught is also a suitable dressage prospect and an outstanding carriage horse. The breed comes in any whole color. Gray, chestnut, and bay are very common, but brown, black, roan, and occasionally dun are seen.

The Irish Hunter has long been imported to North America, usually by individual riders. In order to support the efforts of the Irish Draught Horse Society in other countries, affiliate groups have been organized. The Irish Draught Horse Society of North America was organized in 1993. The society has located several Irish Draught horses, encouraged the import of more horses, and held official inspections to insure that American-born horses will qualify for the Irish register. Frozen semen from stallions in Ireland has also been imported, primarily to sire crossbred foals.

The Irish Draught continues to be a leading producer of top-level show jumping and eventing horses in world competition today, both purebred and crossbred with the Thoroughbred. Although the mare has tradi-

tionally been the source of the crossbred horse, Irish Draught stallions are now being used successfully on mares of other breeds

Without continued and careful attention, this historic breed and the source of a magnificent sport horse could be lost. The global population of the Irish Draught is now about 2,000. There are nearly 1,000 mares and 165 stallions in the main studbook and an additional 850 appendix mares. There are about two dozen Irish Draught stallions and mares in North America, and their population is growing. There are also small numbers in New Zealand and Australia.

 Vulnerable  Rare

### *Spanish Mustang or North American Colonial Spanish*

Several breeds or types of horses powered the Spanish conquest of the New World. The classical Spanish horse, the ancestor of the Andalusian, was the premier warhorse of Spain, and the Jennet was its riding horse. The work stock—the Sorraia, Garrano, Galician, and Asturian—was also brought to the New World. In addition, the Spanish possessed the North African Barb. Besides these valuable horses, early explorers also complained of the mixed, poor-quality animals that suppliers delivered to them. All of these Iberian horses were imported to the Caribbean Islands and to the mainland, where they were bred to supply the army, the missionaries, and the ranchers. Elements of all these varieties of horses are seen in the colonial Spanish stock that eventually multiplied into millions of North American feral horses. Later, both American Indians and Euro-American ranchers developed these horses into new breeds.

The classical Spanish horse was long admired in Europe as the ultimate warhorse and traditional mount for the accomplished rider. But this old breed finds its roots in even more ancient Iberian types, some of which survive today.

The small Sorraia is believed to be a truly ancient breed. The profile is classic Iberian with a dish high on the forehead and the noble ram or Roman nose be-

neath. The head is somewhat heavy, the neck is short and powerful, and the tail is low set. The primitive Sorraia is dun in color with a black mane, tail, dorsal stripe, and ear tips. There is often zebra striping on the legs and a withers stripe. The Sorraia is extremely hardy and has a willing, calm nature. For centuries, cowboys in Spain rode this horse, but the purebred Sorraia is very rare today.

The Garrano is another small horse breed of ancient origins, closely related to the Sorraia but more refined in appearance. Because of its hardiness and sure-footedness, the Garrano worked as a pack or riding pony. Usually bay, brown, or dark chestnut, the Garrano had a heavy mane and tail. The Garrano is still used in Portugal as a packhorse or to pull small carts.

The old pure Galician is nearly extinct. This small horse was a strong and comfortable riding horse with a natural running walk. The phrase “running walk” is somewhat of a misnomer because this extremely smooth gait is actually an accelerated and extended flat walk. The modern descendant, a refined Galiceño, has again been imported to the United States from Mexico, where it has been bred since the arrival of the Spaniards.

The Asturian is another important gaited riding horse. Also small in size, the ambling Asturian was known to the Romans, who called them asturcons. The Asturian is either black or bay in color with a somewhat heavy head.

The Jennet or Jinete was the most famous gaited horse of Spain. The Jennet was renowned but also somewhat mysterious. Both Asturians and Galicians were *ginete*, or gaited ponies, and they may have been the source of the Jennet’s highly desirable smooth, ambling gait. The Jennet also possessed a faster broken pace or four-beat gait. Originally somewhat plain in appearance, the Jennet was refined so that it was swift, light, and elegant in appearance. In England, the Jennet was called a Genet.

Easy-riding, gaited horses were very popular until the end of the seventeenth century in Europe. The strong trotting horse was not commonly used as a riding horse and was viewed as “hard-going.” Gaited horses or “amblers” were known as palfreys in England and

Hobbies in Ireland. The two-beat amble moved like a slow pace. The swaying motion was so smooth that stirrups were not required. Women often sat behind men on a pillion or rode alone between two panniers full of produce. Faster gaits like the broken pace or rack were used by tradesmen and men out hunting or hawking. The racking horse made a distinctive four-beat sound as its feet struck the ground. The rider was not jolted or swayed but moved forward smoothly and rapidly. Gaited horses were usually small and mild in temperament. Because horses can possess so many different gaits and have been called by so many names, it is hard to explain the differences clearly and historically.

The ancestor of the Andalusian or the Spanish horse was regarded throughout Europe as the finest horse, reserved for those possessed of the horsemanship to ride such a proud and fiery animal. The Spanish horse was universally pictured with a noble ram or hawk profile, a high crest, small ears, a broad chest, an abundant mane and tail, great presence, and strength. Although most Andalusians today are gray, black, bay, and roan are also found. Other color patterns were more common in the past. Some researchers believe that the Andalusian was refined by the contribution of the Barb in the southern Spanish region of Andalucía.

The Barb was another desirable horse of the period and was also of ancient development. Many horses described as Barbs were in fact half-Barbs, because their Berber owners generally never sold their mares abroad. Less impressive than the Andalusian, the Barb had a plainer head, a low-set tail, and sloping croup. But the Barb was noted for its great swiftness and endurance. Barbs also possessed smooth lateral gaits.

The Spanish, of course, had greater access to North African Barbs than the rest of Europe. Barb stallions were crossed on native mares to produce racehorses, and Barbs were also used to produce a Spanish cavalry horse with speed and hardiness. This Spanish-type Barb horse was widely used by the conquistadors, and the Spanish imported some Barbs directly from North Africa to the stock-raising operations in the New World.

All of these breeds and types of horses were among the stock brought to the New World by the Spanish

explorers, colonizers, and missionaries. They contributed work as pack, harness, and riding horses. They also brought a wealth of endurance, hardiness, gaited abilities, and colors. At times their bloodlines were mingled, but breeding farms also sought to produce quality remounts for the armies.

The earliest Spanish explorers brought their own horses in small numbers. Bernal Diaz, who accompanied Hernán Cortés in 1519, carefully described the colors and characteristics of the 16 horses brought to Mexico. The great need for hundreds of horses, however, inspired the Spanish to quickly establish breeding stations on Caribbean islands, supplemented by continuing imports.

Small numbers of Spanish horses may have been lost, stolen, or abandoned during the early explorations. But most of the horses that would eventually become the vast feral herds and adopted horses of the native peoples came with the earliest colonization of Florida, New Mexico, Texas, and California, and their spread was rapid. When Don Juan de Oñate crossed the Rio Grande into Texas in 1597, he was met by Apaches mounted on horses. He called these people the *vaquero*, or cowboy, tribe. The Apaches had already been raiding for Mexican-bred Spanish horses, and they were instrumental in moving them north.

By the early 1600s, native tribes were rapidly acquiring Spanish horses even though the Spanish colonial administration issued frequent decrees forbidding the sale of horses. Padre Eusebio Kino supervised the raising of hundreds of well-bred Spanish horses that were sent throughout Arizona to supply the mission lands. Many of these horses were obtained by southwestern tribes that then traded their horses into the hands of northern tribes.

By the early 1700s, Spanish horses from the West were found among the tribes trading with French trappers. At times, the horses were marked with clear Spanish brands. Spanish horses were traded all the way to the English colonies, where they were described as excellent, pure examples of Spanish breeding. After the Revolutionary War, American traders ventured into the Indian country specifically to trade for horses that were brought back east to feed the expanding nation's great

need for horsepower. After the Louisiana Purchase in 1803, it became easier to bring Spanish horses from Texas into the states. The Lewis and Clark expedition recorded the presence of hundreds of wild horses far in the Northwest in the Columbia River valley. Meriwether Lewis noted that the Indian horses of the area were of excellent quality, elegantly formed, active, and durable.

The reintroduction of the horse into North America resulted in two stunning events. First, the feral horse rapidly expanded into its former ecological niche, becoming a vast herd of several million. This was facilitated by the European attitude toward geldings. Although Arab, Turk, and Mongol horsemen used geldings, Europeans believed that gelding made stallions too timid for warfare and unsuitable for men to ride. These beliefs were slowly changing by the sixteenth century, but geldings in the service of the army were generally ridden by servants or women or used as pack or draft animals. The presence of large numbers of stallions and their potential genetics facilitated the development of healthy feral herds. The feral horse became so well established before the arrival of the Euro-American settlers that many experts of the time believed that the wild horse herds were native to the continent. The feral horse received the name *mustang* from the Spanish *mesteño*, meaning wild.

Second, many native peoples rapidly adopted the horse, and this profoundly changed many aspects of their cultures. The Apaches, Pueblos, and Navajos quickly adopted horses, goats, and sheep. From the nearby Utes, the horse was passed to the Shoshones and Flatheads in the Rocky Mountains. The Pawnees of Nebraska were one of the first Plains tribes to use the horse. The Pawnees and Osages developed their own, similar methods of horsemanship, which differed from the Spanish-trained tribes in the Southwest. The mounted Plains tribes of the Arapahos, Blackfeet, Dakotas, Cheyennes, Comanches, Crows, Kiowas, and Lakotas all gave up their permanent villages to follow the buffalo, and the buffalo hunt changed radically. Tipis grew larger and possessions expanded because the powerful horse instead of the dog could pull the travois. Ownership of horses came to signify

wealth, raiding for horses became an important concern, and warfare was conducted on horseback. By the mid-1700s, the horse had reached the Nez Percés far in the Pacific Northwest and into Canada.

Before the horse, American Indian peoples possessed only one truly domesticated animal—the dog. In addition to the knowledge of horse handling gained through the enslavement of many southwestern tribes by the Spanish, native peoples applied their techniques for handling dogs to the horse, which they sometimes called big dog, God dog, or sky dog. In the nineteenth century, Wolf Calf, a Piegan, recalled, “When they first got horses, the people did not know what they fed on. They would offer the animals pieces of dried meat, or would take a piece of backfat and rub their noses with it, to try to get them to eat it. Then the horses would turn away and put down their heads, and begin to eat the grass of the prairie” (Ballantine and Ballantine 1993, 198).

As American settlers pushed their way west, they encountered the wild horse herds and the Indians’ horses, which they often called by tribal names: Choc-taws and Chickasaws back East, Pawnees, Cayuses, and Nez Percés in the West. The mustang was also called cow pony, Indian pony, buffalo pony, or Spanish pony. All of these horses tended to be small, at 13 to 14.2 hands tall.

In the late eighteenth century, a visiting Franciscan priest wrote an account of the two kinds of horses to be found in the Southwest. The *cavallo de camino*, or travel horse, which was a smooth-gaited horse, and the *caballo de campo*, or field horse, which was used by ranchers and cavalrymen, who valued their dexterity on rough ground. The descendants of these colonial Spanish horses were widely used as cow ponies, riding horses, and stage horses and were ridden by the famous Pony Express. They were widely praised for their endurance, cow sense, intelligence, comfortable ride, and other attributes. President Theodore Roosevelt, who spent some time in the West as a young man, praised the mustang as the best potential cavalry horse. The well-known western artist and sculptor Frederic Remington wrote in 1888: “One thing is certain; of all the monuments the Spaniard has left to glorify his reign

in America, there will be none more worthy than his horse. . . . the Spaniard's horses may be found today in countless thousands, from the city of the Montezumas to the regions of perpetual snow; they are grafted into our equine wealth and make an important impression on the horse of the country. They have borne the Moor, the Spanish conqueror, the Indian, the mountain man, and the vaquero through all the glories of their careers" (Remington 1889, 338).

But there were also detractors, who derided the small, rough mustang in comparison to the refined eastern horses. As settlers poured into western lands, the building of the railroads, the killing of the buffalo, and the fencing of the range progressed. Native peoples were forced onto small reservations, and ranchers introduced "blooded" horses. Saddle, driving, and running horses arrived in the West by the 1840s.

Crossbreeding often resulted in larger horses, so stallions of all types were frequently turned loose with ranch or feral stock. In Texas and the nearby ranching country, American Quarter Mile racehorses were crossed with mustangs, resulting in useful and popular working stock horses. Morgans were used in crossbreeding in California and other areas. In the Northwest, where heavier stock was needed to pull feed to the cattle in the mountains, draft horse crosses were more common.

The federal government also contributed to the loss of the Colonial Spanish horse when it forced tribal peoples onto smaller reservation lands. The government viewed the Indian horse as a weapon, and it pursued the extermination or confiscation of the herds. Later, "improvement" efforts introduced outside horse blood into reservation stock.

Pure Colonial Spanish horses were preserved by a few Hispanic, Native American, and Anglo ranchers and survived in isolated feral herds. The feral horse population again became very large in the twentieth century, but most of the population had been changed by the continual addition of outside stallions and mares. During the Great Depression and again in the 1950s, when farm mechanization increased, large numbers of horses were abandoned on private property and federal ranges. The word *mustang* now refers to feral

stock or adopted feral horses, not the traditional Colonial Spanish or Spanish Mustang horse.

Some ranches maintained their Spanish horses and cattle without succumbing to outside influences because they were pleased with their stock's performance. The cow horse remained the primary workhorse in North America long after the automobile and tractor displaced most other working horses. The cow horse is still used in cattle ranching. The pressure to crossbreed the cow horse increased in the years after World War II, largely in response to the growing popularity of horse shows. The Quarter horse became the horse of the West, with a tremendous increase in registered stock, and it remains the most numerically strong breed in North America. Other stock breeds have also enjoyed great popularity, including the Appaloosa, Palomino, Buckskin, and currently the Pinto or Paint. The Spanish Mustang was the basis of all these breeds and contributed to such gaited horses as the Tennessee Walker, Saddlebred, Missouri Foxtrotter, and Mountain Pleasure breeds. In South America, the Colonial Spanish horse was developed into the gaited Paso Fino and Peruvian Paso.

Horse breeders who preferred the true Colonial Spanish horse type continued to seek them out. They looked for horses that exhibited a narrow range of conformation characteristics. This Spanish horse is small, usually not more than 14.2 hands in height and 700 to 800 pounds in weight. The Iberian heritage is often revealed in the profile of the head. The forehead is straight to concave, and the nose is convex. The jaw is strong, the ears are medium to short, and the muzzle is small. The chest is narrow but deep, and the front legs often meet together in an A-shape. The legs and feet are hard and remarkably sound. The chestnuts, or horny calluses on the insides of the legs, are small or nonexistent. The back is short, the shoulders are long and well angulated, the withers are sharp, the croup is sloped, and the tail is set low. Manes and tails are usually full and heavy. The Spanish horse does not look like the old "bulldog" Quarter horse but is smoother and long muscled. Better nutrition and management has resulted in some horses as tall as 15 hands and slightly heavier in weight.

The North American Colonial Spanish horse is also seen in nearly all colors and color patterns, including many rare and attractive variations known by their Spanish names. One possible reason for this richness in color may be the preference that many tribes had for certain distinctive color patterns. The Comanche and Cheyenne favored the *pinto*, or paint, in several patterns known as *overo*, *sabino*, *tobiano*, and splashed white. Pinto comes from the Spanish word *pintado*, painted. Two special patterns, the War Bonnet and the Medicine Hat, were believed to be imbued with mystical powers. Medicine Hat horses are white with a second color such as red roan on the ears, poll, and chest and around the eyes. War Bonnet horses have this second color mainly on the ears. The Nez Percés began to breed their own favored spotted horses, or Appaloosas, in patterns such as blanket, frost, leopard, snowflake, and varnish. Both spotted and Medicine Hat patterns were seen in the Andalusian horse of old.

Some colors are more common in the Spanish horse than in many other breeds, such as black, *grullo*, and buckskin. Both grullos and buckskins are a type of dun with black points. Grullo horses appear in such colors as bluish slate, dark *lobo*, or silver grullo. Spanish words for chestnut and sorrel horses describe the color of the points—*alazan*, *ruano*, and *tostado*. Two other desirable colors are *palomino* and *cremello*. The use of English and Spanish words to describe the richness of color and pattern accurately in Spanish horses is detailed in D. Phillip Sponenberg and Bonnie V. Beaver's *Horse Color* (1983).

Many Spanish horses also exhibit such easy-riding gaits as the running walk; the amble, *paso fino*, single-foot, and *sobreadado*; the rack, flying pace, and *paso largo*; or the uneven four-beat fox-trot. The ability and tendency to perform a gait is determined by the horse's nervous system and conformation, which means that gaits are genetically inherited. When displayed by the Spanish Mustang, these gaits are natural with very little lift, not enhanced by selective breeding or training like the showy Missouri Foxtrotter or Tennessee Walking horse. The gaits of the Spanish Mustang are so variable that they are often hard to identify. Two Colonial Spanish breeds in Puerto Rico and Peru were selected

for distinctive action and *brio*, a special combination of docility, spirit, self-carriage, and a fiery presence. The Peruvian Paso exhibits a distinctive action called *termino*, in which the powerful hind legs push forward in long, straight strides while the front legs swing outward in an arc. This gait is very smooth and fast. The Paso Fino, with great collection and rapid short steps, performs the *paso fino*, or broken pace, at three speeds: the *fino*, *corto*, and *largo*. The best explanation of gaits and gaited breeds is found in Brenda Imus's *Heavenly Gaits: The Complete Guide to Gaited Riding Horses* (1995).

The Colonial Spanish horse is an intelligent, even-tempered horse with a strong sense of self-preservation. This breed has good cow sense and excels at competitive endurance and trail riding. Some Spanish Mustangs are used in such activities as team penning, reining, and gymkhana. Many Spanish Mustangs are kept as pleasure horses because they are such easy-keepers and so enjoyable to ride.

By the twentieth century, the Spanish horse that had so permeated the country as a partner of ranchers and native peoples and had run wild over the West was nearly gone. The causes included crossbreeding, the loss of Native American horses, and the introduction of other breeds into feral herds. One of the first individuals to recognize the situation was Robert E. Brislaw, Sr. Born in the Palouse country in 1890 and orphaned at age seven, Brislaw worked on ranches from a young age. For thirty years, the U.S. Geological Survey employed him as a teamster, packer, and recorder on topographical assignments. He was thus in an excellent position to observe both feral horses and working ranch horses. Brislaw developed a strong appreciation and admiration for the little Spanish Mustang.

In the 1920s, Brislaw became concerned with the Spanish Mustang's rapid disappearance. He began his own preservation project with several Crow Reservation mares, adding to his breeding herd with more mares he sought out in Utah, Mexico, and New Mexico. He used two Ute stallions, one of which escaped to the wild in 1944, never to be recaptured. Bob Brislaw and his brother Ferdinand continued to ranch in Wyoming and raise authentic Spanish horses.

In 1957, the Brislawns joined several other ranchers devoted to the Spanish Mustang to form the Spanish Mustang Registry, or SMR. From its modest start with 20 animals, all strictly inspected and verified historically, the registry has now recorded about 1,100 horses. The registry is dedicated to the preservation of the Spanish Mustang and forbids any deliberate altering of the type (pl. 109).

An offshoot preservation group of the SMR, the Southwest Spanish Mustang Association, or SSMA, strictly limits registration to horses descended from nine important historical breeders: the Brislawns in Wyoming, Ilo Beksky of Nebraska, Ira G. Wakefield of Arizona, Monty Holbrook of Colorado, Abb and Hoots Crisp of Oklahoma, Gilbert H. Jones of Oklahoma, and Jewel G. Whitmire of Oklahoma. Each of these herds carried different heritages or colors that are being preserved intact by new breeders. Choctaw, Kiowa, and Cherokee strains are also recognized. The SSMA promotes the riding of the Spanish Mustang to demonstrate its endurance talents. Crossbreeding is discouraged.

The American Indian Horse Registry places the historic Spanish Mustang in a separate classification but also has classes for inspected partbreds, unknowns, and modern breeds such as the Quarter horse, Appaloosa, Paint, Pinto, Pony of the Americas (POA), and others (pl. 110).

The Spanish Barb Breeders Association, or SBBA, is another offshoot of the SMR, originally based on five recognized strains. One strain includes the horses from the Romero ranch in New Mexico, which was an original Spanish land grant. The SBBA registers horses in three divisions based on inspection. The SBBA is committed to the restoration of the Spanish Barb, using this inspection process and encouragement to breed horses toward specific conformational goals. The SBBA allows the use of North African Barb and Spanish Lusitano horses in their restoration process. These crossbreds are to be registered as halfbreds, but their progeny are later eligible for permanent status. There are fewer than 400 registered Spanish Barbs. Most Spanish Barbs are solid-colored dun, grullo, sor-

rel, or roan, often with primitive markings. The Medicine Hat pattern is especially desirable.

Breeders who object to the use of crossbreeding have started another registry for native Spanish Barb horses, the Society for the Preservation of the Barb Horse and the Barb Horse Registry. This group is endeavoring to perpetuate the pure Barb type. All of their activities and events involve performance to show what these horses can do. Robert and Louise Painter, longtime breeders and the organizers of the registry, believe that there are only 115 to 125 pure Barb-type horses in North America. Eighty-five of these horses are now entered in the registry.

Another preservation effort for Colonial Spanish horses involves the Wilbur-Cruce herd of Arizona. In the late 1870s, Dr. Reuben Wilbur, an Indian agent, obtained 25 mares and a stallion descended from Father Eusebio Kino's Rancho Dolores stock. The Wilbur ranch maintained a nearly pure herd on free-range conditions for more than a hundred years. The purity of this group was verified by blood typing. In 1990, the ranch was sold to the Nature Conservancy to become part of an adjacent national wildlife refuge. Because the horses had to be removed, the Wilbur-Cruce family donated them to the ALBC, which funded the horses' capture and placement with a few breeders in Arizona, California, and Oklahoma. One small band was released at a wild horse refuge in northern California. The Arizona Pioneer Living Museum also has a small group for use in demonstrating early state heritage. A few excess stallions were auctioned to interested riders or breeders of Spanish Mustangs.

Careful attention to breeding is planned to maximize the rare variants in the Wilbur-Cruce population. Preservation of the strain is also most important because the Cruce Colonial Spanish horse or Wilbur-Cruce Mission Strain is the only known "mission" strain of pure Spanish horses remaining in the Southwest. Although some of the horses have been registered with the Spanish Mustang Registry and the Southwest Spanish Mustang Association, the Spanish Barb Breeders Association has created a separate division of its registry for the strain. This should facilitate pres-

ervation breedings. The SBBA is also the repository for the historical documents and information about the strain. At present, there are fewer than 100 identified Wilbur-Cruce Mission Strain horses. More interested breeders are needed.

Spanish feral herds have also been identified. The Pryor Mountain herd in Montana and the Kiger horses of Steens Mountain in Oregon are regarded by many as strongly Spanish in origin, but to date, only the Cerbat herd in Arizona and some of the Sulphur horses in Utah's Mountain Home range have been recognized by the SMR.

The Cerbat feral herd is small. The brushy, rocky Cerbat Mountains in northwest Arizona are extremely rugged. These feral horse herds were present before the American settlers arrived in the 1860s. Rancher Ira Wakefield captured horses from the Cerbat Mountains for use in his breeding program. The original ranch families in the area had not introduced outside horses into the herd. Many of the horses were removed in 1971, when a severe drought threatened the water supplies for cattle. Spanish Mustang breeders obtained some of these horses, and they were recognized by the SMR. In 1990, another small herd was found in the Cerbat area, and their connection to the previously captured group was established through blood typing. The BLM manages the Cerbat herd, and it is critical that they continue to preserve its unique genetic type.

Marye Ann Thompson, registrar of the SMR, owns the majority of the captive Cerbat horses. The mares are used to preserve the pure strain, while stallions are also used in the Spanish Mustang Registry. The Cerbat horses strongly show Colonial Spanish conformation, although their colors are limited to bay, chestnut, and roan. Some unique blood types are also present in the herd. Many Cerbat horses possess gaiting abilities.

Chief Walkara of the Utes drove thousands of Spanish horses into Utah in the 1840s. In 1847, the trader Miles Goodyear also purchased 230 Spanish horses and brought them into Utah. Many of these Spanish horses escaped into the mountains of southeastern Utah, where they multiplied. As time went by, ranchers released larger horses into the herds to increase the size.

In the first half of the twentieth century, most of the horses in the valleys were sold for meat or shot, but a small group of horses survived on the higher, remote Mountain Home range. In the 1970s, this area became the Sulphur Herd Management Area managed by the BLM.

Within a few years, the special characteristics of these horses had been observed. Half of the Sulphur horses are line-backed duns or mouse-gray grullas. They also have two-color, dark manes and tails, dark-tipped ears, and striped legs. The rest are solid-color blacks, bays, chestnuts, sorrels, and browns. Due to the history and geographic isolation of this area, the Sulphur horses are felt to be Spanish in ancestry, and preliminary blood typing supports this conclusion. The SMR has accepted some of these horses into its registry. It would be helpful if a wild horse range or preserve was created for this group of horses.

Theodore Roosevelt National Park in the badlands of North Dakota is the home of the Lakota or Nakota horses. After the surrender of Sitting Bull and his Hunkpapa Sioux warriors in 1881, the U.S. Army confiscated their tribal warhorses and buffalo runners. Local ranchers acquired many of these horses and grazed them on the range. By the late nineteenth century, escapees had formed feral herds. In 1883, Teddy Roosevelt made his first trip to this area, and he soon became a partner in the Maltese Cross Ranch. While tending cattle, he often watched the bands of free-running horses whose descendants still roam the southern areas of the park that bears his name. These horses are now known as Nakota horses and are recognized as a strain of Spanish Mustang.

Although the federal government removed horses from the prairies and badlands during the 1940s and 1950s, horses survived in the more remote areas and in the fenced-in areas of the national park, created in 1978. Since the 1980s, the National Park Service has released Arabs, Quarter horses, a part-Shire bucking horse, and other breeds into the range in a misguided attempt to "improve" the horses to be more acceptable to potential adopters. Although these stallions have since been removed, they have altered the genetic heritage of the

horses in the park. The NPS is not now interested in preserving or reestablishing a historically accurate herd.

Fortunately, local horsemen Leo and Frank Kuntz recognized the original Spanish type and purchased horses for their ranch in Linton, North Dakota, where they continue to conserve this strain. The Nakota Horse Conservancy also promotes their preservation. Nakota horses often show the interesting frame overo and roan color patterns, including a large number of blue roans. They are also found in black, gray, and, less commonly, bay, chestnut, and dun. Some show dun-factor coloration such as leg striping. The Nakota horse has been named the honorary state equine of North Dakota, but there is a great need for more people to become conservators of these horses.

The Pryor Mountain Wild Horse Preserve is located on the high Montana-Wyoming border and is managed by the BLM. This horse refuge was the first of its type and was established in 1968 through the efforts of author and filmmaker Hope Ryden and the dedicated members of the Pryor Mountain Mustang Association. Some Pryor Mountain horses are also owned privately by owners committed to preserving this type.

The BLM has adopted a conservation program for these horses and has welcomed the assistance of the ALBC in identifying and removing the non-Spanish horses, such as those showing a draft influence. Blood typing has confirmed their Spanish ancestry. Most of the horses also show the conformation and range of coloration to be expected in Spanish horses. Because this area was a primary migration route for the Crows and Shoshones, it is thought that these horses are descended from tribal stock. Small bands totaling about 140 horses roam this rangeland that was also a Crow buffalo hunting land. The preserve is open to the public.

In the 1970s, the BLM identified a group of mustangs in Oregon that exhibit some Spanish appearance. The horses are generally colored in shades of red dun, yellow or claybank dun, grullo, and black, with long, dark manes and tails. Most also carry primitive markings. The horses are stocky and muscular, with short backs and attractive heads (pl. 111).

Two retired BLM wild horse specialists, Ron Harding and Bill Philips, gathered horses from a remote and isolated area of Oregon known as Beaty's Butte. Twenty of these horses were placed in the 37,000-acre Kiger Habitat Management Area (HMA) and 7 in the 28,000-acre Riddle Mountain HMA, both in Oregon. Over the next ten to fifteen years, several horses were adopted out by the BLM program, but mostly they were left to increase their numbers. The BLM also transferred horses between the two herds to lessen inbreeding.

In 1987, the BLM and the private breeder Rick Littleton christened the horses Kiger Mustangs and began to promote them. The popularity of these distinctive horses has grown greater than the supply, so the BLM now conducts a lottery for their adoption. In 1996, there were 1,360 potential adopters for 85 available horses. The feral herd now numbers about 100 with roundups and adoptions held every three or four years as the management level is exceeded. The Kiger Mesteno Association has been established to preserve the integrity of the original foundation herd and their descendants. Kiger Mustangs do possess some Spanish factors, but they also differ from other groups of Spanish Mustangs. They have received considerable public attention and recognition, which has helped to secure their future. The attractive and striking Kigers have proven themselves to be excellent riding and using horses. The population now numbers about 500.

The entire population of various Spanish Mustangs or Colonial Spanish horses is probably fewer than 2,000. Many horses are part of historic strains that also deserve individual preservation. Although the registries have focused on the strongly Spanish horses, it is also necessary to accept the variations in type and the newly identified Spanish horses, either individually or in groups.

These horses also face other challenges. There is a definite need for education to inform the public and horse enthusiasts about the differences between Colonial Spanish horses and feral mustangs. The further releases of "improvement" stock into the free-running BLM herds are also a risky proposition without blood typing and identification of the remaining horses. Just as there is no agreement on what to call the North

American Colonial Spanish horses, the several different associations confuse the public. The ALBC itself considers the group of various strains as one breed. A Spanish Mustang Coalition has been established as an umbrella group for the various Spanish Mustang associations and protection organizations. Originally established by Robert Brislawn and Jeff Edwards, the Horse of the Americas Registry reorganized in 2000. This organization seeks to register all Spanish Colonial horses in one searchable database while preserving existing strains.

The Spanish Mustang is unique to North America, an integral part of its history, and the foundation of many New World breeds. The ALBC regards the Spanish Mustang as a high conservation priority in the United States. The veterinarian D. Phillip Sponenberg, who has conducted much of the research on the Colonial Spanish horse, has written that these horses “are a direct remnant of the horses of the Golden Age of Spain and that type is mostly or wholly extinct now in Spain. Our Colonial Spanish horses are therefore a treasure chest of genetic wealth from a time long gone” (Sponenberg, “North American Colonial Spanish Horse”).

On the Blackfeet Indian Reservation in Montana, a large herd of Spanish Mustangs has been reestablished in the past few years. This restoration is one more encouraging event. More riders are discovering the Spanish Mustang’s excellence as an endurance athlete and a sound, talented riding horse.



Critical

### *Florida Cracker (pl. 112)*

In 1521, Juan Ponce de León entered Florida with 80 men and their horses. As the Spanish established settlements, they introduced additional cattle and horses from their newly established colonies in the Caribbean. More horses were also probably brought from the western Spanish territories. They released the horses to graze, and the escapees became feral. By the 1650s, the Seminole Indians had adopted the horses, using them to tend herds of cattle. When the British arrived

in Florida in 1763, they called the native Indian breed the Seminole horse.

These horses reflected their mixed Spanish background, for the Spaniards imported not only refined riding horses like the classical Spanish horse, Jennet, and Barb but also packhorses like the Sorraia and mixed stock. In Florida, these horses faced a difficult climate, for the weather was often hot and humid. Parasites and insects were abundant. The cattle and horses were turned loose to graze on swamp or timberland where the subtropical forage was poor. Only the tough feral and ranch stock survived.

By the early eighteenth century, cattle were found throughout northern Florida, especially across the panhandle. Cattle raising increased when Florida became part of the United States in 1821. The American colonists found that the small, lively “Indian” ponies possessed great endurance and cow sense. These horses stood 13.5 to 15 hands tall and weighed 750 to 900 pounds, and many had inherited the unusual gaits of the Spanish horses, such as a running walk or a single-foot that the colonists called a “coon walk” or “coon rack.” They were also amazingly agile over the rough ground.

Called Florida cow ponies, Seminole ponies, Marsh Tackies, or Prairie ponies, these small, hardy horses became the primary source of work on small family farms. Cattle were run loose most of the year and then rounded up by cowboys who cracked their whips from horseback. From this practice, the cow ponies eventually earned their name, Cracker horse. This way of raising cattle continued into the twentieth century, and feral herds of Cracker horses were still found in Florida in the 1930s. The feral herds served as sources for the useful ranch-bred Cracker horses.

Cattle raising in Florida changed in the 1930s. Brahman cattle were introduced and crossbred on the native cattle to produce larger offspring. Other cattle breeds were also brought in, and with them came the screwworm. This meant that the larger cattle now needed to be roped to be treated for the parasite. The little Cracker horses were not large enough to hold the cattle for roping, so larger Quarter horses were brought in. In addition, federally sponsored eradication campaigns

[To view this image, refer to the print version of this title.]

Fig. 57 Kenny Holder with Spanish Doll, a five-year-old Florida Cracker mare of the Ayers line. Owned and photographed in Florida by Sam Getzen, a longtime conservator of the breed.

against the fever tick and the screwworm exterminated much of the feral livestock, both cattle and horses.

Only a few ranchers kept their Cracker horses and cattle. It wasn't until the 1970s and 1980s that people began to realize that both historical breeds had fallen to extremely low levels. Florida's agriculture commissioner Doyle Conner became concerned about the potential loss of these two breeds. A small group of Cracker horse owners and breeders was also interested in finding a way to preserve these horses as a recognized breed.

Fortunately, good Cracker horses were still being bred and used by a few ranching families. Rancher John Law Ayers had started his herd of Cracker horses in 1930. Horses from this herd were donated to establish a breeding group at Withlacoochee State Forest, where Cracker horses and cattle can now be seen at the agri-

cultural museum. Another herd was created at Paynes Prairie State Preserve. With assistance from the Florida Department of Agriculture, the Florida Cracker Horse Association was established in 1989. More than 300 Florida Cracker horses have been registered. Historical documentation and conformational evaluations are required for registration. The registry is divided into two sections, recognizing foundation horses that were evaluated for acceptance and Cracker horses that are their offspring. Rancher-bred strains are also identified, among them Ayers, Bronson, Harvey, Thrasher, and Whaley. The association has more than 170 members and registered 62 horses in 1999 (fig. 57).

Because the Cracker horse is evaluated by historical criteria, the breed has maintained its traditional handy size and weight. Though small, the Cracker possesses great strength and endurance, easily carrying a working rancher. The head is refined, with a wide forehead, and the profile is straight or slightly concave, not Roman nosed. The chest is medium to narrow, with a good V-shape, not broad or flat. A smooth-riding Cracker has a well-laid back shoulder. The croup is sloped, the

muscling is smooth, the back is short, and the tail is low set. Chestnuts, if present, are small. Any color is possible, but solid dark colors, bays, roans, and grays are most common. A variety of gaits is still seen in the Cracker. Some display a running walk, whereas others perform the natural amble that is still called the “coon walk” or “rack.” The Florida Cracker is a small riding horse, but it is also still a using horse with good cattle sense. These horses remain healthy and are well suited to the hot, humid Florida climate.

Except for the state of Florida horses, most Cracker horse breeders are working cattle ranchers with herds of 5 to 10 horses. Cracker horses are still raised on the range and used in ranching. Association members are not actively promoting the Cracker horse outside Florida, and these horses are not generally for sale. The association’s primary goals for the Cracker horse are preservation, recognition, and increasing the breed’s population.



Critical

### *Chickasaw (fig. 58)*

Long before the European explorers came to the New World, the Mississippian culture flourished through the Cumberland, Tennessee, and Mississippi River valleys of the eastern woodlands. Villages and farmsteads were home to these native agricultural peoples. This culture lasted for eight hundred years until Hernando de Soto began his destructive march from Florida through southeastern North America as far as present-day Oklahoma.

There had been earlier Spanish expeditions to North America, beginning with the 80 men and horses of Juan Ponce de León in 1521, and followed by failed settlement attempts by Lucas Vázquez de Ayllón and Pánfilo de Narváez with much larger groups of men and animals in the later 1520s. Soto’s expedition, however, was much more ambitious. He left Tampa Bay in 1539 with 500 Europeans and large numbers of horses, mules, pigs, and dogs. Along the route, his men pillaged for food, women, and slaves. They terrorized the native peoples, killing those who fought back. Small-

[To view this image, refer to the print version of this title.]

Fig. 58 A historical photograph of the Chickasaw horse. Courtesy of the Chickasaw Horse Association.

pox, measles, venereal disease, and other European pathogens ravaged the defenseless Indians. The Spaniards fought a large battle near Mobile Bay in 1540, killing thousands of warriors. Soto died of fever two years later, but his men did not leave North America for another year.

The Europeans left behind a depopulated, disorganized land in which many chiefdoms had collapsed. Gradually, out of this disorder and in an effort to survive, the Cherokees, Chickasaws, Choctaws, Creeks, and Seminoles banded together in a nation called the Five Civilized Tribes by whites because they had adopted so many European ways.

The Chickasaws lived in present-day northern Mississippi, western Tennessee, and northwestern Arkansas. As the Spanish colonizers and missionaries moved into this area, horses found their way into Chickasaw hands. They became skillful equestrians and avid breeders, riding their horses but also using them to pack out hides to trade or sell.

Chickasaw horses were small at about 13.2 hands

tall. They were closely coupled and well-muscled horses with short backs and necks. The head was short but wide between the eyes, and the ears were small. The chest was wide, the hips were stocky and square, and the tail was set low. Chickasaw horses were widely praised by contemporary writers, who clearly referred to them as a breed. Early European settlers traded or bought Chickasaw horses from tribal members. They were excellent utility horses and showed great speed at short distances.

Chickasaw horses were also taken into Virginia and the Carolinas, where they were bred to the imported horses of the colonists. Impromptu races of these Quarter Mile horses led breeders to develop the Quarter horse. The natural running walk and singlefoot of the Chickasaw horse were also incorporated into the easy riding horses of the South, among them the American Saddle horse and the Tennessee Walker.

The Chickasaw tribe did not fare as well as its horses. After surviving the Spanish, they were caught up in the struggles between the French, English, and Americans. As more Euro-American settlers encroached on Chickasaw homelands, they pressured the government to remove the Indians. President Andrew Jackson implemented the Indian Removal Act in 1830, eliminating the Chickasaws' rights to self-government and their property. Eventually, they and the other members of the Five Civilized Tribes were forced to cede their land. Relocated to Indian Territory, present-day Oklahoma, with their horses, they rebuilt their lives, establishing farms and schools and governing themselves with their own laws and courts.

The Chickasaw horse was once found throughout North Carolina, Tennessee, and Oklahoma. The Spanish Mustang breeder Gilbert H. Jones of Oklahoma included some Chickasaw horses in his breeding stock. The Chickasaw Horse Association was formed by a small group of breeders and registered 590 horses, but the association has become inactive as interest has faded in this important historical breed. If they are not rescued soon, the Chickasaw horses will simply fade away.

### *Choctaw (pl. 113)*

The Choctaws of present-day southern Mississippi and Alabama were farmers and hunters. They lived away from the main travel routes of the French and Spanish, which spared them some of the early disease epidemics that decimated the populations of other native peoples. They also welcomed the survivors of other less fortunate tribes.

So quickly and thoroughly did the Choctaws adopt the Spanish horse that their lives were greatly changed. Their Choctaw "ponies" were equal in quality to the more famous Chickasaw horse, but they were influenced by the French presence in Louisiana. The Choctaws were also able to obtain horses from western tribes.

Beginning in 1724, the French encouraged fighting between the Choctaws and Chickasaws in the hope that the two tribes would destroy each other. Five years later, the Choctaws also fought with the French against the Natchez, who were eventually driven out of the area. Eventually, the Choctaws grew weary of the incessant fighting and came to believe that the French were not rewarding them with enough trade goods. The war leader Red Shoes also feared that the French were usurping his power, so he turned to the English. A bitter and bloody civil war erupted among the Choctaws. After the Revolutionary War, the Choctaw splintered into factions supporting the English, Spanish, and new Americans. They lost the ability to speak as one nation and as a result signed various treaties and land cessions.

After Andrew Jackson signed the Indian Removal Act of 1830, the states of Alabama and Mississippi moved against the Choctaws' lands. They became the first of the Five Civilized Tribes to sign a federal treaty in 1830. Although the Cherokees' tragic Trail of Tears is better known, the Choctaws also endured a winter exodus to the newly established Indian Territory, in present-day Oklahoma, without shoes, winter clothes, or blankets. There the Choctaws and the other relocated tribes rebuilt their lives. The Choctaws retained a sense of loyalty to the South and even raised regiments for the Civil War. The descendants of one Choctaw group remained on their reservation in Mississippi, surviving by subsistence farming and working for white

settlers. Eventually, the Choctaws both assimilated into Oklahoma culture and reasserted their own culture.

The Choctaw pony was taken to Indian Territory with the tribe. Individual farmers and ranchers raised these horses, and some became feral. The Choctaws lost many horses because of federal extermination efforts and crossbreeding. Today the Choctaw pony survives mainly with breeders associated with the strictly regulated Southwest Spanish Mustang Association. Fortunately, the Choctaw strains are well documented.

One Choctaw family has bred an especially pure strain since 1915. Abb and Hoots Crisp of Kosoma, Oklahoma, have continued their uncle's herd, which began with a bay roan stallion and mare. The Crisp strain still shows roan and Appaloosa coloring. In 1983, a Crisp horse named Choctaw Star was the first Mustang to finish 1,000 miles of competitive trail riding without unsoundness.

The Locke strain is even older; it has been bred in Pushmataha County, Oklahoma, since the original Indian removal. The stallion Chief Kiamichi represents this highly desirable line, which is favored by endurance riders. Other old family strains include the Brame, Carter, Helms, Self, and Thurman herds.

In 1975, Choctaw horses still numbered about 1,500. Today they have fallen to fewer than 100 purebred horses in the care of a few breeders found mainly in Oklahoma. Gilbert H. Jones maintains a herd of Choctaws on his Medicine Springs Ranch. Darlene and Bryant Rickman own the largest group of Choctaw horses. Their Choctaws also compete successfully in endurance rides.

One obstacle to Choctaw preservation lies in the splintered Spanish Mustang registries. Some Choctaws are registered with the American Indian Horse Registry or the Spanish Mustang Registry. In addition, many Choctaw owners are not involved in any breeding program. The Choctaw needs to find more interested breeders who wish to preserve the historical strains and not crossbreed with other Spanish Mustangs. Careful cooperation and genetic considerations could still save the Choctaw horse.

Unfortunately, the Choctaw is quite unknown, even among the horse-owning population. The ALBC has

placed a high priority on Choctaw conservation, promotion, pedigree research, and the encouragement of new breeding groups. Its efforts are promising, although breed numbers remain very low. In 1996, 30 mares and 2 stallions tested positive for the equine infectious anemia (EIA) virus as unaffected carriers, although their foals are generally clear, because mares rarely transmit the disease to their young. The adults are kept in quarantine but are successfully reproducing.

Like other Spanish Mustangs, the Choctaw is narrow chested, with sloping shoulders and strong legs. They have a broad forehead, a narrow face, small ears, and a straight or convex profile. The hooves are exceptionally tough, and the mane and tail are often very long. Choctaw horses range from 13 to 15 hands tall and weigh from 750 to 1,000 pounds. They carry extremely varied colors and patterns, including some of the rarest. Many Choctaws are smooth gaited. The Choctaw is an excellent endurance, trail, and cow horse. It possesses great stamina and strength, perhaps more than other Spanish Mustang strains. Choctaw owners often remark on the sweet nature and willingness to please of this rare breed.

### *Sable Island (pl. 114)*

Sable Island is an isolated, 20-mile-long sandbank some 95 miles due east of Nova Scotia in the Atlantic Ocean. Here the sea is shallow much of the way to the mainland. This is a treacherous region for ships, which are also beset by storms, wind, and fog. Since Europeans began their voyages of discovery and trade, Sable Island has witnessed innumerable shipwrecks. Those shipwrecks gave rise to the legend that the horses of Sable Island are descended from horses that struggled ashore. Although the true story is not as dramatic, it is no less fascinating.

Sable Island is a land of constantly shifting dunes. There are no trees, but the summer brings the bloom of shrubs, wildflowers, cranberries, and strawberries among the lush Marram grass, Beach pea, and Sandwort. Freshwater is available all year, the hills and dunes provide shelter, and the island is a migratory stop for many species of waterfowl and the only breeding site

of the Ipswich sparrow. Harbor seals, Gray seals, and Walrus once spent part of the year on Sable Island until they were hunted to extinction there.

The French settlements in the New World included Acadia, the land now known as Nova Scotia and New Brunswick. These settlers found themselves in the middle of conflicts between the French and English. In 1713, France ceded Acadia to Britain, but in the French and Indian War of 1754, the French-speaking Acadians refused to choose sides. The British felt threatened and demanded that the settlers take an oath of loyalty or face deportation.

From 1755 to 1762, at least 6,000 Acadians were sent to the American colonies, primarily to Louisiana. The ships belonging to a merchant named Thomas Hancock of Boston were involved in transporting the Acadians, who were unable to take more than they could carry. Tremendous numbers of livestock were abandoned, including an estimated 1,600 horses. At about this time, Hancock was stocking Sable Island with 60 or so horses. Some of the horses sent to the island were probably Acadian. Similar attempts at placing cattle, horses, and other livestock on the island had been made earlier, but most of the animals were eventually stolen from the island.

The Acadians' horses were believed to be of Breton and Norman breeding. The colonists also purchased horses from the English colonies, probably from nearby New England. The native Canadian breed evolved from these same sources. The Canadian averaged 15 hands tall, with its head held high on a strong neck. The body was sturdy, with excellent feet and large bone in the legs. The mane, forelock, and tail were heavy and crimped, and the fetlocks were shaggy. The Canadian's action was high, and it was known as a trotter. The Canadian and other English or French stock were probably the original horses that came to Sable Island.

By 1801, the shipwrecks had become such a problem that the Sable Island Commission was established to find a way to save both lives and cargo off the coast. The construction and supply of a lifesaving station was begun almost immediately for workers and their families. The station would remain active in dealing with shipwrecks well into the twentieth century. Twice a day,

the crews made patrols on horseback, keeping an eye out for ships in distress. When rescue was needed, teams of horses hauled the large lifeboats over the sandy beaches.

The newly appointed Sable Island commissioner evaluated the horses he found on the island. He located about 60 head and described them as mostly dark bay, about 15 hands tall, with long manes, short necks, strong legs, a good trot, and a fast gallop. Eventually some were caught and tamed by the rescue crews and their families, who depended on the horses for transportation for the next 150 years. Although some horses were slaughtered for food, the Sable Island horses soon became an additional source of income for the station when they were rounded up and sold in Halifax or Dartmouth, Nova Scotia.

By the mid-1800s, the best horses were being sold off the island at rates of 50 or more a year. To meet the demand, up to 20 stallions were brought to the island to breed with the native horses in the years from 1801 to 1912, but some could not deal with the native stallions and others found the life too rugged. The imports were mainly Canadian horses, but they also included Morgans from New England, Thoroughbreds, trotters, and even a Belgian draft stallion. A few mares were also brought to the island, including several Hackneys, Belgians, and an Arab.

All of these horses ran at least part of the year with the native horses. The imported stallions were rotated between the east and west ends of the island. In later years, there was greater management of the herd, including selective gelding, culling, some medical care, and stabling of the more valuable horses in barns for the winter. The lifesaving patrols also regularly checked on the condition of the free-roaming horses (fig. 59).

Although the newspapers called the horses that were sold in Nova Scotia island ponies, they were true horses. Descriptions in the 1860s agreed with the earlier accounts. The horses were still mainly bay, although other colors were present. Their heads were large, often with a Roman nose and a thick jowl, and the ears were small. The crest of the neck was heavy and joined to low withers. The legs were still strong and heavy. The mane and forelock were very abun-

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dant, and the winter coat was extremely shaggy. Although riders called the island horses' ride rough, the horses had great endurance. Some observers noted the presence of unusual gaits, such as the pace.

The practice of removing the best horses to sell effectively prevented the improved stock from radically changing the native island horse. The original herds continued to survive and breed. After new stallions were no longer brought to the island, natural selection insured that the hardy traits were retained. Although not every winter was harsh, periodically severe conditions insured that the weak did not survive to reproduce.

After the lifesaving station was closed, the Canadian government continued to use the island for navigational aids, search and rescue missions, and national defense. Other agencies maintained facilities for monitoring the weather, environment, and wildlife. In May 1960, the government decided to sell all the Sable Island horses under the belief that the horses were suffering and that it would be more humane to slaughter them. The ensu-

Fig. 59 Chebucto's band in 1991 on Sable Island.  
Photography by Zoe Lucas.

ing national uproar, especially among schoolchildren, resulted in the legal protection of the horses and the island. As long as a presence is maintained on the island to prevent vandalism or poaching, the horses should now be safe.

Today's Sable Island horse is believed to resemble the original horses of the Acadians. And because the island horses were probably the genetic basis for the Canadian and Morgan as well, the use of these mainland stallions on the island mares was in a sense complementary. The Sable Island horse remains a snapshot of that founding stock. It stands 13 to 14 hands tall and weighs 500 to 700 pounds. Although they are chunky and deep-chested, with strong, heavy legs, the horses are narrow, not rounded. The neck is heavy and the croup drops sharply. Most horses have a Roman nose or a straight profile, although some dished faces are seen. The mane, forelock, and tail are long, and the ears

are small. Most of the horses are bay, brown, or chestnut. White markings are common, as are mealy muzzles and dorsal lines. Gray, roan, dun, or spotted horses are not seen.

Research biologist Zoe Lucas has been studying the island's plants and animals, including the free-roaming horses, for twenty-five years. This long-term biological and behavioral research is continuing and should provide an enormous amount of important data on equine fertility, parasites, genetics, and other behaviors. Forage quality and grazing are also being studied. Much has already been learned about the natural population fluctuations and the social structure of the horses. The Sable Island horses have been free of human interference for many years, and they are isolated. Lucas feels that this information will further the understanding of both domestic and feral horses.

The Sable Island horse population fluctuates between 200 and 350 horses. The horses are well established on the island, and their future can be protected, barring a natural calamity. Offshore exploration for natural gas and petroleum continues, and possible development of those resources could constitute a threat, as could the possible automation of the weather station. A detailed history of the Sable Island horses has been written by Barbara Christie (1980). A few Sable Island horses are found off-island.



Critical

### *Newfoundland (pl. 115)*

The island of Newfoundland lies in the cold North Atlantic, separated from the Canadian mainland by 60 miles of water. Although the Vikings wintered there a thousand years ago, the island was not be resettled for five hundred years. Here the best natural harbor in all of Canada lies adjacent to the world's richest fishing grounds. Ships from England, France, Portugal, and Spain all found their way to these Grand Banks to fish in the early modern era. The first colony was established on Conception Bay in 1610, and this "new found land" would remain under British rule until 1855, when Newfoundland became a self-governing dominion equal to

Canada itself. Almost a century later, Newfoundlanders voted to make their land the tenth province of Canada.

This unique history has shaped Newfoundlanders' way of life. The island is huge, more than 43,000 square miles, but less than one-tenth of one percent was farmed. Newfoundland's economy was based on the fishing industry and revolved around the deepwater harbor of St. John's. Life in the settlement's "outport" was also based on fishing, on raising some of the food necessary to feed all those fishery workers, and on cutting timber to build the housing and work structures and to use as fuel. Dairy products were important, but farmers also raised hay, potatoes, and turnips.

As early as the 1680s, the colonists were in need of draft animals. The island's British administrator placed an order for horses specifying that they be selected from Scotland, Ireland, and Wales because they needed to be hardy enough to live in the woods in the winter. These horses and subsequent shipments from southwest England tended to be moorland ponies, such as the Dartmoor, Exmoor, and New Forest, and the now extinct Galloway horse. In smaller numbers, Welsh, Connemara, Sable Island, and Acadian horses were introduced to the island. The first census separating ponies from horses was made in 1935, revealing a population of 5,658 horses and 9,025 ponies. Horses tended to be in the cities, while the ponies were an integral and essential element of outport life.

The ponies were essential to working life. They plowed the large gardens and cropped fields, either singly or in pairs. The soil was thin and rocky, so stones had to be harrowed out of the ground. Cartload after cartload of seaweed and dead Capelin that washed ashore after spawning were hauled up to the gardens as fertilizer. Later the hay was cut and hauled to the haystacks and the garden and field crops had to be hauled to storage. Family members needed to be taken to church, the store, the hospital, or social occasions. In winter, sledges, sleighs, or "slides," replaced the pony carts. Logs and firewood were skidded out of the woods over icy trails.

The rhythms of the year's work could not have been carried out without the ponies. Each family owned at least one, and this pony often became a pet as well.

Island horsemanship dictated that the ponies be handled with gentleness and respect. When the ponies were ridden, which was infrequently, they were generally walked, not abused over the rough roads.

Geldings were the primary full-time workers, while mares were used mainly during harvest time. The Newfoundlanders practiced an unusual but highly practical husbandry. Throughout the summer and into the fall, the mares, the young horses, the geldings not in use, and the breeding stallions were all turned loose to run free. The ponies established herds with separate territories. The mares produced foals each year, but the matter of which bred which was generally left to the ponies themselves. The islanders fenced the ponies out of the gardens and fields.

For more than three hundred years, the Newfoundland ponies mixed freely, adapting to their rugged home. They developed a warm winter coat with an undercoat of fine insulating hairs and a wiry, springy outer coat. The mane and tail are thick. The winter coat is often a different color than the summer coat—darker in winter and lighter in summer. The ears are notably small and furry as protection against the cold of winter and the insects of summer. The nostrils have broad nose flaps to close against the cold. Because the ponies traditionally fed on the rough grazing of the island, their jaws developed deep-rooted, strong molars, and their incisors are set in the front of the jaw like a scoop. The small head is nicely shaped and strong.

The Newfoundland ponies exhibit the deep chest and the strong neck and hindquarters of a draft pony. The breast seems strangely narrow, except that it allows the legs to be set close together to travel better on the rocky ground. The narrow front also reduces heat loss in a bitterly cold wind. The feet are small and hard, also advantageous on stony ground.

Because there has been no deliberate effort to breed toward a standard, the Newfoundland ponies exhibit considerable variation, but not in the primary traits of temperament, hardiness, soundness to do work, and a long working life. Another noteworthy trait is that most ponies fit a 19-inch work collar, an important consideration for islanders who had to make or import everything they needed. This pony commonly weighs

about 750 pounds and stands 12.5 to 13 hands tall. Slightly smaller and larger ponies are also seen. The ponies are solid colors such as dark bay, brown, black, chestnut, roan, and gray with very few white markings. Piebalds or skewbalds are not recognized, and the Newfoundland is distinct from the Shetland pony. The Newfoundlanders saw no reason to organize an association or a registry. They understood what made a good pony and its importance to their lives. This partnership lasted until the late twentieth century.

Change came to Newfoundland Island, and the tractor and the snowmobile eventually replaced the pony. Owners were encouraged to geld their stallions, and regulations were enacted to prohibit free-roaming animals. With the decreased need for working animals, horse dealers bought the ponies at criminally low prices. Most sellers were unaware that their ponies, numbering in the thousands, were being sold for slaughter in Europe. In about fifteen short years, a population of thousands of ponies shrank to fewer than 200.

In 1979, the Newfoundland Pony Society was organized to pursue official recognition of the ponies in time for the national Pedigree Animal Act. The society was unable to get enough ponies identified and registered in time, and the lack of official recognition nearly doomed the Newfoundland pony. A dedicated group, Friends of the Newfoundland Pony, which includes the veterinarian and historian Andrew F. Fraser, desperately purchased ponies, found adoptive homes, and fed the ponies in winter. They were able to set up the first small sanctuary for a small group of free-roaming ponies. Newfoundland Pony Care operates as a registered charity to provide sanctuary and care for the surviving ponies.

The existence of the Newfoundland pony should challenge long held conceptions about what defines a breed. A breed is more than pedigrees, registries, and societies; it is what the people in an area regard as a breed. Standardization should never obliterate the very necessary variation in a gene pool. The preservation of genetic variety is now seen as extremely important and should be honored in the recognition of this particular breed. The Newfoundland government's 1997 desig-

nation of the Newfoundland pony as a Heritage Animal for the province is aiding its survival. This status allows for the preservation of all the existing local varieties while defining the characteristics of the Newfoundland pony and establishing the registry. Export is not permitted without official permission. This increased attention should bring more donations and support funds to the remaining ponies. The suggestion has also been made to repatriate the pony to abandoned islands off Newfoundland.

The breeding population of the Newfoundland pony probably remains lower than 100, although the registry has entered 175 ponies, including 20 stallions. At least 90 ponies are now on the mainland. Rare Breeds Canada has consolidated its ponies in Ontario in order to better control and maintain a breeding program. DNA analysis has been undertaken to help define the breed, register the ponies, and coordinate a breeding program.

The Newfoundland pony remains a lovely working harness pony and an entirely suitable riding pony for children, especially with its excellent disposition. Andrew Fraser has noted that the Newfoundland pony may be the only population reflecting the primitive Moorland pony type before modern improvements. The Newfoundland pony is certainly an integral part of the culture and history of Newfoundland, and as Fraser has observed, “a historical debt must be paid to the pony.”



Vulnerable

### *Canadian (pl. 116)*

The name Quebec comes from an Algonquian word meaning “where the river narrows.” In 1608, Samuel de Champlain founded the first permanent colony at this site on the St. Lawrence River. The walled city guarded the route inland for explorers and traders. The settlers eventually clustered on the river and its branches, building farms and settlements.

French colonization proceeded differently from that of the English. It was unquestioned that the land

belonged to the French king. He in turn granted *seigneuries*, or landholdings, to aristocrats, officers, orders of the Catholic church, and occasionally commoners whose wealth might aid settlement. The *seigneur* organized defense, patronized the church, built the gristmill, and rented smaller parcels of his land to *habitants*, or tenant farmers. The farmers in turn practiced subsistence agriculture, paid rent forever, and tithed to the church. At first, colonization was sparse and the colonists struggled. The colony did not truly begin to grow until the 1660s.

To assist the colonists, Louis XIV arranged to have excellent horses sent to the colony. From 1665 to 1670, three shipments of about 14 horses were used to establish an organized breeding program. There may also have been a few private imports, but this stock, along with any original horses, formed the basis of the Quebec herd.

The French imports have frequently been described as Breton and Norman horses. Since the Middle Ages, there have been two versions of the Breton—the heavy draft horse and the lighter riding horse called the Roussin. The Roussin was also noted for its amble or pace, often seen later in the Canadian horse. For its part, the Norman horse was known for good bone and strong muscles. Horses that were sent from the French royal stud in the 1660s could have included classical Spanish horses, for they were in great demand at all the royal courts. The classical Spanish horse stood about 15 hands high and was broad, muscular, and rounded in appearance. The cannons tended to be short, the body was deep, and the chest was broad. The neck was also strong and crested. The head was large, with a broad forehead and at times a convex face. The mane and tail were long and abundant. Many of the characteristics of these three horse breeds were seen in the old Canadian, except that it was usually smaller, at about 14 hands tall. This same description also fits the early Morgan horse.

By the end of the seventeenth century, there were 684 horses in Quebec. Because there were at least 10,000 colonists in 1681, there was very likely a shortage of horses. French colonists turned to purchasing sig-

nificant numbers of breeding stock from New England and Virginia. These horses were of English, Dutch, Irish, and even Spanish ancestry.

The French colonists practiced *l'abandon des animaux*, the practice of turning livestock out from fall through spring to feed on crop residues and whatever else the animals could find. This exposed living promoted the survival of hardy horses. French trappers and traders also took horses further into New France and the trading forts of the Great Lakes region. For a long time, the hardy little working and riding French horse was the only type that was available in Lower Canada. This horse also spread into nearby New England and New York. In 1763, French Canada became the property of Britain, and this increased the trade in horses. In addition, the British brought their horses into Quebec.

Just before the turn of the eighteenth century in Vermont, a famous little stallion was foaled. He was first called Figure, although he was later known as Justin Morgan, the horse who founded an entire breed. The ancestors of Justin Morgan have been variously identified as Thoroughbred, Arab, Dutch, or Friesian. The truth probably lies in the inevitable New World mixture, but with a good measure of the Canadian horse. Justin Morgan was bred to local mares, as were his male progeny. Canadian mares abound in the early generations of the Morgan, often coyly referred to as French or part-French.

There can be no doubt that the Canadian and the Morgan sprang from the same basic mixture of French, Dutch, and English horses. An earlier type was obviously available throughout Quebec and New England. Both versatile little horse breeds were "using" horses, perfect for riding, driving, and light farm work. The Morgan's popularity spread rapidly, and by the Civil War, Morgans were in use across the United States.

In the 1840s, historian George Barnard wrote that in Vermont, "the blood is most commonly intermixed by putting mares of unknown origin, which are a cross of the Canadian race, to American horses of some blood or at least some figure. Such mares are kept on the farms for their excellence in color, and when the colt arriv-

ing at maturity, fetches a good price, the farmer in his simplicity, usually views its merits as accidental, or attributes them to the vaunted sire" (Barnard 1841-42, 535). It was this kind of intermixture that evidently contributed largely to the development of the Morgan horse in Vermont.

Canadian horses had been exported to the United States in large numbers after the end of the War of 1812. They were popular trotting horses and were crossbred on native American mares to improve them, leading to the development of the Standardbred. The Thoroughbred-Canadian cross known as the St. Lawrence horse was larger than its Canadian parent and proved an excellent coach horse. The numbers of imported Canadian horses went up sharply during the Civil War. With the high rate of exports, the widespread crossbreeding, and the arrival of the heavy drafters, the true, pure Canadian horse was in danger of disappearing. The British involvement in the Boer War at the end of the nineteenth century again drew on the "little iron horse."

Concerned individuals organized in 1885 and issued the first herd book the next year. Unfortunately, the commission that was charged with inspecting each horse before registration was not provided with the necessary funds to travel beyond Quebec and parts of Ontario. The number of registered horses would have been larger if horses elsewhere in Canada and even the United States had been included.

The Canadian government opened an experimental farm in 1913 at Cap Rouge, Quebec. A larger stud farm also operated at St. Joachim, Quebec, from 1919 to 1940. And the Quebec Provincial Department of Agriculture reestablished a stud at the La Gorgendiere Farm School, which continued until 1981. The provincial government breeding farm moved toward breeding a taller, hunter-type horse, whereas other private breeders maintained the older traditional type.

The provincial herd was eventually sold at auction, and since then, owners and breeders have struggled on their own to promote and preserve their beloved Canadian horse. In the late 1970s, there were only about 400 purebred Canadians to be found in Canada. The Société des Eleveurs de Chevaux Canadiens reports

that there are now about 4,000 Canadian horses and some 400 births yearly. There are regional breeder associations in all provinces. A few Canadians are found in the United States.

The Equine Research Centre in Guelph, Ontario, has performed DNA analysis to help identify genetically isolated breeds for purposes of conservation. This research established the genetic relationship to the Morgan, and it revealed that the Canadian is genetically distinct from the popular North American riding breeds. In addition, the analysis determined that the Canadian is not highly inbred, which is fortunate for a breed whose numbers fell to critical levels.

The Canadian is an extremely versatile horse, much like its cousin the Morgan. The Canadian excels as a backyard family horse for both riding and driving. Active and lively, the breed is easy to handle and keep. Canadians are involved in jumping, eventing, dressage, endurance, and trail riding. They have also found increasing international success in driving competitions. The Canadian is a general-purpose horse, never nervous, and excellent for young riders.

The Canadian remains the horse of old. Standing 14 hands and up, a Canadian weighs 900 pounds or more. The breed is still compact and sturdily built, with strong legs. The action is energetic with great endurance. The head is refined, broad between the large eyes, with a fine muzzle and small ears. The kindly face of the Morgan is also seen in the Canadian. The neck is upright and arched, and the mane and tail are worn thick and long. Canadians are often black, but bay, brown, and chestnut horses are also seen. White markings are minimal.

The “little iron horse” is truly the national breed of Canada and a historic partner in the nation’s development. The Canadian, or le Cheval Canadien, is an integral part of Quebec’s heritage and deserves preservation. In addition to contributing to the Morgan and Standardbred, the Canadian has also been a contributor to the Saddlebred and Tennessee Walker in the United States.



Rare



Success

### *Lac La Croix (pl. 117)*

The forested lakes of the Minnesota-Ontario borderland are one of the most beautiful and remote wilderness areas in the world. Each summer, canoeing and fishing enthusiasts escape to this haunting land of the loon. There are no roads here, so trekkers portage their boats from lake to lake.

In this region, near Fort Frances, Ontario, lies the Neguaguon Lake Indian Reservation. And in this reservation sits the tiny settlement of Lac La Croix. In summer, the village is accessible only by water. In winter, when the ice is strong enough, vehicles can drive to this Chippewa settlement. It is here that in the 1970s, the last 4 Lac La Croix Indian ponies were running wild in the woods.

The ponies had been running feral in the woods since the mid-1960s. No longer able to care for the ponies, the villagers had turned them loose to browse in the heavy forest and survive on their own without pasture or feeding. In an earlier era, the Chippewas had used these ponies for riding on hunts and for pulling sleds in winter when they were out trapping.

The horses that were adopted by the native tribes of Upper Canada and parts of Michigan, Indiana, and Illinois differed greatly from the “Indian ponies” found elsewhere in the United States and Canada. Most native peoples obtained their horses from Spanish stock, but the Indians in the former French areas of trading and settlement had access to French or Canadian horse stock.

Travelers to Ontario in the 1820s observed that the Mohawks in the Grand River area owned large herds of small ponies. “I had an opportunity of seeing great herds of these ponies running nearly wild on the rich meadow lands about the Grand River, belonging to the Mohawk Indians,” observed Henry W. Herbert in 1831. “These little animals—which I do not think any of them exceeded 13 hands, had all the characteristics of the pure Canadians, and except in size, were not to be distinguished from them.” Another traveler noted that the ponies were so hardy and tough that they traveled for ten days “without showing the slightest distress” (Herbert 1857). They were also able to pull a loaded

sled up to 62 miles in one day. This way of life eventually ended for the Mohawk peoples, and gradually machines replaced the ponies, which were sold or set free. For a long time, the Mohawk Indian pony was thought to be extinct.

Decades later, after making several visits to La Croix, an American named Fred Isham, Sr., became determined to save the Indian ponies he had seen in the woods. The last stallion had just been shot under orders of the local Roman Catholic priest. The stallion had been seen breeding with one of the 4 remaining mares near the school, and the priest was upset that his students could see this. Other villagers were complaining that the ponies were dirty and a nuisance, and it seemed possible that local officials would be asked to destroy them. And so in 1977, Isham organized an effort to save the ponies.

Isham and three fellow horsemen had to make their rescue mission in the winter so that they could drive a pickup with a 20-foot horse trailer over the frozen lakes and across portages to reach La Croix. The men were amazed at the ponies' condition. They had full winter coats over well-nourished bodies, and their feet were in good shape. The men were able to tempt the mares with a bag of apples. The two older mares allowed themselves to be haltered, even though no one had handled them for eight to ten years. The two younger mares put up a bit of a fight, but they, too, eventually conceded. All were taken back to Minnesota.

Fortunately, the mares were already in foal to the dead stallion, and the next spring, their foals were born. This tiny herd was now safe, preserving the remnant of the old native herds. Without a stallion, it was necessary to breed the mares to two Indian pony stallions of unknown heritage but resembling the Spanish type.

In 1993, Rare Breeds Canada began a project to repatriate the Lac La Croix Indian ponies to Canada. Direct descendants of the original horses, 3 mares and a stallion, were purchased. A total of 13 horses have now been brought back into Canada and 4 foals have been born. The population of the Lac La Croix in Canada and the United States was 29 in 1995.

After inspections by breeders of Spanish Indian

horses, the Lac La Croix was determined not to be of a Spanish type. The horses do resemble the descriptions of early Canadians or small Morgans. The decision was made by RBC to begin a program of line-breeding, selecting animals that minimized the introduced Spanish blood. Blood typing and DNA mane hair analysis programs are planned to compare the population to other breeds. It is hoped that the Lac La Croix will be restored to an Indian reservation and cherished as an irreplaceable part of native Canadians' heritage. The RBC hopes to start a Lac La Croix registry.

The Lac La Croix stands about 12.2 hands tall and weighs about 900 pounds. Most horses have a black dorsal stripe and long manes and tails. The head is small and attractive, as are the feet. The Lac La Croix remains a gentle companion and a willing worker.



Critical

*Rocky Mountain (pl. 118),  
Mountain Pleasure (pl. 119), and  
Kentucky Mountain*

Two families of gaited horses were brought to North America. The Spanish Jennet, Barb, Galician, and Asturian were brought up through Texas into the South, where they spread to Native American tribes and were adopted by early Euro-American settlers. Britain also supplied gaited horses, among them the Irish Hobby and the Scotch Galloway. These comfortable pacers or amblers were desirable in the days when the roads were rough. As the roads improved, coaching and trotting horses became more important, and the introduction of Oriental horses and their crossbreeding became highly desirable. Gaited horses rapidly disappeared from England, but the American colonies were still in need of these comfortable saddle horses.

In the early years of the Republic, the area around Narragansett Bay in Rhode Island became the center for a remarkable and famous breed of horses. The writer James Fenimore Cooper described these Narragansett Pacers as small, sorrel colored, and in great demand for their hardiness, surefootedness, and ease of gait. An ambling Jennet stallion was reputedly im-

ported to Rhode Island and may have had an important impact on the breed. It had been observed, as early as the sixteenth century in England, that crossing Spanish Jennets with native British mares produced fine saddle horses.

Narragansett Pacers became the saddle horse of choice for many people in the colonies. Paul Revere was said to have ridden a pacer on the night of his famous ride. Narragansett Pacers were exported throughout the colonies, especially Virginia, Kentucky, and Tennessee, and to Canada. Later, Canadian Pacers would be brought back down from Canada into Kentucky. Sugar planters in the West Indies also imported Narragansett Pacers by the hundreds. Yet, the breed's popularity was brief. By the 1820s, the Narragansett Pacer was rapidly disappearing, often because of crossbreeding but also because of the rush to adopt the trotter for use on the improving roads in the East. The editor of the *People's Farm and Stock Cyclopaedia* lamented in 1885:

The day was in Kentucky, Virginia, and Ohio when every farmer owned a horse that would carry the rider with ease, on a walk of four to five miles per hour, and rack or pace eight to ten miles an hour the livelong day. The advent of good roads and light vehicles has supplanted this most useful and economical animal on the farm. In his stead has come the half-bred trotting-horse that can not walk a mile in ten minutes, or trot in five.

We are glad to note the fact that a demand for good saddle-horses is again springing up, and that the people are recognizing the fact that we have lost that best of all useful gaits. . . . The walk, fox trot, rack, or single foot, the pace or amble, the gallop, all came in play to rest each and make the journey a pleasure to both. (Jones 1885, 509–10)

This demand for good saddle horses or plantation walking horses resurfaced in several popular breeds: the American Saddlebred, the Tennessee Walker, and the Missouri Fox Trotter. In the more remote areas of Kentucky, South Carolina, Tennessee, and Virginia

mountain country, gaited saddlers remained the farmer's choice. Before the turn of the twentieth century, the Saddlebred was still shown in the various saddle gaits of the rack, running walk, fox-trot, or slow pace in addition to the walk, trot, and canter. Modern five-gaited Saddlebreds perform a slow gait or stepping pace and a fast four-beat rack. In the Saddlebred, Thoroughbred blood was added for refinement, but away from the show grounds the gaited saddle horse remained an all-round farm horse.

By the 1970s and early 1980s, people began to notice that the old easy-riding saddle horses were becoming hard to find. Rea Swan, a local horsewoman, traveled throughout Kentucky looking for the type of horse she rode on the mountain trails as a child. One of the few conservators of this type was Sam Tuttle, who used a little Saddlebred and Tennessee Walker in maintaining the comfortable riding gaits and size of his horses. Local oral tradition held that more than a hundred years ago, a gaited Spanish stallion had become such a popular stud in the Kentucky Rocky Mountains that his descendants were still present in the local riding horses. This famous Rocky Mountain horse also gave his name to these gentle, ambling saddle horses. Sam Tuttle's stallion Old Tobe was an excellent example of this type, and he had placed his stamp on his descendants.

In 1986, Rea Swan and others formed the Rocky Mountain Horse Association to identify and promote the breed. The horses they sought had the common characteristics of medium height, 14.2 to 16 hands, and a wide chest with a laid back, sloping shoulder. The eyes are wide spaced and bold, the ears are well formed, and the facial profile is generally straight. The horses also have a natural, even four-beat gait known as a singlefoot or rack that is performed with minimal action. Temperament has always been paramount among these family riding horses, and they are notably gentle and kind in nature. Their body color is solid, with small amounts of white acceptable on the face and below the knee or hock. About 40 percent of Rocky Mountain horses are a deep chocolate color with a flaxen mane and tail. These mountain horses are easy keepers and long-lived but somewhat slow to mature.

They also possess a natural surefootedness and strong endurance.

There is some variety in physical type from the smaller Spanish to the larger Tennessee Walker or Saddlebred influence. Blood typing has revealed that the Rocky Mountain horse closely resembles the American Saddlebred, confirming the origins of the Saddlebred in the old saddle horse stock of Kentucky. The breed also shares markers common to the Spanish gaited horse. Yet the Rocky Mountain horse also possesses five unique markers not found in other breeds.

The Rocky Mountain horse has received a good amount of publicity, and the chocolate-flaxen color combination has become identifiable with the breed. The association is continuing to enhance the desired characteristics through selective breeding. Prospective breeding horses are inspected as to conformation, temperament, and natural gaiting. Until 1988, any horse conforming to the desired traits could be registered. There are now about 3,000 registered Rocky Mountain horses. They are shown without artificial devices or shoe pads.

Two offshoot organizations formed from the Rocky Mountain Horse Association in 1989, both with slightly different goals and methods. The Kentucky Mountain Saddle Horse Association was founded by Robert Robinson, Jr., a lifelong breeder of saddle horses. KMSHA members feel that horses smaller than 14.2 hands should be recognized as the natural descendants of the small Narragansett Pacer. Many of Sam Tuttle's horses were between 13.3 and 15 hands, although he realized that many people preferred a taller horse. The association has maintained an open registry for horses that demonstrate the natural four-beat gait and good temperament of the mountain horse. KMSHA horses may be of any color. The KMSHA registers horses and ponies down to 11 hands in two classifications. About 2,000 horses have been registered.

The Mountain Pleasure Horse Association uses blood typing to establish ancestry and has now closed its registry as well. Mountain Pleasure horses are at least 14.2 hands in height and average 15 to 15.2 hands tall. To date, more than 1,800 horses have been registered, but many horses are in both this registry and the

Rocky Mountain Horse Association. Mountain Pleasure breeders feel that their horses are the more accurate parent stock of all American gaited horse breeds and that the breeding of mountain horses can be traced for over 160 years in eastern Kentucky. Mountain Pleasure horses have been bred by longtime family breeders such as Gordon Layton and Al Prewitt in North Carolina. The most famous Mountain Pleasure horse was the original Trigger owned by Roy Rogers and bred by Al Prewitt's father.

Mountain Pleasure horses exhibit a variety of solid colors with minimal white. About a third are chestnut or sorrel, and palomino coloring has been especially popular. The chocolate-flaxen color combination is also seen in the Mountain Pleasure horse. As in the Rocky Mountain Horse Association, spotted horses are not eligible for registration.

Individual Mountain Pleasure horses can execute their natural gaits slightly differently. Some breeders feel that the shorter the back, the softer the gait. Shorter horses are also reputed to have a softer gait. In order to possess a true mountain gait, the horse must not break into a bouncy two-beat trot or pace, and the horse should be able to keep up this gait for an extended time. High, flashy action is not desirable, nor is artificial enhancement. Instead, smoothness and speed are the hallmark of a mountain horse.

Mountain horse breeders have detected a syndrome known as anterior segment dysgenesis (ASD), which can cause vision problems in horses that have inherited this semidominant gene from both parents. Initial research has indicated that ASD is highly associated with chocolate coat color or white and flaxen manes and tails. Both the RMHA and the KMSHA have endorsed responsible breeding plans to identify carriers, increase the numbers of normal horses, and restrict the breeding of ASD carriers. At this time there is no easy DNA test, so both organizations are working toward determining appropriate identification standards.

Few records were kept in the early generations of mountain horse breeding. Some horses are double and triple registered in the three organizations. The mountain horse possesses a heritage that draws from the many gaited horses that were once so valued. It is

enjoying a new popularity for the same reasons—a lovely personality and a comfortable ride. The mountain horse is an excellent family horse, horse for the first-time owner, and trail horse. All three organizations have grown rapidly as many new owners are drawn to these attractive horses with a history drawn out of America's past.



Mountain Pleasure—Critical Rocky Mountain—Rare

### *McCurdy Plantation (pl. 120)*

In the American South, smooth-riding horses of Spanish colonial ancestry were popular with plantation owners, who rode many miles a day while overseeing the work of first their slaves and, after the Civil War, their sharecroppers or tenant farmers. These gaited horses also worked in the fields, pulled wagons, and were used by farmers for transportation.

In Lowndes County, central Alabama, in the late nineteenth century, Ed S. McCurdy owned a large plantation of this type. He also bred trotting and fine saddle horses. The most influential stallion in his plantation walking horse herd was named McCurdy's Doctor, who was foaled in 1905 in Tennessee. McCurdy's Doctor was gray, leggy, and refined. Tennessee was already the home of the gaited walking horse or Tennessee Pacer, which was a mixture of Spanish stock, Narragansett Pacer, Morgan, Canadian Pacer, and other breeds. McCurdy's Doctor sired another valuable stallion known as McCurdy's Fox.

The McCurdy family continued to breed saddle horses, but their stallions were also used by many of the area's African-American farmers, who would barter work for the stud fees. The McCurdy horse became both a light saddle horse and a reliable worker. Though they were born black, bay, sorrel, or roan with or without white markings, most of the McCurdy horses turned gray with age. They also exhibited a natural, straightforward, lateral four-beat gait sometimes called the McCurdy lick. Besides the flat walk, McCurdy horses also performed the running walk, and some could also fox-trot.

In 1935, breeders and fans of the walking horse came together to organize the Tennessee Walking Horse Breeder's Association of America. The McCurdy family chose to register many of its mares and their offspring with this registry, where they were assimilated into the new breed. Unfortunately, the McCurdy bloodlines were less favored and have mostly become lost in modern Tennessee Walker breeding.

Back in Alabama, the McCurdy horses continued to be a favorite mount for riding trails, working cattle, and field trialing dogs. Some owners bred their own McCurdys, while others would just visit the backroad farms in search of a good saddle horse to purchase. Because they were so valuable as calm, dependable, and versatile horses, the McCurdy horse was maintained as a relatively pure landrace breed. As horses became less important to small southern farmers, however, many were abandoned. Many McCurdy horses were turned loose to fend for themselves in Alabama's Big Creek Swamp. Eventually, the swamp was cleared of horses through helicopter roundups, and most of the horses were sold for dog food.

A handful of individuals who enjoyed using their horses for riding and working their field dogs became concerned that the old McCurdy horse was rapidly disappearing. Beginning in 1993, they worked toward forming the McCurdy Plantation Horse Association. Horses are entered into the registry formed in 1995 by examination and historical proof of descent from McCurdy's Doctor or other foundation McCurdy horses. Some Tennessee Walking horses or other registered gaited horses are also able to prove McCurdy ancestry and meet the examination standards of physical conformation, temperament, and natural gaited ability. Although the traditional gray color is preferred, not all McCurdy horse carry the gray modifier gene.

McCurdy horses are medium in size, averaging 15 hands, and generally refined in appearance. Many of these horses are rangy, strong, and athletic, but they are also calm and easygoing, traits that continue to make them popular for trail riding, working livestock, driving, and field trialing. They also preserve an older form of the native plantation walking horse stock that was so intertwined with southern life. Although the as-

sociation is very young, its members hope that they have saved this grand old saddle horse from extinction. About 250 horses have been registered.

### *American Cream Draft (pl. 121)*

The American Cream Draft is the only surviving breed of draft horse native to the United States. The breed's numbers have never been large, and it remains unknown to most people. American Cream Drafts have been ignored by many horse writers and have even been reported to exist no longer. To paraphrase Mark Twain, however, their demise has been greatly exaggerated.

The Cream Draft is a breed based first on a founding mare and later on a founding stallion. Born around the turn of the twentieth century, Old Granny's heritage remains completely unknown, although what happened afterward was carefully recorded. Old Granny was purchased in 1911 at a farm sale in Story County, Iowa. She had a draft horse conformation and a lovely cream coloring. Bred to a black Percheron in 1920, she foaled a cream-colored colt named Nelson's Buck. He was such an outstanding horse that he was left a stallion. He was bred to another black Percheron mare in 1923, and another colt, Yancey, was produced. Yancey sired a filly named Eureka, and when he was crossed on a Shire mare, a colt named Knox #1 was born. In 1931, Knox #1 was bred to a sorrel-colored Belgian mare and produced an outstanding colt named Silver Lace.

Silver Lace was an active breeding stallion and a striking horse. He stood 16 hands tall and weighed 2,230 pounds. His cream coat lay over pink skin accented by a white tail and mane, and he had unusual hazel eyes. Silver Lace was crossed on Percherons, Belgians, and Shires, and soon cream-colored horses were found on farms surrounding the small central Iowa town of Melbourne. The mysterious, untimely death of Silver Lace in 1939 has never been solved, but jealousy may have driven a spurned buyer to kill the draft stallion.

In nearby Hardin County, Theodore Rierson sought out and purchased all the mares sired by Silver Lace that he could locate. The ancestry of each one was carefully researched and recorded. In 1944, all

the known descendants of Old Granny and Silver Lace were entered in the registry of the newly formed American Cream Horse Association. At that time, there were twenty members in the new group and 75 registered horses. These breeders made an effort to stabilize the American Cream through their breeding practices. In the next thirteen years, another 125 horses were registered. The National Stallion Enrollment Board recognized the breed in 1948.

These horses were now known as American Creams, and they had several common traits. They had the rich and unusual cream coloring of Old Granny and Silver Lace. This color is described as medium cream over a pink skin, and it is the result of a dominant gene called Champagne. Horses with a darker skin produce not the same shade of cream but rather a cream that is too light or even white. The manes and tails of American Creams are white, and there are often other white markings. Foals are born with nearly all-white eyes that quickly darken to the breed's distinctive amber color. Some care needs to be taken to prevent sunburn on the exposed skin around the eyes and lips, just as in all light or pink-skinned horses.

American Creams also are of a handy medium draft size, standing up to 16.2 hands high. Mares weigh from 1,600 to 1,800 pounds and stallions 1,800 to 2,000 pounds. This size of draft horse is often more practical for the working farmer than the taller hitch-type breeds. The Creams also make lovely matching teams.

American Creams have an excellent disposition, and working Creams are calm, no-nonsense horses. This excellent temperament is one of the main reasons why the Colonial Williamsburg Foundation chose to use the Cream to help it portray the role of the horse in eighteenth-century Virginia. These horses must be trustworthy, for they are in constant contact with tourists. Although the Creams are not a breed that traces to the 1700s, they are unique to America as well as critically rare. Colonial Williamsburg has joined the preservation effort for the breed and now owns several American Cream Drafts.

Although it is a productive and useful breed, the American Cream had the misfortune to come into existence at a time when the draft horse in America was

headed down the steep slope to near extinction. The numbers of Creams were just too small to cope well with this downturn. For fourteen years there were no new registrations. The American Minor Breeds Conservancy (later renamed the American Livestock Breeds Conservancy) was founded in 1977 to bring attention to breeds such as the American Cream. When the AMBC conducted a census and placed the American Cream on its Priority List, breed owners began to take action.

The registry was reorganized in 1982 and renamed the American Cream Draft Association. Fortunately, the records were intact. To help expand the population, mares with dark skin were allowed in the registry, although stallions had to have the traditional pink skin. Breeders continue to select for the pink skin, as it gives better color. When two Creams are bred together, there is a 75 percent possibility of achieving the desired cream color. Off-color horses, usually sorrels, are ineligible for registration, but outcrosses are still accepted. The association needs to address these issues and develop a standard that helps to fix the American Cream type.

In 1985, 5 new horses were registered. Numbers are now growing slowly and steadily. In 2000, the association reported about 220 American Creams in the United States, and the breed is now found beyond Iowa in scattered areas around the country. Blood-typing studies have been conducted on the breed to aid in formulating a conservation breeding plan. This blood typing has confirmed the breed's distinctness, ending criticism that the Cream was just a color breed or an offshoot of the Belgian.

The American Cream Draft is a lovely, practical farm and harness horse. If the timing had been better, the American Cream Draft might have become a popular breed. It is certainly deserving of that status.



Critical

### *Lipizzan (pl. 122)*

The elegant Lipizzan may be one of the most recognizable horse breeds to the general public, yet it is definitely quite rare in numbers. After many political

upheavals, wars, and natural disasters, it is somewhat miraculous that this magnificent breed survives at all. The worldwide purebred population is believed to be fewer than 3,000 horses.

The Lipizzan's origins lie in Spain's distant past. In the early eighth century, the Moorish conquerors of Spain were mounted on Barb horses from northern Africa. In the southern Spanish provincial breeding centers of Andalusia and Cordoba, the Barb was crossed with indigenous stock, which eventually produced the classical Spanish horse. For both the military and royalty, no horse has been more admired or desired down through the centuries. This Baroque Spanish horse is the foundation stock for the Lipizzan.

The art of classical riding, as first described by the ancient Greek general Xenophon, had blossomed again during the Renaissance. The military forces of Europe in this era demanded that their officers be accomplished horsemen mounted on fast, light, and agile horses. To this end, most royal houses in Europe were importing the prized Spanish horse for the military and for personal use. Through patience and careful training, horse and rider mastered the art of *haute école*, or high school riding.

Students of history understand the close connection between Spain and Austria in the sixteenth century. In 1519, the Holy Roman Emperor Charles V of the Hapsburg dynasty controlled Spain, much of central Europe, and parts of Italy. After his abdication in 1556, his brother Ferdinand I came to rule Austria and much of the Holy Roman Empire. Charles's son Philip II inherited the rest of the empire, including the Low Countries, Luxemburg, Burgundy, Milan, southern Italy, and Spain.

It was at this time that significant events occurred. In 1562, desiring his own supply of Spanish horses, Ferdinand's son Maximilian II established the royal stud at Kladrub in Bohemia. In 1580, his brother Charles organized another stud at Lipizza, near Trieste. Both sites were within the Hapsburg Empire. For many years, Spanish horses were imported to these studs. The Lipizza stud supplied horses to the royal riding stables, while the Kladrub stud bred heavier horses for coach, although breeding stock was occasionally ex-

changed. Other studs using Lipizzan stock, including Graz in Austria, were developed within the Hapsburg Empire for its military.

The world-famous Spanish Riding School of Vienna, which maintains and practices the Renaissance art of classical riding, was created in 1562 in a portion of Vienna's Hofburg, where it remains today, more than four centuries later. For centuries, the stallions used there were bred at Lipizza, but after World War I, national breeding operations were relocated to the Piber monastery outside Koflach, Austria, which still produces classical Lipizzans for this oldest of equestrian institutions.

Spanish Horses were bred at many royal studs: in Italy at Polesine and Naples, in Denmark at Frederiksborg, in Germany, and elsewhere. Two Spanish Horses from Lipizza, also now known as Emperors, were at the royal stables at Tutbury in England by 1624. Although there were exchanges of horses and bloodlines, by the mid-seventeenth century, the rules that govern the breeding of Lipizzan horses were in effect. Breeding records have been kept since 1735.

The six major lines of foundation sires that continue today were established in the seventeenth and early eighteenth centuries in Austria. The gray Spanish horse Pluto was born in 1765 at Frederiksborg. The black Conversano, of Spanish stock, was born in Naples in 1767. The dun Favory was born in 1779 at Kladrub. Neapolitano was, of course, from Italy, born in 1790 and colored either bay or brown. The gray Siglavy was born in 1810. He was an Arab brought to the stud farm with other Arab stallions to reinvigorate the breeding, because the original Spanish horse was now unavailable. Maestoso, born in 1819, was also gray. He was foaled at Kladrub from a Neapolitan sire and a Spanish dam. At the time of Maestoso's arrival, the stud had been forced to move several times, and the breed's numbers were depleted. Maestoso is credited with revitalizing the Lipizzans. Further experimentation with Thoroughbred and other breeds failed to meet the high standards of Lipizza, so these progeny were eliminated from the stud farm.

The modern Lipizzan stallion carries his ancestry well; his first name is that of his sire and his second

name is that of his dam. Today, 69 mare families from the historic Hapsburg breeding farms are recognized. Surviving stallion lines from outside the Lipizza stud include Tulipan from Croatia and Incitato, found in the former Yugoslavia, Hungary, and elsewhere.

As times changed, Lipizzans were raised elsewhere in the former empire, including Hungary, Romania, Czechoslovakia, and Yugoslavia. Because horses from Lipizza were given away or sold at various times, small private breeding farms were also established. Wartime and the changing fortunes of empire several times forced the horses to be evacuated and moved from place to place. After the end of World War I, Lipizza became part of the modern nation-state of Italy. Although Italy wanted all of the Lipizzan horses, half were returned to Austria (approximately 90 to 100 horses) and placed at the new national stud farm in Piber, near Graz, in Styria. After World War II, Lipizza became Lipica as part of the former Yugoslavia, now Slovenia. Lipica rebuilt its stud farm with 11 repatriated horses, but the Italians kept the studbooks for the years 1918 through 1943.

World War II was another crisis for the old breed and its stud farm—the dramatic story was later told in the well-known film *The Miracle of the White Stallions* (1963). The German High Command took the mares and foals from Piber to a Remount Breeding Depot in Hostau, Czechoslovakia, where they joined the Lipizzan horses from Italy and Czechoslovakia. The stallions stayed in Vienna until 1942, when the Spanish Riding School's director, Colonel Alois Podhajsky, defied an order from Hitler and escaped with the horses and their priceless tack to the country estate of St. Martin in upper Austria. When the U.S. Third Army and General George Patton arrived, the Americans agreed to protect the horses from the advancing Soviets. Colonel Charles Reed led the rescue of 40 to 50 Lipizzan mares, almost 100 of their two- and three-year-old offspring, and a few stallions, who were all still behind the Soviet lines in Czechoslovakia. There was much to fear before this rescue because the Soviet soldiers had already killed Lipizzan mares in Budapest. After their rescue, the horses were divided among Austria, Italy, and Lipica, Slovenia.

The breeding farm stock and Spanish Riding School stallions remained safe in the little Austrian village of Wels in the American zone until 1955, when they returned to Vienna and Piber. As an expression of gratitude, Colonel Podhajsky made an unprecedented performance trip to the United States with 14 Lipizzan stallions. The Austrian government controls the national stud at Piber. Occasionally, horses are offered for sale. The breed was threatened most recently in 1983, when an outbreak of an epidemic of rhinoneumonitis swept through Piber. Many important mares representing the top lines were lost. The Piber stud had to search the world to replace those mares.

Today, about 200 to 250 horses are either at Piber or at the Spanish Riding School. The mares are not ridden, but some are driven at the farm. Each year, the best stallion at the riding school is chosen to spend breeding time at the farm to insure that the best bloodlines are sustained.

Outside of Austria and North America, nine stud farms in Europe are breeding the Lipizzan, but for different purposes and with different breeding guidelines.

About 80 Lipizzans are raised in Hungary at Kecskemét. This state-run farm in Hungary has found a market for large crossbred Lipizzan-Trotters, which they sell for competition harness or driving teams. Some authorities see a noticeable Thoroughbred influence in the Hungarian Lipizzan. Crossbreeds have also been used in agriculture. Before the end of World War II, when the Hungarian government feared that the Lipizzans would be captured by the advancing Soviets, they transferred 100 horses from the stud at Bábolna to Germany. These horses were in Bavaria when the Americans arrived. Two stallions and 4 mares were selected to be sent back to the U.S. Army Remount Service.

More Austrian Lipizzans were found in Cham, Germany, in 1945, as part of a group of 400 Czechoslovakian horses, including Arabs and Thoroughbreds. One stallion and 2 mares were included in the shipment of horses to the U.S. Army Remount Service after the war. Today, some 80 Lipizzans are raised at the Topolianky stud in independent Slovakia.

Little is known of the purebred Lipizzan horses in

Romania, although some crossbreeds have been used for agricultural work. The historical stud farm is at Simbata de Jos, where some extremely rare bloodlines are represented. The difficult economic situation in Romania has affected the farm. Hay and medicines have been sent to the farm as part of the relief efforts of the United States Lipizzan registries and the Lipizzan International Federation. There are about 40 Lippizans in Romania.

In the past, Lipizzans in the former Yugoslavia were often crossed with farm-type horses to produce agricultural workhorses. One farm in Bosnia is still raising this type of crossbred draft horse for farmwork. Two Lipizzan studs were destroyed in Croatia in 1991. One lost 90 Lipizzan horses, but the other was able to evacuate the horses before the shelling. The stud farm in Vucijec, Bosnia, was reduced to desperate circumstances after the regional conflict of the 1990s. In 1997, the Lipizzan International Federation and the United States Lipizzan Registry sent relief shipments of hay and medicines to the farm's 55 mares and foals and 8 stallions. British volunteers helped care for the horses, repair fences, and plant crops. In the late 1990s, a German citizen and horseman named Dieter von Wedelstedt purchased a 51 percent interest in the farm from the Bosnian government. With help from the Bosnian stud director, the new owner intends to establish a well-funded breeding program and to preserve the farm's bloodlines.

Back in Lipica, now in independent Slovenia, the stud farm had rebuilt its numbers after World War II. There are about 500 Lippizans in Slovenia, which is the second largest national population. Lipica has now claimed exclusive rights to the name Lipicanec, or Lippizaner, at the World Trade Organization. This follows the European Union agreement between member nations Austria and Italy that Austria would be the official keeper of the studbook. Italy no longer has a significant breeding population of Lipizzans. The Lipizzan International Federation (LIF) has become very active in mediating this situation, as well as other challenges facing the breed. The LIF intends to create a worldwide register of all horses in member organizations in an equal and nondiscriminatory manner. The LIF has also sponsored extensive genetic and physical data col-

lection to aid in the establishment of standards for the breed.

Although scattered Lipizzans may be owned elsewhere, the remaining large population of purebred Lipizzans is in the United States. There are about 650 Lipizzans in North America, representing a melting pot from most of the European studfarms. The first Lipizzan horses in North America arrived in California in 1937. During a time of financial distress, the Austrian government gave them as a gift of deep appreciation to the opera singer Maria Jeritza, who performed gratis at the Vienna State Opera. Because Madame Jeritza was married to a Hollywood movie producer, the 2 stallions and 2 mares were installed at their California ranch.

The 9 Lipizzans that were shipped to the U.S. Army Remount Service after World War II arrived in America in October 1945. Two stallions were placed with private individuals, and the others were sent to the California Remount Station. They were later sold at auction when the Remount Service was dissolved.

From 1959 through the early 1960s, 20 Austrian, 11 Hungarian, and 6 Yugoslavian Lipizzans were imported to Tempel Farms, in Wadsworth, Illinois, and Raflyn Farm in Washington. Since then, about 50 more horses have been imported, mainly from Piber but also from Hungary and Italy. Tempel Farms maintains 26 performing Lipizzan horses that can be seen in traditional performance twice a week in summer.

The Lipizzan Association of North America was formed in 1992 through the merger of two earlier organizations and represents the United States to the Lipizzan International Federation. The association registers pure or part-bred Lipizzans, and the pedigrees of all purebreds are maintained. Appendix horses do not have pedigrees recognized by the international federation. Thirty to 40 horses are registered each year. Another association, the United States Lipizzan Registry, was established in 1980.

The Lipizzan has remained much the same throughout the past four centuries. The breed is small in comparison to the modern warmblood, averaging 14.2 to 15.2 hands and weighing 1,000 to 1,200 pounds. Although at times it reflects the Arab influence, the

[To view this image, refer to the print version of this title.]

Fig. 60 Lipizzan stallion Conversano II Aloha II, owned by Jean F. Kaplan. Photograph by Elizabeth Theisen, Equine Photography.

head of a Lipizzan is bold with a slight ram profile from its Spanish heritage. The eyes are large and kind, the ears small and elegant. The crested neck, shoulders, back, barrel, and hindquarters all speak of the power necessary for the demanding rigors of classical dressage and the airs above the ground. The legs are short and strong with hard feet that are not shod at the Spanish Riding School.

The horses mature slowly and their life span is long. Mares can easily deliver 13 to 14 foals during their reproductive life. At the school, stallions begin their training at age four or five. They are not ready for performances for another six to eight years. Lipizzans are known to be highly intelligent yet tractable (fig. 60).

The traditional color of foals is a dark blackish brown. Some are more brown or mouse gray. Most Lipizzans mature into gray over their black skin. Some carry black flecks in their white coat, others appear

pure white, and still others remain a light or dappled gray with a darker mane or tail. The rare horse that remains brown or black is considered lucky, and one is traditionally kept at the riding school. As documented in historical artwork, Lipizzans used to show more color in the past.

The modern practice and performance of the art of dressage has changed since the nineteenth century. The classical dressage performed by the Lipizzan is now known as classical, Baroque, haute école, or high school riding. It is marked by ethereal grace and the traditional airs above the ground: the levade, capriole, and courbette. The Lipizzan, Lusitano, and Andalusian were bred to work in small spaces with natural collection and immense power driven from the hindquarters. Modern dressage, with its roots in military tradition and governed by the Fédération Equestre Internationale (FEI), is performed in competition most successfully by the large warmbloods, with their floating action, extension, and long strides. Yet the Lipizzan still attracts admirers who are challenged by the quest for that near mystical partnership of horse and rider. The Lipizzan remains a superb dressage horse, and there is growing appreciation for the Baroque style, especially when it is set to music. Some admirers believe that there should be considerations for the traditional Baroque breeds in modern dressage performance.

Besides dressage, the Lipizzan is used for competitive driving and pleasure riding. The Lipizzan has also contributed to the Kladruber, the Hungarian Half Bred, the Dutch Warmblood, and the Frederiksborg.

The Lipizzan is treasured for its romantic history and classic beauty, yet each of the threats the Lipizzan has faced through the centuries illustrates how easily the breed could have been lost. Even the outbreak of viral illness in the 1980s reveals the vulnerability of a small breeding stock. The global population of the Lipizzan is estimated at about 3,000, with some 650 horses in North America.



Rare

### *Gotland (pl. 123)*

The Gotland is an ancient primitive breed possibly related to the wild Tarpan or the old Exmoor pony of England. Is the Gotland a horse or a pony? Although the answer is open to argument, the fact that the Gotland has lived since the Stone Age on the Baltic island of Gotland off the Swedish coast is not up for debate.

The oral history and folklore of the Germanic tribe of Goths recalls their original home along the shores of Sweden and the nearby islands of Öland and Gotland. During the Stone Age, Visby was the principal settlement on Gotland and the site of a trading post. It is not known why the Goths began to migrate out of the area, eventually reaching and ruling a kingdom north of the Black Sea. When the Huns invaded the Goths' Black Sea settlements in A.D. 375, the Goths were forced into the Roman Empire, conquering Italy, Gaul, and Spain. Although they battled on foot, the Goths also fought from horseback. Their horsemen were so skilled that they could ride without bridle or saddle. The Goths' horses were small, descended from the original livestock they brought on their migration mingled with the blood of native horses.

Back on Gotland, the horses generally ran wild in the forests, although they were also used for riding and draft work in the area. They were sometimes called Russ or Skogruss, the "little horse of the woods."

Not until the mid-nineteenth century did people begin intensively to resettle Gotland, clearing the land and dividing it into farms with the labor of the larger workhorse breeds. The number of horses on the island fell so low that the Swedish government began a protection program in the 1880s. It is believed that by the early twentieth century, only about 150 Gotlands remained. Desperation born of hunger during the years of World War I led to hunting, which pushed the ancient breed close to extinction. By 1970, there were only about 30 Gotlands left. A small group of farmers took action, creating a 200-acre refuge in the Lojsta Forest for the remaining free-ranging horses.

Remarkably, in recent decades, a revival of interest in the Gotland horse has exploded in Sweden. Interest in providing pleasure mounts for children and a near

passion for youth harness racing has increased the Gotland numbers to about 9,000. On the island, the racing Gotlands are stabled during the season and then turned out for the winter on forested pasture. They receive a little hay to supplement their grazing, and the mares get extra oats before foaling.

Gotlands were imported to the United States in 1957. An excellent little Pony Club, 4-H, or handicapped therapy horse, the Gotland achieved some popularity. Americans interested in developing pony breeds, such as the POA (Pony of the Americas), also used the Gotland. By 1989, however, fewer than 30 Gotlands remained in North America.

When the owners of the largest remaining American group needed to sell their herd of 9 female Gotlands, they turned to the ALBC for assistance in keeping them together as a breeding group rather than dispersing the herd. Leslie Bebensee of Kokovoko Farm in Corinth, Kentucky, was able to purchase the herd and begin a new breeding center for the Gotland. By 2000, the Gotland numbered about 200 horses in twenty herds.

The ALBC operated the Gotland Horse Registry from 1993 to 1997, when it turned this duty over to the newly organized Gotland Russ Association of North America. The Gotland population has been blood typed to aid in conservation measures. Many Gotlands can trace their pedigrees to Sweden. Gotland halfbreds are also available.

The Gotland is usually dun or dark bay. There is lighter shading on the muzzle and around the eye. Some horses display barring on the legs, along with withers and dorsal stripes. The Gotland is 12 to 14 hands tall and weighs 600 to 700 pounds. The head is attractive with a straight or slightly dished profile. The Gotland is well proportioned with a somewhat short, well-muscled neck. The legs are strong, and the hooves are tough.

Gotlands are very healthy and long-lived, growing a warm winter coat that sheds out sleek and clean legged. Owners claim that these self-reliant and sensible horses are nearly “bombproof” as mounts for children, and they are able to succeed at all activities. Even-tempered and eager to please, they are also strong

enough for small adult riders. Trotting is their forte, and they can keep it up all day. Gotlands are excellent harness ponies.

The Gotland has made an incredible recovery in its native land, illustrating how rapidly the human demands and uses for a breed can change. The Gotland has, in fact, become the national horse of Sweden. In North America, Gotland owners are enthusiastic about this breed and positive about its future.



Watch

### *Poitou (pl. 124)*

Both the ass and the mule were used in Gaul by the Roman era. The ass was mainly a pack animal, but mule breeding was often practiced to fulfill the demand for quality saddle mules. Even before the Middle Ages, mules were the accepted mount for senior clergy. Bishops and abbots sought handsome, refined mules. Government officials, magistrates, and dignitaries also rode such mules. One highly desired mule was produced from an Andalusian mare and a Catalan jack. In Britain, mule breeding became a lost art after the Reformation, but in western Europe, the demand for impressive saddle mules continued longer.

At the northern end of the Bay of Biscay lies the Poitou region of France, which has long been famous as the home of the Poitou mule. Poitou became a center for mule breeding early in the Middle Ages. In the tenth century, for example, an Italian prelate wrote to the count of Poitou begging for a magnificent mule. By the fifteenth century, Poitevin breeders were developing a specific breed of ass just for mule breeding.

Poitou mules were improved during the sixteenth century when Friesian and Brabant-type mares were imported to work in draining the marshes of Poitou and the Vendée. These horses were the source of the Poitevine Mulassière, a breed of draft horse developed mainly to produce mules when crossed with the Poitou stud, or *baudet*. The Mulassière was never regarded as attractive, but she was built to deliver large mules. She was generally black, gray, or *isabelle* (dun) in color, with a long mane and well-feathered fetlocks.

Her head and ears were large. Although she was often only 15.2 to 16.2 hands tall, she was heavy through the chest and body, with wide hooves. She was also long backed.

In the early eighteenth century, Poitou's well-known mule industry centered on the town of Melle. Poitou mules were regarded as the finest and strongest in France, standing 15 to 17 hands tall and weighing 1,200 to 1,500 pounds. These mules were widely used for pack or harness. The Poitou ass himself was not a working animal, existing only for the production of mules. In the mid-1800s, 15,000 to 18,000 young mules were being sold each year in Poitou at the monthly fairs. At the height of their popularity, it is estimated that some 30,000 mules were produced annually.

The Poitou baudet was the size of a horse, at least 13.2 hands tall but often 15 hands or taller with a long, straight back. His fetlocks, legs, and hocks had the size and substance of a drafter, and his feet were much larger than other asses. His head was long, large, and loose lipped. The ears were so long that they sometimes flopped out to the side. But the Poitou's most striking feature was his long, thick, wavy coat, which was never trimmed and fell in long mats or cords called *cadnettes*. Unlike other asses, the Poitou could grow a forelock and a long mane. His ears were also full of hair. Baudet breeders were often more concerned with the Poitou's coat than its conformation. He was usually colored *bai brun*, or brown bay, but could vary in color between a yellowish brown to black. The eyes, muzzle, belly, and inner thighs were colored silver-gray. A reddish ring separated the gray color from the brown around the eye and muzzle. The Poitou baudet was never marked with a dorsal stripe or colored gray, roan, or red.

Such a baudet was worth the price of 5 mares or 8 to 10 cattle, but only another Poitevine could purchase him because the Poitou breeders zealously protected their industry. Poitou breeders were a closed, almost secretive society that also held to some highly unusual and misguided husbandry practices. The Poitou baudet was kept year-round in a dark, closed stall with little attention to his grooming. The pregnant Mulassière mares were often starved in the belief that they would produce the more valuable colts rather than fil-

lies. The mare's colostrum was believed to be unhealthy and was kept from the newborn foal. Pedigree records were not kept carefully, and a reduction in fertility resulted.

The first Poitou ass was exhibited to the public in 1860. Farm mechanization and railroads affected the demand for mules, but the export of Poitou stock actually increased in the years before World War I. Poitou baudets were sent to the United States, South America, northern Africa, and elsewhere in Europe for high prices. Soon after the war, there was no longer a great demand for the breeding of draft mules in France or elsewhere. From a population of 800 to 1,500, the number of breeding baudets fell to between 100 and 200. By the 1960s, only 10 Poitou foals, or *fedons*, were born each year.

The numbers of Mulassière mares and stallions also dropped steadily as the mule breeding business disappeared, although some Mulassières were still used for agriculture or meat production. In 1996, there were 28 approved stallions and 64 registered Mulassière foals. In France, the breed is now called the Poitevin horse, Mulassière du Poitou, or Cheval Mulassier.

By the mid-1970s, the Poitou and Mulassière both seemed headed for extinction. The number of purebred Poitou males had fallen to 20 and females to 24. The first rescue attempts were unsuccessful, and a number of baudets were lost through export.

In 1982, an *asinerie*, or studfarm, was established at La Tillauderie by Suzanne Auger, one of the last of the longtime breeders. Although pure breeding would be conducted, an upgrading program was also begun with Spanish or Portuguese *anesses*, or asses. The purebred population now totals about 30 Poitou at the asinerie. A support organization of veterinarians and breeders called La Sabaud was established in 1988. The International Donkey Protection Trust and the Donkey Sanctuary of England have also lent their support to the Poitou breeding and research program.

In 1996, there were 92 registered births and 60 approved sires. The baudets were bred to about 200 Poitou anesses and another 400 mares or jennies outside the breed. There are now 200 or fewer registered Poitou in the French studbook, but some may have ques-

tionable parentage. All purebred Poitou are to be implanted with identification chips, and genetic blood typing is under way to determine bloodlines and breeding. A recent survey has located additional Poitou asses outside the region. La Sabaud works with the Parc Naturel Régional du Marais Poitevin, a national park involved with the conservation of local native breeds, to purchase Poitou stock threatened with dispersal. The Poitou are inspected before use in breeding programs. The national studbook for the Mulassière is also continuing in France.

A number of purebred Poitou are now found in European zoos. A small breeding group was also established at the Donkey Sanctuary in England. Another breeding group is located on the Isle of Man. Crossbred and partbred Poitou asses are numerous in Europe.

American livestock writers were acquainted with the Poitou by the 1880s, recognizing its great size and comparing it to the excellence of the French breed of draft horse. Several recorded imports of Poitou were made to the United States, including 10 baudets in 1910. Poitou asses probably contributed to the development of the American Standard or Mammoth Jack but mainly they were lost in the jackstock pool. Mammoth Jackstock or Standard donkeys will occasionally grow a longer, wavy hair coat as possible evidence of Poitou ancestry. One noteworthy Poitou jack named Kaki was imported in 1937. Standing 16.2 hands tall, with excellent conformation, Kaki was successfully used in breeding.

Poitou asses did not make their way to North America again for forty years. A few imports to the Catskill Game Farm in New York were made in 1978 and again in the 1980s, but little is known of their pedigrees or level of inbreeding. Three purebred Poitou were exported to California in 1985, and 4 more arrived in New York in the late 1990s.

In 1996, the number of purebred Poitou donkeys in North America was estimated at about 30. Some donkeys sold as Poitou are probably partbred or do lack authentic identification. The North American Baudet du Poitou Society serves as the official liaison to the French organizations and coordinates the inspection

and registration of American-born Poitou stock. It has also compiled a detailed inventory and description of the Poitou in North America. Anyone contemplating the purchase of a Poitou should consult this group. The society is operated by the American Donkey and Mule Society. At present there are only 5 Poitou breeders in the United States. The very rare Poitou may be seen at the Hamilton Rare Breeds Foundation in Hartland, Vermont.

Globally the purebred Poitou population probably numbers about 250. The various organizations committed to the preservation of the Poitou have saved this ancient breed from extinction, but the dangers of upgrading or crossbreeding, speculative prices, and false records present a continuing challenge for the future. The American and British populations represent a significant portion of this breed whose geographic separation offers some protection against disease yet remains available for modern reproductive technologies to optimize breeding.

Raised with gentle handling, the Poitou is a docile and sweet animal that enjoys human companionship. Young fedons are irresistible, with their 6 inches or more of dark to medium brown baby hair. By the age of two to four years, with regular grooming, this coat disappears and is replaced with a luxurious coat varying from silky straight to curly. The hair on the legs remains heavy all year. Without grooming, the long juvenile hair would mat and tangle with shed hair and debris, forming the cadettes of old. The modern Poitou can be used both for mule breeding and as a companion equine.



Critical

### *American Mammoth Jack (pl. 125)*

The American Mammoth Jack is truly an original. Combining European ancestors with selective breeding toward refinement, size, and conformation, jackstock breeders created the largest, most excellent breed of domestic ass in the world. And it was all toward one goal—the production of draft mules to work on the farms of the American South and Midwest.

The English colonists in North America were not all that familiar with mules, which in England had fallen out of favor as riding animals about the time of the Reformation. In addition, although mule production had long been important in France and southern Europe, mules were not well suited to England's climate and crops. In general, only small donkeys were found in England and Ireland. For their part, the Spanish colonists took their common *burros*, as they called them, to New Spain with other livestock, and the burro readily adapted to the hotter, drier climates of Mexico and the Southwest.

By the Revolutionary War era, a few Maltese jacks had been imported into New England. The Maltese ass stood no taller than 14.2 hands and was somewhat slender and small, but with good bone. Black or dark brown, the Maltese ass was also somewhat fiery and hard to handle. This type is now extinct on Malta. New Englanders bred their jacks to produce mules for export to the sugar and cotton plantations of the West Indies and the South. The sale of mules was successful, but the cost of raising mules through New England winters was prohibitive.

Meanwhile, in Virginia, a most famous gentleman farmer by the name of George Washington was busy experimenting with exotic plants and crops, the uses of manure, and farming equipment that he had designed. Washington raised cattle, sheep, hogs, poultry, and horses. Corresponding with the leading agriculturists of the time, Washington became convinced of the advantages of a useful animal that was still not common in the new nation. What was needed, he believed, was "a very excellent race of animals" (Washington to Young, 1788). In Spain there were jacks capable of siring such mules, but the laws jealously prohibited their export.

By 1785, as a gesture of friendship and goodwill, the king of Spain sent the soon-to-be president a jack from his royal stud. Nearly 16 hands tall, the gray ass, named Royal Gift, looked somewhat clumsy and had a large head. He was probably an Andalusian ass, a breed nearly a thousand years old. This breed was rangy, with large legs, an impressive head, a Roman nose, and big ears. Unfortunately, as Washington complained in a let-

ter to his friend the marquis de Lafayette, Royal Gift was somewhat inhibited in his new home and was failing in his duties. Lafayette, ever the good friend, "maneuvered" around the export laws to obtain two more jacks and two jennets for Washington. And the next year, King Charles of Spain sent another jack to Mt. Vernon. Then Washington discovered the cure for Royal Gift's problems—he needed the company of jennets to inspire him.

Lafayette's present Knight of Malta was an outstanding jack. Of moderate size, he was clean of limb, somewhat fierce natured, and very active. Washington bred Knight of Malta to one of the two jennets that had come with Royal Gift. This Spanish jennet gave Washington his favorite jack, which he named Compound, for this jack did indeed combine the quality of the Maltese with the size of the Spanish. Compound went on to sire many fine mules. Washington then bred some of his best coach mares to both Compound and Knight of Malta with results that inspired others to do the same. He carefully documented the feed and work production of his farm mules and switched his work stock over to the more profitable mules. Washington also actively promoted the use of his jacks with the mares of other farmers, both in the area and far into the South.

Washington encouraged his friend Thomas Jefferson to use mules. Jefferson came to favor mules for plowing and hauling wagons of crops or feedstuff between his farms. Jefferson was already able to find good mules in Virginia and Kentucky, mentioning the mysterious breed known as Don Carlos in his letters.

Another avid mule breeder was the statesman Henry Clay of Kentucky. Among Clay's imports was the Maltese jack Warrior, who had a major impact on the developing American jackstock. Clay also imported other influential Spanish or Andalusian stock, including the jennet Calypso and the jacks Achilles, Don Carlos, and Ulysses. In 1819, a Catalonian jack named Mammoth was imported into Kentucky. Catalonian asses possessed great size, glossy black color, smooth, flat bone, and great style and action. Mammoth was more than 16 hands tall, with large, heavy bone. He was used only on jennets, but his progeny crossed extremely well on descendants of the Clay stock. Al-

though greater refinement came with time, nearly all jackstock can trace back to this great sire, so much so that he has given his name to the breed.

Outside of the Civil War-imposed embargo, several thousand more European jacks and jennets were brought to the United States from 1830 to 1890. These imports included Catalonian, Andalusian, Majorcan, Maltese, Poitou, and Italian breeds. Most of these breeds no longer exist or are found in only small numbers today. The Catalonian type is believed to have made the greatest impact on American jackstock. The studbooks of the American Mammoth Jackstock Registry date to 1888.

Mule breeding to provide work animals for the South became an important business in Kentucky, Tennessee, Missouri, and Illinois, and many mules were sold through the mule market in St. Louis. George Washington's belief that the mule would become vital to the young country's future agricultural and transportation needs was prophetic. Although the mule was closely associated with southern agriculture because of its greater suitability to the heat and its economic labor, mules were also partners in family farms in much of the country outside New England and the Pacific Northwest. Mules hauled wagons across the prairies and pulled barges, streetcars, and cartloads of cargo. In 1885, mules still carried more freight than the railroads. They toiled in mines across the land, and they labored by the thousands in wars. Raising mules was more profitable than raising horses for the breeders, the grazers who raised the mules, and the traders who sold them. By the 1920s, the 5 million mules in America accounted for half the world's population.

The Mammoth Jack was crossed on different mare breeds to create many of the various mule types—draft, sugar, farm, cotton, pack, and mining mules. Following the principles of mule breeders, the ears and head come from the jack, the mare puts on the rear end, and the jack influences the front end. The taller the jack, the taller the mule. And a Mammoth Jack was large, standing from 14 to 16 hands or more and weighing 1,100 to 1,300 pounds. The name Standard became part of the breed name because the Mammoth was bred to a specific standard. According to the registry standard

of 1919, Mammoth Jacks were registered if they stood at least 14.2 hands tall and measured at least 63 inches around the girth and 7.5 inches around the front cannon. Jennets were just slightly smaller. Mammoth Jacks used to sire draft mules were often even larger (pl. 126).

Railroad transportation, farm mechanization, and the availability of hired help all diminished the nation's demand for work mules. After World War II, mules continued to work in some areas of agriculture, but their numbers plummeted. In the three decades after 1941, only about 3,000 jacks and jennets were registered, and the numbers fell even lower in the 1970s. Yet small numbers of dedicated breeders kept their jackstock. With the growing interest in workhorses and mules in the 1980s, interest revived and breeders worked hard to rebuild their stock.

Today's jackstock breeders do not promote their stock in a modern, slick, or glossy way. They are not highly organized, but the buyers know where to find the sellers, and the system works. Mammoth Jack breeding remains centered in Missouri, Kentucky, Tennessee, and the surrounding states, where jacks and jennets are shown at local and state fairs and major auctions serve as a great source of working animals. There is also a modern business in exporting jackstock, mostly as frozen semen to such worldwide locations as China, Afghanistan, and Latin America.

Mammoth Jacks are used today to sire mules for farming, especially where severely hilly land makes the use of machinery dangerous. Subsistence farmers, the Amish and Old Order Mennonites, and a growing number of people who enjoy working with draft horses or mules remain interested in the big mules produced by jackstock. There is also a considerable market for pack mules in the West, where tourists, hunters, and fishing enthusiasts enjoy long trips into the wilderness or mountains. The smaller-boned Mammoth Jacks sire good-sized saddle mules from a variety of mares. The demand for saddle mules has grown steadily in recent years. Mammoth Jacks can also make good riding animals themselves due to their athletic ability, disposition, and size, and some jacks even possess a natural pacing gait.

The Mammoth Jack is the largest breed of domesti-

[To view this image, refer to the print version of this title.]

Fig. 61 This lovely Mammoth Jack jennet was photographed by Suzanne Burnham, D.V.M. Courtesy of the American Donkey and Mule Society.

cated ass in the world today. The breed has great value in increasing the size and quality of donkeys and in producing excellent-quality mules. Both the story of the Mammoth Jack's development and its great contribution to the nation's development have historical significance. As mentioned, most of the old breeds that were used in forming the Mammoth Jack are extinct or reduced to very low numbers. Mammoth Jackstock can be registered with the American Mammoth Jackstock Registry, the Canadian Mule and Donkey Association, the International Registry of American Mammoth Jackstock, and the American Donkey and Mule Society. The standards and height criteria vary among the associations.

The Mammoth Jack is well balanced, with a straight topline, a long, well-muscled croup, well-sloped shoul-

ders, a wide chest, and well-sprung ribs. The legs are most important, large and well formed. The head should be carried well, with large eyes and a straight or slightly Roman profile. The ears are alert and long, often 34 inches from tip to tip. Black color with light-colored points was favored in the past, but the light or reddish sorrel with a white mane and tail has become popular for its excellent cross on the similarly colored Belgian draft mares. Spotted and gray jacks are also available (fig. 61).

In 1990, the ALBC estimated that there were about 550 registered jackstock, but nearly 100 foals were registered that year, so the population is enjoying good growth. There may also be a significant unregistered population. The ALBC remains concerned about changes in type, color, or height standards, and it would like to better document the present-day population to understand changes in the breed. The ALBC stresses conservation of the historic-type black Mammoth Jacks. In Canada, which has the largest population of Mammoth Jacks outside the United States, there were only 50 to 60 jacks and jennets in 1990. Jackstock is also exported to other countries, mainly to improve the native donkey types. Mammoth Jackstock has recently been exported back to Spain to help that nation revitalize its stock. The ALBC estimates the global population at 3,000 to 4,000 animals.



Rare

### *Miniature Mediterranean (pl. 127)*

The well-known little donkeys of Sardinia and Sicily may have originally come from the far end of the Red Sea in Somalia when it was an Italian possession. However, small donkeys are found throughout many cultures of the Mediterranean basin and even Ireland. These little beasts of burden traditionally carried travelers and heavy loads, pulled small carts, powered grinding mills, and produced milk for infants and the sick.

On the islands of Sardinia and Sicily, merchants used their donkeys to deliver merchandise by cart. Be-

cause the donkeys were so small, they easily lived right in the cities. For feasts and festivals, the little donkeys were decorated with feather plumes and bells to pull highly decorated carts. Unfortunately, many donkeys were both underfed and overworked, enduring lives of hardship and cruelty.

An awareness of the plight of these donkeys motivated a Wall Street stockbroker named Robert Green to import six little jennets and one jack from Sardinia to his farm in New Jersey in 1929, and he became their benefactor. Green praised them as kindly, affectionate, patient, hardy, courageous, and intelligent. After three of the jennies were attacked by dogs, only Miranda, Palermo, Suzanne, and their jack, Impheus, were left to found a large herd of miniature donkeys. Over time, many of these little donkeys found their way to other homes, where they were enjoyed as pets, riding mounts for children, or little cart donkeys.

Before long, a small network of Mediterranean donkey breeders was established, including the rich industrialists Henry T. Morgan, owner of Ken-L-Ration, August Busch, Jr., of Clydesdale fame, and Powell Crosley of Crosley Motors, along with the actress Helen Hayes. Another active breeder and importer of Sardinian and Sicilian donkeys, which are very similar, was Richard Sagendorph of Massachusetts. At least one foundation jack was an Abyssinian or Ethiopian.

Most of the miniature donkeys went to homes or to zoos as pets, not as breeding stock, so the number of available miniatures increased only slowly. The Miniature Donkey Registry of the United States was formed in 1958. The registry was transferred to the American Donkey and Mule Society in 1987, and the National Miniature Donkey Association works in cooperation with ADMS to promote the miniature donkey. Miniature donkeys can also be registered with the American Donkey Registry and the International Miniature Donkey Registry, which accepts donkey heights up to 38 inches.

The original donkeys ranged in size from 32 inches to 38 inches in height, but even early in their breeding, most donkeys were 30 to 36 inches tall. Eventually, the height limit was set at 36 inches. The ADMS registry

maintains pedigrees back to the foundation stock. Offspring from nonregistered parents are inspected as to size because other small unidentified donkeys, already present in the United States, have been used in breeding miniatures. Miniature donkeys weigh from 200 to 350 pounds or more and can live twenty-five to thirty-five years.

The official name for the miniature is now the Miniature Mediterranean donkey, which is descriptive of their ancestry. On Sardinia, Sicily, and around the Mediterranean the traditional small donkeys are now being crossbred to larger jacks in order to increase their size. The small donkey is rapidly being lost or replaced, which means that the miniature donkeys in North America have become a genetic reservoir. One small herd of miniatures is now under the government's maintenance in Sardinia. USDA requirements make the importation of donkeys very difficult, so new stock is unlikely.

The Miniature Mediterranean donkey is defined only by height, so there is variation in color and appearance. The original imported donkeys were the typical donkey gray, which is actually a dun color, not the gray seen in horses. Many donkey foals are born reddish or brown, later growing a donkey-gray summer coat with a reddish winter coat. The coat ranges from furry to wiry. Selective breeding has increased the frequency of other colors and color patterns. Solid colors range from very light tan to almost black. White, roan, and spotted donkeys are occasionally seen. Donkeys usually show a pattern of a dorsal and withers stripe, ear markings, striped legs, and, occasionally, collar buttons or spots on the neck. Most donkeys are lighter colored on the nose, around the eyes, on the belly, and along the inner legs. Some donkeys instead have dark points. With an increase in spotted donkeys, some donkeys now have a star on the forehead.

Miniature donkeys are described as compact and well rounded. Although donkeys are naturally narrower than ponies or horses, they should not be slab-sided. The back should be straight or slightly dipped, and the croup is higher and less rounded than that of a horse. The backbone should not protrude. The legs

should be as straight as possible, avoiding an excessively sickle-hocked or cow-hocked appearance. The legs need to be long enough for the size of the body, not tiny or weak. The hooves should be small and narrower than those of a pony or horse.

The tendency toward dwarfish characteristics should also be avoided, especially in the size of the head and the shortness of the neck. The head should be wide at the forehead and jaw, tapering to a small muzzle. The eyes should be large and kind. The profile should be straight or slightly dished, not Roman nosed. The eyes are large, and the ears should be alert, in proportion, and not overly long. Straight necks are proper for donkeys, but obese donkeys will develop a roll of fat or crestiness. Overall, miniature donkeys may vary from a slender to a draft build.

In addition to possessing an affectionate personality, the Miniature Mediterranean donkey remains a very useful animal. These donkeys make excellent companions or pets on limited-acreage properties. Small children can ride small donkeys, and miniatures can pull adults in carts. Small donkeys can pull cartloads of firewood, garden produce, and yard refuse. As a back-packer's assistant, a donkey can carry 75 to 100 pounds of a well-balanced cargo. They also work as guard animals for sheep or goats, protecting them against roaming dogs or coyotes. Some breeders and owners are involved in showing and other competitions such as driving. Miniature donkeys are also used to produce small miniature mules or hinnies when crossed on miniature horses or Shetland ponies. Miniature mules are shown in harness singly or in teams. The refined type is more in demand.

Miniature donkeys have grown tremendously in popularity in recent years. The registries are recording more than 2,000 foals annually. Some of this boom has been fueled by breeders motivated entirely by the high prices that extremely small or unusually colored donkeys can fetch. Other breeders feel that a minimum height standard should be established to prevent the competitive breeding for smaller sizes that can increase the numbers of dwarfish animals and the health problems that result from dwarfism. The breeding of closely related stock or stock with conformational

defects is also tempting to unscrupulous breeders if buyers will pay high prices for any cute, cuddly donkey. Because of this situation, buyers need to be careful to look for physical defects when purchasing a miniature donkey. Boom markets do not continue forever, so the danger exists that there will someday be a surplus and many donkeys will end up in unhappy situations. Breeders truly devoted to the Miniature should base their program on quality animals, planned matings, and well-socialized foals. Preservation of the traditional Miniature Mediterranean type may be increasingly important.

In 1997, the ALBC removed the Miniature Mediterranean donkey from its conservation priority list because the breed's population has continued to increase. There are about 15,000 Miniature Mediterranean donkeys in North America.

*Feral, Including Mustang, Suffield Mustang,  
Chincoteague and Assateague, Banker,  
and Cumberland Island*

The term *mustang* generally refers to all feral horses on rangeland controlled by the Bureau of Land Management. Although the word *feral* technically describes these animals, to most Americans these are wild horses. Congress acknowledged this in the Wild Free-Roaming Horse and Burro Act of 1971: "Congress finds and declares that wild free-roaming horses and burros are living symbols of the historic and pioneer spirit of the West; that they contribute to the diversity of life forms within the Nation and enrich the lives of the American people. . . . It is the policy of the Congress that wild free-roaming horses and burros shall be protected from capture, branding, harassment or death, and to accomplish this they are to be considered in the area where presently found, as an integral part of the natural system of the public lands" (PL 92-195).

Although early American settlers believed that the horse was native to the Plains and some early wild horse proponents sought proof that the horse did indeed survive in North America as a native wild species, the horse was in fact reintroduced into the Americas. Today some ecologists regard the horse as an exotic species that

should be removed, as do some ranchers, who see the feral horse as competing with cattle for grazing land. The fortunes of the feral horse or mustang are buffeted by these differing viewpoints.

One fact is unquestioned: the horse reentered its former ecosystem with great ease. By the 1700s, Spanish mustangs numbered in the millions on the prairies. Horses were pushed further westward by both the Native American tribes and the Euro-American settlers. After the Civil War, ranchers and farmers took mustangs from the feral herds. The cavalry also used these horses in war campaigns against the Indians. Eastern horse stock—escapees from the cavalry, settlers, and ranchers—entered the wild herds.

In the early twentieth century, horses were still in great demand for the military, and so mustangers regularly rounded up the feral herds. As more ranches were fenced and increased attention was paid to the public rangelands, ranchers began to view feral horses as pests and often shot them. After World War II, mustangers captured large numbers of horses for the European horsemeat market, domestic pet food, or simply to reduce their numbers on the range. The methods of roundup became increasingly brutal when airplanes and helicopters began to chase the horses. Both wild horses and burros were rapidly disappearing.

Velma “Wild Horse Annie” Johnston, a Nevada rancher’s wife, raised the awareness of the public and governmental officials. Johnston was responsible for ensuring the passage in 1959 of the first federal wild horse protection law, which prohibited both the use of motorized vehicles in capturing wild horses and the deliberate pollution of water holes in order to trap them. The growing public interest in the free-roaming horses and the support of groups such as the International Society for the Protection of Mustangs and Burros led to the passage of the Wild Free-Roaming Horse and Burro Act twelve years later. This law protected horses as one of the multiple uses of public land equal to grazing, timbering, mining, wildlife, and recreation. The BLM was charged with the responsibility of setting appropriate population numbers and monitoring against overgrazing. Excess horses were to be captured and offered for adoption by the public. Con-

gress prohibited the euthanasia of unadoptable horses in 1988. The law did not protect burros in national parks, monuments, and wildlife refuges, where they have been widely eradicated.

With this protection, the feral horse herds have increased or at least stabilized since the 1960s. The BLM estimates that there are now approximately 43,000 feral horses and 5,000 burros on 43 million acres of public land. Some wild horse advocacy groups state that the true numbers are far lower, whereas ranchers often believe that they are higher. There are 186 Horse Herd Management Areas found throughout ten western states: more than half of the free-running horses live in Nevada’s semiarid public land; significant numbers are found in Wyoming, southeastern Oregon, western Colorado, and Utah; and smaller numbers are found in central Idaho, southern Montana, western North Dakota, northern California, and Arizona. A feral horse herd is also protected in the Ozark National Riverway.

The sale or adoption of mustangs has lowered the excess horse population. In the past twenty years, more than 150,000 horses and burros have passed through the BLM adoption program. About 5,000 to 10,000 horses and a much smaller number of burros are available each year. BLM research has set 26,618 equids as the preferred carrying capacity for their managed lands, but adoption rates have not permitted the bureau to meet this goal.

In spite of its good intentions, the adoption program remains controversial. Although most Horse Herd Management Areas share horse grazing with cattle and sheep, some grazing allotments, often held by ranchers for decades, were taken away from cattle and assigned to the wild horse herds. In addition, cattle and sheep are required to be removed from the grazing land for part of each year whereas the horses are permitted to remain. Charges of overgrazing fly from many quarters.

The BLM’s adoption process received widespread attention and criticism in the late 1990s. Reports charging adopters of deliberately sending horses to slaughter inflamed the public, although the reports did not address the problem of an oversupply of horses in the adoption pipeline. Equine infectious anemia (EIA) has also been found in some wild horse herds. The infected

horses are then destroyed, which also troubles some animal advocacy groups.

Many of the feral horse adopters are well intentioned but unskilled, especially in handling a horse raised without human contact. Most domestic foals are intensively handled and imprinted on humans, but a wild horse needs patient, careful training to become rideable. Many adoptions fail, and the unlucky horse can easily end up at auction. Low prices at auction generally mean that the horse is being purchased by the slaughter market. Both the BLM and the mustang advocacy groups are attempting to educate adopters, and the International Society for the Protection of Mustangs and Burros operates a rescue operation for adopted animals. Several mustang registries sponsor activities and shows for BLM horses as a support system for new owners of these horses. More gentling and training of horses before adoption would improve the success rate.

In 1996, the first trials of a long-lasting contraceptive were initiated. A successful and practical contraceptive would reduce the large numbers of unwanted horses in the adoption program. The initial guideline specifies that a mare must have given birth at least once before she is vaccinated with a contraceptive. Advocacy groups are concerned about this program's effects on the social behavior of the herds. They also fear that budget restrictions could easily make birth control a cheaper alternative than the adoption process. However, fewer horses would also mean that the BLM could be more selective in the adoption process.

The BLM gathering process should take into account the same factors that affect the long-term survival of wild horses and burros: sufficient genetic diversity for viability; sufficient numbers of horses for population viability; and a good mix of experienced horses, reproductively active mares, and healthy young stock to maintain the social structure of the herds. The temptation to remove only young, attractive animals disrupts natural mortality patterns, genetic vigor, and the herd structure. Unfortunately, many wild horses are small, weather-beaten, scarred survivors—not the romantic image of the free-running horse. Several thousand unadoptable horses are now being held permanently on

BLM sanctuary farms. In the past, free-running herds have had their genetic heritage altered by the release of improvement stallions. This has been suggested again in hopes of producing more appealing, adoptable offspring.

Additional groups of authentic Spanish Colonial horses may still exist in the larger BLM-managed population, but these are generally found only in isolated herds. The Cerbat Mountains in Arizona, the Sulphur area in southwest Utah, the Pryor Mountain range between Wyoming and Montana, and the Kiger mountain area in Oregon are the most widely accepted sources of Spanish Colonial or Mustang stock. Individual Spanish horses have also been found in other BLM-managed herds, so it is critical that these stocks be recognized and protected. The BLM has found that these Spanish types are in greater demand for adoption. If additional herds could be identified, they, too, would be more valuable.

The free-roaming horse herds have afforded biologists and students of equine behavior excellent opportunities for study. This knowledge should be added to the BLM's gathering techniques. In the near future, improved computer models will aid range management. It has also been suggested that the BLM compensate ranchers for their grazing rights and then pay them to manage the herds and train both the adoptees and adopters.

The BLM closely regulates burros. The burro population has been lowered dramatically through sales of excess animals. Feral burros are now mainly found in the deserts of Arizona and California. The burro population has not been studied sufficiently to identify unusual genetic populations or historic groups. In addition, about 30 wild mules are captured each year. These wild horse-burro hybrids are in great demand at the BLM adoption sites.

Free-roaming horses are still found in Canada in the foothills of the Rocky Mountains in western Alberta, British Columbia, and the southern Yukon Territory. These horses may number only several hundred, and their genetic makeup is not known.

In southeastern Alberta, horses have been turned

loose to graze on the prairie grass rangeland since the early fur-trading days. Ranchers continued this practice in the first half of the twentieth century, grazing both cattle and horses on what was called the British Block. Until the 1960s, the favored ranch horse of the Canadian prairies was the Morgan, but soon the Quarter horse became very popular. Thoroughbreds and Arabs were also part of the ranch stock. Small numbers of abandoned horses, old mine ponies, and even rodeo stock were also put out on the range to fend for themselves.

The military began to use this area again in 1965. The horses were fenced in and generally ignored, but they survived so well that their large numbers eventually became a problem. In 1994, 1,200 horses were removed, and most were adopted. A breed association was soon organized to promote and track this historic stock. The Suffield Mustang Association of Canada has registered 200 foundation horses taken directly from the prairie. The Suffield Mustang often resembles the old Morgan horse, although more color variations are present. Suffield Mustangs are wonderful riding horses, possessing considerable intelligence, stamina, hardiness, and endurance.

*Chincoteague and Assateague (pl. 128).* The popular image of the Chincoteague pony was formed by the children's classic novel *Misty of Chincoteague*, by Marguerite Henry, published in 1947. The story relates the legend that the ponies are descendants of shipwrecked survivors off Assateague from either an unknown Spanish ship in the late 1500s or the *San Lorenz* in 1820. Blood testing, however, has revealed that the ponies are not significantly different from common American stock.

Assateague is a 37-mile-long barrier island off the Maryland and Virginia coast. The much smaller island of Chincoteague is just 7 miles long and 21 inches above sea level. In the 1670s, English settlers probably placed their horses on the outer uninhabited island to avoid paying the king's tax on fences. It was not unusual for settlers in North America to turn horses loose on islands until they were needed and to breed replacements. Annual roundups reestablished owner-

ship, introduced new stock, and removed needed horses. Free-running horses were found on many barrier islands until the 1930s, when the federal government ordered the removal of both privately owned and feral horses.

The annual roundup on Assateague began as early as the late eighteenth century. By the late nineteenth century, visitors were enjoying the celebration, and the pony-penning became a fundraiser in 1925. In the early twentieth century, at least one Shetland pony stallion was placed on the island, resulting in an introduction of the piebald color pattern. Other horses and ponies may have been introduced through the years.

In 1965, the Maryland portion of Assateague became a national seashore and was fenced off from the southern portion of the island, belonging to Virginia. The privately owned ponies were removed, and a small breeding herd of feral Assateague ponies was established at the national seashore. Since then, these ponies have remained unmanaged but have been carefully studied. The herd has grown and flourished. Although birth control measures are now used on the mares, the ponies are treated as wildlife and do receive no other medical care. Because the ponies do come into contact with tourists and beachgoers, a few troublesome individuals have been removed to the southern portion of the island. A population of about 160 to 170 ponies is maintained.

The Virginia portion of the island is administered as a national wildlife refuge. A population of about 150 ponies is found here. These ponies are owned by the Chincoteague Volunteer Fire Department, which each July conducts the famous roundup, swim across the channel, and auction of the ponies. The event attracts 50,000 spectators, and about 100 ponies are sold at an average price of \$1,700. The American Horse Protection Association, other humane groups, refuge officials, and a veterinarian supervise the welfare of the ponies and their foals. Weak or old ponies and very young foals do not make the swim. The herd also receives biannual dewormings and annual vaccinations.

This herd is tested for equine infectious anemia, and infected ponies have been destroyed. Horses and ponies have also been added to the herd, including two

Spanish Barb stallions. Their offspring are particularly desirable at the auction. In 1978, 40 BLM mustangs were brought to the island, but the harsh conditions led to most of their deaths. Two stallions and a few mares survived to interbreed with the herd.

The ponies survive on freshwater found in ponds between the dunes and salty water from the bay. The salty foods and water sometimes cause the horses to appear bloated, and they drink or urinate frequently during the day. Biting insects and flies are particularly irritating to the ponies, which wade deeply out into the water or retreat to the loblolly pine forests. The ponies eat thorny greenbriar, poison ivy, bamboo-like phragmites, bayberry, salt marsh cordgrass, beachgrass, rose hips, and seaweeds such as sea lettuce.

The ponies on Chincoteague rarely reach 13 hands in height. Whether their size is related to their pony bloodlines or to their adaptation to the sparse food and windswept island is unknown. The ponies are compact, hardy, and healthy. They are found in most common colors. They are attractive and enjoyable mounts for children.

The ponies are not a particularly valuable genetic group but are a historic tradition on the island going back more than three hundred years. The two herds will now evolve separately. Owners of the Virginia ponies consider them a separate breed, and a National Chincoteague Pony Association was founded in 1989. The registry has now registered approximately 300 ponies owned in the United States. The Maryland ponies are a valuable resource for research and a friendly way for the public to learn about feral horses.

*Banker.* A long chain of narrow, sandy barrier islands known as the Outer Banks runs along the coast of North Carolina. These islands were the site of the earliest exploration and settlement efforts in the New World by both the Spanish and the English. As early as 1521, Spanish explorers were believed to be in the area of Cape Fear, leaving livestock behind when they departed. The doomed expedition of Sir Walter Raleigh to Roanoke Island was followed by settlers from the Virginia Company. Both English and Spanish ships called on the growing settlements. The English colonists often purchased Spanish-bred horses from the

Caribbean for use in their new homes. By the early years of the eighteenth century, the horses found on the Outer Banks were described as hardy, swift, and well formed.

One hundred years later, it had become common practice allow the horses to graze on the islands and round them up twice a year. Called Banker horses, Banker ponies, or Shackleford ponies, these horses were widely used for farming, hauling fishing nets, and transportation on the settled islands and nearby mainland. They were described as small horses with long manes, and their ancestry was commonly believed to be Spanish. On Ocracoke Island, the Maritime Lifesaving Service also used the horses.

In the 1930s, federal and local governments attempted to remove feral livestock, but the Banker horse herds persisted in several locations. In the north, small bands remained on long-isolated Corolla Island, although the development of roads and tourism eventually brought serious problems for the free-running horses. In 1989, the county commissioners declared the Currituck Banks a sanctuary for the feral horses. Following a large number of car-horse accidents, fencing was constructed to safeguard the horses on some 1,800 acres in the island's more remote northern regions. The residents hope that this protection will allow the horses' numbers to recover. DNA testing has revealed that the horses do have Spanish origins and that they have developed some distinctive breed characteristics. The Corolla Wild Horse Fund continues to protect and feed the ponies.

More horses are found on the Shackleford Banks, now part of Cape Lookout National Seashore. The history of these horses and their role in the area's cultural heritage is nearly identical to that of Corolla Island. The original settlement on Shackleford was destroyed by a hurricane in the early twentieth century, but at least 100 horses were still roaming free when the National Park Service assumed ownership in the 1970s. Blood analysis performed by Gus Cothran, the director of the Equine Genetics Lab at the University of Kentucky, has found several links to Spanish horses and one old and rare genetic marker found only in the Paso Fino, the Pryor Mountain horse, and the Shackleford or Banker

horse. The Shackleford horses also exhibit the highly unusual practice of stallion territorial behavior.

Another small group of horses is found in the Rachel Carson Estuarine Sanctuary on a tiny island between the Shackleford Banks and the mainland. Local residents have fed these horses in difficult drought years. In the Cape Hatteras National Seashore on Ocracoke Island, the National Park Service maintains another small group of horses in a fenced area.

The National Park Service admits that it manages the Banker horses grudgingly, and only because the public loves them. The NPS definitely regards the horses as “feral.” The horses do graze on the sea oats that hold the sand dunes in place, and they can trample the nests of ground-breeding shorebirds and turtles. National Park Service policy labels the horses as “exotic” and directs their removal if they threaten native plants or animals. Yet, the fact remains that these islands were settled, farmed, and used as common grazing land for three hundred years. Cows, sheep, and goats were also kept on Shackleford and the other islands. The horses are a historical element of island life and a source of pride for many residents. The National Park Service on Ocracoke has even used the horses for its mounted patrols.

The nonprofit Foundation for Shackleford Horses has become the horses’ advocate. Public outcry at the mention of removing the horses or reducing their num-

bers to 50 or 60 animals brought congressional action. The Shackleford Banks Wild Horse Protection Act (PL 105-229) was signed into law in 1998. Horses may be tested for EIA, and excess horses can be offered for adoption. The foundation and the National Park Service are charged with comanaging the herd.

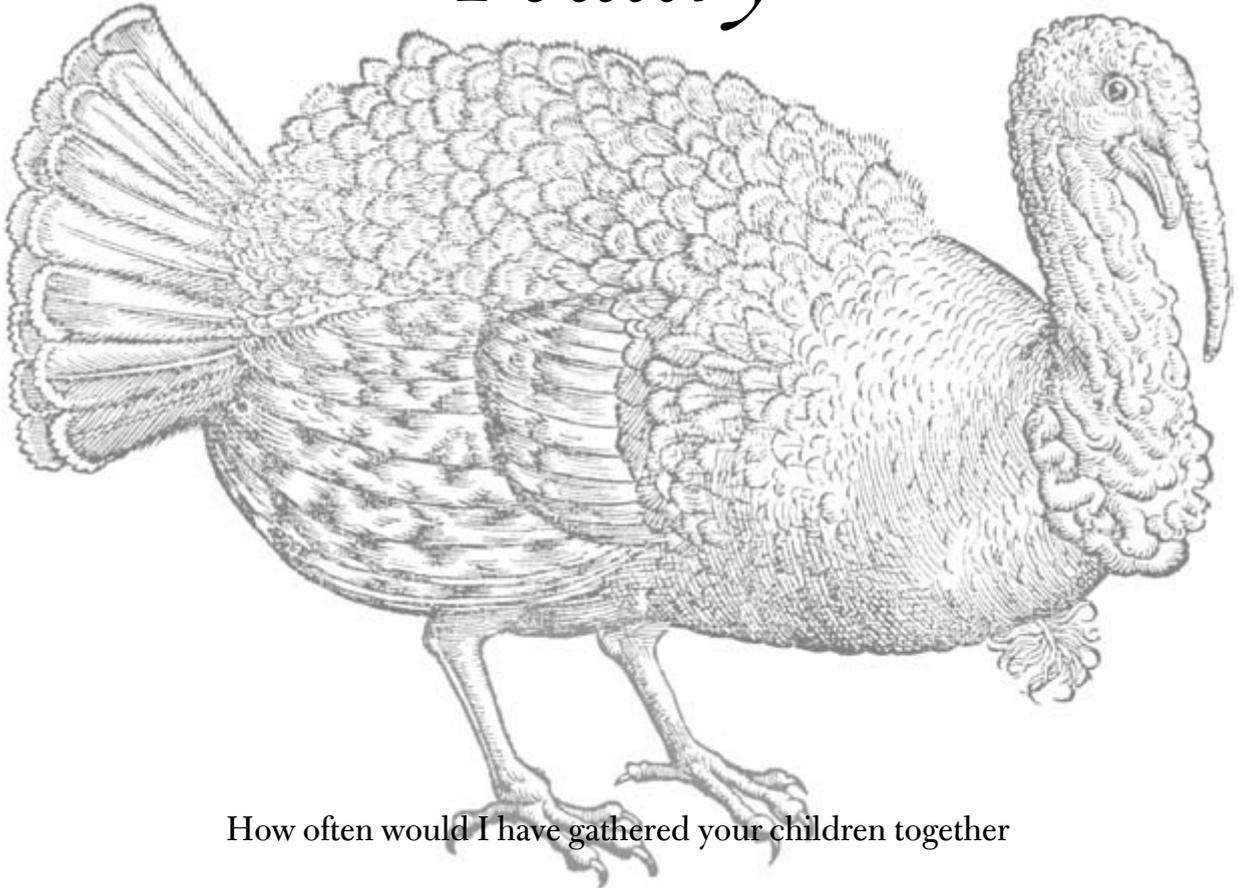
Some Banker horses have been included in the Spanish Mustang Registry. The hardy Banker horses are 13 to 14.3 hands tall and are found in bay, brown, buckskin, chestnut, and dun. There are also pinto-patterned horses on Shackleford Island. The use of western-type horses for crossing on the Bankers is changing the traditional horse in certain areas.

*Cumberland Island.* Far down the southern Georgia coast lies Cumberland Island and its neighboring smaller islands. Cumberland is 18 miles long and 3 miles wide. Once owned by a member of the Carnegie family, the island is now in part under the protection of the National Park Service as a national seashore. The resident population is about 50 people, and there is an inn for vacationers who arrive by ferry or small plane.

It is supposed that the Cumberland horses are also Spanish in origin. The herd numbers about 200 and has become quite tame. When it was suggested that these horses be removed because they are not indigenous, the public outcry brought congressional action prohibiting any spending on horse management.

CHAPTER EIGHT

# *Poultry*



How often would I have gathered your children together  
as a hen gathers her brood under her wings.

—Matthew 23.37

# Chickens

## Natural History

Approximately 11 billion chickens populate the planet. It would be impossible to count them all—from the small flocks scratching a living outside village dwellings to the thousands bred in huge industrial complexes. They are all, however, every one, directly related to one ancestor, the Red junglefowl (*Gallus gallus*) of southern and southeastern Asia.

Genetic typing reveals valuable information about the origins and relationships of domestic animal breeds. By comparing subtle differences in the DNA of mitochondria from a broad variety of chickens and wild fowl, researchers have determined that all chicken breeds share a common ancestor that is genetically identical to the Red junglefowl. In addition, because mitochondrial DNA mutates more rapidly than cellular DNA, changes in mitochondrial DNA provide a yardstick for dating events over thousands of years. By this means, researchers have determined that the domestication of the Red junglefowl probably began about ten thousand years ago in Southeast Asia. Before this evidence, the domestication of chickens was thought to have taken place about four thousand years ago in the Indus Valley of Pakistan.

The Red junglefowl is a small, shy 2-pound wild bird. The feathers on its back and in its curved tail are reddish brown, its breast feathers are black, and the skin on the shanks, or legs, is a dark olive to blue color. Unlike other members of the pheasant and peacock family, the male junglefowl has a fleshy crest, or comb, on its head and wattles. This comb is often absent in female junglefowl. The Red junglefowl looks very much like a small, streamlined domestic chicken.

The Red junglefowl is not considered an endangered species, for it is found throughout southern Asia from Pakistan to Indonesia, where it is well adapted to hot, humid conditions. Red junglefowl are hunted in some places and in others can be mistaken for native domesticated chickens, which they can strongly resemble. Domestic and feral chicken stocks have genetically con-

taminated most wild stock, and very few wild junglefowl still exist.

Observers have noted that wild junglefowl adapt readily to domestication, with two significant exceptions. They are extremely active and will scratch for food much more than domestic birds, destroying the ground of their coop. In addition, the cocks must be kept apart because they will fight aggressively and violently. Junglefowl also cackle and scream somewhat differently than domestic chickens. Researchers who have maintained a very pure strain of junglefowl from India have found their birds to be so flighty that they will injure themselves when penned near too much human activity. These birds are also highly susceptible to domestic poultry diseases.

There are three other species of junglefowl, all found in the jungles of southern and Southeast Asia. The Sri Lanka junglefowl (*Gallus lafayettii*) is found, appropriately enough, in Sri Lanka. A few individuals of this species have been imported to the United States. The Grey junglefowl (*Gallus sonneratii*) is native to southern India, where it is prized for its feathers, used in tying fishing flies. The export of the Grey junglefowl or its feathers has been banned in India since 1968 because some populations have declined. Several hundred individuals of this species are being bred in other countries. The Green junglefowl (*Gallus varius*) is a strikingly beautiful bird native to Java, Bali, and other islands of Indonesia. Approximately 100 Green junglefowl individuals are kept in other countries.

Junglefowl belong to the Galliformes, an order comprising approximately 240 species of heavy-bodied birds that spend most of their time on the ground. Gallinaceous (chickenlike) birds cannot engage in long-distance flight, but they have strong legs and toes for running and scratching. Other galliforms include partridges, quail, peafowl, guinea fowl, turkeys, and pheasants.

The behavior of junglefowl is almost identical to that of domestic chickens that become feral or are allowed to follow their inclinations. Fowl like to live in small groups, although they can recognize up to 80 individuals of their species. Junglefowl identify each

*capon* Middle English, from Old English *capun* and Old French *chapon*, from Latin *capo*  
*chicken* From Middle English *chiken*, from Old English *cicen*, young  
*cock* From Middle English *cok* and Old English *cocc*, in imitation of the sound made by the rooster  
*pullet* From Middle English *poulet*, from Latin *pullus*, young of an animal  
*rooster* From Middle English *rooste*, to roost

other primarily by the size and shape of the comb and wattles. Within these small living groups, a social rank or pecking order is organized based on such factors as threatening and submissive behaviors, age, body size, comb size, and individual preference. A rooster will try to gather a harem of females, but close relationships between a male and a female or a few females also exist. Chickens do not, however, form the tight monogamous bonds common to many geese and duck species. Because newcomers to a flock will cause battles while a new pecking order is established, stable flocks suffer less disease and the members eat more food and gain more weight. Confining birds with very little room greatly intensifies the pressures of the pecking order and the physical damage it does to the birds lower on the rungs of the group.

The crowing of the rooster was once the universal wake-up call. While the rooster may simply be calling to let other roosters in the area know of his presence, why the rooster crows in daylight remains a mystery. Researchers have discovered a pigment called pineal opsin in the pineal gland, which is located on the top of the brain in chickens. This pigment, predating the development of eyesight in animals, may respond to sunlight filtering through the chicken's thin skull. This pigment may also be linked to the bird's biological clock. The hormones melatonin and serotonin, secreted by the pineal gland, may also be involved.

Fowl spend most of their day searching for seeds, seedlings, fruits, berries, insects, grubs, and worms. With their feet they scratch the ground cover to expose tidbits. Swallowed food goes first to the crop, or pouch at the base of the neck, later passing to the gizzard, which is essentially an enlargement of the alimentary canal. Because all birds lack teeth, they swallow

grit and small stones, which help grind up food in the gizzard. While the flock forages, the dominant cock remains on guard for predators. About midday, the flock returns to its sleeping place, or roost, to rest. Fowl also enjoy resting in sunlight and will often take a long dust bath. Fluffing themselves with dust helps to kill body parasites and removes excess oil from their feathers. After dusting themselves, the birds preen, or clean their feathers. After another period of foraging in the afternoon, fowl move to their elevated roost before sunset. They return to the same secure roost night after night.

Junglefowl raise one clutch of eggs per year. Increased daylight and warmer days cause the hen to develop an egg. The production of each egg takes about twenty-four hours. When the hen is ready to lay, she searches restlessly for a nesting site on the ground or uses the same nest as other hens in her group. She lays the egg in a standing position, then rolls it under her belly, where she will sit for a few minutes. When the egg is first laid, it is covered in a slimy wetness called bloom that dries into a clear membrane. When a hen goes broody, she will sit on a clutch of eggs, not all necessarily her own. Broodiness is governed by the hormone prolactin, which is produced after the hen has laid a certain number of eggs.

Before the fertilized egg is hatched, it has begun to develop inside the hen's body, but development stops after the egg is in the colder temperature of the air. This development resumes after a broody or setting hen raises the egg's temperature. The hen sits on the nest for twenty or twenty-one days, leaving only around midday for a few minutes to eat, defecate, and dust herself. The broody hen keeps herself fluffed up to almost twice her normal size first to hatch her eggs and then to warm her newly hatched chicks. Turning the eggs at regu-

From the earliest days of its domestication in Southeast Asia, the chicken was believed to have powers of divination. Sometimes the bones were used or the blood and organs were examined to foretell the future or aid in making choices. The use of chickens in divination spread and continued in many of the cultures that adopted the chicken from Africa to Rome. Romans also based their predictions on how greedily chickens ate or whether chickens refused to leave their roost. They carried the right foot of a chicken for good luck. In addition, the Roman used chickens in sacrificial rituals.

The sport of cockfighting was filled with symbolism. Elements of sexual innuendo were present throughout the fight as owners caressed their fighting cocks and licked their spurs before the fight. Afterward, the owners licked their bird's injuries or placed the cock's head inside their mouth to revive it. Fights were conducted with great drama, and fighting cocks were also used to inspire soldiers.

The cock became such a symbol of sexuality that the word has been associated with the male sexual organ in many languages. Roosters' testicles were also eaten by men to enhance virility. In the sexually repressive era of the late nineteenth century, British Victorians and Americans no longer used the word, substituting *rooster*. *Cock*, like the term *bitch* to describe a female dog, was no longer used in polite society.

In many cultures, the rooster's crowing was also believed to have powers to drive away the dark, evil spirits, or ghosts. To the Persians, the cock's crow banished darkness and evil, bringing light and fire. The cock was sacred to the Greek god of healing Asclepius. All the Greek gods associated with the light were connected with cocks. For their part, the Teutonic tribes believed that the rooster's comb was symbolic of the flames of fire.

The chicken is one of the twelve animals of the Chinese zodiac. To be born in the year of the chicken is to have honor and value. The Heavenly Rooster lived in the land of sunrise at the edge of the world. Each daybreak his crow was answered by all of the roosters of the world. His golden feathers and red comb reflected the colors of the sunrise.

Early Christians believed that the rooster's role in St. Peter's denial of Christ should serve as a warning to humans and a symbol of vigilance. Depictions of roosters began to be placed on church spires and later on weathervanes in the hope that human devotion would be more constant than the wind. The Muslim Prophet Mohammed saw a tremendous cock in heaven that will crow until judgment day.

Eggs have long been symbols of fertility in many cultures. For thousands of years, eggs have been given as gifts and have been used to celebrate the coming of spring. In Christianity, eggs symbolize Christ's resurrection, which led to the custom of creating Easter eggs. Because the eating of eggs was forbidden during Lent, they were saved, hardboiled, and decorated for the holiday.

lar intervals, the hen successfully incubates most of the eggs in spite of changes in temperature, light intensity, and humidity. It is thought that the rhythm of turning influences the later activity rhythms of the chicks.

Before hatching, the egg membranes rupture and the egg breathes. The chicks also vocalize to each other and their mother, complaining of cold or uncomfortable positions. This noise helps coordinate the hatching of the eggs at the same time and keeps the mother

continuously on the nest. An egg tooth on the upper tip of the chick's beak enables the chick to open the shell, a process known as pipping. The chicks hatch within forty-eight hours of one another, which is exactly how long a hen or a newly hatched chick can survive without food or water.

Chicks remain close to their mother for about a week and exhibit a following response. The imprinting period in chicks lasts for several days, although it is

less intense than that of ducklings or goslings. Chicks are born covered with a downy fluff, but their feathers begin to grow immediately. Vocalizing or cheeping is a means of identification and attention seeking. The hen makes deep, clucking sounds, and the chicks chirp to voice a complaint or in fear. The chicks follow their mother and eat or drink by mimicking her example. She also continues to warm them with her feathers. Interestingly, for the first four weeks, wild fowl chicks gain weight at the same rate as intensively raised chicks, but they weigh only half as much as domestic chickens. By eight to ten weeks, the chicks are functioning socially, and by about fourteen weeks, the mother hen will have forced them away. The chicks also lose interest in their mother because she is no longer fluffed up and so looks different to them.

Fowl molt, or renew their feathers, once a year, usually in fall. In domestication, chickens rarely live out their lives naturally because they decline considerably in their egg-laying abilities, but a particularly good broody hen can survive to twelve or thirteen years or longer.

## Domestication

The reclusive Red junglefowl probably did not come freely to scavenge at human settlements, but people could have brought home netted or captured fowl to raise. Fowl could be kept in cages or the flight feathers could be clipped to prevent the birds from flying out of enclosures. Fowl were also sometimes tethered by a strip of leather attached to the shank.

Several behavioral characteristics of fowl smoothed the path of domestication. If they are imprinted on humans as chicks, adult fowl will come running at the sound or sight of their keeper, clustering around to be fed. Likewise, if fowl are cooped as chicks, they will return freely to their roost at night as adults. Fowl are active during the day, so they easily accept cooping at night. By keeping domesticated chickens near their settlements, keepers could check the nests and protect the birds from predators. Fowl do not roam far but will scavenge around farmsteads and nearby areas.

The early domesticated hen could contribute a few eggs in her laying season, which could be extended a little if people removed eggs from the nest. Early chicken keepers would certainly have tended to retain the hens who were better layers, spurring the enhancement of hens' egg-laying abilities. The young chicks that hens raised on their own would have been valuable as a source of meat, and the feathers would also have been used in decorations, clothing, and bedding. This early domestication is hard to document because chicken bones closely resemble those of wild junglefowl, and they disintegrate more quickly than the bones of larger domesticated animals.

The eating of chicken and eggs was taboo among some peoples, including certain African tribes and groups or castes in India. This belief was based in part on the sacred role of chickens, which were often used in divination, the art of foretelling the future. Eggs became powerful symbols of fertility around the world and were often reserved for fertility rites. Other causes of the taboo on eating chicken or their eggs included the eating habits of chickens, which pick through livestock manure for grain, eat small rodents, and peck at animal carcasses. Some cultures also viewed the hen as promiscuous in her breeding habits.

Cockfighting probably dates as far back as the domesticated chicken itself. In fact, many writers suggest that cockfighting was the original reason for the domestication of the junglefowl in Southeast Asia. The ancient Chinese and peoples of the Indian subcontinent described cockfighting by 1000 B.C. Cockfighting spread with the domesticated chicken across Asia, into Europe, and eventually across the seas to the American colonies.

The Greeks and Romans fought cocks, and Julius Caesar noted that the British kept chickens for diversion and pleasure—a likely reference to cockfighting. Between the sixteenth and early nineteenth centuries, British royalty enjoyed cockfighting, but even a poor man could also own or bet on a cock. Many varieties of gamefowl were developed in Britain: Black-Breasted Reds, Custards, Gingers, Mealy Grays, Polecats, and Shakebags. The cocks were dubbed, or cropped of their wattles and combs, to remove an advantage. The

[To view this image, refer to the print version of this title.]

fight, or main, was advertised, bets were taken, and the cocks were dropped from their shakebags into the pit (fig. 62).

Although cockfighting is now frequently condemned as animal abuse, in past eras, it was considered a legitimate, fashionable sport, and it remains so today in many countries. President Abraham Lincoln is said to have acquired the nickname Honest Abe because he was a fair judge of cockfights. In England, clergymen and schoolmasters often conducted cockfights well into the 1830s. Today, cockfighting flour-

Fig. 62 Woodcut of a rooster by Konrad Gesner published in *Historia Animalium* in 1555. From *Curious Woodcuts of Fanciful and Real Beasts* (Dover, 1971).

ishes in Afghanistan, India, China, Southeast Asia, the Philippines, and Latin America, and it remains legal in three American states: Louisiana, New Mexico, and Oklahoma. In 1998, voters in Missouri and Arizona passed referendums placed on the ballot by animal welfare groups to make cockfighting illegal.

In many countries, cockfighting is a major spectator

Chickens were once so powerful and sacred in some cultures that they became a taboo food. In other cultures, chickens were seen as dirty because they scratched through manure in search of grains and seeds. High-caste Hindus would bathe after touching a chicken. Many Buddhists and Tibetans considered chickens so dirty as to be nauseating. Other cultures believed that chickens were promiscuous and carelessly abandoned their eggs. In some African societies, this made chickens dangerous for women to eat.

The cackling of hens was often considered an ill omen. Christian philosophers wrote that women, like hens, should speak modestly, low, and quietly while allowing the rooster to rule. Yet Christ compared himself to a mother hen gathering her chicks, not the arrogant, prideful rooster.

In the prebiblical world of the Near East, it was believed that a rooster would lay one egg in his life and that this egg possessed magical powers. One such egg was hatched by a toad, producing the much feared *cockatrice*. Originally known as the *basilisk* in ancient Greece, this monster took many forms, among them a snake with the head and wings of chicken. By the Middle Ages, the cockatrice had the head of a cock and the body of a lizard or, later, a dragon. The cockatrice could kill with its gaze. It, in turn, could be killed by a weasel, by looking at it from a mirror, or by the crowing of a cock. European travelers were so afraid of this monster that they carried a rooster in a cage when they were in unknown lands.

sport and a cultural tradition. The legal gambling revenue and taxes from cockfighting help make this state-owned business one of the most profitable in the Philippines. Cockfighting is the largest spectator sport in Puerto Rico, and large amounts of money are gambled on the results. In Louisiana, some cockfighting establishments have large amphitheaters where several hundred cocks can fight in a night. Fighting is accompanied by large-scale gambling and rewards of up to \$150,000 in prize money or new pickup trucks. Other pits are small, rural venues frequented by law-abiding members of the community. Cockfighting was declared illegal in Britain in 1849 but no doubt continues underground as it does in many countries.

The many breeds of fighting cocks are generally derived from Southeast Asian and Malaysian stock. The modern gamecock is raised for aggressiveness and is sometimes given steroids, digatalis, and testosterone or injected with tranquilizers to dull the pain of combat. In some parts of the world cocks fight without the gaff, the curved metal spur that makes the fight quicker and bloodier. Most cockfighters defend the ancient use of the gaff, which is strapped to the shank with a leather thong, as a way to equalize differences

in natural or slow-growing spurs. In the United States, expensive fighting cocks are raised in individual cages, fed special diets, exercised, and massaged. The United Gamefowl Breeders Association and several magazines cover cockfighting. Many fanciers also raise gamefowl breeds for show purposes only. Although many people are opposed to cockfighting, it must be said that the cockfighters who have carried their birds around the world for thousands of years have had a major impact on chicken breeding (fig. 63).

Besides the fighting cock types, large flightless chickens with heavy bones, dark skins, and feathered legs were developed in China by the second millennium B.C. At about the same time in ancient Persia, descriptions of domesticated chickens and cockfighting were recorded. The Persians obtained chickens from India, and they regarded the cock as a sacred bird. The Greeks in turn imported Persian birds. Although chickens are not mentioned in the Old Testament, they do play roles in the New Testament, perhaps reflecting the increasing use of chickens in the ancient Near East. As early as 400 B.C., the Egyptians were artificially incubating eggs, a practice that was also successful in China. Although chickens were less popular in Egypt

[To view this image, refer to the print version of this title.]

Fig. 63 Old English Gamecock at Colonial Williamsburg tethered by a leather strap on his shank. Photograph by Joanne Swope.

than geese, ducks, and other birds, they were bred and carefully housed.

Among the Romans, chickens were raised mainly for eggs. The Roman agricultural writer Columella described several breeds of chickens. He noted that the Adriatic hens were ill-tempered but could lay an egg every day. Fighting breeds included the Rhodian, Chalcidian, and Median. Columella described the *nostrum vernaculum*, or common sort, as a practical choice for eggs and meat but gave his greatest praise to the five-toed, white-eared chickens similar in description to the very old Spanish and Dorking breeds. The Romans practiced artificial incubation, the castration of cocks to

produce capons, and the careful feeding of caged birds. They were careful husbanders and recorded their observations and practices of keeping poultry. Chickens also played an important role in divination in Roman religion.

It has been suggested that the chicken did not arrive in Britain until shortly before the arrival of the Romans because only small numbers of chicken bones have been found in pre-Roman sites in southern and eastern Britain. Julius Caesar described the chickens of Britain, but he noted that they were a forbidden food and were kept only for amusement or pleasure. After the Roman occupation, chickens were much more plentiful and over time became a common domestic bird.

Eventually in Britain, most families kept at least a few hens who fended for themselves and, when they were too old to lay eggs, ended up in the cooking pot. Housewives also caponized young roosters. By the Middle Ages, a good hen was expected to lay about 150 eggs yearly, although the egg's size was much smaller than today. More realistically, many hens probably laid about 100 or fewer eggs a year. The hen was also expected to raise a small brood of chicks. Although many monastic orders forbade the eating of meat, they exempted domestic birds and their eggs from this ban. By the thirteenth century, the trade of poulter was recognized in London and other English cities. On manors and estates, large flocks of chickens were the responsibility of dairymaids, who often kept them in coops and fed them on milk and cereals.

The English ate chickens throughout the year and most often served them roasted or stuffed and seasoned with cumin. Chickens were also stewed or made into pottages. An elaborate dish served mainly for its entertainment value was the *cokagryns* or *cokatryce*, in which the front part of a capon was sewn onto the rear part of a suckling pig and then stuffed and roasted. Later, capons were pickled, but because capons were so lean in comparison to geese, it was necessary to add lard to the *sous*, or sauce. Chicken was also baked into pies that were eaten either hot or cold. Broth made from a cock was long believed to cure consumption.

In England, eggs were eaten boiled, roasted in their

*cockpit* Originally the place where gamecocks fought; pilots later referred to their place on the airplane as the cockpit because that is where they fought their battles

*cocktail* Perhaps the mixture fed to cocks before a fight or the mixed drinks consumed after a cockfight

*cock of the walk, cocky as a rooster, cocksure, cocky* Formerly, a confident person, now someone who is conceited or self-important

*get your hackles up* To become angered

*ruffle your feathers* To get worked up

*pitted against* This originally occurred when gamecocks were set against each other in the pit

[To view this image, refer to the print version of this title.]

Fig. 64 The altered capon is depicted in this woodcut published in 1555. From *Curious Woodcuts of Fanciful and Real Beasts* (Dover, 1971).

shells, fried in butter or lard, and baked in custards. Because the poor owned but a few hens, they ate eggs less frequently than wealthier individuals. The yolk was considered the healthy part of the egg, and the white was often used only as a binding agent or discarded. Eggs were forbidden to all throughout Lent until Easter Sunday, when people rewarded their self-denial with plenty of boiled eggs. Wine or ale was mixed with raw yolks and heated into a spiced or sugared caudle. Eventually custard dishes became more elaborate and eggs were used in baking. About the seventeenth century, egg whites were beaten for a dish called cream with snow and for sponge cakes. Eggs were sometimes preserved for months buried in sand or bran meal or packed in wicker hampers. In the cities, poulterers sold

raw eggs, cookshops sold cooked eggs, and farmers sold their eggs directly in the markets. Chickens were also kept in the yards of city houses to provide householders with eggs.

Domestic birds gradually grew in importance and replaced the eating of wild game birds from little songbirds to huge bustards (now extinct) and cranes. By the eighteenth century, chickens were being raised on a large scale for city markets. Before being sent to market, both hens and capons were often crammed with wheat or barley meal, raisins, or bread crumbs mixed with milk. Sometimes the bird's vent, or anal opening, was sewn up a few days before slaughter, a practice that was believed to fatten them even more. This abhorrent custom led instead to sickly birds (fig. 64).

Beginning in the years of the Roman Empire and continuing through the era of the Crusades, many types and breeds of chickens were brought into Europe and exchanged among cultures. The Italian Ulisse Aldrovandi wrote the first detailed poultry book about A.D. 1600. In addition to writing about husbandry methods, Aldrovandi described such breeds of chickens as the Silky, the Turkish, the Persian, the Indian Game, the Paduan, and birds with feathered legs or crests.

A century later, the study of agriculture was flourishing with advancements in the care and breeding of livestock and poultry. The continued development of cockfighting birds or game fowl also had a large influence on common barnyard chickens. In Britain, there were now recognized types or breeds, among them the Dorking, the Old English, the Old Sussex, the Redcaps, the Pheasant Fowl, and the Scottish Creep-

ers. Small, penciled birds were known as Chitterpats, Creels, Corals, or Bolton Greys. These chickens were very similar to the Hamburgs of the Low Countries, whose name they later acquired. At Britain's first poultry show, held in 1845 in London, there were classes for the Dorking, Surrey, Kent, and Old Sussex Fowl. Queen Victoria herself was interested in fancy poultry, and poultry breeding became a hobby for both rich and middle-class Victorians. The necessity of feeding Britain's growing urban population also led to an increase in the commercial breeding and raising of chickens in the nineteenth century.

In 1834, the Chinese port of Canton was opened to foreign trade, and before long, European traders were returning to Europe with large, soft-feathered, docile Cochin and Brahma chickens with unusual feathered legs. Their arrival set off a furor to possess these incredible birds and cross them on domestic fowls. In England, tens of thousands came to view these unusual breeds when they went on public display in 1850 in Birmingham. Exotic Shanghai and Chittagong chickens soon joined the mix, as did unusual chickens from other parts of Europe and the Mediterranean basin, Malay, and Sumatra. This craze, coupled with the outlawing of cockfighting in Britain in 1849, led to an explosion in breeding and showing fancy varieties of poultry.

The first book of British poultry standards was published in 1865, and the Poultry Club of Great Britain was founded in 1877. The *British Poultry Standards* appeared in its fifth edition in 1997. The *Standards* provides the specifications for more than a hundred breeds and varieties of poultry. Chickens are divided into "hard"-feather breeds, such as the game breeds, which have tight feathering, and "soft"-feather breeds, which are divided further into heavy, light, rare, and bantam classes. The Rare Poultry Society serves as the breed club for several rare breeds that do not have a specialist club of their own.

There is uncertainty about when chickens arrived on the many settled Pacific islands and greater controversy on when chickens arrived in South America. Chickens are believed to have arrived on the Cook Islands by A.D. 1100 and on Tahiti by 1300. Hawaii was

settled between A.D. 500 and 700, and chickens were definitely observed on Kauai by Captain James Cook in 1778. Some researchers believe that at least an Asian type of chicken was pre-Columbian in ancestry, but no chicken bones have been found at archaeological sites from that era in Central or South America.

The Spanish navigator and explorer Vincente Pinzón landed on the Brazilian coast in 1500, which would have been the first possible introduction of European chickens to South America. When Hernán Cortés and his men made their first conquering inroads into Central America and Mexico just twenty years later, however, they encountered chickens and noted that they appeared different from European fowl.

An isolated group of native peoples in south-central Chile and neighboring Argentina, the Araucanas, remained extremely free of European influence until the end of the nineteenth century. These peoples raised a unique chicken that bears their name. The Araucana (*Gallus inauris*) is a black-skinned chicken that lacks the final segments of the spinal column, earning it the nickname "rumpless." The Araucana has a small pea comb, silky or hairlike feathers, and distinctive pufflike feather earrings, but it lacks tail feathers. Its shanks and toes are light in color and clean of feathers. Araucanas were most commonly white birds, sometimes with red wings, but many colors and patterns were present.

Araucanas also lay blue to greenish eggs. A single autosomal dominant gene controls the eggshell color: blue on a white shell produces blue eggs, and blue on a brown shell produces khaki-green shells. This mutation to blue coloration may have occurred elsewhere in the world but has not been documented.

In the early twentieth century, the chickens ran freely in Araucana villages, often mixing with Spanish-heritage birds. A crossbred type emerged that had a tail but also wore feather earrings and laid blue eggs. In the 1920s, Araucanas were exported to both Britain and North America. A few breeders worked on maintaining the pure rumpless Araucanas, but many hatcheries crossed them on a number of breeds, resulting in a tailed chicken with earrings that lays blue or blue-green eggs. It is these crossbred varieties that are most commonly encountered today. In the 1960s, a small group

*acting like a chicken with its head cut off* Acting without purpose, disoriented

*bad egg* A disreputable person, as opposed to a *good egg*

*bantamweight, featherweight* A lightweight boxer

*brood* To do little else but think over a situation

*cackle* To make the noise of hens

*chicken feed* A small sum of money

*chicken hawk* One who preys on the weak or defenseless

*chicken, chickenhearted, chickenshit, chicken livered, to play chicken, chicken out* One's cowardly nature or behavior

*chicken scratch, hen scratch* Poor handwriting, dating back to the time of the ancient Greeks

*chickens always come home to roost* One's actions always have consequences

*chuck* A stupid person

*cock-and-bull story* A fantastic or unbelievable tale, originally a story in which animals talk like humans

*curate's egg* Upon the gift of a stale egg, the curate thanked his superior by saying, "Parts of it were good"

*don't count your chickens before they're hatched* From Aesop's fable "The Maid and the Pail of Milk," which also illustrates the importance of *don't put all your eggs in one basket*

*egg on one's face* A state of embarrassment

*egghead* An intellectual (because of a high forehead)

*flew the coop* Gone away, left home

*henhouse* A house controlled by women

*hard-boiled* Tough

*henpeck* To dominate and nag (one's husband) persistently

*mad as a wet hen* Angry

*nest egg* Savings held in reserve

*go to bed with the chickens* As opposed to *get up with the chickens*

*mother hen* Someone who takes an overly protective attitude

*pecking order* Social rank and status

*peep* Little sound

*rule the roost* To be in charge, as a rooster among hens

*scarce as hen's teeth* Very rare indeed

*scratch for a living* To forage like a chicken

*spring chicken* Young person

*walk on eggs* How? Very carefully

*which came first, the chicken or the egg?* The perfect rhetorical question

of purebred breeders organized in the United States to preserve the original Araucana.

The European colonists to North America brought along their common chickens from the ports of south-

ern England, France, Holland, Spain, and Portugal. Most sea voyagers had chickens aboard ship to provide eggs and meat along the route. There were no chickens on the Caribbean Islands before the Spanish arrived, but the islands were soon populated with

*pinfeather* An immature feather  
*barring* The alternate crosswise bars or stripes of two colors on a feather  
*lacing* Plumage in which the feathers are edged with a different color  
*penciling* Plumage in which narrow concentric or crosswise markings are on the feathers  
*spangled* Plumage in which a round or V-shaped marking of a different color is at the end of each feather  
*hackle* Long, narrow neck feathers  
*shank* The lower, scaly part of the leg  
*sickle* The long, curved tail feathers of a male bird  
*spur* The hornlike protuberance that grows from the inner side of the shank  
*single comb* Tall, thin, and serrated  
*rose comb* Low, thick, solid, and covered with small points, generally ending in a spike  
*pea comb* Three short single combs joined at base and rear

chickens famed for their egg-laying. Ships sailed regularly between the Sugar Islands in the Caribbean and the English colonies, carrying along Spanish-heritage stock. The captains also kept fighting cocks aboard their ships.

In the early days of the North American colonies there was very little interest in chicken breeding other than for practical uses or cockfighting. Fending for themselves, chickens interbred in the barnyard. In some areas, such as New England, there seemed to be a preference for regional types. Predation was also a greater threat to poultry in the New World, and the darker, patterned birds were less vulnerable. Over time, many colonists came to believe that white chickens were less healthy than colored birds, and this attitude persisted until modern confinement techniques were adopted. In general, however, the barnyard or backyard chickens took care of themselves and were given little thought. Enlightened farmers like George Washington and Thomas Jefferson, who began to pay attention to the breeding and care of poultry, were the exception. The settlers moving ever westward did not have the luxury of applying scientific methods to the husbandry of poultry.

Beginning in the 1820s, the Mediterranean and then Asiatic breeds found their way to the United States, setting off the same furor or “hen craze” that was occurring in Britain. The United States govern-

ment conducted the first poultry census in 1840, and the first American poultry show occurred one year before the great London show. In 1849, in Boston, more than 10,000 spectators came to view over 1,000 birds. Daniel Webster, politician, orator, and poultry breeder, entered a pair of Javas. That same year the first association of poultry breeders was organized, although the American Poultry Association (APA) was not founded until 1873. In the next year, the APA published the first edition of *The American Standard of Perfection*, in which ideal specimens are detailed through description and illustration; this 1874 edition included seventeen breeds of large fowl in forty varieties. The efforts of the fanciers, who bred for uniform type and color patterns, contributed a great deal toward establishing the breeds and their varieties, although fanciers were somewhat more interested in achieving perfection of the individual rather than productive qualities of the breed (fig. 65).

In the last half of the nineteenth century, American fanciers continued to develop more breeds and varieties, while farmers and poultrymen also worked toward producing improved egg-layers and broiler-type chickens. Concentrations of producers supplying both eggs and meat were found outside cities. The development of cold storage and refrigerated railway cars allowed products to be shipped longer distances to city markets. Other technological developments in-

[To view this image, refer to the print version of this title.]

Fig. 65 The Silver Spangled Hamburg was greatly admired by fanciers. Courtesy of the IAB and Hans Peter Jorgensen.

cluded the heated incubator, the use of electric lights in the hen house to increase rates of laying, the improved ventilation of hen houses and manure disposal, the shipping of chicks from large hatcheries, and medical advances to improve poultry health. At universities, researchers examined profitable production and methods of breed improvement. The APA became the domain of the fancier, whereas special interest and

trade associations developed around economic interests.

Across the country, farmers began to raise larger flocks of chickens as a part of the farm income, replacing the small flocks that housewives traditionally kept to supplement household money. In 1910, 88 percent of farms raised chickens that were kept in flocks averaging about 80 birds. In the 1930s, the National Poultry Improvement Plan (NPIP) was instituted to reduce disease losses and increase poultry production. Sulfa drugs helped battle coccidiosis, caused by a protozoan

*hen* An adult female chicken, turkey, or duck

*rooster, cock* An adult male chicken

*cockerel* In the United States, a male chicken less than a year old; in Britain, a rooster

*pullet* A female chicken less than a year old or one that hasn't laid her first egg; after laying the first egg, she becomes a *hen*

*chick* Baby chicken of either sex

*broiler, fryer* A chicken marketed at seven to twelve weeks of age

*roaster* A chicken marketed at three to five months of age

*capon* A castrated male chicken usually marketed at six to seven months of age

*layer* A female chicken in egg production

intestinal parasite, and the later development of antibiotics increased poultry survival rates.

The broiler industry developed in the 1920s in North America, stimulating the improvement of meat qualities in the established dual-purpose breeds. Specialized crosses between breeds were also popular. American consumers came to prefer white-feathered birds, which eliminated unsightly dark pinfeathers. Yellow-skinned table birds also replaced the white-skinned breeds preferred in England. The choice of yellow-legged birds was based on consumers' belief that dark-colored legs were discolorations associated with bruising or decomposition. Breeders also reduced the feathering on birds, which was regarded as a waste. The White Cornish and White Plymouth Rock cross eventually became the basis of most broiler-fryer flocks.

At the same time, American egg producers took the White Leghorn and improved its laying rate first to 250 white eggs per year and then to 300 or more. Brown eggs and the breeds that supplied them remained commercially viable only in certain regional markets. In Britain, where consumers preferred brown eggs, the development of appropriate strains achieved similar production levels. Laying hens became smaller even as their eggs grew larger. Mechanization and battery-cage production lowered costs for the producers as their flocks grew larger and larger. Battery-cage production used single or multiple-tiered cages, with baffles to deflect eggs and manure, to house layer hens.

By the 1950s, purebred chickens were no longer

being raised commercially for meat or eggs. The increased costs of the large commercial hatchery operations made poultry or egg raising a specialized industry but no longer part of a diversified farm. Although the new commercial systems of production reduced the cost of meat and eggs, they also resulted in overproduction, driving prices even lower. The commercial operations then had to find ways to lower overhead costs even more. Larger "ag" and food conglomerates began to control the market both vertically and horizontally. American companies once controlled these now multinational operations. Global giants such as British Petroleum, Merck Drug, Upjohn, Booker McConnell, Dekalb, Lohmann-Wesjohann, and the Institute de Selection Animale (ISA) now control large percentages of the world market.

This consolidation has drastically reduced the genetic variety of commercial flocks. Only about nine global companies now produce the inbred hybrid breeding lines for layers and broilers. These industrial stocks are a highly guarded resource but are potentially vulnerable to disease or inbred weaknesses. These stocks are also highly selected for battery-cage production and intensive, controlled environment systems.

A drastic reduction in the number of hatcheries supplying chicks to farmers has accompanied this consolidation. Thousands of hatcheries have closed, and with them have passed many separate strains within breeds. In 1934, there were more than 11,400 hatcheries in the United States. Today, there are very few

Two thousand years ago, the Roman scholar Pliny described a variety of chickens that were extremely small yet useful for laying eggs. In Britain by the seventeenth century these small chickens were called *grigs*. Eventually, they were called *bantams* after the Javanese city of the same name and the home of the imported Rose Comb Black Bantam. The Old English Common or Game bantams are descended from these ancient miniature chickens. Japanese bantams were the result of centuries of breeding in that country. Other breeds of these old bantams were found in Belgium and the Netherlands. In 1860, Europeans imported another bantam breed, the Pekin, from China.

Bantams are now available as miniature versions of most full-size chicken breeds. These bantams were created by breeding the smallest members of the breed together, often with crossings of the true bantams. These new bantams are available in a dazzling array of colors and types. They are usually one-fourth to one-fifth the size of standard varieties, although in some breeds they are quite large.

Bantams can be enjoyed or bred by people who are unable to keep large fowl. Raisers of hobby bantams probably outnumber those raising full-size birds by five to one in Britain. Bantams, or Bantys, as aficionados call them, are also popular in North America, both as a hobby and for exhibition. They do lay tiny eggs that can be eaten.

Full-size poultry are also kept as pets, sometimes in the city but more often in the country, where a few birds are part of the yard or barn. Zoos often have free-ranging bantams, which reduce fly and insect problems and eat waste grain.

commercial hatcheries other than the industrial producers.

The divergence between the show or exhibition strains and the utilitarian forms of the breeds had existed since the beginning of the poultry fancy with its emphasis on perfect form and color usually without regard to production traits. At times careful adherence to the preservation of these specific color or physical traits can be important to maintaining other valuable traits but generally fanciers have not been interested in egg-laying or rate of gain.

Today's *American Standard of Perfection* describes more than fifty breeds in more than 170 varieties. The large breeds are raised primarily for meat or eggs and are divided into several geographic classes. The American class includes dual-purpose breeds that are large in size and lay brown eggs. The English class consists of meat producers with white skins. Chickens in the Mediterranean class are smaller and mostly egg-layers. The birds in the Asiatic class are very large and have feathered shanks. They are meaty but grow

slowly. Other classes include French, Polish, Continental, Game, Oriental, and Miscellaneous.

## Husbandry

With the development of the specialized commercial lines of meat or egg-laying breeds, the divergence between production and exhibition grew enormously. A few breeders maintained the old, traditional, farm, or dual-purpose lines of these breeds, which came to be labeled "middle-level." It is these old utilitarian forms of chicken breeds that are in the greatest danger of being lost. The ALBC perceives these heritage breeds as falling roughly into four categories: the dual-purpose brown egg types, the formerly commercial white egg types, the old farm breeds such as the Dominique, and the production breeds that were once commercially viable but are now critically rare, such as the White Wyandotte (fig. 66).

Some breeds have been lost or are now being kept

by only a handful of fanciers. In Britain in the early twentieth century, several new, improved breeds were developed but did not succeed in commercial production, including the dual-purpose White Surrey and Blue Exmoor. The charmingly named Marsh Daisy was a blending of the Malay, White Leghorn, Hamburg, and Old English Game. It was a heavy-laying upright bird with willow-green legs and was available in several color varieties. The Marsh Daisy became extinct after World War II, although some color varieties have been reestablished. The Ixworth was a table bird created from India, Old English Game, and Light Sussex crosses. The Ixworth survives today in only very small numbers. The docile Norfolk Grey is a hardy and efficient forager that produces both eggs and meat. This breed was rescued from extinction in 1974 by the Reverend Andrew Bowden and his wife, Sue Bowden, who then encouraged new breeders. Unfortunately, after their leadership ended, the numbers again dropped, and the breed is now in need of dedicated breeders.

Several breeds developed in North America have also disappeared. The Buckeye was created by Nettie Metcalf of Ohio, who crossed Cornish Games, Brahas, and Black Breasted Gamefowl to create a pea-combed competitor to the Rhode Island Red. The original Buckeye was a fluffy bird with a dark, lustrous color. The Buckeye fanciers created numerous varieties, but the Rhode Island Red won the battle for popularity and the Buckeye faded away. At the USDA research station at Beltsville, Maryland, researchers developed the Lamona beginning in 1912. The Lamona was the only American-class bird that laid white eggs and was created from crosses of Silver Grey Dorkings, White Leghorns, and White Plymouth Rocks. The breed was not standardized until 1934. Although Lamonas were excellent layers and yellow-skinned meat producers, the commercial industry had already begun to swing away from dual-purpose birds. The Lamona arrived too late, as did the California Gray, which was developed by Dr. Horace Dryden of Modesto, California, in the 1930s. The California Gray blended White Leghorns and Barred Plymouth Rocks to produce a lighter dual-purpose bird that laid a great

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Fig. 66 These lovely Barred Plymouth Rocks were illustrated in the *Nebraska Farmer*. They were also the first-prize breeding pen at Madison Square Garden in 1895. Courtesy of the IAB and Hans Peter Jorgensen.

quantity of white eggs. The young roosters were easy to separate from the pullets because their plumage was lighter in color. The California Gray was never recognized by the *Standard* and may only be bred at one hatchery today. The equally rare Barred Holland is very similar but includes the extinct North Holland Blue in its background. Other interesting breeds that have become extinct in North America include the Brakel, Breda, Erminette, Ixworth, Modern Langshan, Old English Pheasant Fowl, Scotch Dumpy, Scotch Grey, and Surrey.

The Chantecler is the only breed of chicken developed in Canada. Brother Wilfred of the Oka Cistercian monastery in Quebec conducted a breeding program to create a chicken suited to the cold Canadian winters while producing both eggs and meat. He used Rhode Island Reds, Dark Cornish, White Leghorns, White Plymouth Rocks, and White Wyandottes. The result was the Chantecler, a muscular, white-feathered bird with a small rose comb and wattles. The breed was

recognized by the *Standard* in 1921. The Chantecler achieved some popularity in both eastern Canada and the northern United States as both a layer of brown eggs and a meat producer. Yet like most dual-purpose breeds, the Chantecler soon lost ground to the specialist breeds. The Oka monastery no longer raised the birds by the 1950s, and the breed was considered nearly extinct.

In the late 1970s and early 1980s, efforts were made to locate any remaining Chanteclers. Breeders in the United States reconstituted the Chantecler but without the use of any original lines. A few breeders in Ontario believe that they have these original lines, and additional birds may be found in Quebec and Newfoundland. There are hopes of verifying these birds and then conducting a conservation program. At present, the Chantecler is considered a re-creation by many poultry experts.

Several organizations are involved in rare poultry conservation. In 1969, the Rare Poultry Society was created in Britain to support all birds that lacked specific breed clubs. The RBST has also determined a priority list and seeks to establish "accredited breeding units" for both preservation and the fostering of utility traits. The ALBC has conducted surveys of stocks, established a priority list, and worked with individuals involved in conservation projects. The Society for the Preservation of Poultry Antiquities has also developed a list of critically endangered breeds, including exhibition, commercial, and utilitarian strains. The American Poultry Historical Society documents the development of the poultry industry and preserves its antiquities. The RBC has created the Heritage Hatchery Network. This network began with twelve breeds previously maintained by Dr. Roy D. Crawford and the University of Saskatchewan. Three additional breed lines have been added from the private conservation collection of the founder of Shaver Poultry Breeding Farms, Dr. Donald McQueen Shaver. The Alberta Poultry Research Centre at the University of Alberta conserves six breeds from the University of Saskatchewan's research flocks, created by Roy D. Crawford, professor of poultry genetics. Many individual breed clubs, such as the Dominique Club of America, also

The mixture of feathers, manure, and bedding sawdust from broiler growing houses is sold as fertilizer. Feathers and carcasses are also processed into animal feed known as avian protein meal or feather meal. DPW, or dehydrated poultry waste, and CPW, or composted poultry waste, are often used in ruminant rations.

provide a network of breeders along with historical and practical knowledge of specific breeds.

The chicken is an extremely valuable domesticated animal. In many developing nations, virtually every household keeps a few scavenger chickens. Although they are not highly productive by Western standards, these chickens provide protein at little or no cost to their owners. The chicken has also made an important contribution to disease prevention. By 1879, Louis Pasteur was experimenting with the microbes that caused fowl cholera. He discovered that a weakened culture of the microbes would give chickens immunity to the disease. Pasteur also applied this technique to the prevention of rabies and anthrax.

Far from being a household scavenger, the chicken is now raised in the industrialized world in stunning numbers. In the United States, approximately 350 million laying hens produce about 72 billion eggs annually. California leads production, followed by Pennsylvania, Indiana, Ohio, and Georgia. The average American ate about 400 eggs a year in the mid-twentieth century but now consumes just 235. Eggs have also become cheaper, declining in cost by more than 50 percent in the past twenty years. The cholesterol threat of eggs turned out to be greatly overstated, but it has had a major impact on the market. True, eggs are rich in cholesterol, but research has since revealed that the two main influences on blood cholesterol are saturated fat in the diet and heredity. Meanwhile, eggs are inexpensive, easily digestible, low in calories, and rich in protein, iron, and other nutrients.

In the modern production system, breeding farms supply eggs to hatcheries, where the cockerel and pullet

chicks are separated. Because only hens are needed for egg production, the cockerels are destroyed. Almost all commercial eggs are produced in large battery-cage operations, and layer hens are kept only through their peak first year of production.

There are about 1.2 billion chickens in Europe. The laying flocks in Britain shrank from about 44 million birds in 1981 to 33 million in 1991, and this trend continues. Both increased production from individual birds and reduced demand from consumers have contributed to this situation. Brown eggs dominate the market in a complete reversal from the United States, where commercial brown eggs are comparatively rare or only available in certain regions and generally cost more than white eggs. Competition from continental Europe and North America will increase the financial pressures on British domestic producers, who may turn to the promotion of high-quality products from high-welfare status farms. Acceptable European Union high-welfare systems include several alternatives to cages, among them free-range or open barns with deep litter or nesting sites and perches.

Approximately 7 billion chickens are slaughtered annually in the United States, compared with 143 million in 1940. Most are broilers, but this number also includes heavier birds and the light, spent, or end-of-lay hens. Spent layers are generally sold for livestock or pet food and are also used in chicken stock or soup. Georgia and North Carolina are the centers of broiler production in the United States. Both male and female chicks are transferred from hatcheries to grower operations. Broiler chicks are sold and housed together to help prevent the introduction of disease. Growers use large chicken houses that can shelter 40,000 chicks or more.

The average American eats 47 pounds of chicken annually, an increase from 26 pounds in 1975. Chicken is regarded as a low-fat alternative to red meat but of course is also popular in North America as take-out fried chicken. This tremendous increase in chicken production spurred a change in processing methods in 1978. Whereas formerly chickens were examined individually and trimmed more slowly, they are now washed, rapidly defeathered, eviscerated, and then

chilled by the thousands in a cold bath. Changes to combat bacterial contamination now include germ-killing rinses such as chlorine and daily *E. coli* and *Salmonella* testing. Europe mandates tougher inspection processes.

Chicken is sold whole or in cut-up pieces. After the larger pieces of meat are removed from cut-up chicken, a thick, smooth paste of mechanically separated meat, bones, and some skin is ground and strained for use in hot dogs, lunch meat, and the popular chicken nuggets.

The poultry industry has concerns about its future, especially the loss of strains resulting from corporate mergers and the stagnation of markets in developed nations. A cooperative international program of gene identification and mapping will contribute toward the development of a consensus genetic linkage map and provide information for selecting superior breeding stocks. The poultry industry would like to identify such traits as disease resistance, immune response, and fat deposition. The production of transgenic chickens carrying and expressing cloned genes may be adopted by some of the primary breeders. Unfortunately, the commercial companies are not concerned with heritage chicken breeds at all because they are depending on genetic engineering for future needs. Yet the industry will need to adapt to other changes, including animal welfare regulations, use of antibiotics, new disease threats, and changing production technologies.

The current use of expensive controlled-environment housing systems may not prove to be cost-effective in the future. The density of stocking has increased poultry's exposure to viral and bacterial disease. As production units become larger and larger, the risk of increased exposure becomes extremely dangerous, necessitating biosecurity and sanitation procedures. Another growing concern is manure handling and management. In the future, this type of expensive housing may be limited to areas where the climate is just too inhospitable or where the value of the product justifies the costs.

The European Union is moving toward banning battery cages for egg production. New directives mandate nests, perches, enriched environments, litter or bedding areas, and increased space for each hen. Euro-

pean experiences with these new systems of husbandry, housing, health, and behavior problems should prove useful to those American producers who are moving away from battery cages. Animal welfare concerns will also affect stocking rates, debeaking, and slaughter issues.

Health concerns will continue over salmonella, contamination in processing, and antibiotic residues in products. Chickens are now being fed on more than grains, including soybean, meat or bone meal, and fish meal. Feed manufacturers are also working on methods of processing chicken feathers to make them more digestible as chicken food. In both Britain and the eastern United States, a strain of salmonella has been found in some eggs. It has been suggested that contaminated animal protein in chicken feed may be the source of this enterobacteria. Chicks no longer receive beneficial bacteria from their mothers to combat salmonella, so a technique has been developed to spray newly hatched chicks with these friendly microbes in the hopes of preventing salmonella from establishing itself in chickens.

There is already a trend in Europe and North America toward commercial range or outdoor production and organic or free-range meats and eggs. "Free-range" can mean many things—from chickens turned outside on a little dirt yard a short time each day to true free-range chickens that forage for a portion of their food on their own, receiving many hours of sunshine and fresh air each day. *Free-range* or *free-roaming* is legally defined as a bird that has access to the outside. *Cage-free* means that the birds are raised not outdoors but on the floor of a poultry house.

Many other labels have appeared in recent years, among them organic, additive-free, humanely reared, all-natural, old-style, and Amish. *Natural* means that no artificial ingredients or artificial coloring can be injected into the bird at the processing plant. The label *no growth hormones* is redundant because no poultry may be fed such hormones in the United States. The antibiotic Bacitracin, however, is a part of the formula food of many chickens, and it can function as a growth drug as well as a disease preventive. The label *No antibiotics* may only be used if documented. *Fresh* means that the internal temperature has never been below 26°F. *Hard-*

*chilled* means frozen. *Lowered fat* or *lowered cholesterol* means that an egg has 25 percent less fat or cholesterol than a standard egg. This is accomplished through the diet of the laying hens. Diet can also produce eggs higher in vitamin E or omega-3 polyunsaturated fatty acids. Research comparing the nutritional composition of battery-cage and pasture-raised eggs could be quite useful to farmers interested in sustainable or forage-based techniques.

More farmers are adopting the methods of free-range production, replacing much of the grain needed for feeding and producing a better-textured, better-flavored meat or eggs. Free-range chicken is generally leaner because the birds move around more. Among the various methods of poultry raising and structures that can be used in this form of production are large indoor-outdoor houses, small movable chicken houses, and pasture-raised birds with shelters, waterers, and feeders. The increased room afforded the poultry largely eliminates cannibalism and the picking at each other that necessitates debeaking in confined flocks.

Free-ranging chickens can perform many useful jobs on a sustainable farm. Chickens do an excellent job of cleaning up a garden of grass, weeds, seeds, and crop residues. They will also consume kitchen food waste and insects such as flies or ticks. Chickens will break up and scatter manure piles in pastures, eating worm or insect larva and undigested grain. A small flock of 10 to 15 hens will cover about an acre in daily foraging. Moving their coop, water, or supplementary feeder will encourage them to cover more pasture and prevent damage to vegetation. Their manure will also contribute to soil fertility.

Free-range chickens need strong legs and must be able to move about, something that the Cornish Rock hybrids cannot do. The less aggressive strains developed for confinement may be less self-sufficient and may not be as alert to predators. Dark-colored breeds are less susceptible to predation by hawks. Breeds such as the White Wyandotte produce plump birds that are acceptable to consumers and are much more active foragers than the battery-bred strains.

Specialty production is an excellent use of many old heritage breeds, but consumers need to be educated

about the differences between this product and store-bought chicken. Most consumers have never tasted a fresh chicken because the meat sold in grocery stores is usually previously frozen. The truly fresh meat taste is much more delicious and the texture is firmer. Large-framed breeds such as the Orpington, Australorp, Barred Plymouth Rock, and Speckled Sussex take longer to grow but produce a delicious meat. The yolk from a free-range bird is deep orange and flavorful. It stands up high and firm in the white of a broken egg, instead of being flat and runny. The old Rhode Island Red, Brown Leghorn, Speckled Sussex, and Barred Plymouth Rock can all produce eggs at high levels while on range. The older or dual-purpose breeds can all contribute a great deal to the success of specialty or direct market producers.

A recent and serious threat to both hatcheries and breeders involves impediments to the shipping of day-old chicks. For many decades the U.S. Postal Service has shipped chicks, and it has provided excellent service. Even the most remote farm families have long been able to mail-order chicks from hatchery lists and formerly even from the Sears catalog. However, some airlines are now beginning to limit or refuse the shipment of both day-old chicks and other poultry, including some airlines with U.S. Postal Service contracts. Shippers will be forced to use more expensive services, and the valuable exchange of stock will become more difficult. Airlines are also refusing chicks due to restrictions on the temperature of airborne live cargo. Although temperature concerns are important for airborne dogs, cats, and other animals, day-old chicks should not be affected by these limits because chicks are usually raised in 95°F to 100°F heat for the first few days of life.

Individuals interested in preserving historic chicken breeds can help in several ways. Ordering these breeds from a hatchery each year supports the preservation of breeding flocks. Individuals should also patronize seasonal or hobby hatcheries, which often preserve rare strains. Consumers can purchase pastured poultry or specialty products directly from farmers. Breeders should educate themselves on the proper evaluation of such important breed qualities as chick health and ap-

pearance, growth rate and feed conversion, mortality, meat or egg production, egg quality, body weight and appearance, and fertility. With this attention to flock records, breeders can practice good culling of their flocks and help document the characteristics of the heritage and rare breeds. Breeders of exhibition strains can also begin to select for these same economic or qualitative traits. Attention should also be paid to such less tangible traits as temperament, foraging ability, broodiness, vigor, and hardiness. Last, breeders need to network and exchange breeding stock.

Chickens are easy to raise and make an excellent introduction to rare breed conservation. Many colorful, interesting rare breeds can be enjoyed on even the smallest farmstead.

## Breed Profiles

### *Dorking (pl. 129)*

The Dorking is an ancient breed reputedly brought to Britain by the Romans, although Julius Caesar noted that Britons already kept and enjoyed chickens before the Romans' arrival. Britain was brought into the Roman Empire in A.D. 43, and at the same time the Roman agricultural writer Columella described a type of chicken very much like the traditional Red Dorking. This single red-combed bird was square and broad breasted, with short legs and five toes. Columella declared that the best chickens have five toes. The Roman scholar Pliny also wrote during this time about a chicken with an odd number of toes. The Romans could indeed have introduced the five-toed Dorking into Britain. It was not until the seventeenth century that chickens were again written about seriously, and at that time the chickens with five toes were still being raised in Italy. Writers also mentioned an old chicken breed known as the Dorking, colored white with a rose comb.

The five-toed Dorking was certainly present in Britain for a very long time. For several centuries the village of Dorking in Surrey and the greater surrounding area, including Sussex to the south, were known as prime poultry breeding areas for the meat markets. Five-toed

chickens were also found in Cumberland and Scotland. The Dorking acquired a reputation for an especially tender meatiness, so that consumers requested them by name. Dorkings also had abundant white breast meat and white skin, both of which were also desirable. Dorking cocks were used to cross on Indian Game chickens to produce table birds. Dorkings were also used to create such new breeds as the Speckled Sussex and Buff Orpington.

The original Red Dorking was bred in large numbers through the nineteenth century but has become the rarest of the varieties, which include pure White, Dark, Silver Grey, and Cuckoo. The number of Red Dorkings became so low in the 1950s that crossings with a Dutch breed, the Welsummers, was attempted. The pure Red Dorking is now one of the rarest of the traditional native chickens in Britain. The Silver Grey is generally believed to be a very old native variety, perhaps as old as the Red, but is felt by some to be a more recent creation (fig. 67).

The Dorking was imported to North America, where it kept its reputation as a special table bird. Settlers had little time to pamper their birds or worry about breeding, unless they were breeding fighting cocks. By the mid-nineteenth century, however, customers at the butcher shops were asking for breeds like the Dorking or Houdan, believing them to be sweeter, more delicious, and meatier than other varieties. The Dorking was not believed to be a good all-around farm bird because it was not an exceptional egg-layer and it fared poorly in wet, cold conditions. Over time, Dorkings and other dark-feathered chickens lost popularity to white chickens, and in America yellow skin became more desirable than white skin. The only Dorking to survive in the United States is the Silver Grey, which is kept only in small numbers by fanciers mainly for exhibition.

Although Columella described the Roman five-toed bird as having white earlobes, all Dorkings have red earlobes, which is unusual in layers of white eggs. Some strains do produce lightly tinted eggs. The Dorking should be a reasonable layer of good-sized eggs but is more seasonal than year-round in production. Poor laying ability has sometimes troubled the small con-

[To view this image, refer to the print version of this title.]

Fig. 67 A Silver Gray Dorking rooster and a Silver Spangled Hamburg hen at Colonial Williamsburg. Photograph by Joanne Swope.

servation population. The Dorking hen will strongly brood her eggs, and the breed forages actively yet is docile in nature.

The Dorking has a stout, rectangular, broad-breasted body with short, sturdy legs. Breeders need to seek to maintain the good heavy size. The traditional Dorking weighs 8 to 14 pounds. The shanks and toes are white. The unusual fifth toe of the Dorking is found on the back of the foot between the rear toe and the shank, inclining slightly upward. It usually does not rest on the ground. Worldwide, only four other poultry breeds have this trait. The large single comb of the Dorking is prone to frostbite injury, and some raisers in colder areas still dub or dock it. The White Dorking still sports the rose comb of old.

The Dorking is a tight-feathered bird with abundant hackle, or neck plumage. The Red Dorking has a rich mahogany-colored hackle and back feathers, and

its tail and underparts are colored black. The Red hen has black tips on her feathers and a gold-and-black-striped hackle. The Silver Grey Dorking is an especially striking bird. The black underparts and tail have a lovely blue-green sheen, while the hackle and saddle (the rear part of the fowl's back extending to the tail) are silvery white. The Silver Grey hen is colored ashy to dark slate gray with penciled markings, a silver black-striped hackle, and a salmon-red breast.

The Dorking is criticized today as a slow grower, but in the nineteenth century, it was considered a fast grower with good conformation. Of course, modern expectations of growth are now skewed toward the broiler production specialists. The Dorking still possesses a good meat conformation and is well suited to range conditions where the ground is usually dry and soft. The Dorking would fit the bill for a gourmet meat bird marketed directly to customers.

The attractive Dorking remains a good general-purpose bird, especially for meat. It is also one of the oldest of British breeds, bred by admirers who wish to maintain its history and nobility. The Dorking is included in the RBST Poultry Conservation Programme.

### *Scots Dumpy (pl. 130)*

The Scots Dumpy has always been somewhat mysterious and rare even though Pliny described these short-legged chickens and the Scots and Picts claimed that their Creepers alerted them to potential Roman attacks. At the beginning of the seventeenth century, Ulisse Aldrovandi described chickens that crept over the earth and limped rather than walked. Known by various names—Creepers, Creepies, Crawlers, Bakies, Corlaighs, Dumpies—they were often used to brood clutches of game birds in Scotland. The breed was exhibited in London and described as the Scots Dumpy for the first time in the 1850s, but more Dumpies could not be found. Poultry writers tried to locate Dumpies several times thereafter. Part of the reason for their rarity lies in the difficulties encountered in breeding them.

The Scots Dumpy has legs 2 inches in length or shorter from the hock to the heel. These short legs

give the Dumpy an unusual waddling walk. The Kruper, or German Creeper, is a similar chicken breed in this respect. The dwarfing Creeper gene is dominant for short legs but is a recessive lethal. As a result, the Scots Dumpy cannot breed true. When two short-legged Dumpies are mated, the results are one-quarter normal-length chicks, two-quarters short-legged chicks, and the remaining quarter of the embryos failing to develop. A cross of normal-length and short-length Dumpies produces half and half short- and normal-legged chicks, which is useful in a small population. The long-legged Dumpies are identical to the short-legged in every other way. Long-legged birds must be used in a breeding program to avoid fertility problems. The short legs combined with the heavy body can also result in insemination problems.

The Dumpy is a quiet, docile chicken with a medium-sized, square body. Like the Dorking, the Dumpy is a meaty bird with white skin. The adult weight is about 6.5 pounds. Because they are not as active, Dumpies gain weight well and require less food to maintain weight. The Dumpy lays about 180 eggs per year, either white or tinted. The Dumpy hen is prized as an excellent brooder and a good mother.

Dumpies are hardy birds with good traits, but they need special care. The short legs can make it hard for the birds to travel over rough ground, and their short size leaves them vulnerable to taller chickens when competing at the feeder. Dumpy chicks can also become chilled in wet grass. In the proper situation, however, they are excellent foragers.

The Dumpy seemed originally to be available in many colors. The breed was standardized in Black, Dark, Silver Grey, and Cuckoo. Except for the Black, the other three varieties were similar to the Dorking coloration. Today only the Cuckoo and Black are found. The Black Scots Dumpy is totally black with a green sheen, dark beak and legs, dark eyes, red earlobes, and a medium-sized single comb. The Cuckoo Dumpy has dark gray fuzzy stripes over a lighter gray background. The legs are light or mottled.

By 1975, the Domestic Fowl Trust found it very difficult to locate Dumpies in Scotland. Fortunately, the trust discovered a family flock that had been taken

to Kenya and maintained since 1902. Twelve chickens were sent back to Britain and bred to the few remnants of the breed that were later found in Scotland. Today the unique Scots Dumpy is still very rare and is part of the RBST poultry breeding program. There is also an active Scots Dumpy club. Dumpies were imported to North America in the past, but they are probably extinct today.

### *Scots Grey (pl. 131)*

The large Scots Grey is descended from the common barnyard birds of Scotland. In the mid-nineteenth century, Malay Game chickens may have been crossed on the native type to increase the breed's height and elegance. The Scots Grey was very popular at poultry shows in the 1870s, and then it fell out of fashion. Fortunately, some dedicated fanciers in Scotland preserved the breed, where it is sometimes called the Scottish National Fowl or, curiously, Chick Marley.

The Scots Grey is an extremely hardy, self-sufficient bird. It is known to forage in winter snow. The cocks weigh 9 pounds or more and the hens about 7 pounds. As a light breed, the Scots Grey is not especially meaty. The breed is tall and upright with long shanks and thighs. The hens do not lay a large number of eggs and are not particularly broody, but the chicks are strong and healthy. The eggs are colored off-white.

Scots Greys are cuckoo colored. The body is steel gray with crisp, metallic dark barring. The hen's markings are larger and crisper. The tails are very full and curving. The eyes are amber, the single comb is red, and the feet are white. The overall impression of the Scots Grey is of a bold, alert bird.

The Scots Grey is full of pride, as are its fanciers, who support a breed club in Scotland. Although bantam Scots Greys are more commonly available, large productive birds are hard to find in Britain. The Scots Grey cock is admirably suited to a self-sufficient way of life and is protective of his hens and chicks. The Scots Grey is also included in the RBST Poultry Conservation Programme.

In 1994, James Hopkins of the Domestic Fowl Trust in Ontario, Canada, imported 12 Scots Grey eggs. Al-

though only one hen and one cock survived, they now have about 300 descendants.

### *Derbyshire Redcap (pl. 132)*

The Derbyshire Redcap represents one of the native breeds that for several centuries were widespread in northern England. The Redcaps were related to the Hamburgs and the Pheasant Fowl, all lightweight small breeds that were excellent egg-layers. The hardy, active Redcaps were barnyard chickens that scratched up their living. The cocks transmitted this egg-laying ability so well that they crossed with other hens. The Redcap also carried good breast meat. The Derbyshire Redcap and its close relatives were known by several names: Yorkshire Redcap, Moss Pheasant, and Manchester.

The Redcap was named for its distinctive large rose comb, whose top is covered with many prominent points and ends in a spike at the rear. Fanciers took this trait and bred to emphasize it. The comb and head came to account for almost half of the judging points, in spite of the breed's many useful qualities. The ever-larger combs at one time grew to near-grotesque proportions.

The Derbyshire Redcap has red earlobes and dark eyes and lays slightly tinted white eggs. The skin is also white. The neck of the cock is somewhat long and well covered with red feathers edged and tipped in blue-black. The hackle shades off to black. The back is a rich bay red with bluish black stripes down the middle of each feather. The tail is black with greenish black coverts and sickles. The good-sized tail gives the body balance. The breast, body, and legs are a lustrous black. The shanks and toes are slate blue. The hen has red-brown plumage with black or bluish black spangles or tips at the ends of the feathers.

The older utility version of the Redcap maintained a well-formed breast, a deep, long body, and prolific laying abilities. Cocks weighed up to 7.5 pounds and hens up to 6 pounds. The exhibition version of the Redcap nearly destroyed these useful traits. The Redcap was a practical, traditional farm breed, and it is now included in the RBST Poultry Support Project. Practi-

[To view this image, refer to the print version of this title.]

Fig. 68 The Redcap with its immense decorative comb was briefly popular in the United States at poultry shows. Courtesy of the IAB and Hans Peter Jorgensen.

cal old Redcaps are very hard to find, and some populations are extremely troubled by fertility problems.

Known as the Red Cap in North America, the breed was belittled for its overly large “miserable” comb. The Red Cap is rare and seldom seen today in North America (fig. 68).

### *Old English Pheasant (pl. 133)*

The Old English Pheasant Fowl is a very old northern farm breed related to the Redcap. It was traditionally kept on farms as an all-purpose chicken. Light in weight, it is an active bird that produces both a meaty breast and a good number of white eggs. The hen is rarely broody and has a fairly long production period. The addition of some Old English Game blood, though long ago, has transmitted a little gamy flavor and self-sufficiency. The Pheasant Fowl can still fly up to roost in trees or rafters, prefers to run on an open range, and is hardy even in snowy winters.

Farmers’ birds in the north went by many names. Some chickens were merged into the Hamburg. The Pheasant Fowl remained somewhat apart as other

breeds were developed in the nineteenth century. Some breeders called their birds Yorkshire Pheasants or Golden Pheasants. A club for the Pheasant Fowl was not formed until 1914, and it floundered for some years with a small membership. The name Old English Pheasant Fowl was first used in 1916. In the 1960s, the records of the club were passed to the Rare Poultry Society, and the breed is now shown under their auspices. The RBST has also included the breed in its Poultry Conservation Programme.

The Old English Pheasant Fowl has been little altered by the show ring and remains utilitarian. It is a light bird but surprisingly meaty, with cocks weighing 6 to 7 pounds and hens 5 to 6 pounds. It is an attractive bird. The gold variety of the Pheasant Fowl has a red rose comb, white earlobes, slate colored shanks and toes, and plumage of rich mahogany and bay shades with dark striping on top and lacing on the breast. Hens are the same color with dark spangles. A silver variety is white with colored markings. The breed exhibits a greater color variation than the show standard allows, but farm flock owners seem to enjoy these differences, particularly because the breed remains so healthy and productive.

### *Indian or Cornish Game (pl. 134)*

Far to the southwest in England, Cornwall has long maintained a sense of separateness and independence. Here the Cornish farmers took three breeds of chicken and created a new, uniquely different bird that has had tremendous impact on modern commercial poultry breeding.

The Old English Game Fowl was the native fighting bird, available in many recognized strains. To a particular strain of the Game Fowl, the Black-breasted Red Game, the Cornish farmers crossed the Red Aseel and the Malay by the 1840s.

The Aseel or Asil is an ancient pure breed from India with a distinctive appearance. It was brought to England by the seventeenth century for use as a gamecock. The Aseel is an upright, aggressive, bold bird. The neck is substantial in width with very small wattles and a pea comb. The shoulders are prominent and

broad, the hips wide. The stern is narrow, but the bird gives the strong impression of being hard and muscled. The thighs are thick and muscular, and the legs are strong. Interestingly, the Aseel possesses a smaller intestinal tract than other breeds. The cock weighs about 6 pounds and the hen about 5 pounds. The hen is broody and lays tinted eggshells but is not raised primarily for meat or egg production in Britain, where it is kept by fanciers.

The colorful English Game Fowl itself was probably already changed by the Aseel. The Old English Game differed considerably from the Modern Game, which is seen today only as an exhibition bird. The older gamecock had a compact, muscular body, a shorter neck and legs, and a longer hackle and tail. Breeders of the Old English Game keep their breed separate from the Modern Games, which are small, slender, and exceedingly tall. The Black-Breasted Red Game strain was an extremely colorful bird with a bright orange head; lighter orange hackle and saddle; black breast, body, shoulders, tail, thighs, and stern; red wing bows; and willow-colored shanks and feet. In the early nineteenth century, this game breed was still a table fowl and a layer of medium-sized eggs.

From the Aseel, the new Cornish fowl received thick and short legs, large thighs, a deep, broad chest and shoulders, a sturdy neck, and a projecting eyebrow. The Malay Game, which was available in England in the eighteenth century, was added to this Aseel-Game cross. The Malay is also a very old type. A tall bird, the Malay has long legs, a low-held tail, and a prominent eyebrow that gives it a cruel expression. The Malay has short and scanty feathers and a yellow skin. Malays are heavier than Aseels.

The Cornish breeders were concentrating on producing a bird with short, thick legs and a wide, meaty body. Sir Walter Raleigh Gilbert claimed credit for the initial development of the Cornish Game in 1849. Fanciers were probably using this and other crossbred types for cockfighting. Although they were slow to strike, the cocks remained somewhat pugnacious and impressive.

The breed rapidly gained great popularity as a table bird, first with Cornish miners but later far beyond

Cornwall. Throughout England, the breed became known as the Indian Game or Cornish Game, and the Cornish Game Club was formed in 1886. In the 1880s, Cornish Games were popular show birds, and they were used to crossbreed on the Light Sussex, Dorking, and Orpington to produce excellent market chickens. As a yellow-skinned bird, their popularity as a meat bird was reduced in Britain, where white was preferred, but they flourished in North America after they were imported in 1887.

The imported Cornish Indian Game was also called the Dark Cornish. It was crossed on the White Malay in the 1890s, creating the White Cornish. Selection was made for faster growth, and the white plumage was standardized. The White Cornish became a meat specialist of immense importance to the broiler industry. Later, the Cornish and White Plymouth Rock cross created the popular Rock Cornish Game hen. A White-Laced Red Cornish was also developed in North America as an exhibition bird. The Cornish Game has also influenced the Chantecler, Buckeye, and Partridge Plymouth Rock.

The Cornish Game or Indian Game is classified as an English breed because of its development in Britain, but it owes much to its Oriental heritage. The Cornish has a thick, compact body with a wide back and a broad, deep breast. The muscle development and arrangement makes the Cornish the ultimate meat producer with a large proportion of white meat of an excellent texture. Mature cocks weigh up to 10.5 pounds and hens about 8 pounds. The legs are spaced widely apart, giving the Cornish its typical stance. The legs are large in diameter and strong. The eyes are deep set and sheltered by projecting brows. The feathers are short and scanty, so much so that their skin is sometimes exposed, especially along the breastbone. The Cornish is not well insulated and requires protection against the cold.

The coloring of the Cornish cock is a lustrous greenish black with dark red highlights. The beak, shanks, and toes are yellow. The pea comb and small wattles are red. The hen has a black hackle with penciled bay and black feathers on the body and tail.

The cock's short, wide-spaced legs can make breed-

ing so difficult that artificial insemination is sometimes needed. The hens are not good layers, which also contributes to fertility problems. Both hens and cocks are active and need space to move. Although the hens will brood, their higher activity level and sparse feathers made successful hatching difficult. Cornish hens lay brown eggs.

The RBST breeding program for the Cornish Game intends to preserve a naturally mating, utilitarian type. Due to breeding for exhibition, many Cornish Games are very short-lived, suffer heart attacks, and have difficulty mating. The trust supports the conservation of a smaller, healthier strain of Jubilee Cornish Game that was conserved by one of its members. The Jubilee was originally developed in Britain in 1886.

The Dark Cornish is raised in the United States in only very small numbers as a home meat bird or for show. Three Cornish lines have developed in America: the commercial or industrial stocks used in the Cornish-Rock broiler cross, exhibition birds, and the traditional Cornish Game.

### *Sussex (pls. 135, 136)*

The origins of the Sussex Fowl are found in south-east England—Surrey, Kent, and Sussex—where fowl similar to the Old Dorking and game birds had existed for some two thousand years on farmsteads large and small. This native stock is sometimes called the Old English Fowl. The very first poultry show, held in England in 1845, recognized these native birds: the Dorking, the Surrey, and the Kent or Old Sussex Fowl. Although the original Sussex Fowl was probably speckled, several color varieties were already developed, including the Red. The Sussex was mainly used as a table bird.

The Sussex was raised for market in larger numbers beginning in the first half of the nineteenth century. The Sussex was also crossed with the Dorking, Cochin, and Brahma to produce capons for a specialized poultry industry in Sussex. The capons were force-fed milk mixed with ground oats.

The Light Sussex was developed with the addition of crossbreeding with the Mediterranean egg-layers, which created a truly dual-purpose breed. Brahma,

Cochin, and Silver Grey Dorking were also used in its perfection. The Light Sussex became the most popular of the varieties in England and Canada, as both a lovely exhibition bird and a utilitarian chicken often used in crossbreeding for market birds.

The Sussex Club was formed in 1903 and soon standardized the three main varieties: the multicolored Speckled, Red, and Light Sussex. Later the White, Silver, Buff, and Brown were recognized. The Buff Sussex was created in the 1920s, and the White was developed from a Light Sussex sport a few years later. The Brown strains can carry some Old English Game. The Light remains the most popular variety, whereas the Brown, Buff, and Red have not captured the eye of many fanciers.

The Sussex remains a good table bird, with cocks weighing 9 pounds and hens about 7 pounds. The Sussex has a deep, rectangular body but is still an active, alert bird that is capable of foraging. The Sussex is truly one of the best dual-purpose chickens, with many hens capable of laying 200 to 250 brown or tinted eggs yearly. The hens will go broody and are good mothers. Some breeders also select a traditional, meatier type for the table.

The Sussex has white skin, which probably limited its popularity in the United States, although the Light Sussex remains fairly popular in Canada and England. The Light Sussex enjoyed considerable popularity in Canada around the 1940s. Birds were brought to Canada during World War II to aid the production of white-skinned market birds to supply the British market. The Light has also been crossed with Rhode Island Reds to develop commercial strains in Canada.

The Light Sussex is a white bird with an attractive black pattern. The hackle feather has a black center surrounded by white. The wing feathers are also marked with black, as is the tail. The beak is whitish, and the shanks and toes are pinkish white. The comb and wattles are bright red.

Two other varieties are seen in North America. The Speckled Sussex has some followers in the United States, who enjoy it both for show and practical purposes. The Speckled is a striking mahogany with individual feathers tipped in white with a black bar. The

White Sussex is maintained by some breeders as a dual-purpose bird capable of good production of eggs and meat on open range with additional grain. The RBST has obtained excellent White Sussex chickens from the long-held flocks of Geoffrey Cloke and Geoffrey Marston, which are noted as outstanding layers and kept as two separate lines. Another strain known as Lord Dewar is also preserved.

Since 1992, the Poultry Conservation Program at the Alberta Poultry Research Centre at the University of Alberta has conserved a strain of Light Sussex originally maintained at the University of Saskatchewan by Roy D. Crawford, the renowned poultry geneticist. The RBC Heritage Poultry Project also recognizes the Shaver strain of Light Sussex, originally from Shaver Poultry Breeding Farms in Ontario.

The British are justifiably proud of the Sussex, which is well-suited for the return of free-range poultry. The Sussex is included in the RBST Poultry Conservation Programme.

### *Croad Langshan (pl. 137)*

When they arrived, the large Asiatic Cochins with their feathered shanks set Britain and North American poultry fanciers into delight and fascination with their plumage and personality. The Cochin had been in Britain for twenty years before a Major Croad brought back to England some black chickens from Langshan in northern China in 1872. Almost immediately, controversy began over whether these black birds were a separate breed or simply a black Cochin. The Cochin breeders used the Croad birds to improve the black color of their birds, while the Croad enthusiasts steadfastly maintained the differences between the two strains. Led by the major's daughter and other breeders, the Croad Langshan Club was formed to breed and promote the original imported type in 1904. Croad's daughter imported additional chickens from China several more times. The club's standards were written specifically to differentiate among the Langshan, Cochin, and any crossbreeds. At this time, the Langshan was also becoming a taller, tight-feathered bird as opposed to the rounder, fluffy Cochin.

The club sought to preserve the original imported type rather than the modern Langshan that was developing. The modern Langshan has black legs with pink soles, whereas the Cochin has yellow legs. Pink color also shows between the leg scales of the Langshan, and the toenails are white. The tail is on the same level as the head, which is small and neat in appearance. The Croad Langshan also has fine bones and short thighs. The breast and abdomen are deep. The cock weighs about 9.5 pounds and the hen 7.5 pounds. The club also strove to maintain the Langshan's utilitarian qualities as a layer and a table bird. By contrast, the exhibition form of the modern Langshan became quite tall, with longer legs and a narrow body, which was not a good meaty conformation.

Langshans were exported from England to the United States. During the 1880s, they were regarded as very good market birds whose quiet nature allowed them to be confined easily. They were good sitters, and the hens continued to lay eggs in the winter. Some excellent flocks were found in the United States until the development of the longer-legged modern type. These birds were no longer utilitarian and therefore injured the Langshan's reputation and popularity. The Langshan is now found only as an exhibition bird in North America.

The soft feathers of the traditional black Croad Langshan have a brilliant green sheen. The legs are lightly feathered on the outside and on the outer toe. The occasional white leg feather is perfectly acceptable and occurs in certain strains. The eyes are dark brown or hazel, and the single comb and earlobes are red. The white Langshan probably originated from a sport from the black. The Croad lays brown-shelled eggs distinctively tinted a slight plum or pinkish shade. The Croad has been crossbred on other breeds to darken the eggshell color. The broody Croad hen is a good mother, both quiet and docile, and can be expected to lay 180 eggs a year. Because it is a larger bird, the Croad will eat more, but it is also an active forager.

The Croad Langshan continued to be popular in Britain through World War II. As dual-purpose birds, the Croads were useful as well as beautiful. The rise of the modern production egg and meat breeds affected

the Croad as it did most other chicken breeds. Like the other breeds, the population of Croads fell to low numbers, and they were often kept only by fanciers for show.

The Croad Langshan Club has continued since its timely rescue by the Rare Poultry Society in 1979. The RBST has also been able to establish breeding groups in its poultry scheme. One particularly valuable strain had been owned since 1878 by the Cloke family, who had received their birds directly from the Croad family. In 1993, this flock was transferred to the care of the RBST. Both groups are working toward preserving the Croad Langshan. Ideally, it should be possible to include both the utility and the exhibition standards in the same bird.

### *Dominique (pl. 138)*

The basic farmyard chickens brought to the New World by the English colonists were probably similar to the common Dorking, Old English Fowl, and Old Sussex Fowl that were all present in southern England in the seventeenth century. These birds arrived with the colonists before the later importations to England of the Asiatic Games, Cochins, and Mediterraneans. The Dutch colonists to the New World may have also brought along their indigenous chickens, such as the old Hamburg stock.

Whatever their exact origin, the smallish, barred Dominique type was well known before 1750. One hundred years later, one poultry writer would state that the Dominiques were “so familiar as to need no description.” They were sometimes described as Dominickers, Pilgrim Fowls, Puritan Fowls, or Plymouth Country Fowls. Both rose- and single-combed birds were seen, although the rose comb seemed to be more common. An often-heard expression was “spunky as a Dominicker rooster.”

There is a great deal of evidence attesting to the Dominique as a popular farm bird over the eastern half of the United States by the mid-nineteenth century. President Abraham Lincoln owned Dominiques. This early farmstead chicken had to be a hardy, self-sufficient bird. Other than a few scratch grains, feed scavenged from

the livestock, or food scraps, the chickens around the cabin or farmhouse had to forage for seeds, insects, and plants on their own. The irregular barring lent them protection from the predators that surrounded the farm. Fluffy, heavy plumage kept them warm in rafters or coops, and the little rose combs were far less likely to freeze in winter. The hen would raise a clutch or two of chicks to provide chickens for the cooking pot. The Dominiques were excellent layers, and their feathers were used for pillows, comforters, and mattresses or feather ticks.

At the first poultry show in Boston in 1849, these rose-combed, barred birds were entered as Dominiques. The import of the Asiatic breeds also began in the 1840s, to great interest and enthusiasm. The Plymouth Rock was partially developed from a Dominique cross in 1865 and exhibited four years later, although the name Plymouth Rock was also used for Dominique-type birds even earlier in New England. In 1870, the managers of a state poultry show in New York resolved the confusion over names. The barred birds were divided into medium-sized, rose-combed Dominiques and medium- to large-sized, single-combed Barred Plymouth Rocks. The next year, the Dominique Standard of Excellence confirmed that only rose-combed birds were acceptable. Most likely, a great many large single-combed Dominiques were absorbed into the new Barred Plymouth Rock breed.

Both the Dominique and the Barred Plymouth Rock were accepted into the *Standard* in 1874. With the increased interest in poultry improvement, the Dominique gained greater uniformity in type and size, but the Plymouth Rock went on to great popularity along with other new and improved breeds. The Dominique began its fade into obscurity, for it was already regarded as old-fashioned. By the turn of the twentieth century, agricultural writers were warning that this traditional breed needed rescue for it had been arbitrarily lost in the rush to adopt newer breeds. Soon even the Dominique’s history was being lost. By 1916, the USDA’s *Farmer’s Bulletin on Standard Varieties of Chickens* dismissed the older Dominique by declaring that “similarity in plumage of the American Dominique and the Barred Plymouth Rock has been the cause of

the former's popularity." In 1946, a poultry science textbook explained that the Dominique, like the Chantecler, had "not been generally adopted by the public, and therefore few flocks are found" (Winter and Funk 1946, 32).

By the mid-twentieth century, the Dominique was rarely seen, and many knowledgeable people worried that it would become extinct. The ALBC was extremely concerned when it could locate only six National Poultry Improvement Plan flocks totaling 110 hens. The ALBC also worried about impure flocks and whether the Dominique existed only in exhibition strains. Fortunately, four breeders persisted in keeping and breeding this historic American breed: Carl Gallaher, Robert Henderson, Henry Miller, and Edward Uber. Almost incredibly, many old bloodlines were saved, including one historic flock more than a hundred years old. Much of this preservation was a quiet effort with birds passed from breeder to breeder.

In 1973, the Dominique Club of America was founded to promote the breed, both the standard and the bantam, and to encourage new breeders. The efforts of this active group should serve as a model for other rare breed conservation clubs and associations. The club has conducted in-depth research on its breed and has used that information to educate the public and promote the Dominique. The club is well organized and responsive to inquiries. It also produces the informative *Dominique News* and an annual breeder's directory and in 1997 published the definitive reference for the breed, *The American Dominique: A Treatise for the Fancier*, by Mark A. Fields. Many of the longtime breeders would like to see the breed called by the same name: the American Dominique. The Dominique Club now has about three hundred members, and the Dominique poultry population has increased.

The attention drawn to the Dominique by the ALBC, which used the breed as a symbol of American rare breed conservation, has also played a big role in promoting the breed. Today the Dominique is more popular than it has been for several decades. Those in search of Dominiques need to watch out for some hatchery stocks that have introduced Barred Plymouth Rock in order to circumvent inbreeding. The ALBC

and the Dominique Club are probably the best sources of information for obtaining high-quality birds. Different strains vary in weight, conformation, egg production, and broodiness. The historic Voter strain is especially important.

Those seeking to conserve the Dominique should pay close attention to the descriptions of the breed from the past. The Dominique was a moderate-sized bird, with cocks weighing from 6 to 7 pounds and hens 4 to 5 pounds. The adjective *medium* is used liberally in the old standard, because the Dominique was not a breed of extremes but rather one of pleasing balance. The head, the rose comb, the neck, the back, the thighs, even the toes and earlobes were described as medium in size. The breast was described as broad, round, and carried well up. The body was full yet compact. The long tail was carried up with well-curved sickle feathers. The carriage of the cock was proud with a full hackle. The hen also carried her tail up but appeared plumper and full breasted.

The only color variety of the Dominique is described as bluish gray or slate. Each and every feather is crossed with irregular barring of dark slaty blue and lighter gray. The tip of each feather is dark. The cock often has finer barring, which can make him appear a lighter shade than the more heavily barred hen. The Dominique feather markings are definitely more irregular than those of the Barred Plymouth Rock. There also should not be any metallic gold or brassy sheen in the feathering even when exposed to sunlight. Old poultry books described the Dominique's fine, lace-like bars on the ends of the feathers. This characteristic is nearly lost in the contemporary breed, although it may be recoverable through the descendants of the old David Hyman strain in the Colonial Williamsburg collection. The eyes are a rich reddish bay. The skin, beak, shanks, and toes are bright yellow. Occasionally red dots of xanthophyll, the yellow carotene pigment, are found on the outside of the legs. The comb, wattles, and earlobes are bright red. The earlobes should be oblong and medium-sized. The comb should be a neatly shaped rose crown with a round, tapering spike. The entire comb should be covered with small pebbling. The hen's comb is slightly smaller than the cock's.

Single combs appear in most Dominique bloodlines, most often in hens. Breeders are divided in opinion over whether single-combed birds should be used in a breeding program.

The Dominique is an active bird and a good forager that does very well on a free range. Docile and calm, it also does well in confinement. The heavy plumage, rose comb, and early feathering are well suited to cold weather. The spring pullets grow fast, mature early, and continue to lay light to dark brown eggs well through the winter. Most Dominique hens will go broody, but not overly so, and raise a clutch of eggs. The Dominique also produces a good table bird.

The revival of interest in the Dominique is rewarding to those who kept the faith in this spunky, little bird that served the early settlers and farmers so well. A Dominique in the barnyard is a piece of living history, and yet it remains a hardy and productive bird.



Critical

### *Java*

Javas are one of the oldest breeds of the American class, and although they once enjoyed great popularity, they are now extremely rare. Beginning in the early nineteenth century, Javas were directly imported from the Indonesian island of Java. Poultry experts of that century believed that the Java was a true junglefowl that had contributed to the domestic chicken.

In the United States, the Java was bred and selected as a dual-purpose breed. Daniel Webster entered a pair in the famous Boston poultry show of 1849. Both the Black Java and the Mottled Java were accepted into the *APA Standard of Perfection* in 1883. White Javas, resulting from a recessive gene, did not acquire a popular following, and the last flock disappeared in the mid-twentieth century.

The Java was certainly a common barnyard bird from 1850 to 1880. It was also raised as an important market bird in New Jersey and New York. By the early twentieth century, Javas were no longer raised extensively, having been replaced by new or improved breeds. By 1940, few flocks of Javas could be found on American farms. The Java had, however, contributed

to the Black Jersey Giant and possibly the Barred Plymouth Rock and the Black Australorp.

The conservation effort for the Java has been led by the Garfield Farm Museum in LaFox, Illinois. This 1840s living history site west of Chicago has kept the Black Java since the mid-1980s because the breed was common in the area and timeframe of the original farm. In 1992, the staff learned that only one seasonal hatchery was still breeding the Java and that only five private breeders could be located. The hatchery flock was very small at 10 females and 2 males.

Garfield Farm has made the Java a conservation project and has increased cooperation and communication among the remaining breeders. Two strains of the Mottled Java and four strains of the Black have now been located and identified. The farm has also conducted blood testing to verify the distinctness of its Javas from such related breeds as the Black Jersey Giant, Black Australorp, and Barred Plymouth Rock. Garfield Farm is working to establish more Java flocks with interested individuals. There are now about forty members of the Java club and more than 500 Black Java hens.

Historically, the glossy Black Java was seen more often than the Mottled variety, and this remains true today. The black color is rich and lustrous with a greenish sheen free from purple barring. The beak is black, and the shanks and feet are black to willow in color. The bottoms of the feet are yellow. The Mottled variety is predominantly black in color with sharply defined spots of white. The shanks and feet are leaden blue with yellow underparts. White chicks have again appeared in flocks and are being bred in hopes of reestablishing the variety.

The yellow-skinned Java is a single-combed, clean-legged, medium-sized bird with an angular build. The back and keel are longer than the other breeds in the American class. This length combined with the broad back, deep body, and full breast gives the Java a distinctive appearance. The thighs are also large and meaty. Cocks weigh about 9 pounds, and hens weigh 6 or 7 pounds. Problems confronting the conservation effort include undersized birds and low fertility.

Javas are still eminently useful dual-purpose chick-

ens, producing both excellent-quality table meat and rich brown eggs. Javas are calm, quiet birds, yet they are active foragers. The hens are good layers and very broody mothers.



Critical

### *Barred Plymouth Rock (pl. 139)*

The roots of the Barred Plymouth Rock lie in the American Dominique. Long before the official recognition of poultry breeds in the APA *Standard of Perfection*, barred birds from New England were called Dominiques, Plymouth Country Fowls, and Plymouth Rocks. At the first American poultry show in Boston in 1849, both Dominiques and Plymouth Rocks were exhibited, but any distinction between them was certainly fuzzy. Both rose and single combs were seen in both flocks.

In 1865, a cross was made between a Dominique cock and a Black Cochin hen, or, according to others, it was a Black Java hen. Or perhaps both. Four years later, a Plymouth Rock chicken was on exhibit at Worcester, Massachusetts. The distinction between the emerging Plymouth Rock and the Dominique was made the next year at a New York State poultry show. The single-combed, medium- to large-sized, barred birds were entered as Plymouth Rocks. With their separate descriptions, both the Dominique and the Barred Plymouth Rock were entered in the *Standard* in 1874, although the Barred Plymouth Rock no doubt absorbed many single-combed Dominiques. Besides the addition of Black Cochin and Java, some writers have suggested that Malay Game, Dorking, Langshan, Brahma, Black Minorca, and others have entered into the mix. Several individuals claimed credit for developing the breed.

The Barred Plymouth Rock rapidly gained popularity, being slightly heavier than the Dominique and an excellent producer of meat and eggs. The Barred Plymouth Rock was widely adopted and spread around the world. Through World War II, the Barred Plymouth Rock was the most common farm chicken in the United States and called by some “the Hereford of the poul-

try world.” Different strains specialized in meat or egg production, and the Barred Plymouth Rock was also used in such broiler crosses as a New Hampshire cock with a Barred Plymouth Rock hen. It was also a favorite among fanciers, who worked hard to breed the exact, perfect color to standard.

Several other color varieties were also developed. The White Plymouth Rock was developed by 1888 from a barred sport. Eventually this variety was heavily selected for rapid meat production and a heavier carcass. The White Rock is a foundation of the modern industrially produced broiler.

The Barred Plymouth Rock earned its huge popularity as a dual-purpose breed. A hardy bird even in cold weather, it is also docile, tame, and active. Both cocks and hens have an upright carriage and are graceful, stylish birds. The hens are broody and good mothers. The hen will also lay light brown eggs year round. The bird itself has a long, broad body with a moderately deep breast. The yellow-skinned Barred Rock matures early into a broiler at 8 to 12 weeks of age. Cocks weigh up to 9.5 pounds and hens up to 7.5 pounds. Breeders of Barred Rocks need to avoid underweight birds, small, narrow bodies, and high tails.

The coloring of the Barred Plymouth Rock is distinct. The barring on the feathers continues down to the skin. On the cock, the black and white bars are of equal width and end in a dark tip. In the hen, the black bars are slightly larger than the light, so that the cock appears slightly lighter in color. The overlapping of the feathers also produces a slight bluish tinge. The eyes are reddish bay, and the comb, wattles, and earlobes are bright red. The beak, shanks, and toes are yellow.

The Barred Plymouth Rock has been eclipsed in popularity by both the White Rock and White Leghorn specialists. There are still acceptable numbers of Barred Rocks in farm flocks, but just like the other dual-purpose breeds, they need to be watched for signs of further decline. The Barred Plymouth Rock is also divided into three general levels: exhibition, industrial production, and the old dual-purpose farm bird. In Canada, the University of Alberta’s Poultry Conservation Program maintains an old University of Saskatchewan R.O.P. (Record of Performance poultry im-

provement plan) strain. The birds of this strain are slightly smaller but have excellent egg production, fertility, and hatchability. The RBC Heritage Hatchery Network also has a Shaver Poultry Breeding Farm strain of the Barred Plymouth Rock.



### *Black Australorp (pl. 140)*

The Black Australorp traces its heritage to the Orpington, bred in the village of the same name in Kent by William Cook in the 1880s. Cook used a variety of breeds in creating several color varieties, but the lustrous Black, pure White, and rich golden Buff earned the greatest following. Their originator was a skillful publicist for his chickens, and they were exported out of England. Orpingtons were noted for early maturity and winter laying ability, but they did not achieve a great deal of commercial success in England because many breeders were more involved in exhibiting. Today the utilitarian Orpington is becoming very rare. The exhibition form differs from this Old Orpington, as it is becoming known.

The stately Orpington is a large, heavy bird that is also capable of good brown egg production. The body is long, round, and deep with a large breast and a wide back. The legs are short, solid, and set apart. There are both single- and rose-comb varieties. The cocks have an abundance of hackle and saddle feathers. The skin is white. Cocks will weigh up to 10 pounds and hens about 8 pounds. Although Orpingtons are large birds, they have a gentle and quiet nature. The hen will brood and is a good mother. The chicks can be too meek in mixed groups. Unfortunately, in the twentieth century, the emphasis was mainly on show-type birds.

The Buff Orpington was introduced from England to North America in the 1890s. The Buff was based on crosses of Buff Cochins, Lincolnshire Buff, and Dorking. The Buff earned its considerable popularity very quickly as a dual-purpose farm bird whose heavy, loose plumage allowed it to maintain egg production even in cold winters. The Buff earned the nickname Golden

Beauty and was often shown at country fairs. The White Orpington is also still available from hatcheries in North America. As with other breeds, the white skin of the Orpington prevented its commercial popularity. In addition, although many individual birds excelled, this uniformity could not be fixed throughout the population.

The Black Orpington was based on crosses of the Black Minorca, Black Plymouth Rock, and Croad Langshan. Black Orpingtons were imported to Australia, where they were developed into an incredible egg-layer without the loss of too much size and meat quality. In many ways, the Australorp maintained the best utilitarian qualities of the old productive Orpington. This new breed produced a hen that earned the world record in an official test in Australia, producing 364 eggs in 365 days. In the 1920s, the Australorp was introduced into North America, and it earned an excellent reputation as a dual-purpose breed. The Australorp was also exported in 1921 from Australia to Britain, where it achieved some success as a family backyard bird.

The Black Australorp, though slightly smaller and trimmer than the Orpington, remains deep bodied. Cocks weigh up to 8.5 pounds and hens about 7 pounds. The coloration of the dark-eyed Australorp has been called intense. Its blue-black feathers shimmer with beetle-green iridescence. The cocks have large bright red single combs and wattles. The beak is black, while the dark slate-colored legs have pinkish white soles. The eggs are light brown and the skin is white, which limits the breed's success in the United States apart from home flocks and direct markets. Although Australorps are an active breed, they are also adaptable to confinement. The Australorp remains an excellent choice for the home broiler and egg flock.

After the Australorp's introduction into the United States, it was crossed with White Leghorns to produce the Austra White. The Austra White was a popular egg-layer until the development of such hybrid crosses as the Hyline and DeKalb. A White Australorp variety has also been developed in the United States.



[To view this image, refer to the print version of this title.]

Fig. 69 A pen of Brown Leghorns. Courtesy of the IAB and Hans Peter Jorgensen.

### *Brown Leghorn (pl. 141)*

There is no question that the Mediterranean egg-laying chickens have had an enormous impact worldwide. The Leghorn and its crosses are the most successful poultry both numerically and in modern production systems. Amazingly, much of the tremendous international poultry industry began with the import of a few brown chickens from Italy. In 1835, a Mr. N. P. Ward of New York took possession of these birds, which had sailed to America on a ship from the port of Livorno on Italy's northwest coast. Livorno was known as Leghorn outside of Italy, hence the English name for the breed that was called the Italian in Denmark and elsewhere in Europe.

Almost immediately, the newly imported Brown Leghorns became popular for their prolific egg-laying ability. Between 1840 and 1845, the White variety was also imported to North America. About 1870, the White Leghorn was imported from America to England and Denmark, where improvements and developments of new strains and varieties continued.

Both Brown and White Leghorns were developed and standardized in the United States. By the 1880s,

both varieties were common. They were known as prolific layers and as small, active, nonsitting birds. Leghorns were sometimes criticized for the smaller size of their white eggs, but breeders eventually developed consistent production of larger eggs. Rose-combed varieties were also developed for the White and Brown, as were color variations known as Dominique and Black. Although more varieties continued to be developed, the White and the Brown continued their dominance in North America. The Black Leghorn achieved some popularity in Britain.

By 1930, 37 percent of all the chickens in the United States were Leghorns. The Leghorns also played a role in the creation of some of the newer American breeds, and eventually nearly all the modern hybrids were at least part Leghorn. White Leghorn strains now dominate the commercial white egg market in North America and Europe.

Three types of White Leghorns are found today: commercial or industrial strains, exhibition birds, and old or middle-level lines, which are in the greatest danger. And although several old White Leghorn strains have been lost and others are in need of conservation, it is the old utilitarian Brown Leghorn, the variety that began this whole story, that needs the most attention. Most of the other standard color and comb varieties are now strictly exhibition birds.

The old Leghorns were repeatedly described as hardy birds, and this is now a serious problem with many of the industrial and show stocks. Conservators of the old single-combed Brown Leghorn should strive for the traits mentioned soon after the turn of the twentieth century, before the commercial strains were developed. These traits include great activity, alertness, and "sprightliness." These small birds were fully capable of flying to roost in trees or barn rafters. They were efficient foragers yet also stylish birds with graceful curves. The little chipmunk-colored chicks were exceptionally active, lively, and hardy.

The yellow-skinned Brown Leghorn is an erect breed with a long arched neck and a moderately long back that slopes gradually downward but rises up into a sweeping tail. The breast is well rounded and carried

forward. The legs are moderately long in comparison with the bird's overall size. The earlobes are smooth, white, and almond shaped. The red wattle is thin and smooth, and the single red comb of the cock stands upright in five distinct points. In the hen, the first point is erect, with the others gradually drooping to one side. The shanks are yellow with the toes often shading to a dusky yellow. The beak is horn colored, and the eyes are reddish bay. Cocks weigh 5.5 to 7.5 pounds and hens 4.5 to 5.5 pounds.

The Brown Leghorn was widely regarded as the most colorful member of its breed. The head of the cock is dark red shading into a brilliant red-orange hackle, where a greenish black stripe runs parallel with the edges of each feather and tapers to a point at the tip. The back is a rich red, and the red feathers of the saddle have the same greenish black striping. The breast is a lustrous black, as are the body and thighs. The wing feathers are red, black, and brown. The tail has black and greenish black feathers. The hen's head is a golden yellow tinged with dark brown. The golden yellow feathers of the hackle have a broad black stripe down the middle. The feathers of the back are a light brown stippled with a darker brown. The breast is a rich salmon, and the body is light to dark brown. The tail is black except for the two main tail feathers, which are stippled with light to reddish brown.

The traditional Brown Leghorn is an excellent white egg-layer for range conditions, although it does require dry and warm housing in cold winters. Hens mature early and can begin laying as early as four to five months of age. They are economical egg producers, consuming only about half the feed of heavier breeds. As table fowls, they are fine for their size. As the *APA Standard* noted after the turn of the twentieth century, the most productive Leghorns closely approach the size and shape of the description. As with many breeds, it is the useful, productive birds that have become hard to find.

At least four White Leghorn strains are also being conserved. The RBC's Heritage Hatchery Network is maintaining a strain obtained from Donald McQueen Shaver, founder of Shaver Poultry Breeding Farms.

These birds were from one of the original foundation strains found in many of the early American and Canadian White Leghorns. The network is also preserving the Munro strain. Alberta Poultry Research Centre maintains Roy D. Crawford's University of Saskatchewan strain.

In New Mexico, David Sullenberger is maintaining the seventy-year-old New Mexico Agricultural Experiment Station strain of single-combed White Leghorns. These birds had developed some adaptation to high temperatures but had become ignored as production birds because they did not lay as well as the hybrids. The flock has become highly inbred but is very homogeneous for its genotype. These White Leghorns are also notably friendly toward people and do not display the nervous flightiness of many Leghorns. These and other strains may provide valuable genetics for industry and small production flocks.



Rare

### *Black Minorca (pl. 142)*

The Black Minorca belongs to one of the oldest domesticated poultry families—the Mediterranean class. The haughty bearing and striking appearance of these birds has been recognized since the Roman agricultural writer Columella described them as the best egg producers. One unusual feature of these birds is the snowy white skin around the face and wattles. This smooth area is really an area of highly developed earlobes. The Black Spanish and Andalusians of Spain, the Leghorns and Anconas of Italy, the Buttercups of Sicily, and the Minorcas of the island of Minorca all share this trait. In addition, these birds have large combs and are excellent producers of white-shelled eggs. They also tend to be early maturing, nonbrooding, and somewhat nervous.

Minorca lies off the coast of Spain, and the breed that bears its name is probably an offshoot of the White-Faced Black Spanish. The Black Spanish was available in Bristol, England, by 1750 and was also bred in Holland. These birds were also romantically known as the Fowls of Seville. Although the Black Spanish were ex-

[To view this image, refer to the print version of this title.]

Fig. 70 A trio of Black Minorcas. Courtesy of the IAB and Hans Peter Jorgensen.

cellent producers of white eggs, the fanciers concentrated on developing their unique facial features. The Black Spanish was also brought to the New World, spreading throughout the Caribbean islands into the southern colonies of America (fig. 70).

On Minorca itself, the native breed was known as the Red-faced Black Spanish. Soldiers returning from Europe and bird fanciers brought this particular bird to England by the 1830s, where it was called the Red-Faced Minorca or Black Minorca. The Minorca was popular in western England, growing in numbers as the Black Spanish lost popularity in the 1870s. One particular champion cock owned by Lord Dewar, named

The MacNab, was immortalized in a famous print. The Minorca contributed to the development of such breeds as the Black Orpington. Superior egg-laying strains of the Minorca were also developed by the turn of the twentieth century. The exhibition form of the breed had a great following, with great emphasis on its facial features.

The Black Minorca was exported to many areas of the world, including North America, where it was admitted to the APA *Standard of Perfection* in 1888. Many admirers of the breed believed that the Minorca was the finest example of its class, nonsitters and year-round layers of chalk-white eggs. Although the Leghorn laid more eggs per year, the Minorca's eggs were larger and equaled the Leghorn's output in weight. In 1930, the USDA determined that among the many egg-

laying contests held the previous year, the Black Minorca laid the largest eggs, averaging 25.7 ounces per dozen. Eventually, however, the Leghorn breeders developed strains known for their large eggs, derailing the Minorca's claim to fame. The exhibition-type Minorcas also diverged from the egg production birds. The traditional type is now quite rare in both North America and Britain.

The Black Minorca is the largest of the Mediterranean breeds but has poor meat conformation. The Minorca's skin is white, as is the flesh. The body is similar to the Leghorn's, long, angular, and narrow. The thighs are stout, and the shanks are long and broad. The cock can weigh 9 pounds and the hen up to 7.5 pounds. The head is carried high, and the back is long and slopes downward with a low but long tail. The single red comb is large and in the hen falls over to one side. The wattles are thin and pendulous, and the earlobes are the characteristic pure white. Almond shape and soft texture are now more important than earlobe size.

The plumage of the broad-feathered Black Minorca is smooth and close-fitting. The color is brilliant, glossy black with a beetle-green sheen. The legs are dark slate to black, and the beak is dark. The overall effect is impressive and stately.

The hardy Minorca is an active forager, though somewhat restless. It seems to do well in confined situations and is suitable for the small backyard flock. The large combs are susceptible to frostbite, and the rose-combed Minorcas were developed later to combat this problem. The White Minorca variety never achieved the level of popularity of the Black. A Buff was also developed by fanciers.



Critical

### *Ancona (pl. 143)*

The coastal Italian town of Ancona lies on the Adriatic Sea, and the Ancona breed comes from this region. The Ancona is developed from the old Mediterranean chicken stocks and is closely related to the Leghorn. At first the Ancona was called the Black Leghorn, and some controversy existed about whether it was just a

Leghorn variety. Yet the Ancona benefits from its mixed ancestry, making it an extremely hardy bird.

In the mid-nineteenth century, the Ancona was imported from Italy to Britain, where it was accepted as a separate breed. The Ancona eventually became one of the important egg-laying breeds in Europe. In spite of its prolificacy, the Ancona's egg size was smaller than the Leghorn, whose commercial strains eventually dominated the market for white eggs.

From England, the Ancona made its way in 1888 to the United States, where it joined many farm flocks as an egg-layer. The Ancona was admitted to the *Standard of Perfection* ten years later. It was described as a hardy, quick-maturing bird capable of foraging. Owners describe the Ancona as having a quick, active, and busy nature. Farmers claim that the birds' alertness and coloration lessens the losses from predators. They are excellent foragers that produce well on far less feed than the heavy breeds. The hen is a nonsitter.

The yellow-skinned Ancona resembles the Leghorn, although individual birds may be a little heavier. Cocks average about 6 pounds and hens about 4.5 pounds. The yellow beak is shaded with black, while the shanks and toes are yellow with black mottling. The black feathers have a beetle-green sheen and are tipped in white in a V-pattern. The plumage is distinctive—the Ancona looks like a white-dotted black bird. The single comb, wattles, and eyes are red, and the Ancona carries the characteristic enamel white earlobes, though their size is not important. The comb in the hen stands erect at the front and then droops gradually to one side. The rose-combed variety, perhaps better suited to very cold temperatures, was developed in 1914.

The Ancona lost the race to become the primary supplier of white eggs in the North American market in part because breeders did not concentrate on developing egg size or higher production. The Ancona is now rarely found as a layer, but for the home flock or on range situations the breed may serve as an excellent producer of white eggs. There is a difference between the old middle-level stocks and the exhibition strains of the Ancona.



Critical

### *Rhode Island Red (pl. 144)*

The Rhode Island Red was developed not by fanciers but by poultry farmers in the area of Little Compton, Rhode Island, beginning about 1830. From the beginning, the breeders' goal was a utilitarian, dual-purpose chicken, not a show bird. They started with their own stocks, which were a blend of many breeds.

Three important types seemed to have had the greatest influence on the Rhode Island Red: Asiatics, Game, and Mediterranean. There are also early references to reddish colored Shanghais. At this time, the Asiatic Cochins and Brahas were often confused and called by many descriptive names—Pootras, Chit-tagongs, Shanghais, and Cochin Chinas. These large birds contributed size and egg-laying ability. The upright red Malay Game was also an important contributor to the Rhode Island Red, giving the breed its deep color, hard feathers, and hardiness. The Malay itself, however, was never popular in North America. The Brown Leghorn also contributed excellent egg production. And there are suggestions of Cornish Game, Java, and Wyandotte in the Rhode Island Red.

The Golden Buff or Golden Red, as the breed was originally called, was first exhibited about 1879 but was bred in large numbers for practical uses before then. The single-combed Rhode Island Red was admitted to the *Standard of Perfection* in 1904, and a rose-combed variety was entered the next year. In the early years, it was common to see both rose- and single-combed birds in the same flock.

The Rhode Island Red is widely considered to be the most successful dual-purpose breed in North America, although the Barred Plymouth Rock is a close second. Exported to Britain and many other countries, the Rhode Island Red may be the world's most widely distributed chicken breed. The breed is probably the best egg-layer of the dual-purpose chickens and has been widely used for that function, laying in the range of 250 eggs per year. It is not a meat specialist, but its size and conformation make for a good eating bird. Its dark-colored pinfeathers were definitely a handicap in its becoming a more popular market bird.

Because of its good production and other useful traits, the Rhode Island Red was one of the most successful and widespread farm flock birds for many years. It is long-lived, very hardy, and adaptable to all sorts of conditions or feed. Many, though not all, Rhode Island Red roosters are aggressive. The hens are usually quiet in disposition. Hens from the egg-laying strains are usually nonbroody. The breed is Rhode Island's official state bird.

The strains of the Rhode Island Red that have been heavily selected for egg-laying are now smaller in body size, less broody, and lighter in color. These strains have been used heavily in the creation of egg-laying crosses. There is also an exhibition strain of Rhode Island Reds that is sometimes called the Mahogany Red. The emphasis on dark rich color has been paramount over utilitarian function in most show birds, although many show birds have good shape and substance.

The old-type single-combed Rhode Island Red is the endangered member of this family. This traditional type is a medium-heavy bird, with cocks weighing up to 8.5 pounds and hens 6.5 pounds. These yellow-skinned birds lay medium to dark brown eggs. They have a rectangular and long or oblong body. The eyes, comb, wattles, and earlobes are all bright red. The beak is a reddish horn color, and the shanks are rich yellow shaded with red. The cocks should have a line of red pigment running down the sides of the shanks to the tips of the toes. The overall color is a rich, lustrous, brilliant mahogany red. Lighter shades are associated with the egg-laying strains, although the deep red color of outdoor birds will also fade in the sunlight. Black feathers are often seen in the tail or wings, but "smutty" birds, or those with black in the body, are not desirable. The undercolor should also be rich red, not gray or black. The plumage forms a smooth surface.

The Tottle strain of Rhode Island Red is unique to Britain and preserved by the Traditional Livestock Foundation along with the Tottle Light Sussex. These two breeds were once crossed to produce excellent hybrids. The Alberta Poultry Research Centre at the University of Alberta maintains Roy Crawford's University of Saskatchewan strain.

The old Rhode Island Red remains one of the best dual-purpose breeds for the farm flock. It is hard to imagine a farmyard without the little red hen.



Watch

### *White Wyandotte (pl. 145)*

In the years after the Civil War, an American-bred, general-purpose chicken was found in many areas of the North and Northeast, especially in New York. Its exact origin is unknown and is confounded by the various names that were used in different parts of the country, including Mooney, Sebright, and American Sebright. This chicken's exact makeup is also murky. The Dark Brahma and Silver-Spangled Hamburg probably served as the basis, but it has been suggested that a French breed called the Breda and the Cochin were also used. The Silver Sebright, a large laced bird, was also reported as a parent. Confusingly, in Britain the Sebright is a small bird developed in the mid-1800s. John P. Ray of Hemlock, New York, and a Mr. Whitaker of Michigan stand out as breeders of specific strains that contributed to the emerging breed.

When this breed was admitted to the *Standard of Perfection* in 1883 as the Silver-Laced Wyandotte, it was decided to consolidate the breed's many names. This proved to be a wise move, for afterward the Wyandotte's popularity grew. Fred A. Houdlette suggested the new name in honor of his father's boat, the Wyandotte, which itself was named in homage to the Wyandot people of North America. Wyandotte chickens were recommended, along with the Dominiques and Plymouth Rocks, for farmers who wished to raise fine table birds for market, especially in the early spring. Wyandottes were eventually found throughout North America, and they were exported to Britain, where they still enjoy some popularity.

Several other color varieties of the Wyandotte were admitted to the *Standard* before the White was entered in 1888, although the White was reported as early as 1872. The White Wyandotte was developed from sports of the original Silver Laced. This bird is pure white,

with no creaminess or brassiness. Every broad feather, shaft, and fluff is snow white, and the plumage fits together smoothly. The rose comb, wattles, and earlobes are bright red. The beak, legs, and toes are yellow, as is the skin.

The Wyandotte is a medium-weight bird that is well suited to colder climates. Its rose comb also survives better in freezing temperatures than a single comb does. Hens are good mothers, and their pleasant disposition makes them adaptable to confinement. The hens also lay a good quantity of brown-shelled eggs. White Wyandotte cockerels plump up sooner than many other heavy breeds. The Wyandotte is known for its "curvy" shape. The neck is short and well arched, flowing into a short, broad back, and the saddle rises into a concave sweep with the tail. The breast is broad, deep, and round. The word *round* also describes the body and the stout thighs. The short legs are set well apart. Cocks weigh up to 8.5 pounds and hens 6.5 pounds.

Raisers of the Wyandotte have encountered some difficulties. For many years, the egg size was often small and gave poor hatching results. These problems contributed to the Wyandotte's near disappearance after the spread of large-scale production techniques. Modern breeders need to guard against undersized birds, single combs, and individuals with narrow breasts in order to maintain the original type. An exhibition form also exists today.



Critical

### *Jersey Giant (pls. 146, 147)*

The Jersey Giant is an American-bred bird developed by two brothers, John and Thomas Black, in New Jersey in the 1880s for the meat markets in New York City. At least three breeds were used in its creation: the Black Langshan, the Black Java, and the Dark Brahma. It has also been suggested that the Black Orpington and the Cornish entered into the mix. First called the Jersey Black Giants, they were later marketed by other breeders as Marcy Giants and Sears Jersey Giants.

The Brahma is a large, quiet bird, Asiatic in ori-

gin, with heavily feathered legs. It is also a long, deep bird with a full, broad breast. The Brahmas were vastly popular in both Britain and North America. The Dark variety was not as popular as the White, which was the object of breeding for plumage points at exhibition, although the Dark variety could be as productive as the White.

When these large, dark breeds, the Dark Brahma, Black Java, and Black Langshan, were brought together, they produced a very heavy bird with excellent breast development. The Jersey Giant is the largest breed developed in the United States. The Black Jersey Giant was admitted to the *Standard of Perfection* in 1922.

The breed was aimed especially toward the commercial production of capons. Unfortunately, the Black Jersey Giant grew too slowly to compete with Cornish-Rock broilers, which are ready for market in a few weeks. The Jersey Giant grows its large frame first, then covers it with flesh. At six months, a cock is a well-fleshed 10 pounds. Because it is so large, the Jersey Giant does require sufficient good-quality feed to avoid bone problems.

Another problem for the Black Jersey Giant was its dark feathers, which left dark pinfeathers on the skin. The American market came to favor birds with white plumage and light-colored legs. The White variety was developed and standardized in 1947 from white sports of the Black. A slate Blue variety was created from a sport in the 1980s, but it does not breed true for blue color.

The Jersey is known as a rugged breed that does especially well in cold climates. The hen also lays well through the winter, producing brown eggs. The hens will brood but are somewhat too large to set eggs easily. The Jersey Giant has a long, deep body with a wide back. The Black variety is slightly larger than the White. Cocks can weigh 13 pounds and hens 10 pounds, but the average bird never reaches the size described in the breed standard. The Jersey Giant is a yellow-skinned bird with a single red comb and wattles and dark brown eyes. The White is a solid color with willow-colored shanks. The feet are yellow on the bottom, and the beak is yellow with gray streaks. Adult Whites occasionally

show a little dark or gray ticking on some feathers. The yellow skin and white plumage make this variety more acceptable on the market. The Black Jersey Giant has a greenish sheen to its black feathers. The feet are also yellow on the bottom, but the shanks and toes are black with a little willow shading.

The general public never adopted the Jersey Giants to a significant degree, although farm flocks are found among those who appreciate the combination of a large meat bird and a reliable egg supply. Exhibition strains also exist for both the Black and the White. The Jersey Giant remains a popular and impressive bird for 4-H or country fair competition. At least two important heritage strains are available for preservation.

In Canada, the last production strain of the White Jersey Giant vanished in 1967. Fortunately, one flock based on this source has been preserved since 1968. This strain is more tightly feathered than usual, which gives the birds a smaller appearance.

In the United States, the foremost breeder of Jersey Giants is Golda Miller, who has maintained a closed flock for more than fifty years. Miller has stressed quality, size, and production so that her flock closely reflects the original breed type. She breeds Blacks, Whites, and the newer Blues. Several breeders have also maintained the Miller line in their flocks.

Both the White and Black Jersey Giants still make excellent home flock birds. The White is rarer than the Black.



Critical

### *New Hampshire (pl. 148)*

This successful dual-purpose bird was developed in Rhode Island and Massachusetts as a strain of the Rhode Island Red. Beginning about 1910, poultry raisers in New Hampshire deliberately selected for early feathering, fast growth, and maturity as well as large egg size and good meat conformation. Certain strains were also noted for their vigor and hardiness. Whereas the show breeders of the Rhode Island Red placed great emphasis on red coloring, this was not much of a consideration to many of the practical New Hampshire

poultry raisers. The New Hampshire Agricultural Experiment Station was working on developing a broiler meat strain as well. With time, the New Hampshire type was recognized for its specialized traits, and it was admitted to the *Standard of Perfection* in 1935. The New Hampshire was a significant contributor to the egg production industry. The breed's rapid growth and early maturity were also recognized by the large broiler industry both in New Hampshire and in the Delmarva Peninsula (Delaware, Maryland, and Virginia) by the 1930s. The Delaware–New Hampshire cross became a popular choice for broiler production.

The New Hampshire differed from the Rhode Island Red in several respects. The color of the plumage was noticeable, being a lighter shade of red. This lighter shade was similar to some strains of the Rhode Island Reds in which poultry raisers had concentrated on egg-laying ability without regard to color. The body of the New Hampshire has been described as more triangular than that of the Rhode Island Red. The New Hampshire chick also feathers out rapidly, grows quickly, and matures early.

The New Hampshire is a medium-sized bird with a broad, deep body. Cocks weigh 7.5 to 8 pounds and hens 5.5 to 6.5 pounds. The single comb, wattles, and earlobes are red. The comb of the hen may lop over. The beak is a reddish horn color, and the shanks and toes are rich yellow. A red line of pigment runs down the sides of the shanks to the tips of the toes. The yellow-skinned New Hampshire is colored rich chestnut red with buff highlights, although the red color can fade out somewhat in sunlight. The tail feathers are black, and the hen's lower neck feathers are tipped with black.

There have been two noteworthy strains of the New Hampshire. Andrew Christie developed the Christie strain in the 1920s. Christie used his own word, *spizzer-inktum*, to describe his bird's vigor and style. The Christie birds are large and lighter in color than other New Hampshires. Clarence Newcomer bred his strain starting in the 1940s as a richly colored egg-laying flock. Both of these strains are now hard to locate. The ALBC has fostered satellite flocks to maintain the Newcomer strain. Purchasers should be aware that some New Hampshires are advertised as New Hampshire Reds,

and they may be a cross of the Rhode Island Red and New Hampshire.

As a dual-purpose breed, the New Hampshire produces an especially nice plump carcass and large eggs. The pinfeathers are colored a reddish buff, so they do not detract excessively from the slaughtered bird. The hens lay a large, lightly tinted to brown egg. The eggs of some strains are darker than others. In intensive management, hens averaged 240 eggs annually, but there were some complaints that the breed lacked persistency of production. The New Hampshire is known as a vital, vigorous bird, and the hens are good mothers. The New Hampshire is also competitive and aggressive in obtaining food.



Watch

### *Delaware*

The lovely Delaware was developed for the broiler industry in the United States. Unfortunately, the Delaware arrived just before the White Cornish–White Plymouth Rock cross literally took over this market. The large-scale producers discarded not only the old dual-purpose chickens but also the alternative choices in newer, specialized breeds.

Around 1940, a hatchery man named George Ellis in Ocean View, Delaware, took a liking to the colored sports that sometimes occurred when New Hampshire hens and Barred Plymouth Rock cocks were crossed for the production of broiler chickens. These white birds were bedecked in the Columbian pattern, which is an irregular black barring on neck, tail, and wing feathers. Ellis and other interested breeders set out to breed from these birds, hoping to replace the Barred Plymouth Rock cocks in fathering broiler chickens. The advantage would be an almost white bird with rich yellow legs, which was exactly the bird that the market preferred.

In the eastern poultry industry, the Indian River, as this new breed was first called, became a popular pure-bred broiler and broiler cross when mated with the New Hampshire. The breed was also called the Ohio Beauty. With a final name change, the Delaware was recognized

by the *Standard of Perfection* in 1952. Unfortunately, the Delaware's popularity fell rapidly against the new hybrid cross, and exhibition breeders did not adopt the Delaware to any extent. Because the Delaware had not yet established a presence or name in home or farm flocks, it was even less secure than many of the older breeds.

Today it is very hard to find Delawares for purchase. In the late 1990s, the ALBC survey could locate only about a dozen breeders for the Delaware, and it estimates that the number of breeding hens is down to about 400 or fewer. Another problem for potential owners is that Columbian Plymouth Rocks are sometimes advertised as Delawares or represented as the same breed.

Ironically, for a breed that was not created for home flocks or small-scale production, the Delaware is an excellent dual-purpose bird. Owners report that the Delaware is hardy, friendly, and calm. Delawares mature rapidly for meat production, with excellent size and conformation. The hens also lay large brown or tinted eggs. One owner reports 70 percent USDA Grade Jumbos in summer and 30 percent in the winter. Delawares have also been used in organic farming situations and on free range, both with great success. Delawares will not gain as fast as the modern industrial stocks that are ready for market in a few weeks, but the Delawares are more economical to bring to market weights in a forage situation.

Cocks weigh 7.5 to 8.5 pounds and hens 5.5 to 6.5 pounds. The single comb, wattles, and earlobes are bright red. The skin color is yellow, as are the shanks and toes. The beak is a reddish horn shade.

The Delaware is unique to the United States and a perfectly useful breed, especially in certain situations. The seriously endangered situation has made the Delaware a conservation priority for the ALBC.



Critical

### *Hungarian Yellow (pl. 149)*

The Hungarian Yellow is a unique conservation population located primarily in Canada. This primitive type,

which is native to Hungary, was brought to Canada by a visiting student for his research by 1970. The flock remained at McGill University when its owner left. In 1971, Roy D. Crawford, the renowned poultry geneticist, transferred them to the University of Saskatchewan, where they were maintained in a nonpedigree, natural mating situation. In 1984, it was learned that the breed had become rare in Hungary and had been cross-bred with other breeds such as the New Hampshire. It was determined that the Canadian strain represented the original Hungarian Yellow breed, and Canadian-bred hatching eggs were requested from Hungary. In addition to Crawford's flock, the breed is now being maintained within the Heritage Hatchery Network of the RBC. Ten farm flocks, including one in Pennsylvania, have been established with good results.

The Hungarian Yellow is a medium-sized, dual-purpose breed. Cocks weigh from 5.4 to 7 pounds, and hens weigh 3.9 to 5.5 pounds. The comb, wattles, and earlobes are red. The shanks and toes are yellow, and the beak is horn colored. The head of the cock is a rich golden yellow to chestnut color and the body varies from bright glossy yellow to medium chestnut. The black tail feathers have buff edgings and some white color. The hen has a pale yellow to medium chestnut-colored head, while the body color varies from yellowish buff to medium chestnut. The tail is black with buff edgings and some speckling. Although the Hungarian Yellow is colored somewhat like the New Hampshire, it has a more upright, slender appearance. Two types are present; one is larger, heavier, and rangier with a darker, looser plumage, whereas the other is well muscled, yet lighter and smaller, with tighter plumage. This type can show yellow to white color in the tail break and wing feathers. Breeders have observed that the darker hens lay fewer eggs and are more aggressive.

The Hungarian hen is an excellent winter layer, a wonderful sitter, and a good mother. The light brown eggs are occasionally speckled or banded with dark reddish brown. The chicks are hardy and active, but the breed is not an aggressive forager.

The Hungarian Yellow is very rare globally and conserved in a purer form in Canada than anywhere else.

## Turkeys

### Natural History

Wild turkeys are native to North and Central America and have been present there for at least ten million years. The two species of turkeys, the Common or Wild turkey (*Meleagris gallopavo*) and the Ocellated turkey (*Meleagris ocellata*, formerly *Agriocharis ocellata*) belong to the order Galliformes, or heavy, chickenlike land birds. Galliformes are nonmigratory birds capable of flying at most only a few hundred feet, and most exhibit elaborate courtship displays. Other members of this order include the grouse, quail, chickens, partridges, and pheasants.

The Ocellated turkey inhabits the shrubby or semi-forested lowlands of the Yucatán peninsula, including southern Mexico, Guatemala, and Belize. Local names include *pavo*, *pavo ocelado*, and the Mayan *ucutz il chican*. The Ocellated turkey is striking in appearance, with a brilliant copper and bronze-green sheen to the body feathers. The exotic-looking tail feathers have an iridescent purple cast with bright blue-green eyespots. Its head and neck are bare and colored blue with reddish coral colored warts. Instead of the finger-like snood of the Common turkey, there is an unusual roundish protuberance tipped with yellow above the beak. This turkey lacks the traditional beard, or tuft of breast feathers, of the Common turkey. The Ocellated turkey is also smaller than the Common turkey, with shorter legs but larger spurs. Very little is known about the habits of the Ocellated turkey or the pressures on its population. The Ocellated turkey may have been kept by the Mayas and is still found as a scavenger around rural homesteads in Guatemala.

The fossilized remains of an extinct turkey species, *Parapavo californicus*, have been found in southern California's La Brea tar pits. This turkey seems to be related more closely to the Ocellated turkey than to the Common turkey.

The Common turkey found in southern Ontario, the continental United States, and northern Mexico was named by the father of modern taxonomy, eighteenth-century Swedish botanist Linnaeus. When he

undertook the job of classifying and naming all living things, he gave the turkey the genus name *Meleagris*, Latin for guinea fowl, and the species name *gallopavo*, meaning chicken-peacock.

Five recognized subspecies of the Wild turkey range across North America: the Eastern (*Meleagris gallopavo silvestris*), Rio Grande (*M. g. intermedia*), Merriam's (*M. g. merriami*), Florida or Osceola (*M. g. osceola*), and Gould's (*M. g. gallopavo*). Each is adapted to a different geographic region and displays slightly different bronzing or color variations. The first four subspecies are the most numerous and best understood. Interbreeding also occurs naturally and as a result of the reintroduction of turkey stocks for hunting. Gould's turkey, found in portions of Arizona and New Mexico and northern Mexico, is much rarer and located in remote areas. A possible sixth subspecies may exist in southern Mexico, but it is not well documented. Research is under way to evaluate these two lesser-known turkeys and foster population increases.

Although there were millions of Wild turkeys in North America when the European colonists arrived, by the early twentieth century, the Wild turkey was near extinction in many areas of the United States and southern Canada. Loss of wooded habitat due to farm development and logging were partially responsible, but overhunting was also a factor. Although turkeys are difficult and wary prey, they are easily baited with corn. By the 1930s, only 30,000 turkeys remained in the wild. In many states, restoration programs have been very successful, and Wild turkeys now number about 4.5 million across the United States. Texas, Georgia, Alabama, Pennsylvania, and New York have the largest populations, but today turkeys are found in every state but Alaska. (Turkeys have been transplanted to four of the Hawaiian Islands, where they now number about 5,000.) Turkeys have adapted to semirural American life, hunting for grasshoppers along highways and attracted to spilled corn around farmyards and even bird-feeders. Licensed turkey hunting is now allowed in many places in spring or fall, though baiting is illegal in many states.

Turkeys are natural foragers that prefer thick wood, brushland, and swampy lowland. They consume large

amounts of acorns, seeds, and berries and forage on plants and insects, especially grasshoppers. At night, turkeys roost in the low branches of trees. Turkeys are adaptable to climates ranging from the very arid to rainforests, although they do have difficulty with deep snow, which interferes with their foraging. Turkeys do not form bonded pairs but live in small flocks consisting of a male stag or tom and several females or hens. The hen raises one brood of chicks, or poults, from a hidden nest, made of leaves and grass on the ground, in which she lays 8 to 20 pale-colored eggs with reddish brown spots. The eggs hatch in about twenty-eight days. The chick must work for two or three days to free itself from its hard shell. The hen does not return to the male until her poults are older. Young males are called jakes, and young females are called jennies. Adult males are known as toms or gobblers. In the wild, turkeys can live for twenty years.

Turkeys make many sounds: a contented purr, a loud gobble-gobble when the male calls his hens, a high-pitched trilling before fights, and a high-pitched, short *putt-putt* in alarm. Females cluck to reassure their poults and to let other turkeys know where they are. They also yelp *keouk-keouk-keouk* when they are ready to mate. Juveniles make a whistling *kee-kee* sound.

The range of the turkey flock is small, and so the flock is very familiar with the area, quickly noticing anything unusual or new. Turkeys have excellent eyesight and hearing. They can see 320 degrees without turning the head. At a normal pace, turkeys jog on the ground at about 12 miles per hour. Alarmed turkeys flee either by running at speeds up to 25 miles per hour or flying up to 55 miles per hour for several hundred yards.

The Wild turkey is the largest land bird in North America, and its weight ranges from 8 to 17 pounds. It has a bare wrinkled head with erectile wattles on the head and neck and the distinctive snood, a fingerlike fleshy protuberance on the forehead. On the front of the neck is another pendulous wattle. The head and neck are colored reddish with blue mottling. This coloring reveals the turkey's state of mind, for when it is excited or alarmed, the head and neck turn a deeper blue. During courtship the snood of the tom also swells. The tom's distinctive turkey beard on the chest is made of

long bristles, and its feathers of are green with metallic casts of bronze, gold, and copper or buff. Toms engage in courtship displays, dropping their wings and strutting and spreading their tail feathers like a fan. Toms have spurs on their hind toes, and they fight each other for possession of the hens.

The Wild turkey was a game animal for many Native American peoples, providing meat, bones for tools, and feathers for clothing and arrows. Some tribal groups believed that the turkey was a special friend of humans, whereas others believed that turkeys were associated with sorcerers or caused illness. The movements of turkeys were often depicted in tribal dances.

## Domestication

The Wild turkey was domesticated by native peoples in the southwestern United States and Mexico at least by 500 B.C. and perhaps much earlier. Many pueblo dwellers regarded the turkey as a sacred animal for religious ceremonies, not as an everyday source of food. At the cliff dwellings of the Anasazi people, turkeys foraged in the steep slopes below the terraces, which were used as garbage dumps. Feathers were an important product from turkeys, often incorporated into the religious beliefs of the Navajo, Hopi, and Zuni cultures.

Excavations in Mexico's Tehuacán Valley have revealed a pattern of food production dating back to about 3000 B.C. that included domesticated dogs and turkeys. The Aztec farmers of the capital city Tenochtitlán raised the turkey, or *uexolotl*, and special small, fat dogs for meat, selling both in the marketplace. The Aztecs sometimes braised turkey and ate it with a hot sauce containing chocolate. Besides raising turkeys in great numbers, the Aztecs bred turkeys in different colors, including white, red, brown, and black. Feathers from turkeys and other birds decorated the robes of the nobles. Behind the Emperor Montezuma II's palace was a great private zoo with cages of jaguars, pumas, sloths, monkeys, armadillos, snakes, eagles, and hawks. Several hundred turkeys were fed each day to the animals, especially to wild birds of prey.

[To view this image, refer to the print version of this title.]

In the early 1500s, soon after the Spanish arrived in Mexico, the turkey was brought to Europe, spreading first to the Mediterranean basin, where the Black Spanish would eventually become a recognized variety. Turkish merchants, stopping at Seville en route to Britain, may have introduced this new dark, large fowl known as the “turkie cock.” The relatively unknown land of Turkey was believed to be the home of many exotic or new foods that were actually native to the New World. Corn or maize was called “Turkie wheat” in Britain and “Turkish grain” in Germany and Holland, and pumpkins were known as “Turkish cucumbers.” The turkey resembled the recently reintroduced African guinea fowl, which also was sometimes described as a turkey cock. As late as 1755, Samuel Johnson’s *Dictionary* defined the turkey as “a large domestick fowl brought from Turkey” (fig. 71).

Misconceptions about the turkey’s origin abounded in Europe, where the turkey nonetheless thrived. In France, it was called *coq d’Inde*, or cock of

Fig. 71 One of the earliest depictions of the turkey in Europe was this woodcut by Konrad Gesner from *Historia Animalium*, published in 1555. From *Curious Woodcuts of Fanciful and Real Beasts* (Dover, 1971).

India, which later became *dindon*. The Italians called it *galle d’India*. Early German references were to *indianische Henn*, but later the Dutch, Germans, and Scandinavians used *kalkoen*, *calcutische Hahn*, and *kalkon*, referring to Calcutta in India. Curiously, in India, the turkey was called *peru*. In the New World, the Spaniards called the turkey *pavo* or *gallopavo*.

In spite of the Turkish story, Britain probably acquired turkeys from several sources. English explorer and merchant William Strickland sailed to the New World in 1520, returning with turkeys. The first written record of these turkeys is found in 1524. Strickland became wealthy from his voyages and used the turkey in his coat of arms.

Whatever the source, by 1541, turkeys were com-

mon enough in the markets of Britain to be classified as “greater fowls” along with cranes and swans. Peacocks and swans were once the celebration dish of the rich, while the poor ate herons and bustards on special occasions. Soon, however, turkeys were being raised as table birds like partridges, pheasants, and guinea hens, and they eventually replaced the other large wild fowl in the markets. The turkey was definitely raised in great numbers by the seventeenth century. For the next two hundred years, large numbers of turkeys were driven along with geese to the markets in London from distances as far as Norfolk and Suffolk. They had to begin their trip in August to arrive three months later in time for the feasts of December.

The English custom of the Christmas turkey was established by 1585. Turkeys were roasted and basted with pork fat or bacon because they were so lean. Sometimes they were stuffed with cloves or breadcrumbs, fruits, and other spices. Sauces and gravies were specially prepared for turkeys. The cooked meat was also used in baked pies.

The surviving, domesticated *criollo* turkeys of Mexico are seen today in colors of white, splashed, bronze, and black. The turkeys taken back to Spain may have included these color variations, but white, black, red, and other color sports also appear occasionally in wild and domestic flocks. Black turkeys were standardized in Norfolk, England, and were known as Norfolk Blacks or Black Norfolks. The Black Norfolk was smaller but with a better-developed breast than common turkeys. The Black would also be important for its future contributions to the development of new varieties. Other early turkey varieties included the Suffolk, the White, and the Cambridgeshire. These varieties were probably taken back to the English colonies with other poultry.

The first domesticated turkeys returned to the New World with the Jamestown colonists in 1607. Turkeys arrived in the Massachusetts Bay colony a few years after the Pilgrims landed in 1620. The colonists were actually somewhat surprised to see wild turkeys in their new home but soon took advantage of them. When the Pilgrims celebrated their first harvest, the men hunted for wild fowl, including turkeys, ducks, geese, and

swans, which they prepared for their feast. President George Washington declared the first Thanksgiving holiday in 1789, although “Turkey Day” was not official until 1863, when President Abraham Lincoln chose the last Thursday in November as the national holiday. Following British tradition, the turkey has remained the traditional centerpiece of celebrations, although in the young nation turkey was also a common meal.

Native Americans used turkeys in soups, stews, and other dishes often combined with such other foods as squash, fruits, or corn. The settlers usually roasted turkeys, both wild and domestic birds who usually foraged for a good portion of their feed. Turkeys were sometimes penned and fattened for a few weeks before a special meal. In the South, the legs of the roast turkey were deviled with the gizzard and liver and served broiling hot. In the Southwest, turkey pieces were often simmered in a spicy broth or gravy flavored with *mole poblano*.

The turkey became closely associated with the new republic. Benjamin Franklin originally lobbied for the turkey to be named the national bird, stating that the eagle was “a robber, a bird of bad moral character,” whereas the turkey, “even though vain and silly, was a bird of great courage.” Abraham Lincoln’s young son, Tad, kept a pet turkey named Jack at the White House. Jack had received a presidential pardon to spare his fate on the dinner table. On Election Day in 1864, Jack accompanied Tad to the soldier’s polling place near the White House. When the president spotted him, he asked, “Why is your turkey at the polls? Does he vote?” “No,” Tad replied seriously, “He’s not of age yet.”

Through the nineteenth century, most farms kept a range flock for their own use and to sell at the holidays. Turkeys were often walked to market, and some of these “turkey trots” involved large flocks of turkeys that traveled many miles. From the 1750s, turkeys were also widely used to control tobacco hornworms. Virtually every tobacco planter kept a flock of turkeys primarily for this purpose, and this widespread practice continued until the early 1900s. Turkeys were also used to control grasshopper damage on various crops. Farmers often brought their prize turkeys to local fairs, and dif-

*cold turkey* A sudden or abrupt end without preparation

*gobble* To swallow food in a hurry

*gobbledygook* Meaningless words or sounds, imitative of turkey sounds

*talk turkey* To speak frankly or get down to business

*turkey* Someone or something that is a failure, especially a theatrical production

*turkey-cock* A strutting, pompous person

*turkey trot* A ragtime dance

ferent varieties were displayed at turkey shows both to farmers interested in commercial stock and to fanciers.

In Europe, the Black Norfolk, Black Spanish, and white turkeys from Holland and Austria were the oldest standardized varieties, but once they were reimported to the New World, they entered a melting pot. The Mexican domestic turkey that was originally taken to Europe was smaller than the Eastern wild turkey. The returning European domestic turkeys were crossed with Eastern wild birds and new “sports” were fostered, but in truth, interbreeding between the two types was inevitable because turkeys range further from their home roost than chickens. At times, colonists practiced deliberate crossbreeding, sometimes using Mexican criollo and other Wild turkey subspecies that were also available. Both the larger Eastern wild turkeys and the heavier colonial domesticated turkeys were taken back to Britain, producing larger varieties there as well.

In the colonies, the Norfolk Black and the wild stock were the foundation for varieties such as the Bronze, Slate, and Narragansett. The Black, Slate, Narragansett, Buff, and White varieties were all admitted to the American Poultry Association’s *Standard of Perfection* in the 1870s. In the *Standard*, all turkeys are considered to be one breed with separate varieties, however today some experts consider certain varieties to be distinct genetic populations analogous to the term *breed*.

Earlier in the 1830s, the Point Judith Bronze turkey was developed from the Norfolk Black and the Eastern wild turkey. First available in Rhode Island, also home to the Narragansett turkey, these birds spread to surrounding areas and were developed into larger, heavier turkeys. The Bronze was admitted to the *Standard of Perfection* in the 1870s. In Britain, the Cambridge Bronze was developed with Norfolk Black stock and later increased in size with the crossing of Bronze turkeys from the United States.

The original White Holland turkey may have arrived in America with Dutch colonists, may have developed separately from white sports in Bronze turkeys, or perhaps developed from a combination of these events. White turkeys in Europe probably derived from white birds and sports found in the Spanish imports from Mexico. In Britain, white turkeys were also called White Holland, British Holland, or White Austrian. The larger and more productive, hybridized White Holland was admitted to the American *Standard* in 1874.

By the 1880s, the Bronze was favored by farmers raising turkeys for market, although the White Holland was growing in popularity. Farmers in southern New England raised the Narragansett in large numbers, and in Kentucky, the Bourbon Red enjoyed similar popularity. The Black also remained popular with smaller farm flocks. Many farm turkeys were called “mongrels” or “commons” and did not reach the larger size of the recognized varieties. Farmers often purchased a larger male, known as a “gobbler,” to increase the size of their flocks. Turkey consumption was largely seasonal, with production geared toward the holiday period of late November through early January (fig. 72).

Early in the twentieth century, breeders in Oregon and other western states began to concentrate on increasing the meat production of the turkey. An Englishman, Jesse Throssel, was also breeding for larger size and broader breasts. When he moved to Canada with his birds, they became available for crossing on the improved American turkeys. These larger, heavily muscled turkeys rapidly gained in popularity. By 1947, there was a definite distinction between the Standard

[To view this image, refer to the print version of this title.]

Fig. 72 A lovely engraving of the unimproved Bronze turkey in the nineteenth century. Courtesy of the IAB and Hans Peter Jorgensen.

Bronze and the new Broad Breasted Bronze. Some breeders began to use artificial insemination to overcome the breeding problems in the Broad Breasted Bronze, or BBB, flocks. Eventually it would become necessary for all commercial turkeys to be mated through AI, as their large breast size made natural mating largely impossible.

About the same time, breeders at the USDA research station in Beltsville, Maryland, began developing a smaller, meaty turkey from various stocks. Over time, consumers rejected the dark spots of pigment left on the plucked skin by the colored feathers of the Broad Breasted Bronze in favor of white turkeys, and the Beltsville Small Whites became the dominant turkey raised for the home market in North America. However, Americans, in contrast to other nationalities, also came to prefer white meat twice as much as dark. Breeders began to develop a larger white bird using White Holland and Broad Breasted Bronze turkeys. The Large White or Broad Breasted White and its various commercial strains were a tremendous success. In Britain, a larger Holland White or British Holland was

*poult* A young turkey  
*broiler* A turkey marketed at 15 to 16 weeks of age  
*roaster* A turkey marketed at 6 months of age  
*tom, turkey cock, stag* An adult male turkey

similarly improved and standardized as the British or Commercial White.

By 1957, poultry breeder George Nicholas of California was commercially marketing his white turkeys. At that time the market was still fairly divided between Bronze and White turkeys. Today, however, Broad Breasted White turkeys almost completely dominate the commercial markets and 90 percent of the turkeys sold around the world are based on a few thousand turkeys in the foundation flocks maintained by just three multinational corporations: Nicholas Turkey Breeding Farms of California, owned by Booker PLC of London; British United Turkeys, owned by Hubard ISA LLC; and Hybrid Turkeys Canada. British United Turkeys alone now controls about half of the world market. These industrial turkey stocks are based on three- or four-way crosses. Turkeys from these breeders are marketed by ten major companies. In the United States, North Carolina is the top producer of turkeys, followed by Minnesota, Arkansas, Virginia, and California.

## Husbandry

The success of commercial breeders and growers has been phenomenal, and they produce an economical addition to the human diet. Three hundred million turkeys, varying in market weights from 10 to 22 pounds, are produced each year in the United States alone. Turkeys are also available in weights up to 36 pounds. Americans now eat an average of 18.5 pounds of turkey each year, and this choice is increasing. Canadians and the British are also large consumers of turkey.

The production of all these turkeys is a large-scale, specialized business. The major companies produce eggs from their carefully protected breeding stocks. One line of egg-layers is crossed with another line of meat producers to create the market stock. These eggs are sent on to huge hatcheries, which sell the day-old poults to turkey raisers. The turkey strains are developed and marketed for specific production characteristics. "Broilers," or smaller white turkeys, are raised for home roasting, generally for special meals. At least 80 percent of the turkeys are larger in size and sold directly to processors for convenience products.

Turkeys are raised in large, long barns housing several thousand birds. Large birds require twenty-four to twenty-eight weeks to grow to market weight, while the small turkeys are ready in eighteen to twenty-two weeks. Fast-growing, heavy turkeys require a high-quality diet of grain and supplements for good health. Close confinement also requires careful attention to disease and climate control. Some raisers clip the feathers on one wing to prevent birds from flying, and the two inside toes may be clipped to prevent birds from scratching each other. Turkeys are often debeaked to prevent pecking or cannibalism, and the snood is clipped off the day-old poults destined for the market, although this is not recommended for breeding stock.

The eleven commercial breeding or foundation flocks, totaling 7,000 to 10,000 birds, are strictly guarded against disease. Visitors and their cars are sanitized before entering the farms. In addition to an outbreak of a known avian disease, a new mutant virus or a mistake in breeding plans could devastate the population. The possibility also exists that the three major strains of commercial turkeys are very inbred, especially suffering from a lack of genetic diversity in disease resistance. Another problem, called "knockdown syndrome," is attributed to various deficiencies, toxicities, and muscular or skeletal problems. These turkeys exhibit leg weakness or become "downer" birds, unable to rise or move. The commercial strains are also highly selected for survival in close confinement systems. The genetic diversity of the modern commercial turkey is extremely narrow.

The rapid increase in the size of the modern white turkey has made it so heavy that its legs cannot support it. In fact, the weight of breeder turkeys has almost doubled since the 1960s. "Downer" turkeys are a major problem that the industry is attempting to remedy through breeding increased leg strength into turkeys. In addition, heavier birds often lay fewer eggs or have an increased tendency to lay them internally. They also produce defective eggs: multiyolked, irregularly shaped, or with poor shell quality. The lower production of eggs combined with the higher costs of feeding the bigger birds has reduced the income of turkey broodstock raisers.

Meanwhile, the old varieties and strains of turkeys have nearly disappeared. Many agricultural schools and major universities once kept research flocks, but today, only the University of Wisconsin and North Carolina State continue to do so. Because there is so little demand, smaller or seasonal hatcheries have also abandoned the turkey. Only eight hatcheries raise their own breeding flocks, and they keep only a few of the historical varieties. The danger in this trend is the lack of a sufficient gene pool to meet the challenges of the future either in disease resistance or to meet the demand for a different product. In addition to the potentially valuable traits the old varieties possess, there is some indication that certain color genes are linked to other traits such as broodiness.

The old varieties are called variously Historical, Heritage, or Standard turkeys. Most of these turkeys are extremely close to extinction. Fortunately, several groups and individuals are working hard to conserve and promote these varieties. The ALBC has conducted a census of varieties and released the most comprehensive current study of the turkey, *Birds of a Feather; Saving Rare Turkeys from Extinction* (Christman and Hawes 1999). The ALBC is emphasizing the conservation of many varieties, including the Beltsville Small White, Black, Bourbon Red, Bronze, Buff, Narragansett, Royal Palm, Slate, White Holland, and Sweetgrass strain of Wishard Bronze turkeys. In 1998, 1999, and 2000, Paula Johnson of the Society for the Preservation of Poultry Antiquities (SPPA) conducted com-

prehensive turkey censuses and reports, collecting information on both the Wild turkey and all known surviving varieties and strains in both Canada and the United States. These studies are extremely valuable and timely.

In early 1999, the Standard Turkey Preservation Association, headquartered in Ponoka, Alberta, was organized to support and encourage both breeders and keepers of traditional turkeys. Also in 1999, the All-American Turkey Growers Association, originally organized in the mid-1920s, was revitalized to interact with the APA on behalf of turkey breeders and exhibitors. Norm Kardosh, Frank Reese, Jr., and Danny Williams, all of Kansas, have spearheaded this renewed effort.

In Britain, the RBST has established approved breeding centers for several varieties of turkeys including the Bronze, Slate, Bourbon Red, Buff, Pied, and Nebraskan Spotted. The Spotted appeared as a mutation in a flock of Broad Breasted Bronze in 1947 (pl. 153). The Rare Poultry Society serves as the breed club for turkeys. In Canada, the RBC promotes the Heritage Poultry Breeds project, which includes turkeys.

The Ocellated and criollo turkeys of Mexico and Central America also need study and conservation. These hardy unimproved types, in addition to their possible genetic value, may hold great potential as seedstock for developing nations where expensive commercial production is not practical. Only about 30 Ocellated turkeys are currently being kept in private collections in the United States.

Small farm flocks that sell directly to consumers or local stores are now only a tiny portion of the turkey market. Although turkey raisers often use confinement housing for turkeys, in fact turkeys do well outdoors on range conditions with acceptable weather and predator control. Turkeys hold excellent potential in sustainable agriculture both as active foragers and as natural pest controllers. They will roam further than other farmyard poultry. In naturally mating varieties, one tom will serve the needs of a dozen hens. The hens should go broody and successfully raise their poults. Turkeys should possess large frames and deep bodies. The prominence of

the breast varies with the variety, but the legs should be substantial and straight.

In spite of their appearance and size, turkeys can be as friendly as chickens and can be herded by humans. Their reputation for stupidity may be based on the commercial stock, for turkeys are naturally very curious and alert. Turkeys are also stately, even majestic in appearance. Newcomers to turkey keeping will be surprised that their birds will enjoy roosting on the low roofs of outbuildings, even in cold or inclement weather.

Farmers used to keep small flocks of turkeys as a source of supplementary income, but fewer people are raising turkeys today. Grocery store prices for turkey are very low, making it hard for the small producer to realize a profit. However, there are markets for fresh, range, or organic turkeys, and the unimproved varieties are especially suited for this purpose.

Although new breeders and keepers of turkeys are desperately needed, newcomers are urged to begin with the less endangered varieties because the numbers of the rarest turkeys are now so extremely low that they require experienced, dedicated caretakers. Keepers of varieties with larger numbers should not abandon them in favor of more critically rare varieties, because all of these turkey varieties are certainly endangered. The conservation of all the heritage turkey varieties is extremely important and may ultimately benefit the turkey industry as well as preserve the only domestic species native to the New World.

## Breed Profiles

### *Black*

Originally known as the Norfolk Black or Black Norfolk in Britain, the Black turkey is one of the oldest European turkey varieties, originally derived from the domestic turkey encountered by the Spanish in Central America, which was descended from the Gould's turkey. The Gould's plumage has a glossy green shine with white coloring on the tail feather tips.

In Britain, the Norfolk Black was developed and standardized, primarily in East Anglia. The Black was

raised in large numbers for the meat markets. The birds in these flocks were not uniformly black in color, often still displaying the white feather tips off their ancestors. Eventually the British Poultry Standard described birds with no white in their feathers, little gloss to their dense, black feathers, and black shanks and toes. Males weigh up to 25 pounds and females 13 to 15 pounds. The Norfolk Black was traditionally a small, plump bird but has now been crossed with the larger commercial Bronze to increase its size. The RBST has located some smaller birds and selected others of the traditional or historic type, which it hopes to conserve. The contemporary Norfolk Black birds found in Britain today are not directly linked to the Blacks found today in North America.

The Norfolk Black was brought to the New World, where it remained a favorite variety and commercially important in the eastern states, especially Maryland and Virginia, until the development of the Broad Breasted Bronze. Blacks were known for their docile nature and rapid growth. They were also crossed with the Eastern wild turkey, which gave rise to the Narragansett, Slate, and Bronze varieties.

The Black was accepted by the *APA Standard of Perfection* in 1874. It was still a small bird, with the minimum for toms at 20 pounds and for hens at 12 pounds. The plumage was described as a lustrous, metallic, greenish black. The beak, shanks, and toes were described as slaty black. Weights crept up as Blacks were crossed with Bronze turkeys to increase market size. In 1910, the *Standard* called for toms of 27 pounds and hens of 18 pounds. Thirty-three pounds is now acceptable for toms, and the *Standard* also describes the shanks and toes as pink. In reality, most Black turkeys still have black shanks and toes. White or brown coloring on the feathers is undesirable and considered a disqualification in the *Standard*, although today some Black strains have white in their feathers.

The Black remains an excellent family flock turkey due to its smaller size and calm disposition. The hens tend to be less broody than other varieties and are good egg producers. A small flock is still kept for research at North Carolina State University, and another flock can be viewed at Colonial Williamsburg.

The critically endangered Black is raised commercially by only two or three hatcheries and perhaps a dozen private breeders, and the hen population totals no more than 192 hens and 53 males. Poultry catalogs often describe Black turkeys as Black Spanish, but there is no reasonable link between the Black and the very old Spanish stock. The official name in the *Standard* has always been the Black.



Critical

### *Narragansett (pl. 150)*

The Narragansett type originated in Rhode Island and Connecticut, when the Norfolk Blacks imported by the colonists were crossed with native Eastern wild turkeys. The farms in the area were especially favorable for raising poultry, which became an important commercial crop early in the nineteenth century. Decades before the name Narragansett was officially used, this type of turkey was well known and described. Larger in size than common farm turkeys, the hardy Narragansett turkeys were also selected for good production values. They were raised outdoors in large flocks where they rustled up a major portion of their own food foraging for insects. Young turkeys dressed out for market at 14 pounds, whereas six-month-old toms were marketed at 22 to 28 pounds. Weights have increased since the Narragansett was admitted to the *Standard of Perfection* in 1874. Today adult toms weigh 33 pounds and hens weigh 18 pounds.

The Narragansett was renowned for its beauty. The pattern is the result of a single recessive sex-linked gene that replaces the copper bronze coloring with a steel gray. The tail and covert feathers are penciled light tan ending with a broad band of black with gray to white edgings. The primary and secondary wing feathers are barred with black and white, and when the wing is folded, the coverts form a wide gray to white band. The gray coloring seems to vary in different strains. The black plumage is a rich metallic color. The beak is light horn, and the shanks and toes are deep salmon.

The Narragansett remained a popular market bird in the region until the early twentieth century. Farmers

throughout New England, the mid-Atlantic region, and the Midwest adopted these turkeys. Narragansett flocks performed very well in university tests, but as with all non-broad-breasted varieties, they steadily lost commercial popularity. They are now extremely rare, with some 66 hens and 28 toms found among thirteen breeders.

This truly American historical variety is still an outstanding turkey, with excellent production in both meat and eggs. Breeders report that Narragansetts are very docile, are easy to herd, and stay closer to home than many other varieties. The hens are very good mothers who will hatch out other poultry chicks as well. They have always been superb hardy foragers and would make an excellent choice in sustainable farm situations. The lovely Narragansett deserves to find more admirers.



Critical

### *Bronze (pl. 151)*

As the European domesticated turkeys interbred with the larger Eastern wild turkeys in the colonial era, the settlers were pleased with the increased size and health of these hybrids. They encouraged and refined their new domestic turkey stocks. Bronze-type turkeys were long present in the colonies, although they were not officially called the Bronze until the 1830s. At that time, the farmers of the Point Judith area of Rhode Island used this name to describe their stock, which no doubt also included the local Narragansett type.

The markings of the Bronze turkey resemble those of the wild Eastern turkey, although the white color in the tail is believed to have come from the original Mexican stock. Part of the Bronze's popularity came from its similarity to the attractive wild bird. The Bronze was known as a docile bird that was easier to handle than the European whites.

The head and throat wattles of the Bronze are a rich red that can change to a bluish white. The neck feathers are a light metallic bronze, and the beard is black. The body, wings, and tail combine beautiful barring with brown, black, and rich, brilliant, shimmer-

ing green-bronze. The beak is light at the tip to dark at the base. The shanks and toes are very dark in young birds but become pinkish in adults. The color of the female is similar to the male with edgings of white on the feathers. Black or white birds also occur as sports in Bronze flocks.

In New York in the 1850s, the Rev. R. H. Avery began the development of a larger turkey using both the Narragansett and Bronze. The work of breeders to develop this Mammoth Bronze continued into the early twentieth century. The Bronze itself was admitted into the *Standard of Perfection* in 1871, but increases in size continued. By the 1880s, the *Standard* Bronze turkey was already described as the largest and most handsome of the turkey varieties. At a market age of twenty-four weeks, toms weighed 18 to 22 pounds and hens weighed from 10 to 14 pounds. Mature gobblers weighed from 30 to 40 pounds. The Bronze became the most popular market bird in the United States.

In Britain, the Cambridge Bronze was developed with Norfolk Black stock but increased in size with crossings of Bronze turkeys from the United States. Broad-breasted English Bronze turkeys would make their way back to the United States, where they were used in the development of the Broad Breasted Bronze. When Englishman Jesse Throssel moved to Canada and imported his own larger birds in 1927, they were crossed on the improving American Bronze. Breeders in the Northwest were responsible for much of this development.

The Broad Breasted Bronze, or BBB, did not appear commercially until 1939. Just one year earlier, *Turkey World* magazine reported that the Standard Bronze turkey possessed almost 64 percent of the market. Over the next ten years, the shorter-legged, heavily muscled BBB gained in popularity until it dominated the industry. There were drawbacks to the widespread adoption of the heavily muscled BBB as a small farm flock bird, however, including difficulty in raising successful hatchings and the necessity of artificial insemination. Because poultry processors favored the lighter-colored pinfeathers of the white turkeys, the BBB was eventually superseded by the commercial Large White birds and today itself is rare. Bronzes are still raised by a few

hatcheries that supply poults to family flocks. Unfortunately, they have at times been crossed with white birds for this home market. The ALBC estimates that about 7,000 BBB hens are held by seasonal hatcheries.

In Canada, Roy Crawford of the University of Saskatchewan preserved the Primitive Broad-Breasted or Ridley Bronze for many years. This strain was originally sold through seasonal hatcheries but not for industrial production. There is now a small satellite flock of these turkeys in Canada, preserved through the efforts of the RBC's Heritage Hatchery Network.

A few breeders kept strains of the original, unimproved, or historical Standard Bronze turkey, including the Kardosh strain raised by Bob Reese, Jr., for the past fifty years and the Pawlet Vermont strain raised by Michael Johnson for thirty years. By 1945, Charles R. Wishard was raising naturally mating Bronze turkeys for meat production without vaccinations, growth hormones, or subtherapeutic medications. These free-range birds maintained their hardiness and self-sufficiency. Wishard's practices predated the concepts of organic, low-input, and rotational grazing, but that is exactly what they were. Wish Poultry still maintains its hardy Bronze turkeys or Wishard strain, selling about 3,000 birds yearly direct to consumers. They also remain one of the few sources for a production strain of Bronze turkey, but they have not been selected in terms of the *Standard* for exhibition purposes.

The ALBC has arranged for the conservation of two flocks of Wishard and Oregon State University research birds, formerly owned by Sweet Grass Farms. These birds have demonstrated their success in semi-intensive range production. A light-colored Sweetgrass strain is also being studied for its ability to produce a cleaner-appearing carcass.

Today, the *Standard* description of the Bronze is a curious mixture of historical Standard Bronze and the commercial Broad Breasted Bronze. The ALBC and SPPA have both suggested that a separation of the two varieties, as is done in Britain, would be very helpful to conservation efforts. Both the ALBC and the SPPA estimate that fewer than 300 Bronze females are being kept for breeding purposes. Approximately 70 percent of these birds are from the Wishard strain.

The Bronze turkey is the bird that Americans think of as their Thanksgiving symbol, but it is critically endangered. It would be wonderful if exhibition flocks were located at more historical and farm parks so that Americans could become more familiar with their traditional bird.



Bronze—Critical Broad Breasted Bronze—  
Watch

### *White Holland*

White turkeys occur as sports in wild and domestic turkey flocks. The Aztecs raised white turkeys, and the Spanish took white birds to Europe. Whites spread throughout Europe and were probably reimported to the New World with the European colonists. Imported European white turkeys were thrown into the American melting pot, where they were crossed with both wild and domestic turkey varieties. White-colored turkeys were admitted to the *Standard of Perfection* in 1874 as the White Holland, but any link to Dutch turkeys was probably remote at best.

The original White Holland toms weighed 26 pounds and hens 16 pounds. The feather color was white throughout, with a pink or flesh-colored beak and pink to white shanks and toes. The beard of the male was deep black. The eyes may be brown or blue-green, the importance of which is debated. The turkeys were of the same type as other historic varieties—long legged, active foragers, and good breeders. White Hollands were less popular than the Bronze, but they were well known.

During the 1950s, White Hollands were deliberately crossed with the Broad Breasted Bronze to develop Broad Breasted or Large Whites for commercial production. In a short time, the Large White replaced the BBB as the commercial bird, and it is now raised by the millions.

Unfortunately, the *Standard* has combined the Large or Broad Breasted White with the historic White Holland, much as it did with the Bronze and the Broad Breasted Bronze. The *Standard* now calls for weights of 36 pounds for toms, and the exhibited birds are usually of the short-legged, broad-breasted type.

The historical White Holland, which was a very practical bird, is now critically endangered. The SPPA located 45 breeding birds in 1998 but in 1999 found only 19 hens and 9 toms with five breeders. The ALBC would like to see studies of these birds to help document their distinctiveness and performance.



Study

### *Buff*

Buff turkeys are a lovely light to reddish color on the body. Wing feathers are white to light buff, and the tail feathers are white shading to buff near the ends. The head and throat wattle are rich red shading to bluish white. The beak, shanks, and toes are also bluish white or flesh-colored. The Buff is a very old variety, also admitted to the *Standard of Perfection* in the 1870s. Weights for toms were set at 27 pounds and for hens at 18 pounds. The white downy undercolor was an advantage at market.

The Buff was most common in the mid-Atlantic states. Historically, Buff turkeys from Pennsylvania were used in the creation of the Bourbon Red in Kentucky, but as the Bourbon Red became more successful the Buff lost popularity. The Buff was not a particularly successful exhibition bird either, because it was hard to achieve the proper coloration. By 1915 the Buff was so rare that it was removed from the *Standard*.

The Buff experienced a revival in the mid-twentieth century, when it was bred at the New Jersey Agricultural Experiment Station, where researchers were working on a medium- to small-sized market turkey. It was renamed the Jersey Buff and experienced considerable popularity, primarily in New Jersey and California. It was not readmitted to the *Standard*, and interest declined with the development of the Large White.

The Buff is now extremely rare. The SPPA was able to locate only 68 hens and 22 toms with six breeders in 1999. The ALBC is also concerned that this small number is not genetically distinct and consistent enough for the Buff still to be regarded as a true variety. There is a need for research to establish the connection be-

tween the historical Buff and the remaining contemporary population, but the Buff population needs to be preserved and studied. The Buff or British Jersey is also the object of turkey conservation by the RBST in Britain.



Study

### *Bourbon Red (pl. 152)*

The attractive Bourbon Red was developed primarily from Buff turkeys with infusions of Bronze and White Holland. Most sources credit Mr. J. F. Barbee for perfecting this variety in Bourbon County, Kentucky, around 1890. Some early authorities reported that a native type called the Wild Yellow Turkey was bred up with outside crosses, but it is generally believed that darker Buff turkeys known as Tuscarora or Tusawara Reds from Pennsylvania were taken into Ohio and Kentucky and there were used as a foundation stock. Although the variety was first called the Bourbon Butter-nut or, variously, the Kentucky Red, Barbee was more successful at marketing these birds later as Bourbon Reds. The Bourbon Red was an especially attractive turkey, an active forager, and a good market bird, with mature toms weighing 30 pounds. The Bourbon Red was admitted to the *Standard of Perfection* in 1909. Tom size eventually increased to 33 pounds.

This striking variety of turkey is brownish red in color, officially a rich dark chestnut mahogany, with white primary, secondary, and main tail feathers. The beak is light at the tip to dark at the base. The shanks and toes are reddish pink. The original color pattern was very difficult to achieve with consistency, and eventually the *Standard* was changed to allow a buff-colored bar in the tail feathers and black edging on the breast, shoulder, and back feathers. Breeders must also pay attention to maintaining the red coloring so that it does not fade to buff.

The Bourbon Red was a commercial success throughout the 1930s and 1940s, especially as a farm flock turkey mainly found in the Midwest. This variety also has light-colored pinfeathers, which leaves a nice,

clean-appearing carcass. In spite of the drastic drop in numbers of historical turkeys with the adoption of the commercial Large Whites, the Bourbon Red has remained a relatively popular variety, no doubt because of its attractiveness. In 1999, the SPPA was able to locate 834 hens and 158 toms, although this numbers still marks them as an endangered variety. The Bourbon Red is still available through commercial hatcheries as well.

The Bourbon Red, also known as the Red or Victorian Buff, is also found in Britain and is the focus of turkey conservation by the RBST.



### *Slate*

Slate or Blue Slate turkeys are also an old variety, admitted to the *Standard of Perfection* in 1874. They may have been developed by crossings of the White Holland and Black or perhaps from the Black itself as a mutation. The Slate was about the same size and weight as the Black with toms weighing as much as 27 pounds. The Slate never achieved commercial popularity and tended to be an unusual variety often raised for exhibition.

There are two different genetic breedings that create the slate coloring, each slightly different in appearance. It remains difficult to breed this variety true to the *Standard*. The slate color, sometimes called Splash, is an ashy blue sometimes dotted with black. The Blue is a solid grayish blue. Feathers of other colors are a disqualification. The *Standard* originally called for the shanks and toes to be colored light to dark blue, while the beak was horn colored or light to dark blue. Today the beak is generally horn colored, and the shanks and toes are pink. Tom size has increased to 33 pounds, with mature hens at 18 pounds.

Many observers had regarded this variety as practically extinct, but the SPPA found about 108 hens and 30 toms with twelve breeders in 1999. The Slate strains in Britain were generally used for exhibition only.



### *Royal Palm*

The Royal Palm is a beautiful, smaller turkey that has retained popularity with exhibitors and small flock owners. It is also a more recent variety, developed by Enoch Carson in the 1920s and admitted to the *Standard of Perfection* in 1977. Although it had a clean carcass and a convenient size, the Royal Palm came upon the scene too late to have a commercial chance against the Large White breeds. Toms reach sizes of 22 pounds and hens 12 pounds.

Carson raised Blacks, Bronzes, Narragansetts, and Wild turkeys in a mixed flock in Florida. The Palm pattern appeared in a male sport and was carefully cultivated until it bred true. The color pattern is remarkably lovely and striking. The Royal Palm has white feathers with black edgings, gradually increasing in proportion until the saddle appears black. The breast is also white shading into black. The white tail has a broad black band. The coverts and wings are white with black bands and edgings. The shanks and toes are pink. The Palm pattern is also seen in Blue and Red colors.

The Palm pattern was also developed in Europe in the eighteenth century. In Britain, the variety is variously called the Royal Palm, Pied, Black and White, Black-Laced White, or Crollwitzer, its German name. The RBST has included the variety in its conservation efforts. The European and American varieties are unrelated.

The White Palm's ornamental beauty has earned it continued interest. This is a nice-sized family bird that remains a very active forager useful for pest control. The SPPA has located almost 800 Royal Palms, but it remains an endangered breed nonetheless.



### *Beltsville Small White*

In the 1930s, at the USDA research station in Beltsville, Maryland, breeders worked for seven years to develop a small, meaty turkey for the smaller, modern American family's needs. Crosses were made between many varieties, including four strains of Wild turkeys, the

Standard Bronze, the Broad Breasted Bronze, the Narragansett, the Black, a Scottish-bred White Austrian, the White Holland, and a Charlevoix Bronze, which was a small-type Canadian strain. In 1941, the USDA released the Beltsville Small White to the public. Producers accepted the Beltsville Small White, and the breed reached its greatest use in the mid-1950s, when it was the most popular white turkey and was raised by the millions. The APA accepted the Beltsville in 1951. Because its small size made it less profitable for the commercial producer, however, the Large White or Broad Breasted White turkey quickly replaced it.

The Beltsville Small White is a naturally mating turkey well suited to small producers producing birds for family use. Mature toms weigh 21 to 23 pounds and mature hens 12 to 13 pounds. Birds were formerly sent to market at 9 to 15 pounds. This variety is pure white with a horn-colored beak, a black beard, brown eyes, and pink or white shanks and toes.

The SPPA has only located two flocks of Beltsville Small Whites. The American flock is owned by the federal government, which has kept it in a biologically controlled building since 1961. The other flock is owned by the University of Guelph. In 2000, Gerald Donnelly of Ontario was able to create the Arkell Small White Turkey Conservancy with birds from this group, which are being made available only to experienced turkey breeders. The ALBC moved this variety to Critical on the Priority List in 2000 because some stock has been identified and made available.

The turkeys listed in hatchery catalogs as Beltsville White are generally bred from a University of Wisconsin flock of 100 birds known as White Midgets. White Midgets, which were a little smaller and less broad-breasted than the Beltsville Small White, were bred by J. Robert Smyth, Jr., at the University of Massachusetts in the 1950s. These birds have occasionally been shown as Beltsville Small Whites at poultry shows because the APA does not recognize the White Midget. The SPPA could locate only 58 hens and 26 toms in 1999, a population drop of almost half from 1998. The White Midget is also critically endangered.



Critical

## Ducks

### Natural History

Ducks, geese, and swans are members of the family Anatidae, the dominant family in the order Anseriformes, which dates back more than eighty million years. Nearly 150 species of ducks, geese, and swans are found worldwide. The word *duck* is not a precise classification but rather a commonly used name for the smaller members of this order. Ducks generally have shorter legs and necks than geese and swans, and their bill is usually flatter. Sometimes it can be difficult to decide whether a particular bird is classified as a duck or a goose. Whereas the larger geese and swans can be more aggressively protective, ducks are generally shy and reticent. There are five subfamilies of ducks: surface-feeders, tree ducks, bay ducks, sea ducks, and stiff-tailed ducks.

Most ducks are powerful swimmers and have strong wings for their long migrations. The duck's legs are set apart and placed far back on its boatlike body for an advantage in swimming. On the land, however, ducks are awkward walkers, waddling on their webbed feet. Ducks are excellent flyers, showing both agility and considerable speed.

Duck bills are broad and flat. Little teethlike serrations or horny plates on the inner edge of each jaw allow the duck to strain food from the water. Searching underwater, the duck sieves out plant and animal matter. Ninety percent of most ducks' food comes from plants, including all parts of aquatic weeds, algae, and a little grass. Ducks also catch and consume small fish, slugs, eels, leeches, worms, snails, crustaceans, and insects and their larva.

The duck's dense feather coat is waterproofed by oil from a gland near the tail and weatherproofed against the cold by its marvelous down, which is an insulator superior to any man-made material. The larger male, or drake, wears the more colorful coat during breeding season and engages in mating displays. After the breeding season, ducks molt and cannot fly until their wing quills regrow.

Ducks will gather in groups, employing both greet-

ing and threatening calls. Migratory ducks coordinate their take-offs by signals and integrate their flight patterns. Although wild ducks form mated pairs, domestic drakes will mate with many females, who are not particularly broody over their eggs. Ducks can live at least eight years and as long as twenty.

Surface-feeding, or dabbling, duck species usually live in marshes or along shallow ponds or lakes and slow-moving streams. They are agile flyers who feed mainly on vegetation found in shallow waters, although they also eat insects, small fish, and mollusks. They lay their eggs on the ground in nests lined with plants and their own warm down. The ducklings are covered with down and within a few hours of birth are able to follow their parents out of the nest and begin to feed for themselves. Because they are so precocious, the newly hatched ducklings possess a powerful ability to imprint on the first thing they see and follow it. Female dabbling ducks make the universal loud quacking sounds, whereas males usually quack more softly and also coo, grunt, or whistle. The ubiquitous Mallard (*Anas platyrhynchos*) belongs to this subfamily of more than 40 species.

## Domestication

Even though ducks are easily kept in captivity, only two species have been bred and altered by human domestication. The Mallard is found across temperate Europe, Asia, and North America. The drake has an iridescent green head with a white neck band. The back is grayish brown, the underparts are grayish white, and the breast is chestnut colored. The speculum, or colored wing patch, is purple. A few of the drake's tail feathers curl upward. In contrast, the plain female Mallard is a mottled brown, which provides camouflage when she is nesting. The Mallard is the ancestor of most domestic ducks, and it will easily breed with them.

The other, very different domestic duck is the Muscovy (*Cairina moschata*), which is found from Mexico south to Peru, Uruguay, and Brazil. The Muscovy is a perching duck that nests in tree holes, forages on grass, and is distinguished by its bare, wattled red head.

*drake* An adult male duck

*duck* An adult female duck, also called a *hen*

*duckling* A baby duck

Muscovies were domesticated in Central and South America and were already present in white and color patterns other than the natural dark coloration when the Spanish eventually encountered them in Peru, indicating that they had been selected and bred for some time. The Muscovy was taken back to Europe by 1550. It has become a very popular domestic fowl in France.

The domesticated Muscovy is a large, heavy duck producing a leaner meat than common domestic ducks. The Muscovy female can also raise several broods of eggs each year and retains strong brooding and mothering traits. The Muscovy is also used in Taiwan and Europe to breed mulards, sterile hybrid crosses used for meat production. Pekin ducks—large, white domesticated ducks of Chinese origin—are often used in these crosses. Mulards fathered by a Pekin drake are called hinnies, while those from a Pekin female are called mules. Artificial insemination has increased fertility in this cross from 20 or 30 percent to 80 percent.

Prehistoric hunters captured ducks more easily during their molting period of flightlessness. Because of imprinting, ducks were readily domesticated. Clipping their flight feathers would have prevented flying, although many domestic ducks have lost the ability to fly any significant distance. Ducks grow rapidly and efficiently in the first few weeks, making them an excellent source of meat protein. Ducks are also adaptable to a range of climatic conditions from hot and humid to cold. Besides meat, ducks provide both eggs and down. Ducks can forage for themselves during the day and be cooped at night as protection against predators. Ducks are easily herded, even by children, along riverbanks or in fields to forage.

Many experts believe that Mallards were domesticated separately in China and the ancient Near East around 1000 B.C. The Egyptians also kept several wild species of duck in captivity, including the Northern

*duck* From Middle English *duk, doke*, from Old English *duce*, related to *duken*, to dive  
*drake* Middle English  
*canard* French for duck

Pintail (*Anas acuta*), the Common teal (*Anas crecca*), and the Eurasian Wigeon (*Anas penelope*). The early Germanic peoples began keeping ducks in the Iron Age, and duck husbandry later spread into the Mediterranean regions of Europe. Selection for white color began in the Middle Ages after sports appeared in the native coloration. In China, the white Pekin duck has been bred for many centuries.

Prehistoric Britons hunted wild ducks, and their eggs were eaten in spring. Duck down and feathers were gathered from nests or from slaughtered birds for use in padded clothing, pillows, and comforters. Although a wild duck was an unusual addition to the diet of the poor, the wealthy ate great numbers of fowl of all types, from the very small to the very large. Fowl were usually roasted, sometimes stuffed, and usually served with special sauces. The duck yields flavorful dark meat that remains moist and tasty even when the bird is old. Geese and chickens were the more common birds of the farmyard, although by the eighteenth century, ducks were being raised on a large scale in Aylesbury, Buckinghamshire, for the London market. Ducks were often slowly walked to market over long distances, and dogs were often used to herd them.

With the exception of Aylesbury and, later, Long Island, New York, ducks were generally raised on a small scale on farms in both Britain and the North American colonies. Even in the nineteenth century, ducks were a valuable product only if the prime young duck, such as Long Island duckling, could be sold in city markets to the upper classes. Large duck eggs also brought a slightly higher price just before Easter; otherwise, they held no special value. Many people felt that the taste of duck eggs was stronger than the flavor of chicken eggs, so they were used chiefly in baking (fig. 73).

Many breeds and varieties of ducks have been developed. The American Poultry Association recognizes fifteen breeds of ducks in the *Standard of Perfection*. In Britain, the *British Poultry Standards* recognizes heavy, light, and bantam ducks based on size and weight. The Domestic Waterfowl Club of Great Britain was organized in 1996 to assist breeders with the many new imports and varieties that have been appearing in Britain. In 1999, the British Waterfowl Association published its own standards for both domestic and wild waterfowl. Although some ducks have remained dual-purpose, fanciers and farmers have created specialized meat ducks, egg-layers, and small ornamental ducks.

In North America, the most popular domesticated duck is the creamy white Pekin, introduced from China in 1873. Almost all commercial production uses strains of this variety, producing more than 22 million ducks annually. Duck is generally sold whole and frozen. For many years, Long Island duck farms raised millions of ducks for the restaurant and home market, but today duck raising is concentrated in Indiana and Wisconsin. Although exhibitors raise ducks for show, they are mainly interested in the more competitive breeds, not the preservation of utilitarian characteristics. Bantam and the smaller, cute call ducks are growing in popularity because they can be kept in smaller spaces. Call ducks were first bred as decoys to attract wild ducks to hunters, but they are now available in many color varieties. Mallards are also raised in captivity for stocking private hunting reserves.

## Husbandry

Compared with the chicken and turkey industry, the duck business is quite small. Duck remains an important sector of the poultry business in Britain, although they tend to be consumed mainly at Christmas. Duck is not a popular meat in North America, in part due to its relatively high fat content and cost, although certain ethnic groups favor duck. Muscovy ducks, their mulard offspring, and some of the rare breeds are leaner and could possibly be marketed more

successfully. Organic or range-grown ducks are easily produced for direct sales. Unlike the Netherlands or other European countries, there is only an ethnic market for duck eggs in North America. Balute, or embryonated eggs, are also a specialty or ethnic market product. Feathers and down, though still valued, have largely been replaced by cheaper synthetic materials.

Ducks possess many advantages for the farmer. They are unquestionably more efficient to feed than chickens or turkeys, and ducklings are certainly harder than chicks or turkey poults. Ducklings are efficient growers, able to forage for themselves or consume food

waste that other fowl cannot eat. Ducks grow faster than commercial broiler chickens and are ready for market in just six to seven weeks. Ducks can be used to control such pests as mosquito and beetle larvae, snails, and slugs. They are also used to clear weeds and algae from waterways and ponds. In addition, as they forage, ducks fertilize the soil. The feathers from one duck weigh approximately one pound and can provide additional farm income.

Ducks have only a few limitations. Layers should be cooped in the morning until they produce their eggs, for they are apt to lay them anywhere, even in water.

Fig. 73 The Rouen enjoyed some popularity as a producer of hybrid market ducks in the United States. Courtesy of the IAB and Hans Peter Jorgensen.

[To view this image, refer to the print version of this title.]

Muscovy ducks can be used to brood duck eggs if necessary. If ducks are kept in unsanitary, overcrowded conditions or fed moldy feed, they are susceptible to disease. Ducks do require higher levels of niacin, which is generally found in fresh greens, than other poultry.

Conservators of rare ducks and geese face several obstacles. Zoning and health restrictions are making it harder to keep poultry of any sort in urban and suburban areas. In addition, the number of people keeping and raising many of the rare ducks is very small, and the fancy is not especially popular with younger people. It is hard to rejuvenate the gene pool because imports from outside of the United States are both costly and time-consuming. The rarer breeds are also raised in a small number of hatcheries. The hatchery with the greatest variety of both ducks and geese is Holderreads' Waterfowl Farm and Preservation Center in Corvallis, Oregon, which maintains some strains that date back more than a hundred years.

In 2000, the ALBC conducted its first major North American waterfowl survey in conjunction with the International Waterfowl Breeders Association. The survey, which centered on standard-size domestic waterfowl, revealed that many more breeds of ducks and geese were endangered than had been previously documented. The survey also drew attention to the confusion created by the hatchery catalogs' practice of giving different names to the same waterfowl breed as opposed to the APA accepted name. In addition, different strains of a single breed are often not conserved or explained to the potential buyer. Although these challenges remain, it is important that more people cultivate an interest in keeping and raising historic and unusual ducks. Raising ducks is an attractive, interesting hobby, and ducks can be a source of diversified farm income.

## Breed Profiles

### *Rouen (pl. 154)*

The Rouen closely resembles the wild Mallard. The drake has the same lustrous coloring but with a more brilliant sheen. (It should be remembered that Mallard-colored ducks, like the wild Mallard, look different

*canard* A false and misleading story; from the French expression *vendre un canard à moitié*, to half sell a duck

*dead duck* Someone who is doomed

*duck* A peculiar person; an amphibious military vehicle

*duckboard* A boardwalk laid across a muddy or wet surface

*ducks and drakes* The game of skipping flat stones across water

*duck soup* Something easy to do

*ducky* Fine, excellent

*ducktail* A hairstyle that resembles the tail of a drake

*duck weather* Rainy and damp

*feather one's nest* To provide for oneself

*fine day for ducks* A rainy day

*laid an egg* To fail to score in cricket, also called a *duck's egg*

*lame duck* A weak person; one whose position will soon end

*like water off a duck's back* Rolls right off

*sitting duck* An easy or defenseless target

*ugly duckling* One that appears unpromising but often has great potential (the ugly duckling will grow up to be a swan)

when they are molting because their feather pattern changes.) Females have golden almond or chestnut bodies with well-defined penciling. Both sexes have orange legs. The drake's bill is a bright yellow-green, and the female has an orange beak with a black saddle and bean, or nail, at the tip. Rouens have attractive round heads and present a pleasing picture. The exhibition form of the Rouen is much larger than the utilitarian strains, and it carries itself differently from them.

The Rouen is an old, hardy breed that bears the name of the northern French city of its origin. In France, the original Rouen duck is known as the *Rouen clair*, or clear Rouen. This type produces the most desirable table duck. The *Rouen foncé*, or dark Rouen,

is the duck British breeders developed to be heavier and darker in color. The dark Rouen is seen more frequently outside France than the more active Rouen clair. The Rouen is bred mainly for the restaurant market, and it is gaining in popularity because it yields a leaner carcass than the Pekin. The Rouen does grow somewhat more slowly than the other white varieties, and its dark pinfeathers do not dress out as attractively as the white breeds, which some consumers may see as a drawback.

The Rouen is an excellent forager and has a calm nature. Long, broad, and heavier than the wild Mallard, it cannot fly well. Rouens are popular in the western United States as pond ducks and garden insect controllers. Adult exhibition drakes can weigh 10 pounds and ducks 9 pounds. Although they are seasonal layers, Rouens can produce 100 or more eggs per year. The white eggshells often have a yellow or green hue. The ALBC has documented about 5,000 Rouen ducks in the two distinct strains.



Rare

### *Aylesbury (pl. 155)*

This duck received its name from the valley of Aylesbury in Buckinghamshire, some 30 miles northwest of London, where the best white table ducks were raised. By the nineteenth century, poultry shops were appropriating the name for all their table ducks. The Aylesbury was so established that the Chinese white Pekin, introduced in 1876, did not become a commercial success in Britain.

The commercial Aylesbury remains the premier meat duck in Britain, although the Pekin has been used in crossbreeding on the Aylesbury for commercial production, which has made the pure utilitarian strain quite rare. Although the Aylesbury was imported to the United States by 1840 and admitted to the APA's *Standard of Perfection* in 1874, the breed never achieved much popularity because it developed a reputation for being less hardy in commercial situations than the Pekin.

The Aylesbury matures more rapidly than the

Rouen, reaching market weight in about eight weeks. The feathers and skin are white, which produces an attractive carcass. Mature drakes weigh 9 to 10 pounds, with females almost as heavy at 9 pounds. The exhibition Aylesbury has a very distinctive shape, with a deep keel, a long body, and a wedge-shaped head. It carries itself horizontally to the ground and has some difficulty mating naturally. The legs are dark orange, and the bill is a paler flesh color. The Aylesbury can lay 100 or more white eggs annually.

The ALBC Waterfowl survey located just two primary breeding flocks and a total of 282 breeding Aylesbury ducks of both strains in North America. The British Waterfowl Association has launched a Save the Exhibition Aylesbury Campaign, with the twin goals of locating the ducks remaining in the United Kingdom and establishing conservation breeding flocks.



Critical

### *Crested*

Crested ducks have been documented since the Middle Ages. In 1368, the estate records for Ramsey Abbey in Cambridgeshire record "Cirrarr" or crested ducks. Crested ducks also appear in seventeenth-century Dutch art. Some writers have suggested that European crested ducks are linked to Bali ducks (a crested Runner-type duck) from the East Indies, although the standard Crested White duck was probably heavily influenced by Pekin and Aylesbury ducks in Britain.

The characteristic, abundant tuft of feathers on the head is a breed requirement, although the dominant gene is lethal to the portion of homozygous ducklings in incubation. In each brood, another portion of the hatchlings will not be crested, and the remainder of the brood will have the crest. Because many of the crests are off-center or oddly shaped, few ducks in the United Kingdom and North America meet the Crested duck standard. The ALBC has noted that skeletal and other deformities are common in crested ducks. Because the crested gene is dominant, a Crested cross on any other breed will produce some crested offspring. Crested varieties of various breeds have been created.

Crested ducks are considered a light breed, maturing at 7 pounds in drakes. The body reveals its likely Aylesbury ancestor in its nearly horizontal carriage. White Crested birds have light orange shanks and toes, a yellow bill, and blue eyes.

The White Crested was recognized first, followed by the Black. Other colored varieties have also been developed, such as the mallard or gray, blue, and buff. In its waterfowl survey, the ALBC has found slightly more than 160 breeding ducks with a handful of breeders. Because the Crested has always been an ornamental rather than an agricultural duck, the ALBC has chosen not to include the breed in its Priority list. Owners do report that their Crested ducks are fine layers and table birds.

### *Runner*

The upright Runner is an unusual duck of Indonesian origin. This same type of duck is depicted on ancient temple wall carvings in its homeland, which attests somewhat to its age. In 1876, the captain of a tea ship brought the distinctive Indian Runner duck to Dumfriesshire, Scotland, from Malaysia. Earlier imports, some as early as 1830, are also on record. Runners were improved as prolific egg-layers in Scotland, Belgium, and Holland, and they have been used to create hybrid layers with the Muscovy. Early in the twentieth century, laying contests were held in England, with champion Indian Runners capable of laying 300 eggs per year. New imports of Runner ducks were made into Britain in the early 1900s. Runner ducks were also introduced into North America early in the twentieth century.

Fanciers of Runner ducks, also called Indian Runners, have developed many color varieties, including fawn and white, penciled and white, fawn, white, chocolate, trout, mallard, Cumberland blue, and black. White was until recently the most common color in Britain. In Britain, this breed has its own Indian Runner Duck Association. In North America, the fawn and white was the first variety accepted into the *APA Standard of Perfection*, and it remains the most widely available type from hatcheries. Other varieties, such as the penciled and white, are available from breeders.

Reflecting their unusual appearance, runners have acquired such nicknames as Penguin Ducks and Bottle Necks. The Runner is a tall duck with a long neck and a slender body. They do not waddle but actively step or run. They are also known for being somewhat nervous. Runners certainly have a unique body type. The head and neck have been described as an umbrella handle. The long, flat head joins the neck at a near 90 degree angle. The long, slender neck forms an imaginary line straight down to the ground. The back is also long and straight and is carried nearly upright at about 80 degrees. The body is clean, with very little keel. The medium-sized legs are also straight and set apart. Males weigh 4 to 5 pounds, and females weigh 3 to 4 pounds. Runners yield a small to medium-sized, yellow-skinned carcass, with broilers weighing 2.5 to 3 pounds at 6 weeks.

Runners make fine farmyard ducks because they are active foragers and heavy layers. The duck usually lays about 180 to 200 eggs yearly. The eggs range in color from blue-green to white and are similar in size to chicken eggs. Although mating season lasts from March to August, Runners are not good sitters.

Curiously, the Runner is now enjoying growing popularity due to its excellent herdability, and the breed is strongly recommended by experienced trainers of herding dogs. Runners flock or pack together more strongly than other duck breeds. Their upright stance allows them to move fast. Runners are quietly active and generally show little tendency to fly, flutter, and flap about while being herded. In fact, they can fly only about a foot or so off the ground for 3 or 4 feet. Because Runners are somewhat nervous and wild, they never get too tame and complacent to be herded by dogs.

Runners kept for herding should be purchased from one flock because adults will not accept strange adults or ducklings. Some herders believe that the mallard variety or other darkly colored Runners are flightier and less herdable, possibly due to influences from other breeds. Each drake should have two or three females, though Runner drakes do not seem to fight among themselves as much as other breeds. People who train herding dogs for trial have certainly discovered the Indian Runner, and their breeding efforts are becoming

significant. The ALBC survey of 2000 located about 3,000 Runner ducks in thirteen primary flocks.



Watch

### *Khaki Campbell (pl. 156)*

The Campbell duck is a specialist egg-layer developed by Adele Campbell in Uley, Gloucestershire, around the turn of the twentieth century. Campbell crossed the Rouen with the imported Runner duck, which had arrived in Britain in 1876. The breed is noted for its excellent egg-laying abilities, which is just what Campbell desired. She did not wish her ducks to become an exhibition breed. Most likely, Campbell also added some additional wild Mallard blood into the development of the breed.

The Campbell duck combined the traits of its ancestors into a pleasing form. It has a more upright stance than other breeds, with a long, slender neck and a fine head. Mature drakes weigh about 5 pounds and ducks slightly less. Campbells yield small, lean roaster ducks of 3 to 4 pounds. The Campbell is active and hardy. It is an excellent forager, and it can fly. It is also a superior egg-layer. Without the use of artificial light or special care, the Campbell duck can produce up to 340 white eggs a year, a number comparable to commercial laying chickens. The Khaki Campbell is used in commercial egg production. The Jansen duck farm in Holland further improved the Campbell's laying abilities during the 1920s and 1930s.

The Khaki Campbell is the original variety of the Campbell breed, as accepted by the APA. The Khaki Campbell drake resembles the Rouen in the greenish bronze color of the head, neck, and wing bar. The body and remaining plumage are in shades of warm khaki. The female is khaki or seal brown. The legs are orange, and the bill is greenish blue in the drake and greenish slate in the duck. Campbell ducks are also seen in other color varieties of Dark and White, which were developed later. From 1917 to 1923 in Britain, Oscar Gray interbred Khaki Campbell and White Campbell ducks to produce the Abacot Ranger or Hooded Ranger, as it was called for a time. Admitted to the *British Poultry*

*Standards* in 1934, the Abacot Ranger was exported to Germany, where breeders improved it as the Steicher. In Britain, the Abacot Ranger died out, only to be re-imported in the 1980s from Germany. Abacot Rangers are colored silver-white with fawn to buff spots, streaks, and hood.

The Khaki Campbell is an excellent multipurpose breed for the home flock, providing both eggs and table birds. They are excellent foragers of snails, slugs, insects, and mosquitoes and good sitters. Ironically, many Khaki Campbells are raised now for the show ring, sometimes at the expense of their traditional and superior egg-laying ability. Adele Campbell would be happier to learn that the Khaki Campbell is attracting attention again and gaining new admirers for the right reasons.



Watch

### *Cayuga (pl. 157)*

The Cayuga or Black Cayuga is one of the few duck breeds to originate in the United States. Mr. J. S. Clarke of Cayuga County, New York, has been given the credit for developing the breed. The exact stock used in the Cayuga's development is somewhat mysterious. A newspaper first mentioned the breed in an article of 1851, but even after they were admitted to the APA *Standard of Perfection* in 1874, Cayugas remained rare. The Cayuga was introduced into England in 1851.

Early writers speculated that Black East Indies were crossed with a baffling bird called the Buenos Ayrean and the "common duck" to create the Cayuga. Some authorities asserted that the Buenos Ayres was a wild American Black duck (*Anas rubripes*).

Even the Black East Indies may not actually have come from the East Indies. The breed seems to have been in Britain for some time, where Charles Darwin called it the Labrador duck. Darwin also noted that it bred true to color. Curiously, British breeders believe that the Black East Indies originated in America. The breed has also been called the Black Brazilian and Buenos Aires. First mentioned in the 1965 *British Poultry Standards*, Black East Indies were a small light

breed weighing 4 or 5 pounds. Today the Black East Indies is a bantam duck. Even mature drakes may weigh only 2 pounds. But they do have beautiful, lustrous black feathers that gleam with a green sheen, as well as black eyes, beak, and legs. They are also hardy and active, and the ducks are good mothers. The ALBC survey of 2000 found only some 135 breeding East Indies birds.

The Cayuga, however, is a large, upright bird, with drakes weighing at least 8 pounds and ducks about 7 pounds. In the late nineteenth century, the Cayuga was described as easily fattened and nearly as large as the Rouen. The females were also noted as hardy birds and good layers but careless mothers. They remain much the same today, though perhaps they are now slightly smaller. Cayugas lay light blue, sooty green, or gray eggs.

The Cayuga wears the stunning, beetle-green glossy feathers of the Black East Indian. Ducklings are born with black feet and legs that change color slightly as they mature. The adult bill is slate to black, and the legs are mottled orange and black. Cayugas occasionally have a trace of yellow on their breast. Older Cayugas may have some white feathers or mostly orange legs.

The Cayuga remains a meat-type duck with good hardy qualities, although the breed is mainly seen today as an exhibition bird in both Britain and North America. The attractive feathers are used for making fishing flies.



Rare

### *Blue Swedish*

The Blue Swedish is an old northern European breed that was imported to the United Kingdom and North America. Usually raised for meat, the Swedish is somewhat slow to mature. This hearty breed has a pleasant, friendly temperament and good foraging habits.

The Blue Swedish is considered a heavy bird, with full, deep breasts, a broad body, and stout thighs and shanks. Drakes generally reach weights of 7 to 8 pounds. The most distinctive feature of this duck is, of course, the blue color. The drake's head is dark blue

with a green luster, and the body should be a uniform shade of slate or steel blue except for the two pure-white outer primary feathers and a white bib. A blue bill is also preferred, with orange-black shanks and feet in the drake and bluish black shanks and feet in the duck. The correct blue shade for exhibition is hard to achieve. If exhibitors use blue-colored pairs, the blue color will emerge in 50 percent of the hatch, with 25 percent white and 25 percent silver or splash. The colors are a lovely addition to a home flock, and if the black and silver birds are interbred, the result is a 100 percent blue hatch.

Waterfowl fanciers long believed that the Yellow Swedish was extinct, but a small number was rediscovered in southern Sweden. Breeders consider the Yellow to be a better layer and the Blue a preferable meat producer.

In North America, Blue Swedish ducks are faring better than many other breeds. The ALBC survey of 2000 found more than 1,800 breeding ducks and a good number of breeding flocks.



Watch

### *Buff or Buff Orpington*

The lovely Buff or Buff Orpington duck was developed by William Cook of Orpington, Kent, around the turn of the twentieth century. Cook was also the originator of the Orpington breed of chickens. Cook used Aylesbury, Rouen, and Runner ducks to develop a breed that provided both meat and eggs. Orpington ducks achieved considerable popularity for this dual-purpose ability and were also found in Black, Blue or Lavender, Chocolate, and Silver varieties.

Buff Orpingtons, the only variety usually seen today, are lovely birds with rich, red-buff coloring. Other than the glossy seal-brown head of the drake, the Orpington should not have any blue, white, or brown feathering. It is sometimes hard for breeders to achieve this even coloration. Although Buff Orpingtons are classified as a light breed in Britain, they reach weights up of 7 to 7.5 pounds, and the ducks are good layers. Many breeders keep Buff Orpingtons for their color

and exhibition purposes, but they remain productive as well.

The Buff, as the APA lists the Orpington, was imported to the United States soon after its development. The ALBC has located more than 800 breeding birds with eleven breeders in its survey.



Rare

### *Ancona*

Like the Ancona chicken, which is black with white spangles of color, the Ancona duck has spots or splashes of white on the feathers and even the bill and feet. Profuse spotting is preferred. Developed in Britain in the early twentieth century, this light breed is extremely rare there today. Generally black, the Ancona can also be blue, chocolate, lavender, and tricolored. Breeders report that the Ancona is an active forager and a very good layer of white, blue, or spotted eggs. The ALBC survey of 2000 found about 130 breeding birds, with no single large flock.



Critical

### *Magpie*

The striking Magpie duck is said to have been developed in Wales, but its actual origin is not clear. The breed may be related to the Runner duck. These hardy, long-lived, triple-purpose ducks were definitely exhibited by 1923. Like the Orpington, the Magpie is heavier than most light breeds, reaching weights of 7 to 7.5 pounds. Breeders report that Magpies are good foragers and egg-layers and that the ducks are good “broodies.”

The Magpie has attractive plumage, though it is the hardest duck to breed with correct markings for exhibition purposes. Magpies are white with dark heads and dark backs down to the tail. Varieties are the Black and White, the Blue and White, and the Dun and White (which is not accepted by the APA *Standard of Perfection*). Pure white rejects were developed into a utility breed called Stanbridge Whites in Britain. Stan-

bridge Whites were easily confused with White Campbell ducks.

Ironically, imports from the United States to the United Kingdom in the 1970s renewed British interest in the Magpie. The ALBC survey located just 126 breeding ducks in 2000.



Critical

### *Australian Spotted*

The Australian Spotted duck received its name from the possible use of an Australian spotted wild duck in its ancestry, but this breed was developed in the United States in the 1920s. Mallards, call ducks, and the Pintail are also believed to be included in its creation. The wild Pintail is a refined, slim, and agile duck native to North America. The Pintail’s most distinctive feature is its long, sharp tail.

The Australian Spotted duck is bantam-sized, with feral tendencies and excellent flight ability. The Spotted duck is hearty, very active, and an excellent forager. This foraging ability has been put to agricultural use in pest control.

The three color varieties of the Spotted duck are the Bluehead, Greenhead, and Silverhead. The ALBC has added the Australian Spotted to the Priority List, based on its practical possibilities. Unfortunately, the breed is extremely rare, with only 30 breeding adults and one breeder in 2000.



Study

### *Saxony*

The Saxony was developed in the Saxony region of Germany as a dual-purpose breed in the 1930s. Saxony ducks were imported to Britain in the 1960s, where their color gained them a home among fanciers. The buff-colored drakes have a blue-gray head and neck encircled by a white ring. The breast and shoulders are a rusty red with faint silver lacing. The back is blue-gray fading to light gray in the tail. The lower body is oatmeal colored, set off by gray flight feathers. The legs and feet

are orange, and the bill is yellow. The female has paler buff, grayish blue, and apricot coloring. Several silver varieties are also found.

The Saxony has retained its utilitarian traits. Drakes reach 8 pounds with a full, meaty breast. Ducks lay about 150 eggs yearly. The Saxony is also noted for its extremely easygoing nature. Unfortunately, the Saxony is quite rare. The ALBC survey located only 72 breeding birds and no large flocks in 2000.



Critical

### *Silver Appleyard*

This large, heavy breed was developed in the 1930s by Reginald Appleyard, a well-known British waterfowl breeder. Appearing in shows in the next decade, the breed was soon accepted into the *British Poultry Standards*. Appleyard did not describe exactly how he developed his “ideal” breed, but experts believe that Pekin and wild Mallard were used. The Silver Appleyard is noted as an attractive, early-maturing dual-purpose duck. Drakes mature at 8 to 9 pounds, with ducks only slightly lighter. The ducks are also good layers of large white eggs. The drake has a green head with distinctive silver eyebrows and throat. The drake’s silver-white plumage is set off by a claret and chestnut to fawn breast while the duck is silver-white and fawn.

The Silver Bantam, first developed by Reginald Appleyard, and then the Miniature Silver Appleyard, developed by Tom Bartlett in the 1980s, also appear in hatchery catalogs and at poultry shows in Britain. The Bantam Appleyard is seen in North America.

In 2000, the ALBC discovered six breeders but just one primary flock of Silver Appleyard ducks, with a total population of 128 breeding birds.



Critical

### *Welsh Harlequin*

In 1949, Leslie Bonnet in Wales discovered honey-color sports in his utilitarian Khaki Campbell flock that were eventually standardized as the stunning Welsh Harlequin. Males have iridescent greenish black heads

and a white ring encircling the neck. The white to off-white body color is enhanced with chestnut, brown, and burgundy shading on the upper back fading to silver gray with a white-edged brown tail. The wings show colors of brownish gray, chestnut, white, and a greenish bronze patch on the speculum. The shanks and toes are orange, while the bill is olive-green with a black “bean” at the tip. The duck is colored honey-fawn to cream with brown graining and lacing. The beak coloring differs between the male and female, which helps to sex the young ducklings.

Welsh Harlequins are medium-sized, with drakes averaging 5 to 5.5 pounds. Slightly heavier than Campbells, Harlequins from utilitarian lines produce 250 to 350 white eggs yearly and are active birds but are also noted for their calmer nature. Some breeders note that Harlequins are less self-sufficient than other breeds and need dry bedding and protection from predators.

John Fugate of Tennessee imported hatching eggs directly from Bonnet in the late 1960s and later imported adult birds from Europe in 1982. Most of the American ducks descend from the later import. The Welsh Harlequin itself is listed as critical by the ALBC, with only 188 birds in the hands of five breeders.



Rare

## Geese

### Natural History

About two dozen species of geese are found worldwide. Geese are intermediate in size between ducks and swans in the family Anatidae and are more terrestrial than these relatives. In domestication geese and ducks can interbreed and offspring do occasionally occur, but generally there are noticeable differences between the two. Geese are generally larger than ducks and have heavier bodies and longer necks. Geese also have long, strong legs that enable them to walk great distances. In spite of their size, geese are excellent flyers that seasonally migrate vast distances in large flocks. Geese are mainly vegetarians and are better equipped to digest fiber than chickens and turkeys. Geese prefer to graze

on grass, pulling it up with their powerful broad bills, but they will also eat broadleaf weeds, seeds, berries, roots, and the incidental snail or insect. Geese also feed on aquatic weeds in shallow water, and their long necks enable them to reach down into difficult spots. Geese feed for long periods during both day and night.

Geese are impressive birds with a stately bearing, a large head, and a slightly arched neck. Although geese do molt, unlike drakes, ganders wear the same color plumage all year. Immature geese are soon as big as adult geese but do not display adult coloration. The small fluffy feathers, or down, form an undercoat close to the body, providing superb insulation. Both down and the longer outer, or contour, feathers have been used by people since prehistoric times.

Geese are gregarious except during the breeding and nesting period. The sexes are about the same size, often look very alike, and strongly mate for life. Their lifespans range from fifteen to twenty years, with individuals of some species living to thirty or forty. Geese are very intelligent and recognize individuals and situations. Just as one partner will mourn the loss of the other, geese can become attached to their companions, which can make it hard to separate them. Geese also exhibit individual personalities and temperaments. They communicate through hisses and honks.

The female goose lays between 3 and 12 eggs and nests on the ground near the water for about thirty days; the gander guards the nest and later the goslings. Possessing exceptional eyesight, geese are extremely alert, and parents will fiercely defend their offspring from predators or strangers. Geese can be dangerous if aroused, attacking powerfully with bill and wings.

## Domestication

Geese have adapted well into human care. Although geese are monogamous in the wild, a domestic gander will often mate with three to four females. Pairs and trios do best, however. Groups flock together strongly, so they can be easily moved or herded. Their intelligence makes them very adaptable to a routine, and they make excellent watchdogs. Some owners report

*gander* An adult male goose

*goose* An adult female goose

*gosling* A baby goose

that their geese are very sensitive to different human personalities. Geese are hardier than chickens and less susceptible to disease unless overcrowded. The down-covered goslings mature quickly; their greatest threat comes from predators while they are young.

Domesticated geese are self-sufficient in finding their own food and require only rudimentary shelter in temperate climates. They can be put to work gleaning harvested fields of waste or weeding orchards. Geese grow quickly and efficiently with goslings reaching weights of ten pounds in ten weeks. Besides providing meat at little cost to the raiser, geese yield useful feathers, down, and rich fat that was very valuable in the past.

These traits made the goose a very useful animal to humans. Geese were domesticated as early 3000 B.C., probably in southeastern Europe and northern Africa. Geese were also domesticated separately in Asia. All domestic geese are believed to be descended from just two wild species. The wild Greylag (*Anser anser*) goose of northern and central Eurasia spends its summer breeding season as far north as Iceland and migrates to winter in northern Africa. Asian or Chinese domesticated geese are descended from the wild Swan goose (*Anser cygnoides*), which summers in Siberia and winters in China. European geese are more suited to temperate climates, whereas the Asian geese tolerate hot climates better. European geese have pinkish or orange-colored bills and feet, whereas the bills and feet of the Asian are orange.

The ancient Egyptians also kept several varieties of wild geese in captivity, and they are depicted on stone reliefs and wall paintings. Some geese, such as the very beautiful Red-breasted goose (*Branta ruficollis*), were kept for ornamental purposes. Other captive geese included the Brent goose (*Branta bernicla*), Greater and Lesser White-fronted geese (*Anser albifrons* and *Anser*

*erthropus*), and Bean goose (*Anser fabalis*). The famous frieze known as the “Geese of Meidum” found at the Fourth Dynasty tomb of Nefermaat illustrates several of these species. The Egyptian goose (*Alopochen aegyptiacus*) is still considered partially domesticated in tropical Africa, but its difficult personality has prevented it from being more widely adopted.

The ease with which geese interact with people has been demonstrated in recent years in North America. The Canada goose (*Branta canadensis*), once threatened with extinction, has made itself at home in parks, suburbs, golf courses, and decorative or cooling ponds near urban buildings. These flocks no longer migrate and will feed on lawn grass, perfectly comfortable among people and their routines. Canada geese have become pests in many areas, and some biologists consider them on the road to domestication. The North American population of Snow geese (*Anser caerulescens*) has likewise exploded due to changing agricultural practices. Feeding on winter fields of barley, lentils, rice, soybeans, and wheat, more geese now survive winter and the long annual migrations. Unfortunately, when the burgeoning numbers of geese return north to their subarctic coastal marsh breeding grounds in Manitoba, they are destroying the delicate native vegetation. The Nene (*Branta sandvicensis*), the endangered goose of Hawaii, is kept easily in captivity by waterfowl enthusiasts, even in cold climates. By the mid-twentieth century, the population of Nene had declined to only about 50, but thanks to the efforts of breeders, there the Nene now number about 2,000.

Geese were certainly part of everyday life in ancient Egypt, Greece, and Rome. And at least since Egyptian times, geese were fattened by force-feeding. When the Gauls attacked Rome in 388 B.C., geese sounded the alert to wake Rome’s consul, who roused the troops and saved the city. The Gauls also raised geese, driving them to market in Rome. Later, the Franks used their geese to produce an unusual product. When geese were fed on ground iron and flour, their droppings could be used to case-harden sword blades. Curiously, the increased carbon content of the droppings did indeed make the iron harder.

In the sixth century B.C., the Romans invented the

*goose* From Middle English *goos*, from Old English *gos*

*gander* From Old English *gandra*

quill pen. An improvement on the hollow reed pen, the quill pen, made from the goose’s primary wing feather, was very durable and could produce thinner, more delicate letters. In fact, the word *pen* comes from the Latin *penna*, or feather. Until the development of metal fountain pens in the nineteenth century, quill pens were the most widely used writing instrument in the West for more than a thousand years. Every literate person carried a penknife for trimming quills. The geese of Poitou in France, Switzerland, Italy, Germany, and Russia were noted for their superior quills.

Julius Caesar noted that the Celtic peoples of Britain kept geese and hens but did not eat them. These geese seem to have been closely related to the wild Greylag. Pliny wrote about a delicious goose that the Britons did eat, known as *cheneros*. This may have been a different bird, the white-faced Barnacle goose (*Branta leucopsis*). Perhaps influenced by the Romans, Britons began to raise and eat geese in large amounts. Even the poorest rural families would keep some chickens and often a few geese that generally shifted for themselves. Children or gooseherds sometimes herded geese on common land. On manors, geese were often another responsibility of the dairymaids. Less frequently, geese were penned up and fattened on cereal and milk. In general, geese were less popular than chickens because they laid fewer eggs.

Goose was usually a special meal. Young, or “green,” geese were usually eaten in early summer, whereas larger fattened birds were saved for Michaelmas. The Feast of St. Michael on September 29 was centered on the traditional goose. Goose was roasted and served with strong garlic sauces. Goose with *sauce madame* was stuffed with herbs and fruit, roasted, and later served with garlic and wine sauce poured over the carved bird. *Gauncil* was another flour-thickened sauce served with roast goose. To “rear the goose” was

to carve it. As fewer wild fowl were available, more domestic birds were raised for market. In London by the 1370s, residents could buy roasted birds at cookshops. Elizabethan recipes for serving older geese included one with mustard and vinegar sauce, while green geese were served with cooked sorrel leaves.

By the seventeenth and eighteenth centuries, large numbers of geese were raised in the countryside, such as Lincolnshire or East Anglia, and walked to market on journeys that could last three months. Market geese were fed or crammed on barleymeal, oatmeal, and ground malt. The enlarged liver then produced *pâté de foie gras*, which was especially popular in France but was actually invented by the Romans. More commonly, geese and other birds were stuffed with mixtures of breadcrumbs, herbs, and dried fruit. By the eighteenth century, oyster and chestnut stuffings were popular. Sometimes geese were pickled for later use.

Live geese were also plucked for down and feathers. A goose could produce half a pound of feathers and one and a half ounces of down at each plucking. Feathers were used in stuffing mattresses or bedcovers, and the down was used as insulation in quilted coats. When geese were plucked several times a year, they became tougher for eating.

In seventeenth- and eighteenth-century Russia, there was an unusual use of geese as fighting birds. Breeds such as the Arzamas and Tula were selected for their aggressiveness. When goose fighting was banned in 1906, these large, heavily muscled geese were developed into meat production breeds.

Regional varieties of geese became well known. The large Toulouse of France was noted for production of foie gras, while smaller white geese were raised in Italy. In the early eighteenth century, the very large, white Embden was imported from northern continental Europe to Britain, where it was rapidly crossbred on the native Old English and English Grey goose. Market geese became heavier, replacing the lighter country types that were able to walk to market. The imported French Toulouse was also further developed in Britain. The upright, knob-beaked Chinese goose also made its way westward into Europe.

The earliest colonists to the New World brought

along the older, useful goose types. English, Irish, and Scottish settlers carried aboard ships the common geese of Britain, such as the Pilgrim goose, which was raised for both meat and eggs. French colonists in Canada probably used the traditional Toulouse stock. Germans were also fond of raising geese, and German settlers helped to establish the tradition of geese on American farms. These geese were hardy and mostly took care of themselves, foraging on pasture grasses. Farm geese supplied useful products for the family, and young geese remained a good market crop near cities in the winter months. Geese were often finished or fattened on corn for a month before going to market. Noodling, or feeding geese noodles several times a day to fatten them, was believed to be a better method of fattening than corn feeding. Feathers and down also fetched good prices, which were welcomed by the farm families. Pillows and mattresses, called feather ticks or ticking, were stuffed with goose feathers. Feather ticks were considered a luxurious improvement over straw or hay.

Most of the geese found on farms were crossed or mixed, not pure breeds. They were generally several pounds lighter than the breeds raised and shown according to the *APA Standard of Perfection*. In North America today, there are eleven breeds in the *Standard*, including the elaborately feathered Sebastopol and the striking Pomeranian. The British Waterfowl Association classifies geese as heavy (African, American Buff, Embden, and Toulouse) or light (Brecon Buff, Buff Back, Chinese, Pilgrim, Roman, Pomeranian, and Sebastopol).

## Husbandry

In the United States, the number of geese has declined since 1930. There are about 5 million geese today, with most commercial production located in Minnesota and Iowa. The white Embden is the most popular breed, replacing the Toulouse, which was more numerous in the mid-twentieth century. Goose is eaten infrequently, although there is a market for goose down. Almost all the down used in sleeping bags, comforters, and warm

*cook one's goose* To ruin beyond repair

*don't kill the goose that lays the golden eggs* From Aesop's fable "The Goose with the Golden Eggs," in which the owner cuts open the goose to look for gold; later used in "Jack and the Beanstalk"

*honk* The loud sound of a goose, later applied to horns

*gone goose* In a hopeless situation

*goose among swans* A common or homely person among his or her betters

*goose, goosey* Silly or foolish

*goose* To poke someone in the rear (as a goose would attack)

*goosebumps, goose flesh, goose pimples* The temporary erection of the papillae on the skin from cold, fear, or excitement that resembles a plucked goose

*goose egg* A zero score; a large swelling on the head after an injury

*gooseneck* A slender, curved object; a gooseneck stock trailer has a high hitch that locks into a pickup truck bed

*goose step* A parade or military step in which the legs are held straight

*take a gander* To look at something by stretching one's neck

*wild-goose chase* A pointless endeavor; originally a horse race in which the leader determined the course and the others had to follow

clothing is imported, often from China. Feathers can be plucked from live geese in the spring or fall just before the molt, when the quills are dry and do not contain blood. A single goose can produce a pound of feathers each year. There is also a small niche market in supplying goose eggs for crafters.

In North America, geese have been kept for their value as commercial weeders since the 1950s, when cotton growers began using them to combat herbicide-resistant weeds. In 1960, more than 175,000 geese were used in southwestern fields with the added benefit of their droppings as fertilizer. Geese will not eat most broadleaf crops, such as asparagus, beans, berries, beets, grapes, hops, mint, onions, sugar beets, tobacco, and strawberries. Conversely, they will graze the grass and eat the fallen fruit in orchards. They can keep the grass and weeds down between nursery or Christmas trees and florist flowers. The most profitable management of weeder geese is to purchase goslings in the spring and market the young adults in the fall during the holidays when the prices are highest. Weeder geese do require drinking water and shade.

Geese are still used as watchdogs on farms, in ware-

houses, and military bases. Admirers feel that geese have keener eyesight and are more alert than dogs because not all members of the flock sleep at the same time.

Geese have never been raised on a large scale in North America. Over time, the less fatty turkey replaced the goose for special meals. Goose has remained popular in such countries as France, Germany, Denmark, the Netherlands, Russia, and China, where commercial purebreds and crossbreds are raised. Demand for table geese has actually increased in Britain in recent years. The most popular breeds in Britain, North America, and Europe remain the Embden, Toulouse, and Chinese (fig. 74).

Geese are economical to raise if they have access to pasture. Young geese are ready for market as early as ten to twelve weeks, although many are sold at a larger weight when they are twenty to thirty weeks old. Young geese are lower in fat than older geese but still fatter than other types of poultry. The main predator threats to the hardy and self-sufficient goose are coyotes, foxes, and dogs. Some enthusiasts believe that breeding for smaller geese in the recognized breeds, therefore using

[To view this image, refer to the print version of this title.]

Fig. 74 A pair of utility Toulouse geese, which were for a time the most popular breed in the United States. Courtesy of the IAB and Hans Peter Jorgensen.

less land and food, would make it easier for more people to keep geese.

Geese can be messy in small areas, loud, and protective at nesting time. Too many geese can foul waterways and spread disease. But with the proper space or with a job to do, geese remain as useful now as they have been for thousands of years. Although some breeds are successful in the poultry markets, it is important to maintain the old varieties that may find jobs again in new patterns of agriculture.

## Breed Profiles

### *Pilgrim (pl. 158)*

Pilgrim geese are one of the few goose breeds to possess sex-linked coloring, in which the sexes are clearly different colors. Even in day-old goslings the male is colored a creamy white and the female an olive-gray. Adult ganders remain white with blue eyes, whereas the goose is colored soft gray and white with dark hazel eyes. This autosexed trait is useful for sorting goslings. In both sexes, the bills and legs are orange.

The Pilgrim goose probably traces back to the com-

mon geese of western England. In the Middle Ages, the presence of autosexed geese was recorded in various writings in Britain, France, and Holland. In Britain, these geese were known simply as the common goose or sometimes as the Old English goose. One subvariety was called the West of England goose. Also an autosexing breed, the medium-sized West of England goose may still be representative of the Old English goose type. The ALBC survey located one small flock of 6 geese in North America in 2000. The lightweight Shetland goose is another close relative. Two small flocks of Shetland geese are conserved in North America.

The Pilgrims themselves may not have carried geese aboard the *Mayflower*, but subsequent colonists most likely brought this Old English farm goose with them. The common and yet unique Pilgrim goose has been present in North America since the earliest days of colonial settlement, based on several descriptions of the white ganders and gray females. Some agricultural writers called them English geese and described them as ancient in origin. Efforts were made to standardize the type in the early twentieth century, with one Oscar Grow of Missouri taking credit for naming the breed. Pilgrim geese were added to the *APA Standard of Perfection* only in 1939.

The Pilgrim goose is medium in size, with the gander weighing up to 16 pounds and the goose about 13 pounds. The Pilgrim has traditionally been a dual-purpose breed, producing both meat and white eggs. It is known as a fast grower and a good layer. Pilgrims are calm, quiet, well-tempered geese and excellent parents. Owners of Pilgrims often find them quite personable. Pilgrims are also active geese that are good for weeding.

It is hard to determine the exact population of many breeds of ducks and geese, whose farm flocks are not involved in commercial production or routine testing. The Pilgrim has become increasingly rare and is becoming harder to obtain from hatcheries. Difficulty in locating stock and inbreeding has led to fertility and other problems in Pilgrim geese in some areas of the United States. The ALBC has sought to identify flocks of healthy geese to help breeders conserve good stock. The most recent survey located about 660 breeding geese with five large flocks and many more small ones.

There are no major differences between production and exhibition forms of the Pilgrim.



Critical

### *Toulouse (pl. 159)*

The large Toulouse remains one of the most popular breeds for commercial production. The Toulouse is particularly well suited to cold winters and is raised mainly in the upper Midwest. The sad-faced Giant Dewlap Toulouse is also an exhibition bird. The old, active farm or utility Toulouse, however, is becoming harder to find.

Named for the town in southern France, the Toulouse has been traced back to at least A.D. 1555. It was imported early to Britain, where its size was increased, and it was later exported to North America. The Toulouse grows rapidly, and it is an important meat producer in Europe. In France, the Toulouse is also used as a source of pâté de foie gras. The Toulouse will lay 35 to 50 eggs a year.

The pearly gray Toulouse is darker on the back shading to light on the breast and white on the abdomen. The bill is light orange, and the legs and feet are reddish orange. There is also a Buff variety as well as the rarer White Toulouse. The Toulouse has a broad, deep body with a rounded breast, which makes it an excellent producer of dark meat. The keel is prominent, and the birds carry themselves almost horizontally. In the Giant Dewlap variety, the body and dewlap, or fold of loose skin hanging under the neck, have been increased to almost gigantic proportions, with ganders weighing up to 26–28 pounds.

This loosely feathered breed also produces good yields of down. The fluffy feathers contribute to its massive appearance. The utilitarian strain is more tightly feathered than the Dewlap.

The Toulouse remains a fairly popular meat bird, and the ALBC survey of 2000 found more than 3,000 Toulouse of both varieties combined. The Giant Dewlap is rarer, especially in Britain, where breeders have been importing American birds to increase the gene pool and to help with infertility problems in the breed.

Because it is a heavy breed, the generally placid, nonaggressive Toulouse does better in confinement than other goose breeds. Because of their size, the females can be somewhat clumsy with their eggs and goslings. Toulouse geese do best on flat ground in quiet conditions. The Toulouse is an excellent and popular cross on the popular Embden for meat production.

The ALBC is also investigating the Gray goose, an old farm type that may be descended from the old, common English Gray goose. Others have called this type a commercial or non-dewlapped Toulouse. The ALBC survey found 18 breeding birds in the hands of two breeders.



Watch

### *Roman*

Roman geese are descended from a small type of white geese common in much of Europe for many centuries, although they were not imported to Britain from Italy until the early years of the twentieth century. These white geese with occasional gray markings were standardized in Britain as a plump, early maturing table bird especially suited to smaller families.

The Roman goose is now described as “chubby” for it has a short neck and back and a full breast with no keel. The gray coloring has nearly been eliminated, and these geese are usually pure white with blue eyes, a pinkish bill with a white bean (the hard protuberance on the tip of the upper beak), and orange-red legs and feet. In North America, the Roman goose is often crested. The American *Standard of Perfection* requires a tuft of feathers on the head, and nontufted birds are extremely rare.

The Roman goose is also a prolific breeder, although it was never successful commercially in the United States. It remains a lovely goose for home use and serves as an effective watchdog. The ALBC discovered about 430 breeding birds in two major flocks with nearly a dozen smaller breeders.



Critical

### *Pomeranian*

The very old Pomeranian breed is named for Pomerania in old Prussia, but these geese were also found throughout northern Europe as a hardy, foraging type. They remain strong foragers and a popular market goose in Europe. Pomeranians were imported to both the United Kingdom and North America, where they remain quite rare.

The Pomeranian is strikingly marked in the Saddle-back pattern. Dark coloring is found on the head and upper neck, the back, and the wings. The remainder of the body is white, and the eyes are blue. Both the Buff-backed and Gray-backed varieties are seen in North America and the United Kingdom. The solid Gray and pure White varieties are available in Europe. The bill, legs, and feet are red. Pomeranian geese have a nearly horizontal carriage and a single lobe, or round fatty deposit on the abdomen. Although the Pomeranian is primarily raised for meat, the goose can lay 30 eggs or more per season. Some Pomeranian geese are exceptional layers. Ganders reach 17 pounds and females 15 pounds.

Pomeranian owners report that their birds will attempt to eat any greenery, include decorative plants. They also eat tree bark and especially enjoy willow trees. Breeders recommend that young goslings have fresh green cuttings, such as grass, in their diet. Because they are such good foragers and hearty in cold weather, Pomeranian geese could be a good choice for free-range situations. Unfortunately, only about 240 breeding geese in two primary flocks were located in the ALBC's most recent survey. There are, however, a good number of small breeder-flocks, probably due to the Pomeranian's good keeping and raising qualities.



Critical

### *Chinese*

Chinese geese were developed in Asia from the wild Swan goose (*Anser cygnoides*), which winters in northeastern China and Japan and nests in southern Siberia and northern Mongolia. The Swan goose is a slim bird

with a long swanlike bill. It is brown in color with a brown bill.

Chinese geese were introduced to Britain by the mid-nineteenth century, where they were originally called the China goose. They have also been called the Swan goose for their long, elegant neck and graceful appearance. Two varieties have long been known in Britain and North America: the Brown and the White. Both were admitted to the APA *Standard of Perfection* in 1874. The exhibition forms of Chinese geese today are smaller and more finely boned than either the original imports or the farmyard flocks that were popularly raised as meat and egg producers.

Chinese geese are small, very upright, and lean. Because they are such good egg producers, laying 50 to 100 white eggs yearly, some strains are raised primarily for that purpose. They are active foragers and, because of their smaller size and agility, less damaging to crops than larger breeds, so they are often used for weeding. Chinese geese have a reputation as excellent watchdogs because they are very vocal and curious. The ganders can be very protective of their broody mates.

Chinese geese are tightly feathered, and the color pattern of the Brown variety is quite similar to that of their wild ancestor. The top of the head is dark brown, and a brown stripe runs down the back of the neck. A thin white band separates the head from the black beak and its characteristic knob. The knob grows with age and is usually larger in the gander. How or why this feature was developed from the knobless Swan goose is unknown. The neck and breast are buff to grayish brown, the underparts are white, and the back and wings are darker brown. The legs and feet are dusky orange. White Chinese geese are pure white with an orange bill, knob, shanks, and feet. Ganders weigh 12 pounds and females 10 pounds, although the White variety can be slightly heavier.

Chinese geese are an excellent choice for sustainable farming because they can forage for most of their food, they grow quickly, and they lay well. They also produce a lean yet moderate-sized market bird. Chinese geese cross well on other breeds, improving the meat-to-bone ratio. They do require shelter during freezing weather to prevent frostbite to their knobs.

The Chinese goose remains a favorite in both Britain and North America. The ALBC noted nearly 4,000 geese in ten primary flocks in its most recent survey.



Watch

### *African*

The African goose actually originated in southeastern China, where it was a very large, dewlapped breed. The African goose is closely related to the Chinese goose, and both are descended from the wild Swan goose (*Anser cygnoides*) of eastern Eurasia. This Asian breed was carried to both Europe and North America, where in its original Brown variety it was admitted to the APA *Standard of Perfection* in 1874. A White African variety was accepted thirteen years later. The African is not related to the Toulouse, contrary to the opinions of earlier agricultural writers who believed that it was a cross between the Chinese and the Toulouse.

The African goose is heavy and wide, like the Toulouse, but very upright and stately in its carriage, without a keel or fatty lobes. Ganders should weigh at least 20 to 22 pounds and females 18 pounds. The original African carries a dewlap under its head. The head, combined with the distinctive knob on the bill, which grows in size as the goose matures, appears quite large. A dark brown stripe covers the top of the head and runs down the back of the wide neck. The beak and the knob are black and are separated by a thin white stripe from the brown head. The legs and feet are dark orange. Buff and cream color fades down the neck into the breast, and the underparts are white. Brown and gray feathers cover the back and wings. White Africans are pure white in color with an orange bill, knob, legs, and feet.

A smaller African strain is also available in North America. Some of these birds may carry Chinese blood and were formerly used for meat production. The larger, traditional African should be chosen for breeding flocks wherever possible, but care must be taken to avoid the heavy keel, large abdomen, and horizontal carriage of the Toulouse. The traditional African is

sometimes labeled the Super African in poultry catalogs.

African geese are excellent producers of lean meat for roasting, despite the dark pinfeathers. They are very active, long-lived, and good producers of young geese for market. They do need shelter from extremely cold temperatures to avoid frostbite on their bill knobs. African geese are also imposing birds, standing up to three feet tall. Although they have loud voices, African geese are usually quieter than their relative the Chinese goose. They can also be gentler, especially if hand-raised.

The ALBC identified 2,600 African geese of both strains and varieties combined.



Watch

### *Sebastopol*

This unusual goose was imported to Britain in 1859 as an ornamental breed. The original imports were shipped from the port city of Sevastopol (formerly Sebastopol) on the Black Sea. Nineteenth-century poultry writers also called them Danubian geese and noted their presence in the areas around the Black Sea. Although the Sebastopol was likely related to Russian or German fighting geese, the Sebastopol was bred solely for its beauty.

A mutation is responsible for the breed's curled or frizzled feathers, which lack a stiff quill or spine. The trait is not fully understood, but it is not a simple dominant gene, so the geese inherit varying amounts of curl or frizzle or none at all. There are two types of Sebastopol geese. The smooth-breasted type has long trailing feathers on the wing, while the frizzle-feathered has soft, curled, twisted feathers over much of its body and longer feathers on the wing. The wing itself is often abnormally formed, and most Sebastopol geese cannot fly. Breeding frizzled birds to each other often causes serious wing defects; to produce better goslings, a frizzle should be bred to a smooth-breasted bird. A near-perfect bird of either type can be quite expensive to purchase.

Sebastopol geese are usually white with blue eyes and an orange beak, legs, and feet. The Gray or Buff varieties are rarely seen. Sebastopols are medium in size, with ganders weighing about 14 pounds and geese about 12 pounds. They have round heads and sturdy arched necks. Their carriage is moderate. Sebastopols have no keel, but they do have two fatty lobes on their abdomen. Because the curly-feathered birds cannot fly, they are easy to contain. Breeders strongly recommend that Sebastopols have frequent access to clean water because their trailing feathers are easily soiled. Sebastopols require shelter in cold or inclement weather because they lack tight feathers and down to provide warmth. In spite of their ornamental purpose, Sebastopols can be good producers of meat and reasonably good layers. Some birds can have fertility problems, so potential flock owners should take care to select healthy stock. Owners report that their birds are friendly and quiet.

The Sebastopol stock in Britain was augmented in the later twentieth century with imports from both the United States and Europe. The APA *Standard of Perfection* recognized the Sebastopol in 1938. The ALBC survey of 2000 located 645 breeding geese in three large breeding flocks.



Critical

### *American Buff*

This Buff goose was developed somewhere in North America either from common gray farm geese or from European-imported, buff-colored birds. In 1947, it was admitted to the APA *Standard of Perfection*. It was also exported to Britain, where it is still available as a heavy goose. In Britain, the American Buff is larger than the Brecon Buff and is distinguished from it by its orange bill.

American Buffs are colored in shades of light fawn to dark buff with white underparts. Too much white coloration or any gray is not desirable. The bill and legs are orange, but they can fade to pink. The large body is deep from the back to the egg pouch, but there is no keel. The American Buff is heavier in appearance and has a more upright carriage than the Brecon Buff. The adult gander weighs about 18 pounds and the goose about 16 pounds. It is a double-lobed breed, with two round fatty areas on its abdomen.

Primarily an ornamental or exhibition bird, the American Buff was never an important commercial breed, but it produces both meat and eggs. Buffs do tend to be well-behaved birds and good parents.

It can be difficult to obtain Buff geese from hatcheries, and buyers should take some care in private purchases because buff coloration can occur in other breeds or non-purebred birds. The ALBC could locate only one major flock, a dozen or so small flocks, and some 380 breeding birds in its most recent survey.



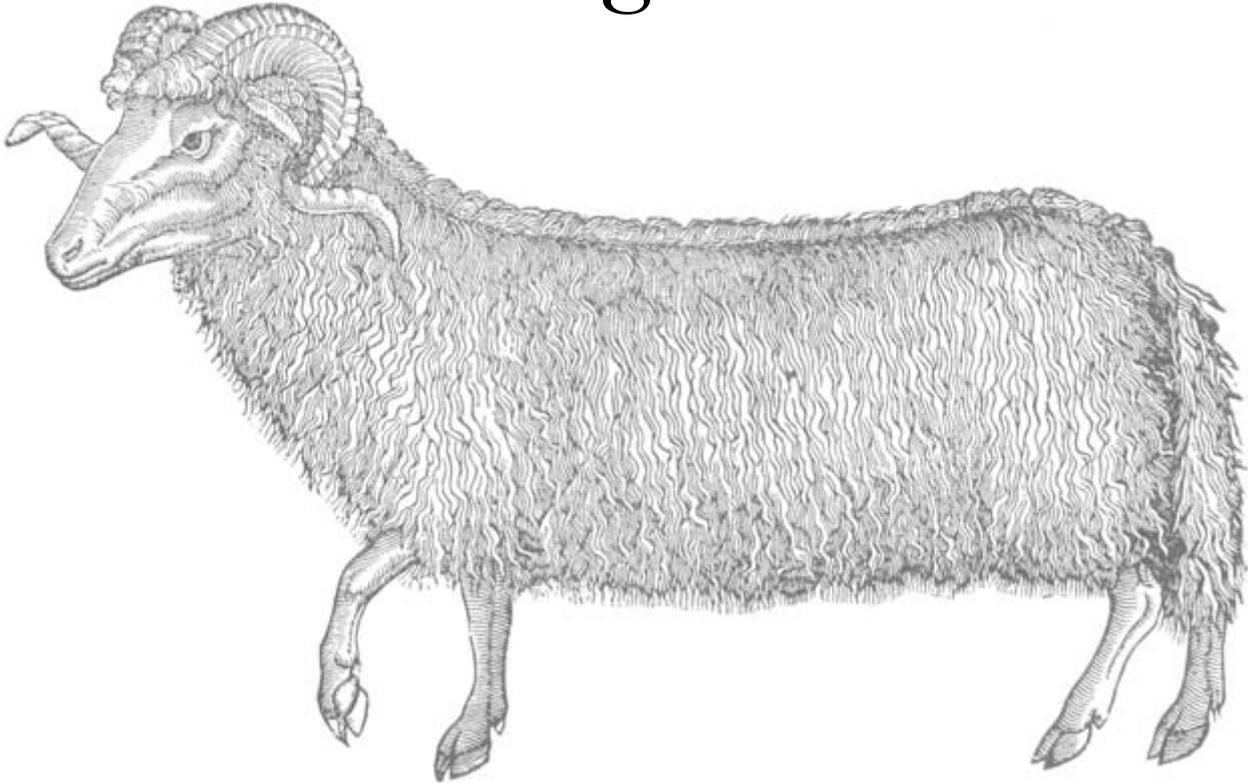
Critical

### *Brecon Buff (pl. 160)*

This Welsh goose was not seen outside of Breconshire until later in the twentieth century and remains very much a minor breed. A dual-purpose bird, the Brecon is shaded from white on the underparts to light buff on the chest. The head, neck, back, thighs, and wings are colored in shades of darker buff. The bill and legs are a rosy pink, not orange. The Brecon Buff carries itself at about a 35 degree angle. The keel, or breastbone, is small, not large as in the Toulouse. The gander weighs up to 20 pounds and the goose a few pounds less. Although the Buff or American Buff appears quite similar, it is a larger, heavier bird than the Brecon Buff. The Brecon Buff is not found in North America.

CHAPTER NINE

# *Preserving a Future*



Unless we do something radical today, we will be unable to do anything tomorrow.

—Jacques Cousteau

The history of humans and their domesticated animals reveals their interdependency and the sense of stewardship this special relationship engenders. Each breed's story illustrates specific agricultural, scientific, ecological, recreational, historical, and cultural reasons to conserve this domestic animal diversity. The loss of any of these breeds would diminish a biological wealth and heritage that has developed over thousands of years. Any loss would diminish the richness of life itself.

Some of these endangered or historic breeds offer resistance to future potential threats from disease or to today's genetic problems confronting production stock. Others offer real value in alternate methods of agriculture, especially the grass- or forage-based systems that lie in opposition to the rapid-growth or grain-fueled techniques that often support production strains or crossbreeds. Most rare breeds can fit very well into systems of sustainable agriculture. The growing awareness of the need to conserve the land, prevent water pollution, and reduce the use of chemical fertilizers, herbicides, and pesticides is focusing new attention on sustainable or alternate methods of agriculture. Likewise, animal welfare group demands and consumer fears concerning food safety are becoming increasingly important trends for farmers to heed. The rare breeds can be most useful in responding to both legislated and nonlegislated requirements that satisfy these multiple developments (fig. 75).

Farmers have long understood the requirement to fine-tune their stock to their land, something that Wendell Berry has described as "letting the farm judge" (1996, 97). English, Welsh, and Scottish sheep farmers understood this need when they developed more than sixty distinct breeds and additional specific crossbreeds of sheep on an island the size of one medium-sized American state. Each breed was particularly well-suited to the climate, the geography, and the preferences and needs of those farmers in one area. Adaptation rather than standardization proved to be the more profitable path. Standardization is especially dangerous when the industrialized nations export their highly specialized, production breeds to developing countries, where these animals not only supplant the highly

adapted, indigenous breeds but cannot be supported by the required levels of technology. Further, Western stock generally lacks resistance to tropical and subtropical parasites and diseases.

The plight of the rare and historic breeds today exposes both the problems that confront them and their relative states of endangerment. The question then becomes how to best conserve these breeds and others. Many approaches to this conservation effort exist, but they can be divided into two general categories: *utilizationist* and *preservationist*.

The utilizationist believes in maintaining the useful genes in breeding populations so that they are available for improving commercial stocks. Poultry and swine seedstock producers maintain representative groups for this purpose. This tactic requires identification of useful traits and their maintenance through careful breeding programs. Strict utilizationists do not believe that it is necessary to conserve breeds but only their desirable genes. They see no reason to conserve breeds that have not been used to develop or improve the current commercial stocks or breeds that seemingly have no unique or desirable trait. Conservation of a desired gene pool or composite of breeds through crossbreeding does require fewer resources, both financial and physical. Commercial agribusiness, agricultural specialists, and government agencies often advocate this approach.

One of the problems with this approach is that a particular combination of genes that comprise a trait or group of traits, once lost, would not be readily available but would need to be redeveloped if desired in the future. This might or might not be successful. In fact, no amount of backcrossing can exactly re-create a desired breed. The desired characteristic may also be caused by the interaction of a number of genes. They may be recessive or masked by other alleles. Most important, it is impossible to predict which traits will become valuable or needed in the future. These desirable traits may be lost through genetic drift or dilution through other mating systems.

The advantage of conserving an intact breed should be self-evident. Pure breeds possess a defined group of characteristics within an accepted range, includ-

[To view this image, refer to the print version of this title.]

Fig. 75 Plowing with three draft mules in northern Illinois in 1992. Photography by Robert Mischka.

ing physical appearance, production traits or abilities, behaviors, and adaptation success in a certain environment. These traits evolved subject to nonreproducible pressures and from unknown or no longer surviving ancestors. These combinations are predictable and quickly accessible through purebred offspring. Strict genetic purity also produces the powerful hybrid effect when purebreds are crossbred or even when purebred lines within a breed are crossed. Dilution of the parent breeds rapidly reduces this effect.

The conservation of separate breeds and their own varieties, lines, or strains is definitely preservationist in approach. Carefully designed breeding programs can preserve the widest possible genetic diversity while allowing the population of a breed to adapt to environmental conditions or disease challenges.

Wildlife conservationists debate the merits of *ex situ* or *in situ* methods of preservation. *In situ* conser-

vation occurs in the natural habitat of the animal. For domestic animals, this means preservation of breeds in real world situations where they are expected to produce or perform while meeting the challenges of foraging, disease, and climate.

*Ex situ* means that the animal is protected out of its normal habitat. Although this method of preservation can occur in managed breeding groups, it also includes the cryogenic preservation of semen, ova, embryos, or DNA samples. The preservation of semen, ova, or embryos can be valuable for rare breeds especially when the population has fallen to low numbers, is widely separated geographically, or is suffering from increasing introgression. The use of these methods is more successful for large animals, such as cattle and horses, although the success varies widely from individual to individual. Certain lines of bulls are so successful at producing viable semen for preservation that the cattle industry has come to use them heavily. In effect, semen viability has become a selection trait. It is very difficult to collect ova or embryos for sheep or

goats. Material from swine or poultry is not yet successfully preserved at the same rates of success or at all. The preservation of DNA is also based on possible future developments that would enable this material to be used.

Governmental agencies such as the USDA have chosen to invest in this technological approach, including gene mapping and germ plasm storage, without addressing the reality that all the diversity or the members of each breed or strain can simply not be preserved through such methods. Stored materials can never reconstitute a breed. Cryogenic storage does not conserve the relative frequency of genes, and it is biased by the selection of which animals are collected. In addition, cryogenically stored materials do not develop responses to changes in disease or environment, nor can they be studied or monitored. Already semen stored in some European banks is considered unsafe by health regulations and therefore may never be used. Finally, such conservation is extremely susceptible to loss through accidents.

Cryogenic storage is a useful adjunct to but never a replacement for live animal breed preservation programs. In the past, government stud farms, subsidized operations, university research stocks, or individual breeders often conserved breeds. Government-sponsored breeding or stud farms, although widespread in Europe, were never widely used in Canada or the United States other than for the raising of horses for the cavalry, military, or police. The Canadian government has subsidized some heritage breeds in the past, such as the *Canadienne*, but this support has eroded due to budget pressures. Today in the United Kingdom, subsidies are generally linked to specific forms of production or use of lesser-value lands. In the United States, agricultural livestock subsidies have mainly been eliminated and were never breed specific. The only livestock animals the United States government has ever supported were the Morgan horse, Texas Longhorn, and feral Mustang.

The recent foot-and-mouth epidemic in the United Kingdom lends strong support to the *ex situ* preservation of native breeds through the establishment of more breeding groups at different sites. Some of the

most devastated rural areas include the native home farms of such breeds as the Hebridean, Herdwick, Manx Loghtan, Whitefaced Woodland, and Castlemilk Moorit sheep, British Lop and Gloucestershire Old Spots pigs, and Galloway, Devon, and Dexter cattle. At this stage of the epidemic, in early summer 2001, it is impossible to assess the ultimate damage that has been inflicted on these or other breeds. The heavy burden on the farm family itself is almost incomprehensible, especially where the same family has raised flocks or herds for three or more generations.

The conservation of domestic animal diversity and native breeds was included in the International Convention on Biological Diversity, popularly known as the Rio Summit, in 1992. Unfortunately, the United States government was not a signatory to the accord. The proposition that nations have a responsibility to preserve their livestock and poultry resources has achieved some recognition with many national governments and international wildlife organizations. Domestic animal diversity is also supported by the activities of the United Nations Food and Agriculture Organization.

The FAO's Global Information System for Domestic Animal Diversity and the World Watch List for Domestic Animal Diversity inventory national breeds and support *in situ* conservation of indigenous stocks. The FAO plans to establish cryogenic semen and embryo banks, assist with DNA analysis of native breeds, and facilitate the exchange of necessary animals, sperm, and embryos. The FAO supports the use and development of indigenous breeds. It also promotes sustainable agriculture practices, not the adoption of high-input, imported breeds.

In North America, the large agricultural universities were once important conservators and researchers of pure breeds and strains. This approach has mainly been abandoned in favor of commercial conservation of gene pools or crossbred strains. In 1997, Utah State University asked the renowned and vitally important Navajo Sheep Project to find a new home. Even more disastrous is the frequent solution to the dispersal of university herds or flocks by sending them to slaughter. Fortunately, private nonprofit organizations such as the American Livestock Breeds Conservancy and Rare

[To view this image, refer to the print version of this title.]

Fig. 76 The Budweiser Clydesdales have served as tremendous ambassadors for their breed. The corporate and family support of the Clydesdale has been invaluable to their successful survival. Photograph courtesy of Anheuser-Busch, Inc.

Breeds Canada have been able to rescue some of these stocks (fig. 76).

Britain's Rare Breeds Survival Trust was the first such livestock conservation organization, and its programs are as varied as its membership. In addition to individual contributions, corporate donations and

sponsorships have been valuable in supporting its programs. As an organization, it has directly rescued threatened animals and established breeding groups. The RBST also facilitates cooperation among breeders, provides workshops, seminars, and conferences to breeders, monitors both populations and bloodlines, conducts research programs, and maintains bull and boar semen banks. It has aided with embryo transfers and the import of needed bloodlines for some breeds. Financial incentives are offered to breeders to encourage use of selected lines or breeds.

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The RBST organized and continues to administer the *Combined Flock Book* for sheep breeds that lack registration facilities. The *Combined Flock Book* supports the breeds until they can function on their own as breed organizations. This effort has been extremely successful and can serve as a model for other national efforts.

In addition, the RBST has introduced the card-grading system for use in livestock shows rather than the traditional system of rewards often based on fashion. Instead of a single, top prize-winning animal, many animals may be judged worthy examples of their breed, thus encouraging diversity.

The RBST has also conducted a long-term campaign of public education and awareness of the need for preservation through such programs as the National Show and Sale. This has led to such efforts as the Traditional Breeds Meat Marketing Scheme and the direct marketing of rare breed wool. The RBST publishes a magazine and other printed materials to an audience that includes not only breeders but also professionals in several related fields, hobbyists, and many interested

Fig. 77 The three-year-old Gotland stallion Kokovoko Dante in harness. The small population and their breeders have been supported by the ALBC. Courtesy Leslee Bebensee of Kokovoko Farm in Kentucky.

and supportive individuals. The RBST also acts as a lobbyist for the needs and concerns of rare breeds with national governments and the European Union Commission.

In the United States, the American Livestock Breeds Conservancy has undertaken similar projects but with some different priorities. The periodic census of livestock in North America recognizes that Canada and the United States share a considerable history, a common market, and the ready exchange of genetics. In addition to standardized breeds, both Canada and the United States enjoy a wealth of landrace and feral breeds. Rare Breeds Canada and the ALBC emphasize many of these breeds as a priority for conservation (fig. 77).

Both organizations publish general interest news-

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Fig. 78 At farm parks, children can meet breeds such as this Fainting goat and Guinea hog. Courtesy Gabriella Nanci.

letters and extremely valuable handbooks to guide conservation breeders large and small. The organizations also foster a network of breeders through conferences and other educational efforts. The ALBC has developed an excellent multimedia program for use with children and other groups.

The ALBC provides registry assistance for breeds that need this service and monitors bloodlines of selected breeds. Affiliated experts can assist both breeders and breed organizations with blood-typing, DNA fingerprinting, and the development of recovery breeding programs or coordinated breeding plans. It also maintains a semen bank. The conservancy fosters contacts between groups with such related interests as sustainable agriculture and family farming. The ALBC has also stepped in to facilitate the rescue of threat-

ened breeding groups and their placement with private breeders. The ALBC has chosen not to own animals or to control breeding plans itself.

The RBC's Host Farm Program has placed many breeding groups of livestock and poultry on member-owned satellite farms. The host farm supports the breeding group and in return receives ownership of a percentage of the offspring. Breeding programs are developed and must be followed accurately. When the population increases, new satellite breeding groups can be established. The advantages of this system are enormous; it separates the populations of breeds to insure them against a natural disaster, yet it also coordinates their breeding. The animals live under different conditions, and yet they can be closely monitored and studied. Most important, it spreads the cost of maintaining the animals.

The RBC has also conducted studies of Canadian heritage breeds and supports a semen collection. Edu-

cational efforts have included the Home Farm, student internships, and cooperative efforts with like-minded conservation and sustainable agriculture organizations.

Historical sites and farm parks also make important contributions to rare breed conservation. The concept of a farm park began in 1970 at Cotswold Farm Park in England. Joe Henson's primary goal was to maintain a breeding center, and opening the farm to the public was seen as a means of financial support. Now a major undertaking, Cotswold Farm Park has supported some three hundred breeds and been closely involved in preservation breeding, all with the monetary support of 100,000 annual visitors.

This idea has been successfully copied at more than twenty other farm parks in Britain. Farm parks are members of the RBST and can earn approved status by meeting several standards, including the display of registered stock in good health, the maintenance of at least two significant breeding units, satisfactory facilities for both the animals and the visitors, and the presentation of educational information. Gift shops, tea or snack shops, picnic areas, and play areas are often included in the farm parks. Most farm parks are privately owned, but several are owned by city or borough councils, and two are operated by the National Trust.

There are a handful of similar farm parks in North America, such as Lake Farm Park in Ohio, but living history sites are more widespread. Some farm parks are operated by local, state, or provincial governments for educational and recreational purposes. Most display common breeds such as Holsteins, but a few are now focusing on the breeds that were involved in the development of agriculture, especially those that are indigenous to the local area. In this way, tourism can play a significant role in the support of rare breed conservation (fig. 78).

Historical sites are brought to life with costumed interpreters who demonstrate daily life, and livestock animals certainly played an enormous part of everyday life in the past. Authentic stock is useful for exposing visitors to the daily interactions between people and their farm animals. Historical sites search for breeds that were present in that particular time and place. This

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Fig. 79 At historical sites, tourists can experience daily life in the past. These Dark Brahma chickens are found at Firestone Farm, the childhood home of Henry Firestone, founder of Firestone Tire and Rubber Company. The farm, which has been moved to Greenfield Village, represents the year 1882 in east-central Ohio. Courtesy Henry Ford Museum and Greenfield Village.

can be so difficult that many sites have become involved in breeding their own stock. Some sites have chosen to re-create the phenotypically correct stock by back-breeding, while others have sought out heritage stock from distant locations and arranged for imports. Some of these sites have played vital roles in saving historic breeds. Historical sites can be privately owned but are generally supported by governmental units (fig. 79).

Purebred breed organizations and their members are not only an essential component of this work but often the single most important tool for breed conservation. Breed associations, societies, and registries maintain the valuable pedigrees and verify the registration

of new stock. They educate their members, promote the attributes of the breed, and assist the members with marketing. Through their combined resources, they are able to support the use of expensive technologies. Most associations also foster breed improvement, often through national championship shows.

This last mission can be detrimental to preservation. Breed shows do serve a valuable function in promoting the breed, allowing raisers to view each other's stock, make comparisons with their own, and obtain new animals or arrange for breedings. But focusing on fads, rewarding only one type, and breeding mostly to recognized champions all affect the breed's genetic variation and phenotypic variability. Crossbreeding, either permissible or encouraged by a breed association, definitely causes introgression and dilution. Adhering to a tightly drawn standard that eliminates purebred individuals based on slight imperfections or minor color variations can also be very detrimental.

Breed registries can resist these influences when they focus on serving the breed, not the breeder. Just as every individual breeder holds a small portion of the breed gene pool, so he or she bases his or her selection on slightly different needs and beliefs about the most effective or attractive type within the breed. The registry needs continually to remind itself and its members that all accepted types and variations are part of the breed. They are all essential to maintaining the genetic variation that gave rise to the traits that first drew all the breeders together. There is a great temptation within the governing boards of associations to represent the breeders; instead, the breeders and their representatives must continually remind themselves that they are safeguarding their greatest treasure. They are in fact the *stewards* of their breed.

Individual breeders must also work hard at becoming good breed stewards. The stories of many of the breeds in this book reveal how one dedicated individual, a family, or a small group persisted in caring for the last members of a breed until their efforts were recognized. The belief and actions of one individual can enable a breed to survive through periods of unfashionability or temporarily uneconomic conditions. In some cases, the farmer was motivated by the mar-

velous adaption of his breed, strain, or landrace type to a particular locale. At other times this determination was fueled primarily by family tradition, and there are certainly cases that can be explained only by great attachment to a breed (fig. 80).

Breeders contribute their time, finances, physical effort, and knowledge to maintaining a breed. They resist the pressures to adopt multicrosses and complex lines to continually breed purebred animals. Many individual breeders are struggling today, especially those who are conserving the extremely rare breeds with very small populations. Because their breeds are not generally commercially viable at present, many of these breeders need financial aid and increased support in coordinating their breeding programs.

There are responsibilities in breed stewardship. Foremost is the preservation of the breed's functionality, integrity, and purity. The need to maintain scrupulous records and resist illicit introductions of outside blood is paramount. The breeders must also educate themselves on the characteristics, traits, acceptable types, and abilities of their chosen breed. They must be vigilant in culling animals that have serious deficiencies, congenital faults, or are atypical of their breed. Owners of historic or minor breeds also need to avoid the hype that comes with the use of such descriptions as exotic, ancient, old world, and even endangered or rare.

Breeders obviously need to remain financially solvent. The farm must be supported by the sale of products, and surplus stock must be sold. Decisions about culling and slaughter are important and necessary. Placement of breeding stock is also important. Careful thought must be given when stock is sold into situations in which the animals will be placed out of the breeding pool.

The experiences of longtime breeders or mentors are invaluable to new breeders who receive this baton of breed stewardship. When these new breeders have no rural experience, they also need educational support. Joining both conservation and breed groups is the first step for the potential owner and breeder.

Last, concerned individuals who own no animals can still play a major role in conservation. The majority

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of the members of the rare breeds conservation groups do not breed animals, but they do value their historical contributions and aesthetic variety. They treasure both the connection to the past and the marvelous diversity of these animals. Their financial support is also very helpful to the conservation and rescue groups.

We can all help in other ways. As author Robin Mather urges, “Vote with your buck” (1995, 175). There are several ways to do this. Purchase fiber, fiber goods, or food products from local farmers or those that use forage-based, grass-fed, or free-range methods. Taste the difference in truly fresh meat and eggs or meat from different breeds. Experiment with goat meat and cheeses, lamb, or duck. If possible, purchase products directly from local or family farms, the raisers receive much more of the profit. Consumers must question the wisdom of allowing a few multinational corporations to control the bulk of the food

Fig. 80 *From left to right*, Dartmoor ponies Farnley Dude, Farnley Lady Fair, and Farnley Gabrielle, with their young riders. Photograph by Cynthia Brann.

sources of such vital products as chicken, turkey, and pork.

Yes, not all cows are black-and-white Holsteins and most pigs are not pink. Pigs can have curly hair or spots. Cows can carry long, graceful horns or lend their shoulders to the yoke. Chickens, ducks, and geese can wear a spectrum of glorious shaded feathers. Turkeys were not meant to grow to monstrous size. Sheep can have no wool or wool in rich colors. Some sheep have two, four, or even six horns. And there are many, many marvelously different and unique animals that should be found down in the farmyard.



## *Selected Organizations and Journals*

### **Organizations**

These organizations are the primary source of information about rare breeds of livestock. Most of these organizations have helpful materials available for purchase on a variety of topics. Because addresses change, the most current source of referrals to breed organizations and breeders can be found through the publications of the national rare breeds groups. Information about many of these groups and breed organizations can also be found online on the World Wide Web.

Rare Breeds International  
Villa del Ragno  
Via Nomentana 134  
I-00162 Rome  
Italy  
[www.rbi.it](http://www.rbi.it)

Rare Breeds Survival Trust  
National Agricultural Centre  
Stoneleigh Park  
Warks CV8 2LG  
United Kingdom  
[www.rbst.org.uk](http://www.rbst.org.uk)

American Livestock Breeds Conservancy  
PO Box 477  
Pittsboro, NC 27312  
[www.albc-usa.org](http://www.albc-usa.org)

Rare Breeds Canada  
c/o Environmental and Resource Studies Program  
Trent University  
1600 West Bank Dr.  
Peterborough, ON K9J 7B8  
Canada  
[www.trentu.ca/rarebreedscanada/](http://www.trentu.ca/rarebreedscanada/)

American Poultry Association  
Lorna Rhodes, Secretary  
133 Millville St.  
Mendon, MA 01756  
[www.ampltya.com](http://www.ampltya.com)

Breeds of Livestock Project  
Oklahoma State University  
Department of Animal Science  
[www.ansi.okstate.edu/breeds](http://www.ansi.okstate.edu/breeds)

British Waterfowl Association  
Rachel Boer, Secretary

Oaklands, Blind Ln.  
 Tanworth in Arden  
 Solihull B94 5HS  
 United Kingdom  
[www.palmiped.btinternet.co.uk/BWA.htm](http://www.palmiped.btinternet.co.uk/BWA.htm)

Domestic Animal Diversity Information System  
 Food and Agriculture Organisation of the United  
 Nations  
 Viale delle Terme di Caracalla  
 00100 Rome  
 Italy  
<http://dad.fao.org>

Domestic Fowl Trust  
 Honeybourne  
 Nr. Evesham, Worcestershire WR11 5QG  
 United Kingdom  
[www.mywebpage.net/domestic-fowl-trust](http://www.mywebpage.net/domestic-fowl-trust)

Domestic Waterfowl Club of Great Britain  
 Michael and Sylvia Hatcher, Secretaries  
 Limetree Cottage  
 Bright Walton, Newbury  
 Berks RG20 7BZ  
 United Kingdom  
[www.domestic-waterfowl.co.uk](http://www.domestic-waterfowl.co.uk)

Feathersite  
 Barry Koffler, webmaster  
[www.feathersite.com](http://www.feathersite.com)

Holderreads Waterfowl Foundation and Preservation  
 Center  
 PO Box 492  
 Corvallis, OR 97339

International Waterfowl Breeder's Association  
 Julie Madden-Dixon, Secretary  
 2500 South 38th St.  
 Lincoln, NE 68506  
[www.alltel.net/~md44721](http://www.alltel.net/~md44721)

Irish Rare Breeds Group  
 c/o Dr. Brian Jones  
 Derk  
 Dromard, County Sligo  
 Ireland  
<http://acer.gen.tcd.ie/igret/breeds.html>

Kerr Center for Sustainable Agriculture, Inc.  
 PO Box 588  
 Poteau, OK 74953  
[www.kerrcenter.com](http://www.kerrcenter.com)

New England Heritage Breeds Conservancy  
 PO Box 20  
 Richmond, MA 01254  
[www.nehbc.org](http://www.nehbc.org)

Poultry Club of Great Britain  
 Mike Clark, Secretary  
 30 Grosvenor Rd.  
 Frampton, Boston  
 Lincs PE20 10B  
 United Kingdom  
[www.poultryclub.org](http://www.poultryclub.org)

Rare Poultry Society  
 R. J. Billson, Secretary  
 Alexandra Cottage, 8 St. Thomas's Rd.  
 Great Glen, Leics LE8 0EG  
 United Kingdom

Rural Heritage  
[www.ruralheritage.com/index.htm](http://www.ruralheritage.com/index.htm)

Society for the Preservation of Poultry Antiquities  
 Glenn Downs, Secretary  
 1878 230th St.  
 Calamus, IA 52729  
[www.feathersite.com/Poultry/SPPA/SPPA.html](http://www.feathersite.com/Poultry/SPPA/SPPA.html)

Standard Turkey Preservation Association  
 Sheane and Bonnie Meikle  
 Box 7, Site 6, RR 2

Ponoka, AB T4J 1R2  
Canada

## Journals

The following periodicals are particularly valuable sources of information on rare breeds and their husbandry.

*American Livestock Breeds Conservancy News*. Published by the American Livestock Breeds Conservancy, PO Box 477, Pittsboro, NC 27312

*The Ark*. Rare Breeds Survival Trust, National Agricultural Centre, Stoneleigh Park, Warks CV8 2LG United Kingdom

*Country Smallholding*. Buritan House, 120 Station Rd., Newport, Saffron Walden, Essex CB11 3PL United Kingdom

*Genesis*. Rare Breeds Canada, Trent University, Environmental and Resource Studies Program, Peterborough, ON K9J 7B8 Canada

*Rural Heritage*. 281 Dean Ridge La., Gainesboro, TN 38562

*Small Farm Today*. 3903 W. Ridge Trail Rd., Clark, MO 65243-9525

*Smallholder*. Smallholder Publications Ltd., High St., Stoke Ferry, King's Lynn, Norfolk PE33 9SF United Kingdom

APPENDIX TWO

## *Where to See Rare and Historical Breeds*

### **Great Britain**

A list of nineteen Approved Farm Parks is available from the Rare Breeds Survival Trust: [www.rbst.org.uk/html/approved\\_centres.html](http://www.rbst.org.uk/html/approved_centres.html)

Blue Ridge Institute and Museum  
Ferrum College  
PO Box 1000  
Ferrum, VA 24088-9000  
[www.blueridgeinstitute.org](http://www.blueridgeinstitute.org)

### **North American Farm Parks and Living History Farms**

This is a partial listing of some noteworthy programs. For a comprehensive directory of living history sites, visit: [www.alhfam.org/alhfam.links.html](http://www.alhfam.org/alhfam.links.html)

Association for Living History, Farm and Agricultural  
Museums

Judith Sheridan, Secretary  
8774 Route 45 NW  
North Bloomfield, OH 44450  
[www.alhfam.org/welcome.html](http://www.alhfam.org/welcome.html)

Billings Farm and Museum  
PO Box 489  
Woodstock, VT 05091-0489  
[www.billingsfarm.org](http://www.billingsfarm.org)

Colonial Williamsburg Foundation  
PO Box 1776  
Williamsburg, VA 23187-1776  
[www.history.org](http://www.history.org)

The Farm Park  
RR 1  
Long Sault, ON K0C 1P0  
Canada

Florida Agricultural Museum  
Princess Place Rd.  
Palm Coast, FL 32137  
[www.flaglercounty.org/agrimuseum/agril.htm](http://www.flaglercounty.org/agrimuseum/agril.htm)

French Farm  
516 Lake Ave.  
Greenwich, CT 06830

Frontier Culture Museum  
PO Box 810  
Staunton, VA 24402-0810  
[www.frontiermuseum.org](http://www.frontiermuseum.org)

Garfield Farm Museum  
PO Box 403  
LaFox, IL 60147  
[www.foxvalley.elnet.com/-garfarm/](http://www.foxvalley.elnet.com/-garfarm/)

Hamilton Rare Breeds Foundation  
PO Box 282  
174 Advent Hill Rd.  
Hartland, VT 05048

Hancock Shaker Village  
PO Box 927  
Pittsfield, MA 01202-0927  
[www.hancockshakervillage.org](http://www.hancockshakervillage.org)

Mount Vernon  
Mount Vernon Ladies' Association  
PO Box 110  
Mount Vernon, VA 22121  
[www.mountvernon.org](http://www.mountvernon.org)

Kelmscott Farm and Kelmscott Rare Breeds  
Foundation  
RR 2, Box 365  
Lincolnton, MA 04849-9626  
[www.kelmscott.org](http://www.kelmscott.org)

Lake Farm Park  
8800 Chardon Rd.  
Kirtland, OH 44094

Old Sturbridge Village  
1 Old Sturbridge Village Rd.  
Sturbridge, MA 01566  
[www.osv.org](http://www.osv.org)

Overstreet-Kerr Historical Farm  
Rt 2, Box 693  
Keota, OK 74941  
[www.kerrcenter.com/overst.htm](http://www.kerrcenter.com/overst.htm)

Plimoth Plantation  
PO Box 1620  
Plymouth, MA 02362  
[www.plimoth.org](http://www.plimoth.org)

El Rancho de las Golondrinas  
334 Los Pinos Rd.  
Sante Fe, NM 87505  
[www.golondrinas.org](http://www.golondrinas.org)

Shaker Village of Pleasant Hill  
3501 Lexington Rd.  
Harrodsburg, KY 40330  
[www.shakervillageky.org](http://www.shakervillageky.org)

Wilding Heritage Farm  
1980 Koksilah Rd.  
Cowichan Bay, BC V0R 1N0  
Canada



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