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EUROPEAN BREEDS OF CATTLE

VOLUME II



BJU.XK

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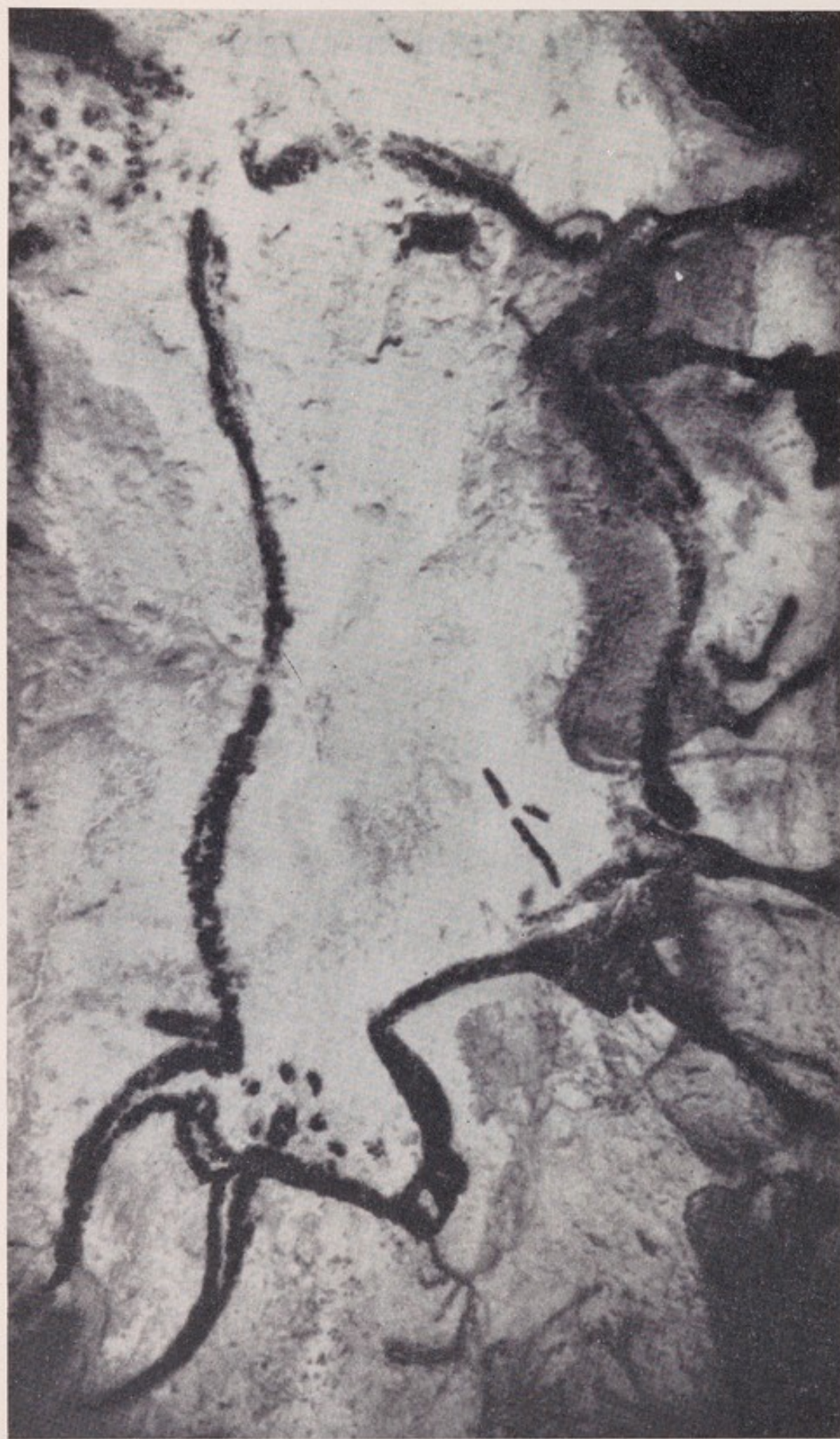
Sheep with lambs on Alpine pastures.

Courtesy Kocher



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EUROPEAN BREEDS OF CATTLE



Drawing from the cave at Lascaux, France.

PREPARE

EUROPEAN BREEDS OF CATTLE

Volume II

Prepared by

M. H. FRENCH

in association with

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and

E. A. McLAUGHLIN

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

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PREFACE

"The glorious uncertainty of animal breeding" was once the prerogative of a wealthy few whereas, today, an augmentation of cattle productivity has become the economic spur for thousands of dairy and beef farmers throughout Europe. Unfortunately, improvement through breeding is frequently so far in advance of practical potentials that many enthusiastic attempts to introduce genetic ameliorations into inadequate nutritional and management regimes have ended disastrously. Body conformation, physiological characteristics and productive ability have segregated in the different breeds in conformity with the environmental circumstances with which they have been equilibrated. In addition, man has selected for polygenic, quantitative characters and has elaborated a number of breeds and strains with distinguishing external and productive traits.

Breeds are, in fact, small units isolated from the rest of the population. They have genes common to the species at large but which, because of selection in different nutritional and ecological niches, have aggregated into groups with restricted ranges of variability. Inevitably, breeds may differ widely or may so overlap in functional characteristics that there is more variation between individuals within a breed than there is between the averages of two breeds. This differentiation becomes more complicated as man-made social and economic factors are imposed on biological, climatic, nutritional, edaphic and other influences. Improvements in feeding, housing and management have permitted certain breeds to develop in areas where this would have been impossible 50 years ago. With the wider expansion of modern knowledge of feeding and management, the factors which favored the segregation of many different breed entities are steadily being removed and this makes it possible to introduce larger and more productive breeds. Many examples of these changes are to be seen in the Mediterranean and eastern European countries.

One can still encounter in Europe the shifting cultivation and the extensive degenerated fallow systems in which oxen do the bulk of the work, where cows are used for breeding replacements for work oxen and where beef is a low-quality product from unwanted

or worn-out animals, e.g., the Alentejo and Berrenda breeds in Portugal and Spain. The tractor has taken over in the flatter, more fertile land but oxen are still retained where holdings are badly fragmented or where topography prevents the economic use of mechanized equipment, e.g., the Pugliese and Mértola breeds of Italy and Portugal. The same breeds may be encountered in different sizes according to the fertility of the soil, as with the Chiana in Italy and the Black Andalusian in Spain. Feeding is responsible for marked differences in body dimensions and in productivity as, for example, occurs with Buša cattle in Yugoslavia and Greece. In other cases, milk/draft or milk/meat breeds, such as in the Modena and Piedmont breeds of Italy, have replaced the older triple-purpose animals. As with the replacement of the Asturian breed in Spain or the Steppe cattle in Turkey by Brown Swiss, local types have been graded to dual-purpose milk/meat animals. In other areas, particularly peri-urban environs, upgrading with the Friesian has turned the local breed into milk producers.

Attempts to replace indigenous by new breeds are conditioned by the ability of the latter to adapt to the new environment. It is often insufficiently appreciated that different breeds do not react equally to changes in habitat, so that a breed which is disease-resistant and highly productive in one locality may not be so in another. Furthermore, no matter how adaptable a breed may be, it will not be productive if its feeding is inadequate in quantity or quality.

The stratification of the cattle industries is illustrated by the changing husbandry patterns. There is the summer nomadism to higher altitude communal grazings and the return in winter to stall-feeding at lower elevations on crop residues and conserved fodders, such as occurs in Switzerland. Alternately, the restricted summer grazing period may be a relatively short respite from the long period of stall-feeding enforced by the cold of the northern U.S.S.R. Hill grazings may suffice for the slow growth of beef animals but, for finishing, these stores must be moved to lower, more nutritious pastures. This system contrasts fundamentally with the intensive production, in confinement, of baby beef. In the dairy herds, stratification is also encountered from the intensive, artificially maintained, peri-urban herds to the summer grazing and winter stall-feeding systems on most dairy farms and to the summer grazing and milk-producing period, which alternates with stall-feeding for maintenance only during the winter.

In some countries such as Italy, male calves unwanted for breeding purposes are used for veal production and even in traditionally more pronounced beef-eating countries, such as the United Kingdom,

the percentage of calves slaughtered for veal is surprisingly high. Logically, a more efficient use of these animals would be to feed them intensively to baby beef or higher liveweights, but human population feeding habits change slowly. Nevertheless, the living conditions in this century are altering so fundamentally that traditional dietaries are having to be modified and there must, eventually, be a swing away from the early slaughter of animals that could more profitably be used at larger liveweights.

In a number of the lesser developed countries, the losses from calf mortality are still astonishingly high and much could be done to increase beef outputs by a correction of these faults and the rearing of the saved animals.

Rising incomes and standards of education are combining with increases in population numbers, changing social habits and methods of living to influence significantly the consumer demand for beef. This change is stimulating important alterations in national husbandry programs and in international meat trades. Consumer tastes for smaller joints, leaner and more tender meat, at prices within their purchasing powers, have accelerated production practices and this, in turn, has decreased labor costs. Changes from the traditional joints of the past and the current unwillingness to chew tough meat emphasize the necessity for early beef, particularly if the latter is to compete successfully with broilers and pork.

Increased consumption of milk and its products has now progressed to the point where the advantages secured will not willingly be lost. Consequently, the attempt to increase beef production naturally envisages the use of surplus stock from the national dairy herds. Beef from culled and aged cows must continue. The increasing utilization of mechanized equipment for farm operations has reduced the demand for work oxen. Similarly, the improvements in health and productivity have reduced the annual replacements required by the dairy herd, so that more heifers are available with the steers for beef production. The beef yield and quality can be raised in these surplus cattle by using beef sires on certain dairy cows and in the case of others, such as the Friesian, of using sires which transmit the necessary milk-producing characters to their daughters and, at the same time, confer superior fleshing ability on their offspring.

The introduction and satisfactory proving of the value of artificial insemination in fairly large populations has been an important development of this century. It has permitted the evaluation of dairy sires on scale and with an accuracy never before possible but its adoption has not yet become sufficiently uniform throughout the

countries of Europe. On the beef side, there has been less correlation of progeny carcase quality and quantity with individual sires, as there appears to be a much lower relationship between external measurements and carcase characters than would have been imagined from the past judging of fat animals.

With the dissemination of better health control, feeding and husbandry practices, many of the smaller local breeds, because of their low genetic ceilings, are being bred to more productive breeds from the same or other countries. Quite possibly these lower productive breeds, which are being submerged, possess certain genetic characters which are absent from the more productive animals which are displacing them. It is possible that much of this genetic material is really not worth preservation but, because of the risk that some useful characters may be lost for ever, there is justification for establishing germ plasm banks and for the institution of experimental work to determine whether the introduction of fresh genes into modern high-producing breeds could be justified economically. These are long-term projects and fairly costly but the risk remains that, even if germ plasm reservoirs are collected now, they will be discarded as interest focuses on new breed introductions and the economic circumstances with which they are surrounded.

Although cattle domestication occurred more than 6,000 years ago, the details of how this was achieved are lost in the unrecorded past. It is known, however, that European wild cattle, *Bos primigenius*, was absent from or rare in the Lower Pleistocene, more frequent in the great Interglacial period, and became common after the end of the Ice Age. This species at one time spread from Siberia to Spain but its center of domestication has never been determined.

Within recorded time, this wild urus or aurochs slowly disappeared from western Europe and retreated to the Polish forests, where the last recorded survivor died in 1627. Although it finds no place in this book, it was mentioned in the introduction to Volume I and is again referred to because of its great contribution to the make-up of certain existing domesticated cattle breeds. The aurochs were referred to by Caesar and, at that time, inhabited the Hercynian forest which covered much of what is now Germany. Both Seneca and Pliny mentioned these animals, while the writings of others indicated how, with the passage of time, the hunting of them became prohibited and how their area of distribution slowly contracted with diminution in their numbers.

The external characters of these wild aurochs have frequently been described, though some accounts have not been made from first-hand knowledge. Bulls were large and often had very big

horns. Mertens (1906) refers to the use of horns as drinking cups and describes one which was 195 centimeters in length and held 2 liters. Aurochs were shade-loving animals and their gradual extinction was preceded by a destruction of the forests.

The best account of the aurochs now available is that of Herberstein, first published anonymously in 1549. The engraving illustrated in Figure 1 was included in that publication but was, according to Noack (1897), drawn from a stuffed hide and suffered from certain rather serious distortions. Figure 2 was originally copied from an oil painting on wood, found by Hamilton Smith in an Augsburg shop, which was believed to date from the early part of the sixteenth century. Certain drawings in the Aurignac caves at Lascaux are probably the best prehistoric representations of the wild ancestors of domesticated cattle. Zeuner (1963) states they "all belong to *Bos primigenius*" (see Figures 3 and 4).

In this second volume, it is regretted that the amount of information on the various breeds or the quality of the photographic material for each country are not uniformly presented. This is unfortunately a consequence of marked variations in the amount and type of the assistance received from the different countries and of the lower nutritive regimes to which some of the breeds are still exposed. Because of the latter, there is sometimes a tendency to refrain from mentioning these problems and to hide them due to the absence of the necessary funds to correct the situation. The more advanced countries have passed through and surmounted these difficulties and there is little doubt that the problems will be overcome in those areas where these more primitive types still exist. Nevertheless, a recording of the breeds about to be bred out will be of interest to future generations.

All breeds, even the most successful, have certain weaknesses and it is the objective of breeders to eliminate them. Furthermore, the weakness in a given breed may not appear in crossbred stock derived from it. There is always room for improvement in the temperament of the bulls of some dairy breeds or the carcass quality of a breed used for beef or the milk yield of another type. This is inherent in any livestock breeding program and should be realized by everyone.

As the land available for cattle decreases due to the greater areas which will be utilized for food and cash crops, it will be necessary to combine maximum productivity per unit of land. This may not be the same as aiming at maximum production per animal. It may not always entail the use of purebred animals but could easily result from the employment of suitable crosses, to take advantage

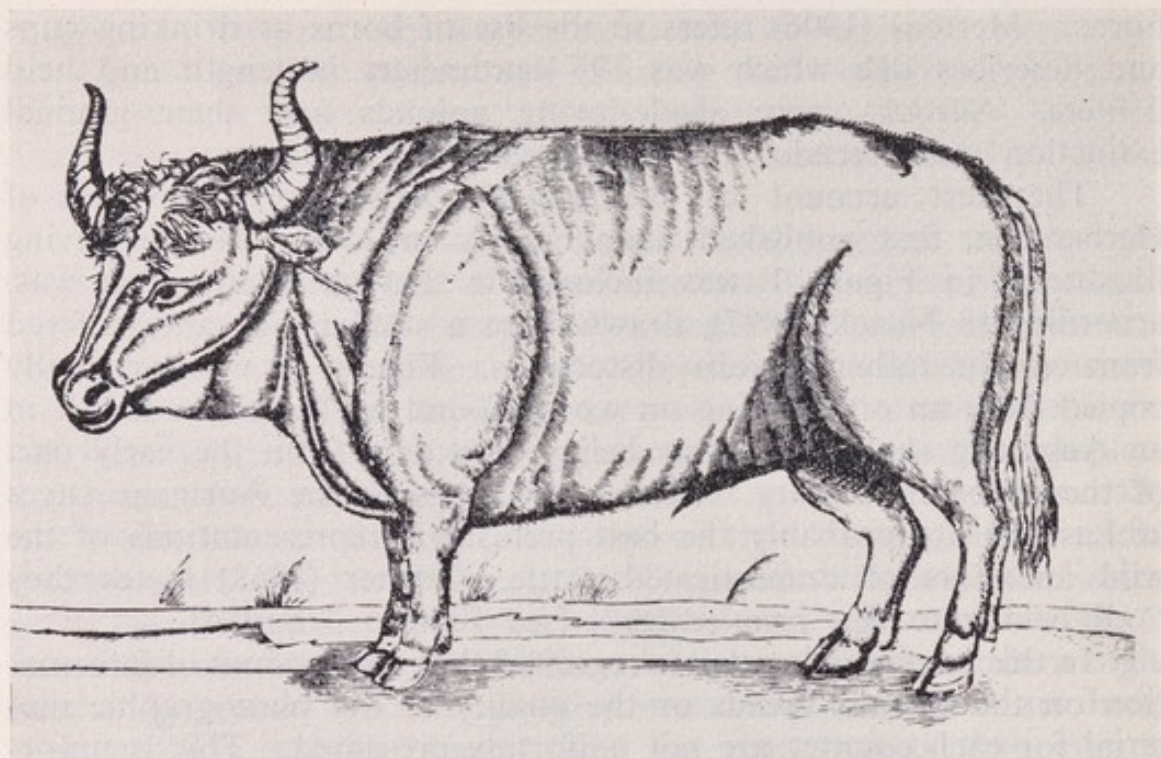


FIGURE 1. — Aurochs depicted by Herberstein, 1549.

Courtesy Hutchinson and Co. (Publishers) Ltd., London

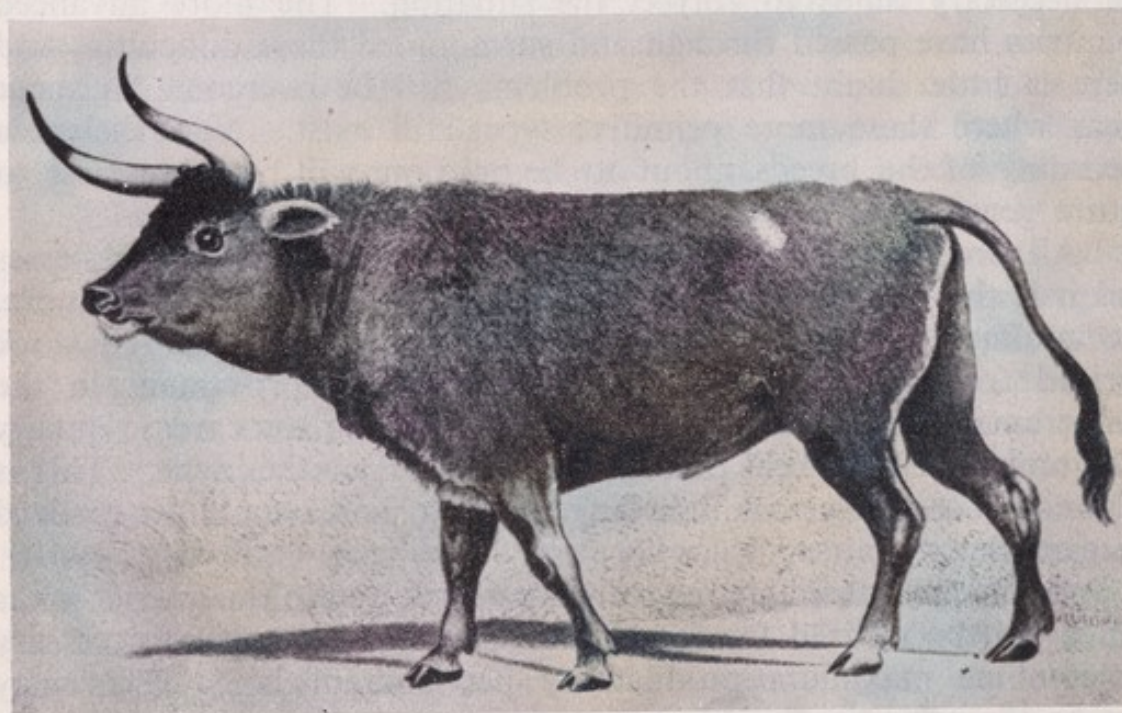


FIGURE 2. — Aurochs, based on a picture found by Hamilton Smith in an Augsburg shop and reproduced in 1827.

Courtesy Fauna Preservation Society, London

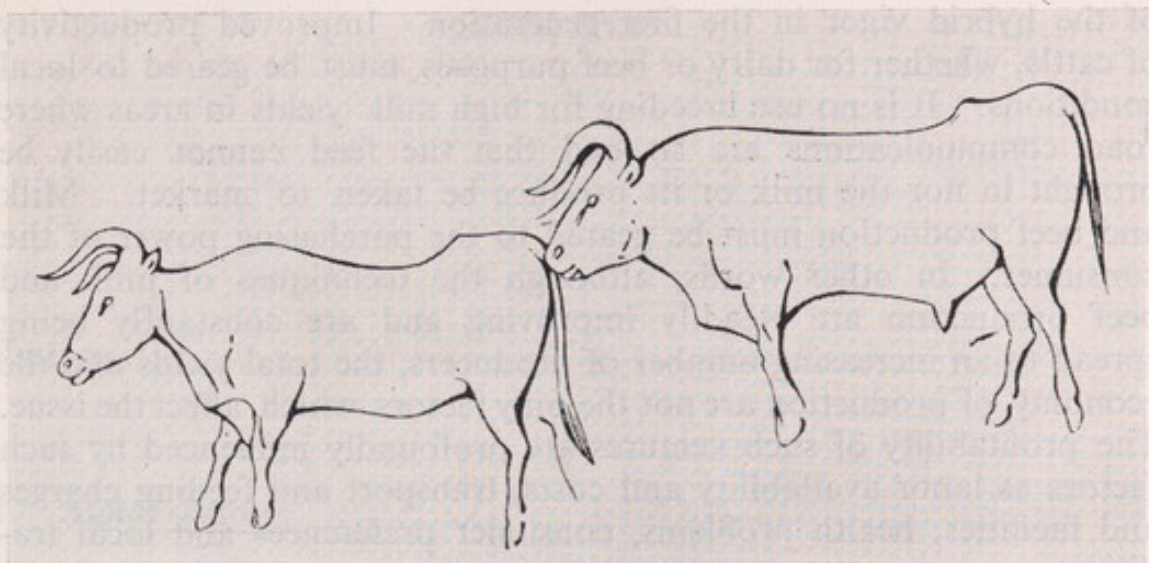


FIGURE 3. — Aurochs bull and cow. Magdalenian engraving on a stalagmite. After Breuil, from the cave at Lascaux, France.

Courtesy Hutchinson and Co. (Publishers) Ltd., London



FIGURE 4. — Red cow with black head and white stripe along the back (after Windels), from the cave at Lascaux, France.

Courtesy Hutchinson and Co. (Publishers) Ltd., London

of the hybrid vigor in the first generation. Improved productivity of cattle, whether for dairy or beef purposes, must be geared to local conditions. It is no use breeding for high milk yields in areas where road communications are so bad that the feed cannot easily be brought in nor the milk or its produce be taken to market. Milk and beef production must be geared to the purchasing power of the consumer. In other words, although the techniques of milk and beef production are steadily improving and are constantly being spread to an increasing number of producers, the total yields and the economy of production are not the only factors which affect the issue. The profitability of such ventures are profoundly influenced by such factors as labor availability and costs, transport and feeding charges and facilities, health problems, consumer preferences and local traditions.

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195.	Montafon bull	313

196.	Montafon cow	313
197.	Kholmogor bull	319
198.	Kholmogor cow	319
199.	Friesian bull	323
200.	Friesian cow	323
201.	Tagil bull	329
202.	Tagil cow	329
203.	Yaroslavl bull	332
204.	Yaroslavl cow	332
205.	Ukrainian Red bull	336
206.	Ukrainian Red cow	336
207.	Estonian Red bull	345
208.	Estonian Red cow	345
209.	Latvian Red bull	348
210.	Latvian Red cow	348
211.	Ukrainian Whitehead bull	354
212.	Ukrainian Whitehead cow	354
213.	Gorbatov Red bull	358
214.	Gorbatov Red cow	358
215.	Yurino bull	362
216.	Yurino cow	362
217.	Istoben bull	365
218.	Istoben cow	365
219.	Kostroma bull	378
220.	Kostroma cow	378
221.	Brown Swiss bull	382
222.	Brown Swiss cow	382
223.	Simmental bull	386
224.	Simmental cow	386
225.	Tambov Red bull	390
226.	Tambov Red cow	390
227.	Bestuzhev bull	393
228.	Bestuzhev cow	393
229.	Ukrainian Grey bull	396
230.	Ukrainian Grey cow	396
231.	Shorthorn bull	402
232.	Shorthorn cow	402
233.	Kalmyk bull	406
234.	Kalmyk cow	406

1. ALPINE EUROPE

SWITZERLAND

Switzerland has long been famous for its cattle and has supplied breeding stock to many other countries. One of the reasons for this successful distribution, apart from the intrinsic productive quality of the animals, derives from the healthy, hardy and active types that are necessary to cope with the wide seasonal and diurnal variations in environmental conditions and retain the ability to walk and climb considerable distances daily in search of feed.

Switzerland comprises an area of some 41,300 km², of which 9,750 km² are nonproductive (high and steep mountains, glaciers, lakes, etc.). Apart from the forested regions and extensive Alpine pastures, about 11 percent of the total surface is under arable land, of which 12 percent is sown to fodder crops and pastures. Approximately 43 percent of the country is available for grazing purposes.

The country can be divided into three main zones, namely: (i) the Jurassic region in the northwest, with mountain ridges reaching from 1,200 to 1,600 meters and with many intervening valleys; (ii) the undulating plateau area stretching from Lake Constance in the northeast to Lake Geneva in the southwest and lying at an altitude of 200 to 600 meters; and (iii) the Alpine regions in the south-central area, southern and eastern parts, which represent 58 percent of the area of the country. The altitude of the pre-Alps in the northeast does not exceed 2,500 meters, and excellent pastures are encountered in this area. In the Bernese Alps, north of the Rhone, the Finsteraarhorn rises to 4,275 meters and the Jungfrau to 4,165 meters. The largest glacier in Europe, the Aletsch Gletscher, covering 130 km², is found at this same altitude. On the Italian border, Monte Rosa attains a height of 4,640 meters, while the Matterhorn rises to 4,500 meters.

The annual rainfall is considerably influenced by altitude and by the directions of the valley slopes. Precipitation is from 700 to 900 millimeters on the central plateau, 900 to 1,500 millimeters in the Jurassic area, and 1,500 to 3,000 millimeters on the main Alpine slopes. The snow line varies, with locality, from 2,400 to 3,100-meter altitude zones. In the Alpine areas, the mean winter temperature falls to -10°C and to -2°C on the southern slopes but is

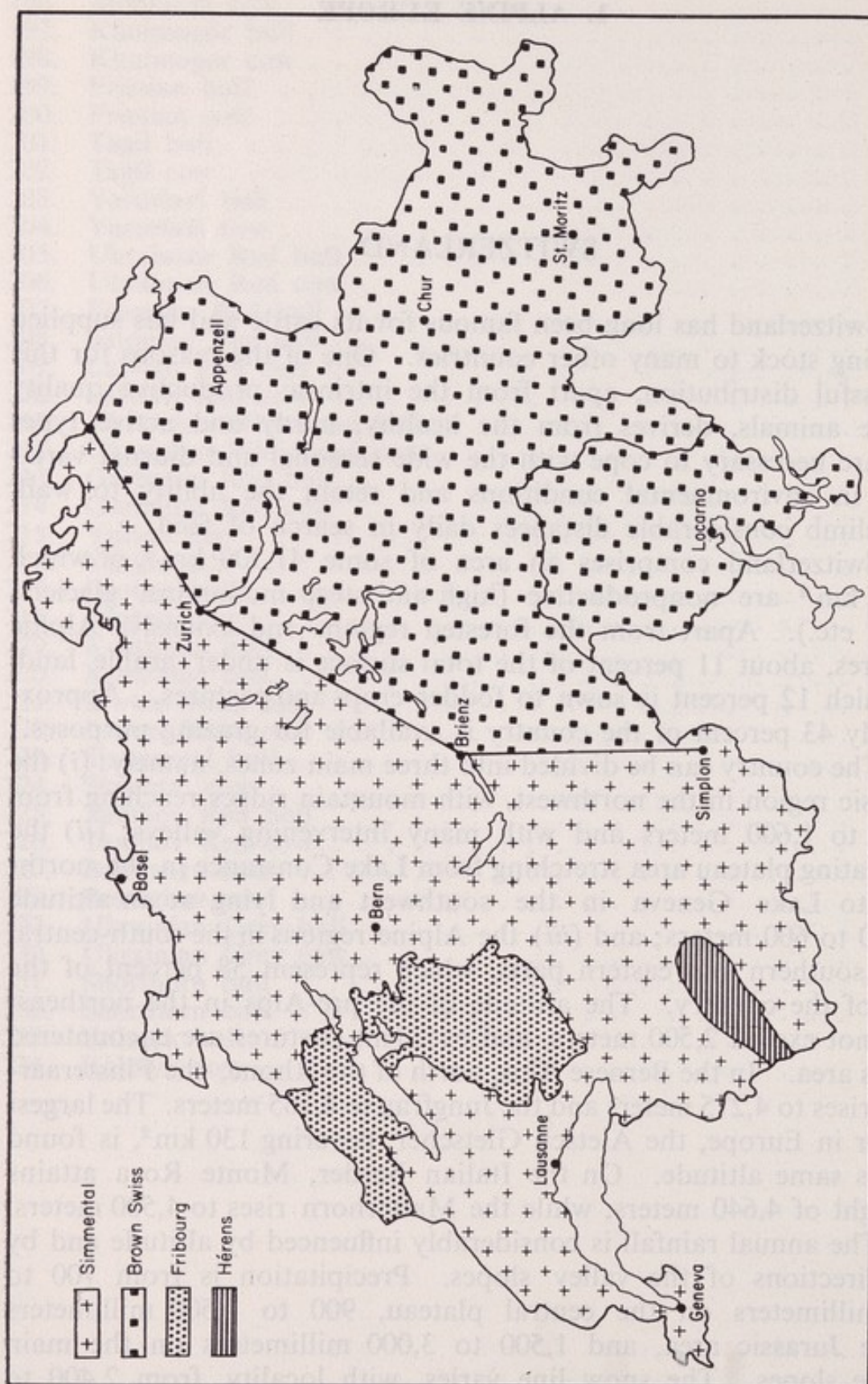


FIGURE 5. — Distribution of Swiss cattle breeds.

between 0° and 2°C on the central plateau. The July temperature averages 18°C in the central plateau but reaches only 10°C at elevations of 1,500 to 2,000 meters. The main livestock areas are in the Alps, pre-Alps and the Jura. The green hills to the north of the main mountain masses provide good pastures and are well supplied with roads — two factors which favor the production of milk and its associated cheese industry (the Emmental and Gruyère). In the plateau area between the mountain masses, agricultural activities are well developed and milk production is gaining in importance. More than 82 percent of Swiss farms are less than 20 hectares in area.

The cattle population, in 1961, was 1,760,792, composed of the breeds as shown in Table 1 (see also Figure 5).

TABLE 1. — DISTRIBUTION OF BREEDS IN SWITZERLAND

Breed	Number	Percentage
Simmental	879 530	49.9
Brown Swiss	820 056	46.6
Fribourg	25 905	1.5
Hérens	24 650	1.4
Crosses	10 651	0.6
	1 760 792	100.0

The soils and climatic conditions are favorable for pastoral exploitations, the government and Breeders' Associations are extremely active in maintaining the standards of excellence of these breeds, and even small farmers are actively engaged in producing animals of a high standard of performance.

Figure 5 shows the distribution of Swiss cattle breeds in 1946, according to the Federal Bureau of Statistics.

BREED ORGANIZATION

There is a Breed Society for each of the four breeds and in each society there are amalgamated a large number of Breed Associations. A Central Herdbook Office is established for each breed and is under the direction and supervision of the state. Each Breed Society directs activities within its own district, including milk record-

ing, shows, bull sales and advisory work, in close co-operation with the official livestock service of the Federation and the cantons. All Breed Societies are amalgamated into a Central Organization (Kommission Schweizerischer Viehzuchtverbände) for uniformity of milk recording.

Responsibility for the approval and entry of animals in the Herdbook rests with the agricultural authorities of the cantons and special committees carry out the inspections required. The Breed Associations collect the relevant data and forward the information to the central unit, where a complete record is maintained.

Milk recording started at the end of the last century but the system was unified for all breeds in 1921. Greater financial support was provided by the government and the cantons in 1958 for the encouragement of milk recording and, in 1961, 25 percent of all cows were recorded (up to 50 percent in the principal breeding districts). All cows entered in the Herdbook must be milk recorded under the supervision of inspectors or district representatives of the Breed Societies.

Progeny testing of bulls and the yearly publication of the results is the responsibility of the Breed Societies. Bulls are assessed by daughter comparisons, using at least 15 contemporary records of other cows of the same age and breed. When the daughters and their contemporaries are distributed between two or more associations, the harmonic mean is calculated for daughters and contemporaries and used as a weighting factor for calculating the average differences.

Artificial insemination has been carried out on a relatively small scale since 1948. In 1946, the Swiss Artificial Insemination Association was founded as the only organization permitted to develop A.I. breeding centers. In 1962, about 30 bulls were divided between three breeding centers and utilized for artificial insemination in connection with the progeny testing of bulls in districts where natural service comparisons would be difficult because of the small size of the herds.

Simmental

(Simmentaler Fleckvieh, Race tachetée rouge du Simmental)

ORIGIN

The breed derived its name from the Simme valley in the Bernese Oberland where red and white cattle are known to have existed in the Middle Ages and from where cattle were purchased and ex-



FIGURE 6. — Simmental bull (Chlaus MM 2074). Dam averaged 4,470 kilograms of milk in 6 lactations.

Courtesy Swiss Cattle Breeders' Association

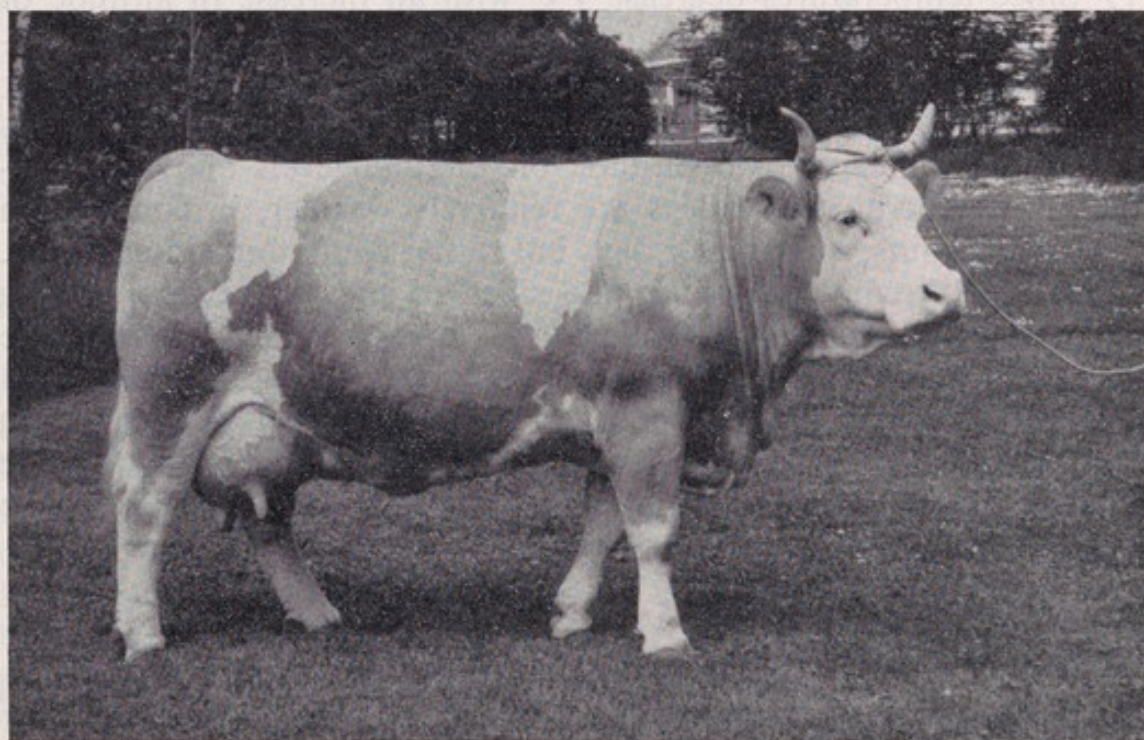


FIGURE 7. — Simmental cow (Fürst MM 2526). 3-year average: 5,696 kilograms of milk containing 4.3 percent of butterfat.

Courtesy Swiss Cattle Breeders' Association

ported to other European countries. Early in the nineteenth century these cattle, known as Berner cattle, still possessed the characters of but a slightly improved landrace and various color types existed, namely, red or black spotted and single-colored reds. Improvement measures were started and the principle of pure breeding was defined and recommended in a Government Order of 1862, Herdbook registration commenced, and the breed was identified and extended.

LOCATION, TOPOGRAPHY AND SOILS

The Simmental breed lies in the area of Switzerland to the west of the line from Lake Constance to Zurich and roughly south to the Simplon Pass. Within this area are the cultivated plains of the north and west of the country, the central region of the milk products industry (Bern and Fribourg), the Emmental valley, the pastures of the Jura and the lower slopes of the Alps in the cantons of Bern, Fribourg, Vaud and parts of Valais.

The soils vary appreciably with locality and altitude.

CLIMATE

Since temperatures decrease 1°C with an increase in altitude of about 180 meters, it is obvious that the Alpine ranges vary considerably in thermal levels, particularly as valleys offer sheltered air pockets or wind-catching chutes. Topography, in fact, can at times exert more influence than altitude on thermal levels and precipitations. In general, the valleys are relatively warmer, in comparison with the summits, on summer days but rather cooler on winter nights. Mean winter temperatures up the sides of the valleys are usually higher than in the bottom valleys and, during winter, these can be filled with fog when it is sunny at higher elevations. The diurnal temperature range can be appreciable. Rainfall (including snowfall) rises with altitude. Table 2 gives data for centers of varying altitude in western Switzerland in areas where Simmental cattle are to be found.

FEEDING AND MANAGEMENT

In Switzerland, cattle are out in the summer on artificial or natural pastures and, from mid-May to the end of August (100 to 120 days), many of the cows and the young stock graze up the mountains to heights of from 1,000 to 2,500 meters. In winter, the stock

TABLE 2. - AVERAGE CLIMATIC CONDITIONS FOR SIMMENTAL CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
ALTITUDE (447 m)												
Temperature (°C)	-1.1	0.8	2.7	8.6	13.0	16.3	18.0	17.3	13.9	8.5	3.6	0.1
Rainfall (mm)	52	55	75	90	107	133	130	129	103	91	68	76
ALTITUDE (317 m)												
Temperature (°C)	0.0	2.2	5.0	9.4	13.3	17.2	18.9	17.8	15.0	9.0	5.0	0.5
Rainfall (mm)	36	41	51	66	79	104	84	84	79	79	61	51
ALTITUDE (1 444 m)												
Temperature (°C)	4.4	1.7	2.2	5.5	10.0	13.3	15.5	15.0	12.8	8.3	2.2	3.3

are housed or in yards and fed hays, silage, kale, fodder beets and concentrates, according to their milk yield. In the river valleys and in the central plains, a high standard of mixed farming is possible on the fertile soils but, even on the mountains, the grasses are surprisingly nutritious and the grazing exercise hardens the animals and renders them adaptable to many conditions in countries outside Switzerland.

PHYSICAL CHARACTERS

The color of the hair of Simmental cattle is yellowish brown or red, combined with white markings in a characteristic manner. The head, the underside of the breast and belly, the legs and the tail switch are white and there may be a variable degree of white patches on the body, particularly behind the shoulders and on the flanks. It is desirable that the colored areas should be continuous and not broken into many small patches. The hair is soft and the lightly pigmented skin is medium-thick and pliable.

The head is rather long, with a straight profile and a wide nonpigmented muzzle. The horns are fine, white in color and curve outward from the side toward the front, with the tips turning slightly upward. The strong shoulders slope nicely into the withers, the back

is long and straight. The rump is long, wide and level, and the thighs are well muscled to the hocks. The body is long and the ribs are adequately sprung to cover a large paunch area. The brisket is fully developed, the chest and flanks are deep, and the legs are strongly boned but not too long. The udder is nicely hung and, although not large, is neatly folded and prolonged behind and gives a surprisingly large volume of milk.

The muscled loins and buttocks give ample opportunity for meat storage, while the strong limbs and hard hooves are well adapted for hard work. Although developed originally as a triple-purpose animal, the modern tendency is to prefer a dual-purpose milk and meat producer. Table 3 gives average liveweights and body measurements of this breed.

TABLE 3. - AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF MATURE
SIMMENTAL CATTLE

	Males	Females
Liveweight (kg)	1 080	750
Wither height (cm)	144	138
Chest girth (cm)	236	200
Chest depth (cm)	83	74
Hip width (cm)	63	53

The tendency in the last 15 years has been to breed for early maturity, an animal smaller in height, more muscular but of the same mature weight. This has been achieved without any impairment of productivity and hardiness.

FUNCTIONAL CHARACTERISTICS

Heifers calve for the first time when between 30 and 36 months old and, during adult life, i.e., from the time of their first calf, will produce some 5 calves in 6 years. Selected cows will bear up to 10 calves in their lifetime. Male calves average 50 kilograms at birth and females weigh 42 kilograms. Young bulls are first used for service when between 10 and 13 months of age and the best continue in use until they are 10 years old.

Milk performance is now the primary basis of selection and Table 4 shows the milk records obtained in 1961.

TABLE 4. - AVERAGE LACTATION RECORDS OF SIMMENTAL CATTLE (1961)

	No. of cows	Days in milk	Milk	Fat
			<i>Kilograms</i>	<i>Percentage</i>
All recorded cows	74 540	305	3 968	4.03

The highest individual yield in the same year was 9,117 kilograms containing 4.10 percent of butterfat. The high butterfat content of Simmental milk makes it particularly valuable in butter-producing regions.

For meat-production purposes, the breed has a high growth rate, a well-muscled body and no excessive tendency to store large quantities of subcutaneous fat. On the other hand, the intra- and intermuscular fat is well developed, while the muscle fibers are light in color and tender. Table 5 gives liveweights and carcass yields (according to Engeler, 1961).

TABLE 5. - CARCASS PERCENTAGE OF SIMMENTAL CATTLE

	Liveweight	Carcass
	<i>Kilograms</i>	<i>Percentage</i>
Calves (2-3 months)	130-140	60-65
Steers (1½-2 years)	550-700	54-58
Heifers (1½-2½ years)	500-700	53-56
Cows (over 3 years)	600-900	52-54

Because of their strong build, even temper and tractability, Simmental cattle make good work animals, although the demand for them has decreased since the advent of motorized machinery. They are put to work when 22 to 24 months old and weighing 350 to 450 kilograms liveweight. Engeler (1961) gives the following

data (Table 6) obtained with 47 Simmental cows at work in official tests.

TABLE 6. - WORKING ABILITY OF SIMMENTAL COWS

	Traction power	Speed	Performance
	<i>Kilograms</i>	<i>m/sec</i>	<i>HP</i>
Persistent traction (3 000 m)	73.3	1.20	1.17
Heavy traction (400 m)	106.6	1.18	1.68
Maximum traction (15 m)	177.9	1.37	3.33

BREED ORGANIZATION

Local breeders are united in Associations and these Associations are grouped into three Federations. The first, founded in 1891, is the Red and White Spotted Cattle Breeders' Society at Bern which has more than 28,000 members. The Red and White Spotted Cattle Breeders' Union, at Brienz, is formed of members from the Bernese Oberland. Lastly, approximately 3,500 members from the cantons of Zurich, Schaffhausen and Thurgau are affiliated in the Union of Red and White Spotted Cattle Breeders' Federation of Eastern Switzerland, with offices at Winterthur.

These Federations organize breeding, co-ordinate technical problems, and are responsible for milk recording and the maintenance of Herdbook registrations. All three Federations are under the Swiss Organization of the Herdbook for Simmental Cattle at Bern, which is responsible for supervising Federation activities, checking the registration of young stock and for attesting pedigrees and issuing certificates of productivity. The Commission of Swiss Cattle Breeding Federations at Bern, to which the different native breeds of the country are affiliated, is concerned with export and other technical aspects.

There were 879,530 Simmental cattle in Switzerland in 1961 and the number is still increasing.

Breeding stock have been exported not only to the neighboring countries, to eastern Europe, to the Balkans, the U.S.S.R. but to many overseas regions, where they have been used for pure breeding purposes and for grading up native stock.

Brown Swiss
(Braunvieh, Race brune des Alpes)

ORIGIN

Skeletal remains found in the lacustrine regions suggest that the Brown Swiss are one of the oldest of modern breeds of cattle. They have developed from crossings between the *Bos taurus primigenius* or aurochs cattle and the later *Bos taurus brachyceros* animals. These crosses of marsh cattle developed in the neolithic period and, by 1800 B.C., a small red beast was to be found in the lake villages. During the last 1,000 years, monastic and commonland government records indicate that these shorthorned brown animals have been in existence and that they were kept for meat and work. They continued in this primitive form until the nineteenth century, when the introduction of better fodder crops and improved management systems opened the door for breed improvement, individual selection and high productivity. Once this became possible, the milk-producing potentials were exploited and a triple-purpose animal was evolved. Although still used for work on the farm, the modern development has been toward a dual-purpose milk and meat animal.

LOCATION, TOPOGRAPHY AND SOILS

Modern Brown Swiss cattle derive mainly from the canton of Schwyz and they are often referred to as the Schwyzer breed. Today they are dominant over the eastern half of the country and occupy the area to the east of a line from Lake Constance to Zurich, Lake Brienz and to the Simplon height. They are to be found in 18 of the 25 Swiss cantons and in 9 they are the only breed kept. Approximately one third of this area is the plateau between the Jura and the Alps at an average of 200 to 600 meters above sea level. They also occupy the pre-Alpine and Alpine pastureland between 600 to 2,000-meter altitude.

Summer grazing conditions between 1,000 and 2,800 meters above sea level provide varying pasture conditions but usually herbage adequate in minerals, while the keen air has an invigorating and health-stimulating effect. The topography naturally varies from the valleys and plains to steep, rocky hillsides and the animals have for generations been accustomed to these conditions. Their body conformations and musculature are in no small way a direct consequence of this.

The valley soils may be deep and rich in organic matter but the plateau soils, morainic and glacial deposits are more varied and the maximum variation occurs between the valley alluvium and the mountain ridges.



FIGURE 8. — Brown Swiss bull (Edel MM 5476). Yielded 6,034 kilograms of milk containing 4.4 percent of butterfat in third lactation.

Courtesy Brown Swiss Herdbook Society



FIGURE 9. — Brown Swiss cow (Blena MM 2227). 4-year average: 4,618 kilograms of milk containing 4.41 percent of butterfat.

Courtesy Brown Swiss Herdbook Society

CLIMATE

The wide and sudden variations in altitude, gradient and aspect induce marked local variations in climatic conditions. The winds show a diurnal variation in direction — downhill in the mornings and uphill in the evenings — and mountain masses such as the Alps make their own climates. The valleys are warmer than the summits in summer days but are colder during winter nights. The valley bottoms in late autumn and early winter are often filled with fog, while the higher ground is bathed in sunshine. In addition, the warm foehn and the icy bise winds can create sudden and appreciable changes in climatic conditions. In many areas, too, the incident ultraviolet irradiation is very marked. Table 7 gives an idea of the range in average climatic conditions.

TABLE 7. — AVERAGE CLIMATIC CONDITIONS FOR BROWN SWISS CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
LUCERNE (488 m)												
Temperature (°C)	-2.2	0.5	3.9	8.4	12.8	16.1	18.3	17.2	13.9	7.2	3.9	-0.5
Rainfall (mm)	35	41	51	66	79	104	84	84	79	79	61	51
RIGHI (1 787 m)												
Temperature (°C)	-4.5	-4.0	-3.4	-0.2	3.9	7.5	9.9	9.4	7.5	2.7	-0.8	-3.5
Rainfall (mm)	50	59	71	117	164	241	265	242	190	124	71	72
Relative humidity	81	81	82	86	86	85	85	85	85	78	74	78

FEEDING AND MANAGEMENT

In the plateau and lower valleys, from 200 to 800 meters in altitude, cattle are kept for the production of milk, meat and work. They are out grazing during the summer but are housed from mid-October to mid-May. Even in this period, they are usually allowed out for about five hours of exercise and/or grazing on permanent or temporary pastures. A proportion of the herd replacements are bred on the farms, while young stock may be maintained in the open throughout the year and sent to the higher Alpine grazings in the summer. At the higher altitudes, the animals are maintained very

largely for the production of calves for sale to lower farms or for export. In winter, the cattle are kept inside and maintained chiefly on hays, with very restricted amounts of concentrates or none at all. In May and September, at the two ends of the grazing season, stock graze the natural pastures near the homesteads but the summer period is spent on the Alpine pastures up to 2,500 meters. Services are arranged so that cows calve down between October and January, when they and their progeny can be attended to easily. The calves receive hays and concentrates from the 13th week onward and, from about 20 weeks of age, are turned out on the natural pastures.

At all altitudes, the basis of feeding is roughage, while purchased concentrates rarely constitute more than 5 percent of the ration. In the lower regions and peri-urban areas, where the need for milk is greater, the higher-producing cows may be entirely stall-fed on balanced rations or may be allowed out for exercise and some grazing.

PHYSICAL CHARACTERS

The coat is a single-colored grayish brown of varying pigmentation intensity, from light to dark brown but with the darker shades preferred. A light color ring occurs around the muzzle but the light streak along the back, which was once fashionable, is now seldom encountered. In the inguinal region, the hair color is also lighter than on the body, while spots on the belly sometimes occur and do not prevent registration. The elastic skin is of medium substance and pigmented, and the hairs are short, fine and soft. The mucosa of the body orifices and the muzzle are black. The horns are white with black tips, medium to small in size, and grow outward, forward and upward at the tips.

The head is short but broad, and the body has a straight topline, deep chest and well-sprung ribs. The dewlap is not emphasized, the underline is often parallel to the back, but the hindquarters are long and wide, with the muscles carried down to the hocks. The legs are nicely muscled and possess strong bones, the hooves are hard and dark colored. In the better milking strains, the glandular udder is capacious, firmly hung, and carries well-shaped teats adequately spaced. Table 8 summarizes data on the liveweights and body measurements of Brown Swiss cattle.

From show records, there appears to have been little alteration in the size and conformation of these animals during the last 75 years.

TABLE 8. — AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS
OF BROWN SWISS CATTLE

	Males			Females		
	1 year	2 years	Mature	1 year	2 years	Mature
Liveweight (kg)	300	585	930	250	400	597
Body length (cm)	—	149	177	120	138	163
Wither height (cm)	116	134	146	114	128	135
Chest girth (cm)	160	201	230	—	—	190
Chest depth (cm)	57	70	81	53	63	71
Hip width (cm)	40	50	60	37	46	56

The Brown Swiss are more dairy type in conformation than the Simmental but still carry sufficient meat, so that, when judged by Friesian, Jersey or Ayrshire standards, they look beefy. They are quiet and easy to handle.

Obviously, there is an appreciable difference in the liveweights and body measurements of Brown Swiss cattle reared in the more fertile lowland areas and those which are bred in the mountains. Table 9 gives the data published by Engeler and dell'Ambrogio in 1953 for 10-month-old bulls reared in the two environments. Approximately 2,500 males, exhibited at the show of the Swiss Federation of Brown Cattle Breeders between 1940 and 1949, are recorded in the data.

TABLE 9. — AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS
OF 10-MONTH-OLD BULLS

	All bulls shown		Bulls placed in first class	
	Alpine	Lowland	Alpine	Lowland
Liveweight (kg)	249	286	253	289
Wither height (cm)	111	113	111	113
Chest girth (cm)	31	33	31	34
Chest depth (cm)	52	54	53	54

The above data particularly emphasize the difference in live-weights and in certain body proportions between cattle raised intensively in the lowlands and those reared in the highlands.

FUNCTIONAL CHARACTERISTICS

Heifers calve for the first time when about 29 to 30 months of age and continue to breed regularly, while 15-year-old cows which have provided 12 calves are not uncommon. The average calving interval is about 395 days but calvings between October and December are the objective for the stock which summer in the higher mountains. Bulls are first put to service when 9 to 12 months old and are capable of long periods of active use, up to or more than 9 years of age. Average lactation records of this breed, for 1961, are shown in Table 10.

TABLE 10. — AVERAGE LACTATION RECORDS OF BROWN SWISS COWS (1961)

	No. of cows	Days in milk	Milk	Fat
			<i>Kilograms</i>	<i>Percentage</i>
All recorded cows	99 056	305	3 642	3.88
Recorded cows in the plains	38 891	305	4 007	3.87

Individual records can exceed 10,000 kilograms of milk containing good percentages of butterfat. What is perhaps more important is the recognized adaptability to climatic conditions both within and outside their country of origin. The data in Table 11 (Engeler, 1956) give the variations in milk yield of Brown Swiss cows at different altitudes in Switzerland.

For meat production, the Brown Swiss exhibits a good fattening ability and, in controlled feeding experiments up to 17 months of age when weighing 450 kilograms, will have averaged 0.85 kilogram gain per day. Bulls will average 1.05 kilograms at the same age. Finished animals will attain the following liveweights: heifers and cows up to 800 kilograms, steers up to 900 kilograms, and fully mature stock up to 1,100 kilograms. Normally, however, stock intended for beef production are slaughtered at 18 months of age, weighing up to 485 kilograms. Dressing percentages of 55, 58, 54

TABLE 11. - MILK YIELDS OF BROWN SWISS COWS AT DIFFERENT ALTITUDES IN SWITZERLAND

Cows housed in winter;	Cows on Alpine pastures in summer at :	Milk yields			
		1st lactation	2nd lactation	3rd lactation	4th lactation
	 Kilograms			
Below 800 m	—	3 288	3 850	4 188	4 406
Below 800 "	Above 1 600 m	2 905	3 370	3 632	3 824
800-1 200 "	" " "	3 836	3 293	3 457	3 723
1 200-1 600 "	" " "	2 726	3 090	3 390	3 586

and 52 are recorded respectively for young bulls, old bulls, heifers up to 3 years and cows from 3 to 8 years of age. The meat is of good quality with comparatively little fat, although carcasses as a whole will contain 20 to 25 percent of bone.

In draft trials, 3-year-old heifers can maintain a pull of 68 kilograms, 4-year-old cows a pull of 79 kilograms, and 5-year-old oxen 132 kilograms over a distance of 400 meters at speeds of 4.7, 4.6 and 4.8 kilometers per hour respectively. Both females and oxen are used for work purposes on the farms but the advent of the tractor is reducing this demand on the larger estates.

BREED ORGANIZATION

Brown Swiss cattle breeders are organized into over 800 Breeders' Associations, including some 35,000 members. The Brown Swiss Cattle Breeding Union was created in 1897 by the union of these local syndicates. The union and its syndicates collaborate in breeding control, the maintenance of Herdbooks, bull and progeny testing, disease control, and the sale of stock. The Herdbook is under government supervision, whose officers assess, with the local Associations, the value of the animals to be registered or amend the grading of registered animals and maintain registers of elite animals.

There are about 820,056 animals of the breed in Switzerland (46 percent of the total cattle population) and, of these, 220,600 are registered in the Herdbook. Since 1928, milk recording has been carried out according to the rules applied to all breeds. Annual results of progeny testing activities and artificial insemination were organized under a single Association in 1961.

Herdbook registrations actually commenced in 1878 but the work was discontinued after three volumes had been published. For many years only handwritten catalogues of inspected animals were kept, until the Breeders' Associations were reorganized in a Federal Union in 1897, and the first volume of the new Herdbook (Stammzuchtbuch für Braunvieh) was published by the Ministry of Agriculture in 1911. It contained the pedigrees of breeding bulls dating back to 1891. Since 1921, the Federal Organization of Brown Swiss Breeders has maintained a Central Herdbook at Zug.

Fribourg

(Freiburger Schwarzfleckvieh, Fribourgeoise tachetée noire)

ORIGIN

This old breed of cattle has evolved in Switzerland from the ancient primitive black *Bos taurus primigenius* and the later crossings of this with *Bos taurus brachyceros*. Others think that the *Bos taurus frontosus* from the northern lands was also involved in the evolution of the Fribourg breed. Zoologically, it is a black and white relative of the Simmental cattle. In 1766, Louis XV of France bought a herd of these animals and, at the 1856 Paris Exhibition, a large bull of this breed was awarded first prize. The breed derives its name from that of the canton where it was first segregated and improved along modern lines.

LOCATION, TOPOGRAPHY AND SOILS

The Black Spotted Fribourg cattle are raised principally in the cantons of Fribourg, Neuchâtel and Basel-Campagne, the three zones where the greatest control has been exercised over its breeding. It is found in smaller numbers in other areas. The topography and soils vary in the same way as in other Alpine regions and, in the mixed-farming districts, this large animal is greatly appreciated.

CLIMATE

The typical continental climatic conditions apply in the area where this breed has been evolved (see p. 6 and 13).

FEEDING AND MANAGEMENT

The conditions described for the other Swiss breeds are applicable to Fribourg cattle.

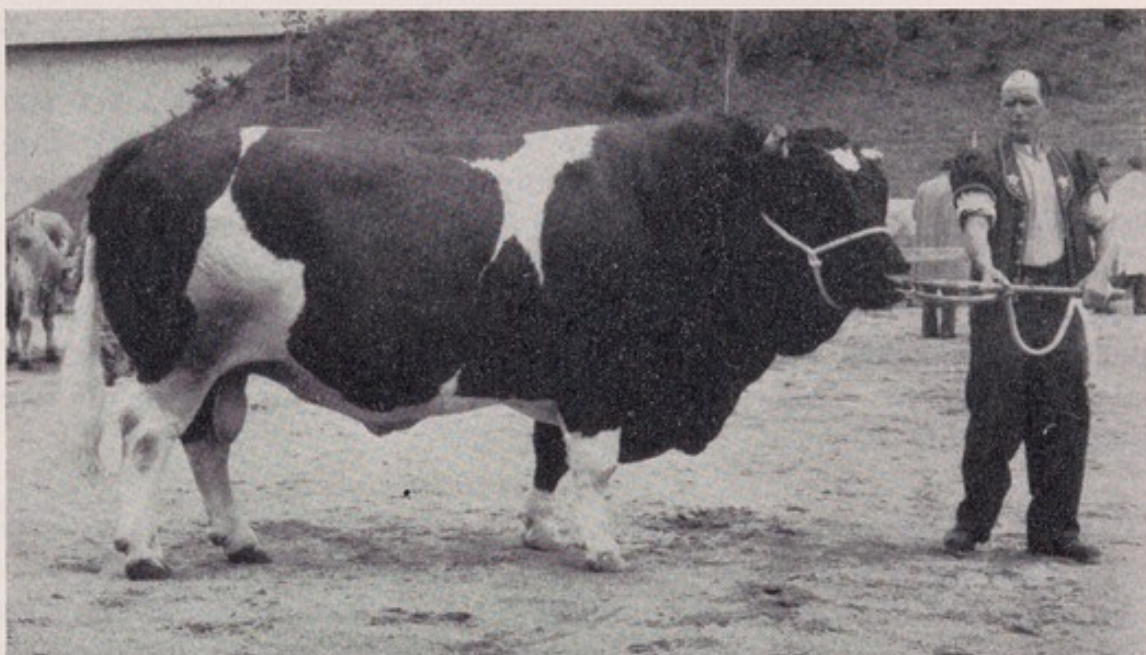


FIGURE 10. — Fribourg bull (Radar MM 1434 Le Bry). Prix d'honneur at Lausanne National Show. Dam averaged 6,073 kilograms in 8 lactations.

Courtesy Swiss Cattle Breeders' Association



FIGURE 11. — Fribourg cow (Bataille 1082). 6-year average: 6,412 kilograms of milk containing 4.33 percent of butterfat.

Courtesy Swiss Cattle Breeders' Association

PHYSICAL CHARACTERS

The physical characters are similar to those described for the Simmental breed, except that the coat color is black and white instead of red and white. The pattern and color distribution are, however, very similar. In general, the animals have heavy forequarters and less developed hindquarters when reared under poor conditions but are better proportioned as the nutritional environment is improved. This is one of the largest and heaviest breeds of cattle in Europe. Average liveweights and body measurements are given in Table 12.

TABLE 12. — AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF FRIBOURG CATTLE

	Males			Females		
	1 year	2 years	Mature	1 year	2 years	Mature
Liveweight (kg)	800	1 000	1 200	550	650	800
Wither height (cm)	138	147	152	—	—	142
Chest girth (cm)	—	—	230	—	—	210
Chest depth (cm)	70	78	82	—	—	74
Hip width (cm)	51	52	59	—	—	55

FUNCTIONAL CHARACTERISTICS

Heifers calve down for the first time when they are about 3 years old. The average milk yield of 3,977 recorded cows, in 1961/62, was 4,142 kilograms of milk containing 3.80 percent of butterfat.

Apart from their known milking and butter-producing qualities, these large, well-muscled animals produce meat of good quality and taste. With their heavy liveweight and normal carcass yields, they fit well into a milk/meat economy. The carcass yields are 62 percent for calves weighing 100 kilograms, 58 percent for bulls, 56 percent for old cows and males, and 62 percent for fattened oxen and bulls in good condition.

Due to its size, robustness, docility and agility, this breed has for long been noted for its draft powers and heavy work potential. Although these have not been lost and many animals are used for farm work, the emphasis is shifting to a milk/meat dual-purpose animal.

BREED ORGANIZATION

Fribourg cattle are organized in a Herdbook Association which is supervised by the government, in the same manner as other Swiss breeds.

There were 25,905 cattle of this breed in Switzerland in 1961/62, of which 9,955 were registered in the Herdbook.

Hérens **(Eringer, Race d'Hérens)**

ORIGIN

The ancient breed of Hérens cattle derives its name from a district in Valais and belongs to the *Brachyceros* type. After the Brown Swiss cattle, this breed is the second most ancient in Switzerland and its origins are unknown. Certainly it existed in Roman times and a bronze head of that period, found at Octodurus, faithfully depicts the typical proportions of an Hérens bull.

LOCATION, TOPOGRAPHY AND SOILS

The breed forms a compact population in central Valais and is uniformly distributed in the districts of Martigny, Conthey, Sion, Hérens, Sierre, Entremont, Trient and even in Chamonix, at the foot of Mont Blanc, in France. The breeding area is in the upper Rhone valley, in the heart of the Alps, where there are many rivers between the Bernese Alps and the Pennines. The former is rich in pleistocene, upper Jurassic and cretaceous rocks and derived soils, the latter chain is predominantly crystalline, granite, gneiss and various schists, and is deeply dissected by steep valleys. The soil is very variable, as would be expected from its rock origins but also because of morainic deposits left behind from the Ice Age. The Rhone and other river valleys contain appreciable alluvial deposits. In altitude, the region of Hérens cattle varies from 480 to over 2,500 meters.

CLIMATE

Naturally, the climatic conditions vary appreciably with altitude and with shelter from wind, which the mountains provide for some valleys, or the wind chutes which the topography induces in other valleys. Table 13 gives average data for the areas where Hérens cattle are found.

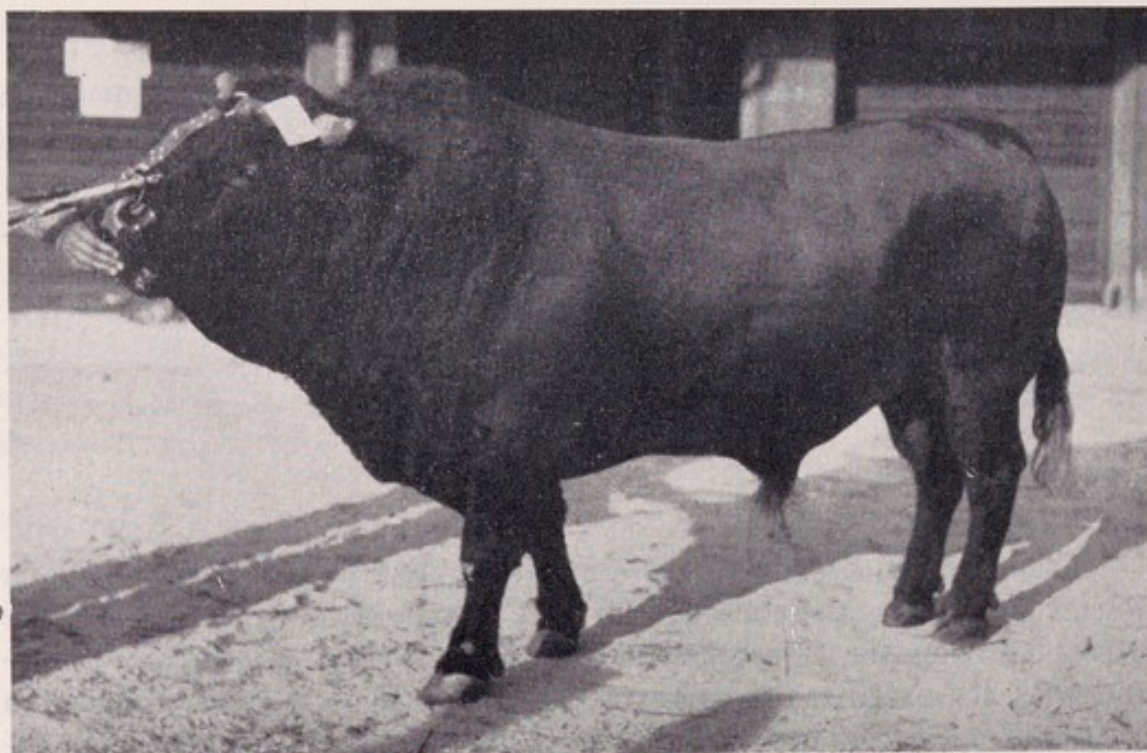


FIGURE 12. — Hérens bull (Ture MM 766). Dam yielded 3,004 kilograms of milk containing 3.9 percent of butterfat in second lactation.

Courtesy Kern Film Agency

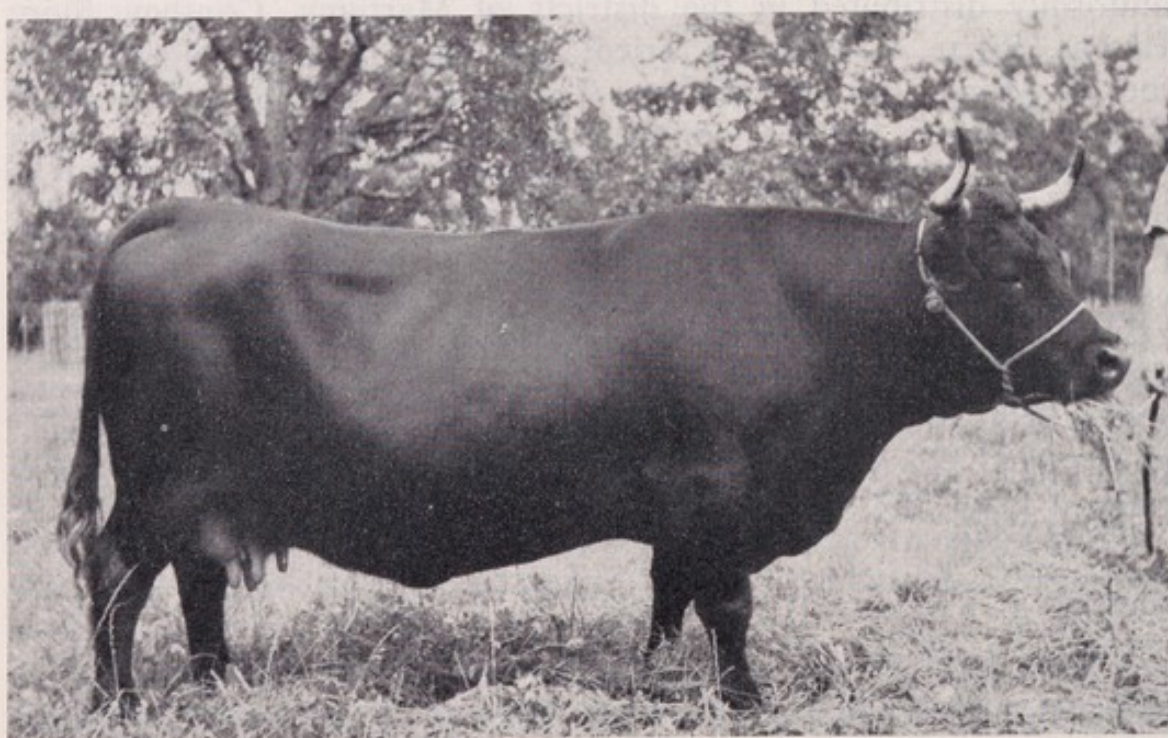


FIGURE 13. — Hérens cow (Violette 155 FEH). 3-year average: 3,442 kilograms of milk containing 3.90 percent of butterfat.

Courtesy Swiss Cattle Breeders' Association

TABLE 13. - AVERAGE CLIMATIC CONDITIONS FOR HÉRENS CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
ALTITUDE (477 m)												
Temperature (°C)	-1.1	0.8	2.7	8.6	13.0	16.3	18.0	17.2	13.9	8.5	3.6	0.1
Rainfall (mm)	52	55	75	90	107	133	130	129	103	91	68	76
ALTITUDE (2 500 m)												
Temperature (°C)	-8.9	-8.4	-8.4	-5.0	-1.1	2.2	5.0	4.4	1.1	-1.7	-5.0	-8.4
Rainfall (mm)	162	183	167	206	193	243	360	256	211	178	122	170

FEEDING AND MANAGEMENT

In the lower regions, a mixed agriculture is practiced but the meadows and fields give way to mountain grassland areas, with steep slopes and rocky outcrops. The quality of the pastures or the mountain grazings vary with the soil conditions but generally decrease with altitude. The cattle are brought in for stall-feeding during the winter on crop residues, hays and such by-products as may be available. They are turned out to pasture as soon as possible in the spring, usually on land at medium heights. But, with the onset of summer conditions, they are sent higher up the mountains to grazings between 1,700 and 2,500 meters in altitude. They remain at grass for as long as possible, even to November, spending the nights in the open and often in snowy conditions. In fact, only an animal of considerable rusticity and health could survive in these conditions.

PHYSICAL CHARACTERS

The hair color varies from chestnut to dark brown or dark red which may be almost black. The hair around the muzzle and along the backbone is more yellowish but no white markings are tolerated in the male. In females, small circumscribed light or white colorings are allowed on the udder. The muzzle and body orifices are black or dark colored but never pink or clear. The hair is short and medium-thick and the hooves are dark colored, the skin supple, and the horns, which spread outward, forward and upward, are pale in color with black tips.

Hérens cattle are small, as might be deduced from their habitat and mode of life, the skeleton is fine but solid and the head is short and wide. The body is compact, with a fairly straight back and a deep chest, but the hindquarters, although fairly long, are sometimes lighter than the forequarters. The musculature carries little fat and the animals are in harmony with their environment. The udder is not large. Table 14 gives average liveweights and body measurements recorded, for this breed, although many of the cattle at the higher altitudes are less well developed.

TABLE 14. — AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF HÉRENS CATTLE

	Males			Females	
	1 year	2 years	Mature	2 years	Mature
Liveweight (kg)	—	—	600	—	450
Wither height (cm)	107	115	122	108	119
Chest girth (cm)	145	164	182	147	176
Chest depth (cm)	53	59	67	52	64
Hip width (cm)	32	40	44	38	48

Raising and feeding these animals under a better system of husbandry causes weights and body measurements to increase appreciably.

FUNCTIONAL CHARACTERISTICS

Heifers calve for the first time when about 3 years old and may continue to produce up to 8 or 10 progeny. Table 15 gives milk recording data in 1961.

TABLE 15. — AVERAGE LACTATION RECORDS OF HÉRENS COWS (1961)

	No. of cows	Milk	Fat
		<i>Kilograms</i>	<i>Percentage</i>
All recorded cows	3 602	2 691	3.86
Registered cows	2 591	2 718	3.87

The animals are also slaughtered to give a fine-grained, tasty meat and are used for draft purposes. It is a triple-purpose animal; however, the emphasis on milk is being intensified. The animals are very active, work well and are resistant to disease. Although their milk yield does not compare with Simmental and Brown Swiss cattle, they have to live under more strenuous and less favorable conditions.

BREED ORGANIZATION

Like other Swiss breeds, Hérens cattle are inspected for Herd-book registration and the cows are subjected to milk recording trials.

AUSTRIA

Austria lies between 46° and 49° north latitude and has many similarities with Switzerland in its topography, soils and climate. The Alps and pre-Alps, which occupy some 60 percent of the total area, decrease in altitude as one passes from west to east, although the highest point, Gross Glockner, is in east Tirol and attains a height of 3,795 meters above sea level. The mountain area is broken by many valleys and the rivers flowing down them. Of the total country, 24 percent is under arable cropping and 28 percent is in meadows and pastures. Approximately 56 percent of the agricultural area is in pastures, 34 percent are valley, and the remaining 22 percent are Alpine grazings. In the eastern portion of the country, e.g., around Vienna and along the Danube, and also toward the Hungarian border, there is a much greater percentage of lowland area than in the west.

Most Austrian farms, particularly in the Alpine districts, are rather small, so that about 40 percent of the herds contain less than 7 and only 10 percent carry more than 20 cows. Normally, cattle breeding is conducted in the Alpine areas while milk production and livestock fattening is a more specialized activity in the eastern plains, although stall-fed cows are encountered in all peri-urban areas for city and town milk supplies. In Alpine regions and on many small farms, cattle are used for draft purposes but, on the larger plain units, tractors are replacing them. There is also a tendency for many dairy animals, sold to peri-urban units and to farmers in the eastern plains, to be milked out and sold to butchers. This puts a strain on

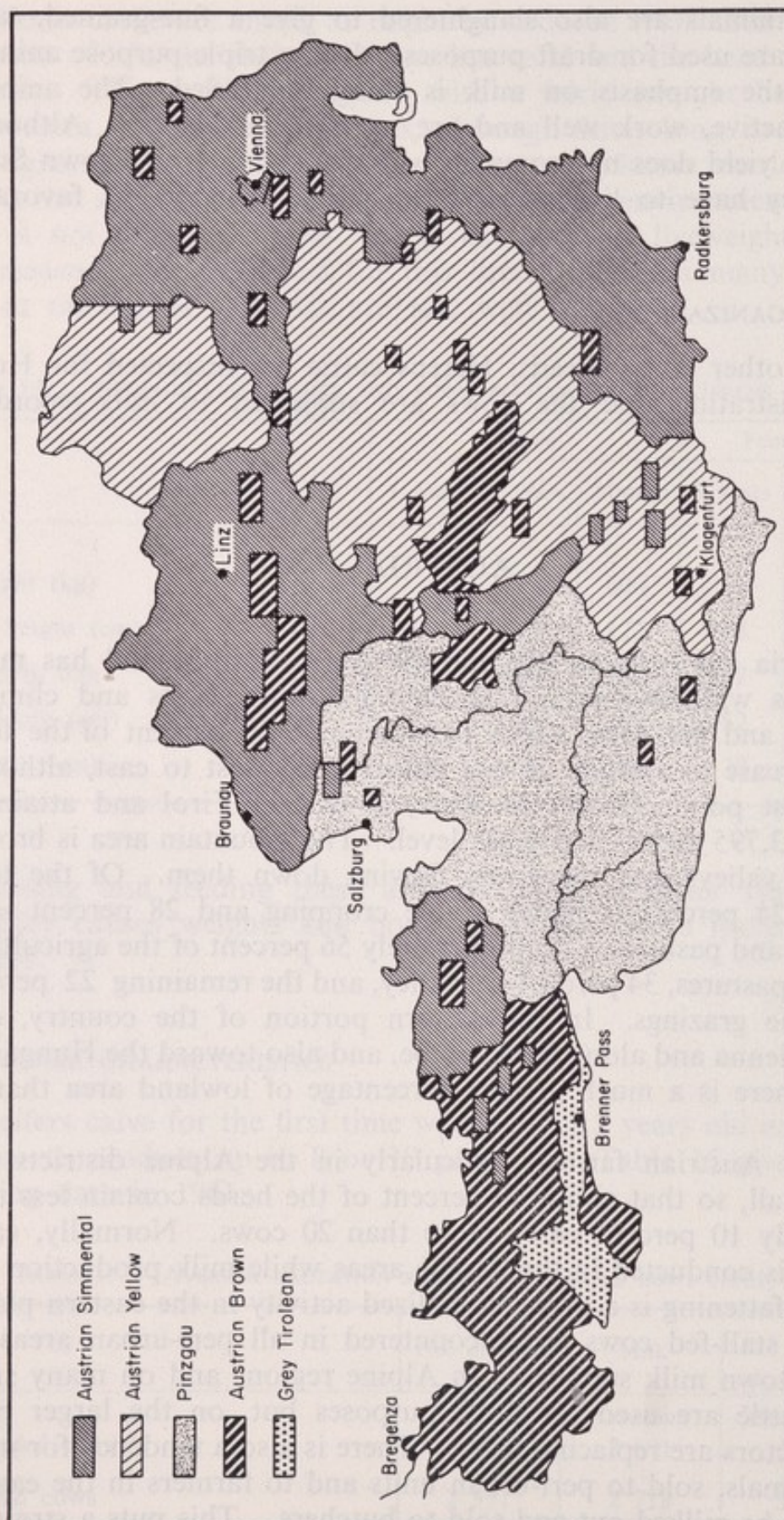


FIGURE 14. — Distribution of Austrian cattle breeds.

the maintenance of good dairy types because it is the above-average producers which are so frequently subjected to this wastage. In spite of this, the production of dairy products is rising and during this decade small quantities of butter and cheese are being exported (about 10 percent of the butter and cheese produced is exported).

The climatic conditions vary appreciably with altitude and in the lower valley areas due to mountain masses sheltering some and providing wind chutes for others. The climate is continental in type with a higher rainfall in the summer months but, as would be expected, the precipitation on the mountain areas may be several times that recorded in the valleys and plains.

Figure 14 illustrates the distribution of the main cattle breeds. In 1959, the cattle population was made up of the breeds as shown in Table 16.

TABLE 16. - PERCENTAGE OF DIFFERENT BREEDS IN THE AUSTRIAN CATTLE POPULATION (1959)

Breed	Percentage
Austrian Simmental	46.0
Austrian Yellow	20.0
Pinzgau	14.0
Austrian Brown	14.0
Grey Tirolean	2.0
Black and White Lowland	0.6
Various and crossbreds	3.4

The Fleckvieh (Simmental) and Pinzgau cattle are essentially triple-purpose animals. The large broad Simmental animals, imported from Switzerland, have not yet permanently influenced the Austrian counterpart population, which is more rangy in conformation. This is possibly a consequence of nutritional influences, but their meat is of good quality, although the quantity of bone in the carcass is rather high. The smaller Pinzgau is a very old breed indigenous to parts of Austria.

In the Yellow cattle there are now amalgamated several breeds which were previously maintained separately, i.e., the Murboden

(the largest section of this group) centered around Steiermark, the lower Austrian Waldviertel, the Mariahof (Styrian Blond) in Styria and the Kärnter Blondvieh (Carinthian Blond).

Brown cattle are particularly popular in the Alpine regions but are also used in peri-urban dairies in very confined, often unhygienic conditions, where they do less well. The Grey Tirolean cattle of Austria are probably the most ancient indigenous type and are found largely in the Tirolean highlands (Oberinntal). The Tux-Zillertal in the Tirol and the Bergscheck in upper Styria are rapidly disappearing.

Black and White Lowland cattle have derived largely from importations from Germany, as have the Red cattle. The Oberinntal breed is a small dairy animal resembling the Jersey and some think it developed from the same origins.

BREED ORGANIZATION

Cattle Breeding Associations in Austria are regional organizations limited to one specific breed. The Associations for the different breeds have formed unions for co-operative action and for the promotion of uniform operational methods. There is also a Central Organization for maintaining uniformity to which all Breed Associations are affiliated and which is known as the "Zentrale Arbeitsgemeinschaft Österreichischer Rinderzüchter." The Federal Government grants subsidies for cattle improvement purposes but does not issue general regulations for the various provinces.

The Breeders' Associations are supervised by the provincial Chambers of Agriculture. A licensing system is in operation for bulls and all bulls used for service must be inspected and approved. The general control of livestock breeding matters is vested in the Director of Livestock Breeding in the Chamber of Agriculture.

Milk recording is undertaken by provincial Milk Recording Societies which are also supervised by the Chamber of Agriculture. In 1961, some 20 percent of all cows were milk recorded. The system of recording is standardized throughout the country while, from 1962, all lactation records are being calculated on the basis of a 305-day lactation period. All cows registered in the Herdbooks must be milk recorded and are usually not registered until after they have completed a lactation.

Progeny testing is now being carried out by the Breeders' Associations by dam-daughter comparisons. The Milk Recording Societies deliver the milk records of individual cows to a Central Office where progeny testing results are conducted.

Advanced Registers have been established on the same lines as those being used in Germany, i.e., cows are entered on the basis of regular calvings and high milk yields throughout a number of years, while bulls are eligible when they have a specified number of registered daughters in the Advanced Register (Rinderleistungsbuch).

Austrian Simmental (Alpenfleckvieh)

ORIGIN

The origins of this breed extend back to early times. In the fifth century, the Bavarians brought with them to Austria their light red, partly spotted but heavy, strong cattle. These mixed with the old noric, small, native peat cow and gave rise to a number of different cattle breeds which had developed in various regions of Austria between the Middle Ages and the beginning of the nineteenth century. They were red or yellow in color with varied patterns of white, e.g., the Ennstal and the Spotted Red cattle in Steiermark, the Wels cattle in upper Austria and the Innviertel cattle in the Tirol. Subsequent to 1830, these various indigenous breeds were crossed with and graded up by imported Simmental from Switzerland and Germany, so that eventually there emerged the Austrian Spotted breed (Simmental).

LOCATION, TOPOGRAPHY AND SOILS

Simmental cattle are now the most important breed in the eastern and central parts of the country and also in the Tirol. They are kept on the plains, in the valleys and on the mountains, up to an altitude of 1,500 meters, while in the Alpine region there are two main distribution areas (i.e., Tirol and Obersteiermark). The soils vary in these localities from brown earths, podzolic and brown podzolic to rendzinas, alluvial and clay.

CLIMATE

To illustrate the range of climatic conditions under which the Simmental breed lives in Austria, Table 17 shows the data for Graz at 365 meters, Neumarkt at 880 meters, and Hochserfaus (Tirol) at 1,815 meters.



FIGURE 15. — Simmental bull (Pilsner 57800 FIH). 4-year average of dam: 5,195 kilograms of milk containing 4.45 percent of butterfat.

Courtesy Pohl

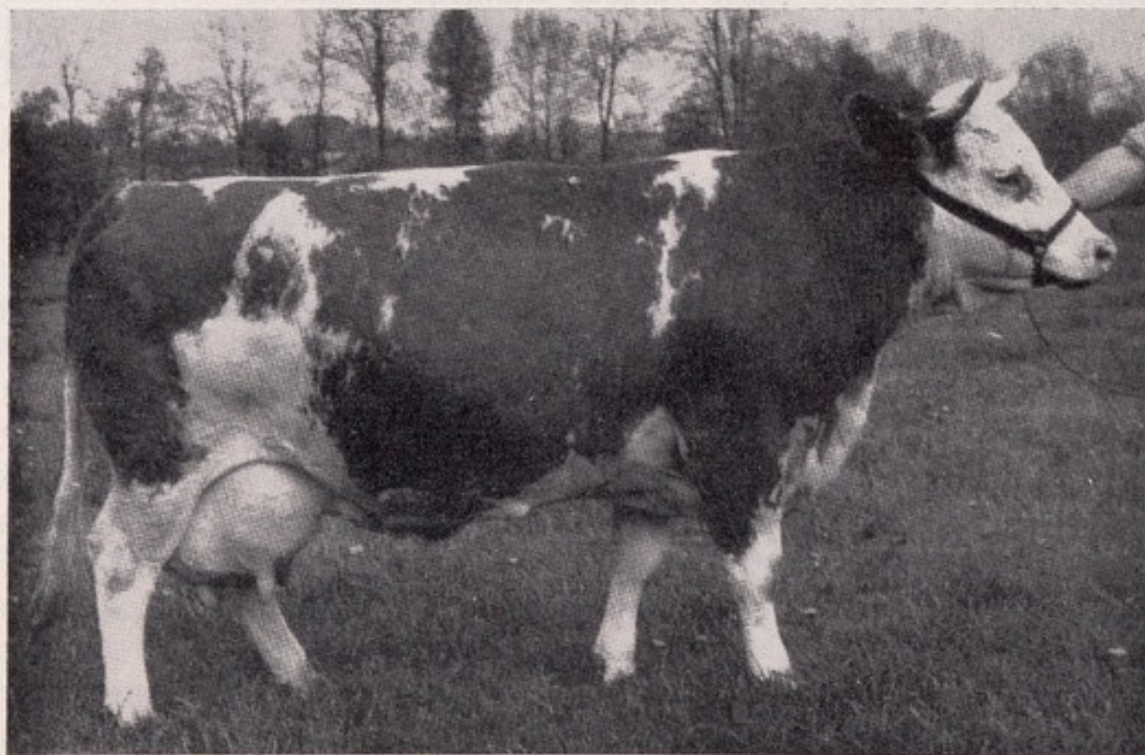


FIGURE 16. — Simmental cow (Wirra 53477 FIH). 5-year average: 7,556 kilograms of milk containing 4.56 percent of butterfat.

Courtesy Pohl

TABLE 17. — AVERAGE CLIMATIC CONDITIONS FOR AUSTRIAN SIMMENTAL CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
GRAZ												
Temperature (°C)	-2.6	-0.4	4.1	8.8	13.6	17.0	18.6	17.9	14.2	8.6	3.4	-0.7
Relative humidity (%)	78	73	67	65	68	67	68	70	75	80	82	81
Rainfall (mm)	31	29	41	67	85	118	137	117	101	77	52	40
NEUMARKT												
Temperature (°C)	-5.1	-2.6	1.4	5.7	10.5	13.4	15.4	14.6	11.3	5.9	0.9	-3.5
Relative humidity (%)	80	75	72	72	73	72	73	76	78	80	83	83
Rainfall (mm)	23	23	38	55	76	106	122	115	83	68	52	36
HOCHSERFAUS												
Temperature (°C)	-5.8	-4.8	-3.1	-0.5	5.6	8.5	10.7	10.4	7.8	3.5	1.7	-4.0
Relative humidity (%)	66	64	65	65	70	70	72	73	72	71	69	69
Rainfall (mm)	64	54	60	73	73	102	127	117	95	57	51	73

FEEDING AND MANAGEMENT

The bulk of the animals are kept and fed in yards and sheds but graze summer pastures at the lower altitudes and also live on the higher mountain slopes from May to the end of September. In the arable regions, milk and meat production are most important, whereas in the Alpine areas, attention focuses on the rearing of young stock. Everywhere the animals are employed for work purposes.

Naturally, the feeding standards achieved in the different zones vary appreciably. In the summer, the stall-fed stock receive cut clovers and grasses, while the Alpine stock graze the natural herbage. In winter, all animals rely on home-grown fodder such as hay from grasses and clovers, fodder beet, straw, maize stover and silage in varying proportions. In the more intensive farms, brans, grains, oats, barley and purchased concentrates are fed to milch cows.

PHYSICAL CHARACTERS

The physical characters conform with the general attributes of Simmental cattle in Switzerland (see p. 7), with the typical white head, pigmented skin, and a red (or yellowish red) and white hair pattern. Table 18 shows the average liveweights and body measurements of adult cattle.

TABLE 18. - AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS
OF ADULT AUSTRIAN SIMMENTAL CATTLE

	Males	Females
Liveweight (kg)	900-1 200	550-750
Wither height (cm)	137-146	127-138
Chest girth (cm)	220-250	195-215
Chest height (cm)	80-87	70-77

FUNCTIONAL CHARACTERISTICS

Heifers calve for the first time when 2 to 3 years old, depending on locality and the level of nutrition. Young bulls are put to service when 14 months old and enjoy an active breeding life of 2 years before being slaughtered.

In 1961, the number of cows which were milk recorded was 66,498 and the average lactation records of registered and nonregistered cows was as shown in Table 19.

TABLE 19. - AVERAGE LACTATION RECORDS OF AUSTRIAN SIMMENTAL COWS (1961)

	No. of cows	Milk	Fat
		<i>Kilograms</i>	<i>Percentage</i>
Nonregistered cows	27 511	3 293	3.92
Registered cows	38 987	4 020	4.08

The highest individual yield was 10,107 kilograms of milk containing 4.27 percent of butterfat.

The Austrian Simmental are put to work when about 2 years old. They are strong and hard working, rapid in movement and

generally docile, although some animals become too temperamental to keep.

This breed has justifiably earned a reputation for its ability to fatten well, to grow rapidly and yield a good quality carcass when fed in yards.

BREED ORGANIZATION

Herdbooks and registrations commenced in 1870 and the nine Breeders' Associations were amalgamated in 1950. In 1959, there were 1,060,000 head of this breed and the number is steadily increasing. Some 42,000 animals are registered in the Herdbook.

Austrian Yellow (Gelbvieh)

ORIGIN

Originally, a native type of small, dark peat cow inhabited the region, but these were later inbred with the late-maturing light Steppe cattle from the east. Certain types were consolidated over the centuries and developed into valuable breeds, such as the Mürztal. In the valleys of Styria and parts of lower Austria, Bavarian Red and Red Spotted cattle had a greater influence, from which several herds of Austrian Yellow developed. They existed as specific breeds of Yellow cattle until recently, when they were combined to form the present omnibus breed. Each type is of ancient although distinct origin and, in the more recent past, they have been known as the Murboden cattle of Steiermark, the Waldviertel cattle in lower Austria, the Mariahof and the Kärnter Blondvieh (Carinthian Blond). Bulls of the German Gelbvieh breed have been imported to help standardize the new amalgamated breed.

LOCATION, TOPOGRAPHY AND SOILS

The breed is found in the Steiermark area, the county of Neumarkt and communes in the district of Murau between 900 to 1,200-meter altitude, in Kärnten in St. Veit an der Glan at 500 to 900 meters in the eastern part of Feldkirchen, most of Klagenfurt (400 to 900 meters), Völkermarkt, Wolfsberg and in Waldviertel. The soils vary appreciably from the lower to the higher areas and, in some granitic and gneiss soils, the level of lime is very low.

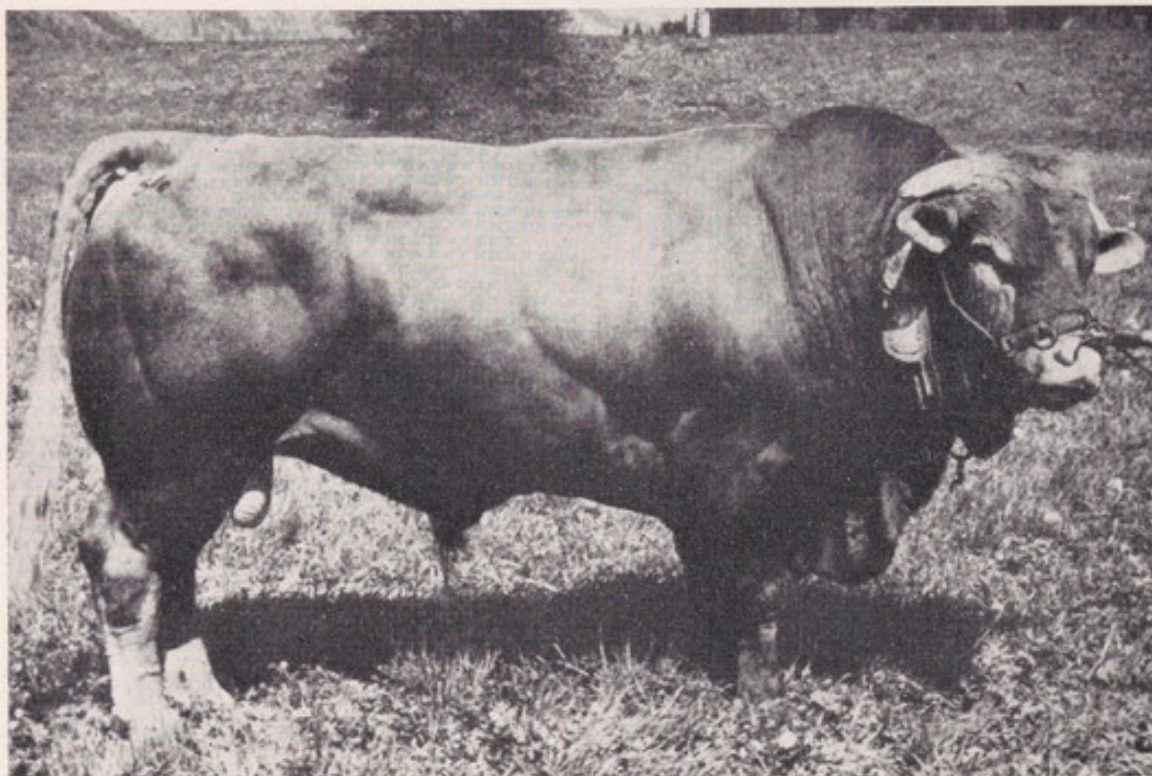


FIGURE 17. — Austrian Yellow bull (Hadrian 2633). 5-year average of dam: 4,099 kilograms of milk containing 4.33 percent of butterfat.

Courtesy Ebner

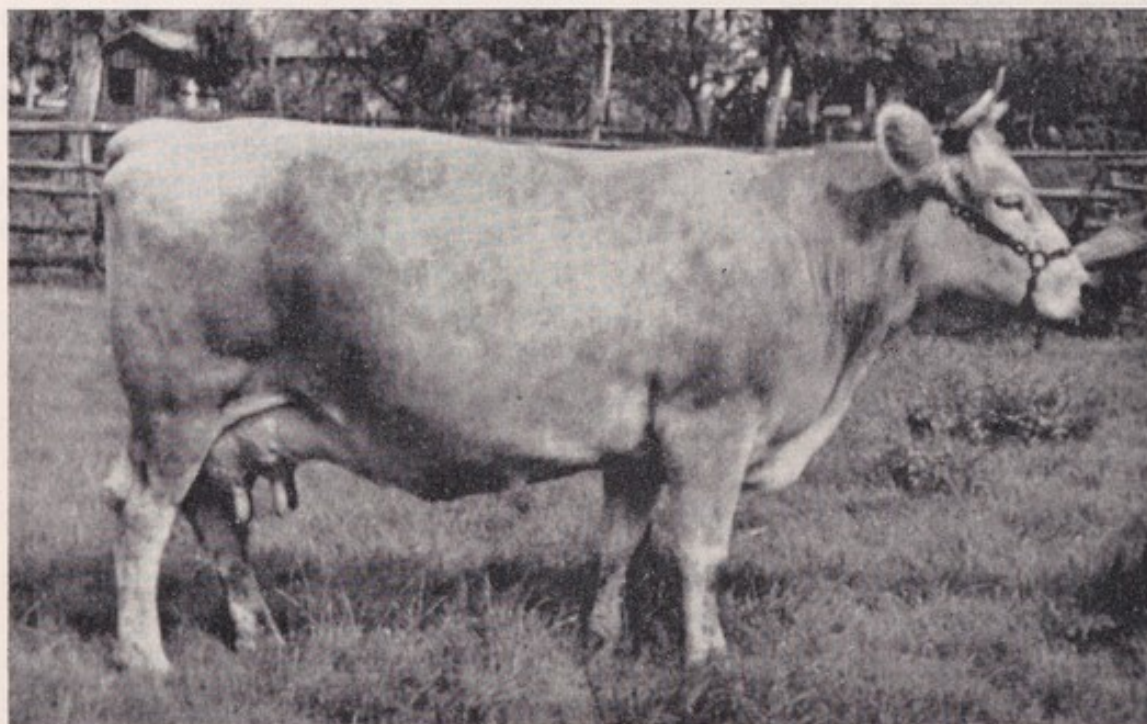


FIGURE 18. — Austrian Yellow cow (Semla 25736). 4-year average: 4,270 kilograms of milk containing 4.36 percent of butterfat.

Courtesy Kniely

CLIMATE

To define the average climatic conditions over such a large and varied topographical region is very difficult. Table 20, however, gives the data for Admont in Steiermark.

TABLE 20. - AVERAGE CLIMATIC CONDITIONS FOR AUSTRIAN YELLOW CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-5.3	-3.2	2.3	7.1	12.0	14.6	15.9	15.1	12.1	7.1	0.1	-3.9
Relative humidity (%)	82	77	72	70	69	71	71	74	75	78	82	85
Rainfall (mm)	74	60	65	82	103	139	168	153	119	74	61	7

FEEDING AND MANAGEMENT

During late spring to early autumn, as many cattle as possible are sent to mountain grazings and only milking cows are normally kept on the fields in the plains. There are often too many animals for the available fodder, although increased attention has recently been given to the growing of specific fodder crops and to the making of silage. Cows in the plains may be fed silage crops as well as being allowed some pasturage in the summer. In the winter, all stock receive grass and legume hays, straws and, to an increasing extent, silage from maize, grass or beet tops, as well as ordinary farm by-products. Concentrates may be given to the better milkers or for fattening purposes.

PHYSICAL CHARACTERS

The hair is soft, short to medium-long, and grows on a lightly pigmented skin of medium thickness. In color, the hair is of a single hue on any individual but may range from light yellow (cream) to reddish or brown. The muzzle, hooves, body orifices and the teats are yellowish brown in color.

The head is of medium length, wide in the forehead and straight in profile. The body is long, with a fairly straight back, deep chest, well-sprung ribs and a capacious abdomen. The dewlap is small, the loins and quarters long, and there can be good muscular development provided the level of feeding is sufficiently high. The udders

are reasonably well developed and attached, while the legs are short, strong and muscular. Table 21 presents some details of liveweights and body measurements.

TABLE 21. — AVERAGE LIVEWEIGHTS AND BODY MEASUREMENTS OF AUSTRIAN YELLOW CATTLE

	Males			Females		
	1 year	2 years	Mature	1 year	2 years	Mature
Liveweight (kg)	300-390	480-550	900-1 000	250-300	400-450	500-650
Wither height (cm)	—	125-130	131-138	—	—	132
Chest girth (cm)	—	182-185	210-215	—	—	186-189
Chest depth (cm)	—	64-67	70-77	—	—	69

FUNCTIONAL CHARACTERISTICS

The Austrian Yellow is a triple-purpose breed but there is a tendency to convert it to a milk/meat animal in the lower-altitude, better nutritional environment, and to leave it as a triple-purpose beast for milk, meat and work at the higher elevations where feed is less abundant in the winter and where the tractor is displacing the work animal to some extent.

The average age at first calving varies from 2 to 2½ years of age and 5 to 6 calves is the normal lifetime production of cows. The birth weight of male calves averages 40 to 50 kilograms and females average 35 to 45 kilograms. Bulls are first used when 14 months old and have an active breeding life of 2 to 4 years. In 1961, milk records were taken from 18,636 cows and the average yields are as shown in Table 22.

Animals are put to work when about 2 years old and are active

TABLE 22. — AVERAGE LACTATION RECORDS OF AUSTRIAN YELLOW COWS (1961)

	No. of cows	Milk	Fat
		Kilograms	Percentage
Nonregistered cows	12 357	2 597	4.16
Registered cows	6 279	3 378	4.15

and willing. They are used for all kinds of farm work and for haulage purposes and are worked for 200 days per year.

These Austrian Yellow cattle fatten rapidly when on grass or fed in yards. Average carcass percentages vary from 52 to 53 percent. There is a good proportion of meat in the carcass, which is light colored, fine in fiber structure and well marbled. It is tasty and does not shrink unduly in cooking.

BREED ORGANIZATION

Breeders are organized in three Associations which are controlled by the "Arbeitsgemeinschaft der Gelbviehzüchter." In 1959, there were about 460,000 Austrian Yellow cattle in the country, of which about 12,000 were registered in the Herdbook.

Pinzgau (Pinzgauer)

ORIGIN

The home of this breed is in the Pinzgau valley in the province of Salzburg and several old landraces have contributed to its formation, including the Mölltal cattle in Kärnten as well as the Pustertal and Tux-Zillertal cattle from the Tirol. Although of ancient origin (see also the section on the Bavarian Pinzgau, Vol. I, p. 252), the present-day Pinzgau emerged about the middle of the last century, became very popular in Austria, and found a good market in neighboring countries.

LOCATION, TOPOGRAPHY AND SOILS

Their present breeding area in Austria is concentrated around Salzburg, the eastern parts of Steiermark, east Tirol and Kärnten. The bulk of these animals are to be found in an area of the Alps of northern Austria, with the 3,800-meter Gross Glockner as its center. The animals live in the valleys and on the lower slopes of the mountains at altitudes from 500 to 1,500 meters but graze up to 2,500 meters in the summer. In the valleys, one encounters alluvial and colluvial soils with appreciable quantities of clay in the upper layers, whereas on the mountains brown podzolic soils are more normal.

CLIMATE

The climatic conditions vary considerably and, in quoting the data for 600 meters, it must be remembered that the conditions in

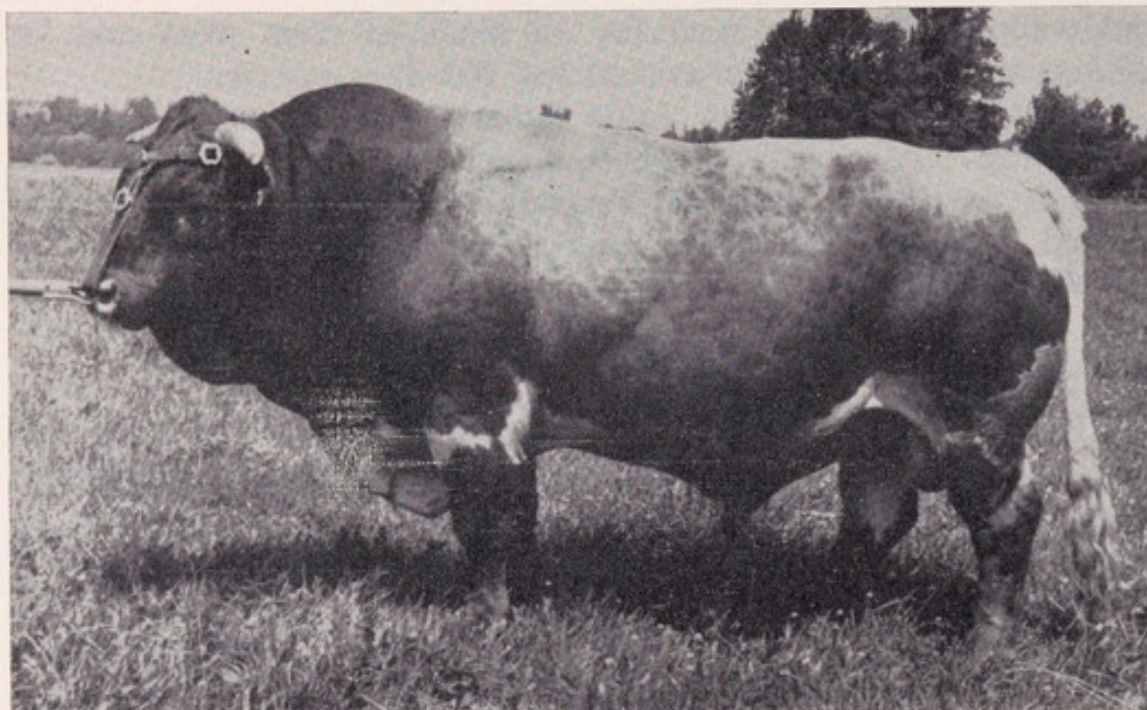


FIGURE 19. — Pinzgau bull (Baldrian 60300). 1,025 kilograms liveweight. 7-year average of dam: 3,488 kilograms of milk containing 3.99 percent of butterfat.

Courtesy Holz

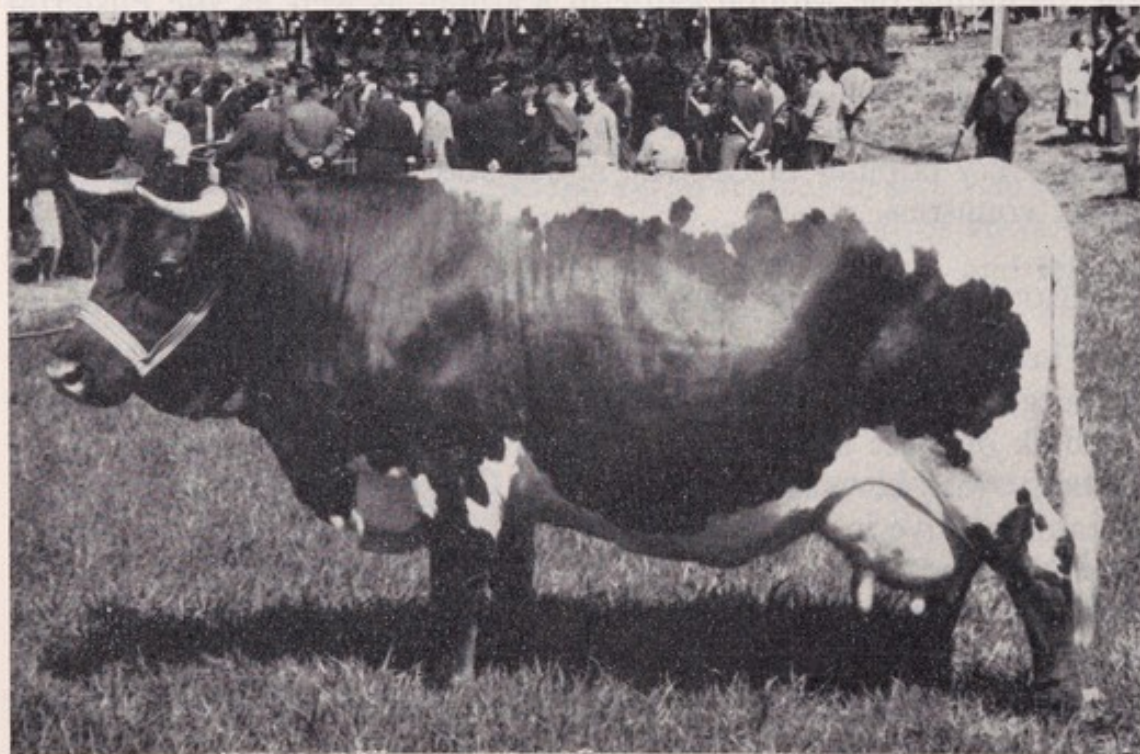


FIGURE 20. — Pinzgau cow (Glucka 55131). Average of 8 lactations: 3,948 kilograms of milk containing 4.23 percent of butterfat. Highest yield: 4,847 kilograms of milk containing 4.35 percent of butterfat.

Courtesy Kocher

the valleys are very much warmer than the mountain slopes in summer but are more humid in winter.

TABLE 23. - AVERAGE CLIMATIC CONDITIONS FOR PINZGAU CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature(°C)	-3.3	-0.5	3.9	8.9	12.8	16.7	17.8	17.2	13.9	8.9	3.3	-1.7
Rainfall (mm)	38	43	48	58	69	102	127	114	86	58	41	51

FEEDING AND MANAGEMENT

The feeding levels and management systems are extremely variable and vary from complete stall-feeding throughout the year, even in the valleys, to the more normal system of summer grazing and winter housing. The general feeding arrangements are similar to those discussed on p. 31, but whereas the cattle are kept mainly for milk and beef in the lowland areas, they are used for work both in the valleys and on the mountains.

PHYSICAL CHARACTERS

The physical characters are similar to those described for the German Pinzgau in Vol. I, p. 255. Table 24 gives the liveweights and body measurements of the Austrian Pinzgau.

TABLE 24. - AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF PINZGAU CATTLE

	Males			Females		
	1 year	2 years	Mature	1 year	2 years	Mature
Liveweight (kg)	405	720	912	317	484	602
Body length (cm)	137	162	174	131	153	166
Wither height (cm)	118	132	139	119	110	133
Chest girth (cm)	165	209	232	150	187	202
Chest depth (cm)	62	76	85	56	67	75
Hip width (cm)	43	54	60	39	46	55

For a very long time these animals have been used for draft purposes on farms and their muscular development and the hardness and durability of their hooves are such that they can do long hours of work on rough surfaces. Their broad, deep bodies and well-sprung ribs give them ample capacity to deal with coarse fodder, and their strong, broad frames allow large quantities of good-quality beef to be carried. Size and weight naturally depend on feeding and so vary between the lowlands and the higher slopes of the mountains.

FUNCTIONAL CHARACTERISTICS

Although basically a beef/work animal, the demand for milk and the developments achieved in this direction in the lower altitudes justify this breed being classed as a triple-purpose animal. As always, however, the raising of milk production tends to be at the expense of one or both of the other characters and, in the valleys, there has been a shift toward a milk/beef type.

The average age at first calving is 34 months and some 4 to 6 calves are produced at regular yearly intervals during the cow's lifetime. At birth, male calves average 50 to 60 kilograms and females 45 to 55 kilograms. Bulls are ready for service at 14 months and, because of their docility, are used from 3 to 8 years. They are active and quick in service. In 1961, milk records were available from 28,749 cows and these are summarized in Table 25.

TABLE 25. - AVERAGE LACTATION RECORDS OF PINZGAU COWS (1961)

	No. of cows	Milk	Fat
		<i>Kilograms</i>	<i>Percentage</i>
Nonregistered cows	17 832	2 929	3.93
Registered cows	10 917	3 473	4.02

The highest individual record for this breed (1955) was 8,125 kilograms of milk containing 4.15 percent of butterfat. The average yield for the Austrian Pinzgau (3,135 kilograms) thus corresponds very closely with that for the Bavarian part of the breed (3,191 kilograms), as does the butterfat content.

The Austrian Pinzgau is an excellent beef animal and the raising of steers for beef is quite common. They fatten well at grass or

under stall-feeding and at 3 years dress out at 55 to 65 percent for liveweights of around 900 kilograms.

Males are put to work when about 2 years old but females may be up to 4 years of age before they are employed for this purpose. They are docile and even-tempered and work from 4 to 7 hours daily at all forms of farm work during 80 to 100 days of the year. They can stand up to great strain and will work under a wide variety of climatic and soil conditions.

BREED ORGANIZATION

Some 362,457 Pinzgau cattle, or 30 percent of the total cattle population, are encountered in Austria. There are four Breeders' Associations. Between 40,000 to 50,000 animals are registered in the Herdbook.

Austrian Brown (**Braunvieh, Montafoner, Vorarlberger**)

ORIGIN

Austrian Brown cattle developed in the Alpine region of eastern Switzerland and western Austria from a small gray-black to reddish brown peat cow and from an even smaller black Celtic cow with white markings. Subsequently, a large yellowish gray cow, the Rätier, exerted considerable influence on what was later called the Montafoner.

In the fourth and fifth centuries, a large blond-yellow to reddish "Aleman" breed influenced the type of animals in the Allgäu, Lech and Oberinntal regions. These strong and dark colored Walser cattle formed the second branch from which the modern Austrian Brown has developed. Considerable interchange took place between Switzerland and Austria in the formative years of the Brown cattle in the two countries, and the two breeds are now very similar.

LOCATION, TOPOGRAPHY AND SOILS

This breed is encountered in all the federal counties of Austria at varying altitudes and on different soil types. They are found in the Vorarlberg and Tirol at altitudes between 550 and 1,700 meters in Steiermark and in Kärnten. They graze on Alpine pastures up to 2,500 meters and down to the arable plains of lower Austria.



FIGURE 21. — Austrian Brown bull (Dietrich 3956). 10-year average of dam: 4,208 kilograms of milk containing 4.22 percent of butterfat.

Courtesy Kriesche

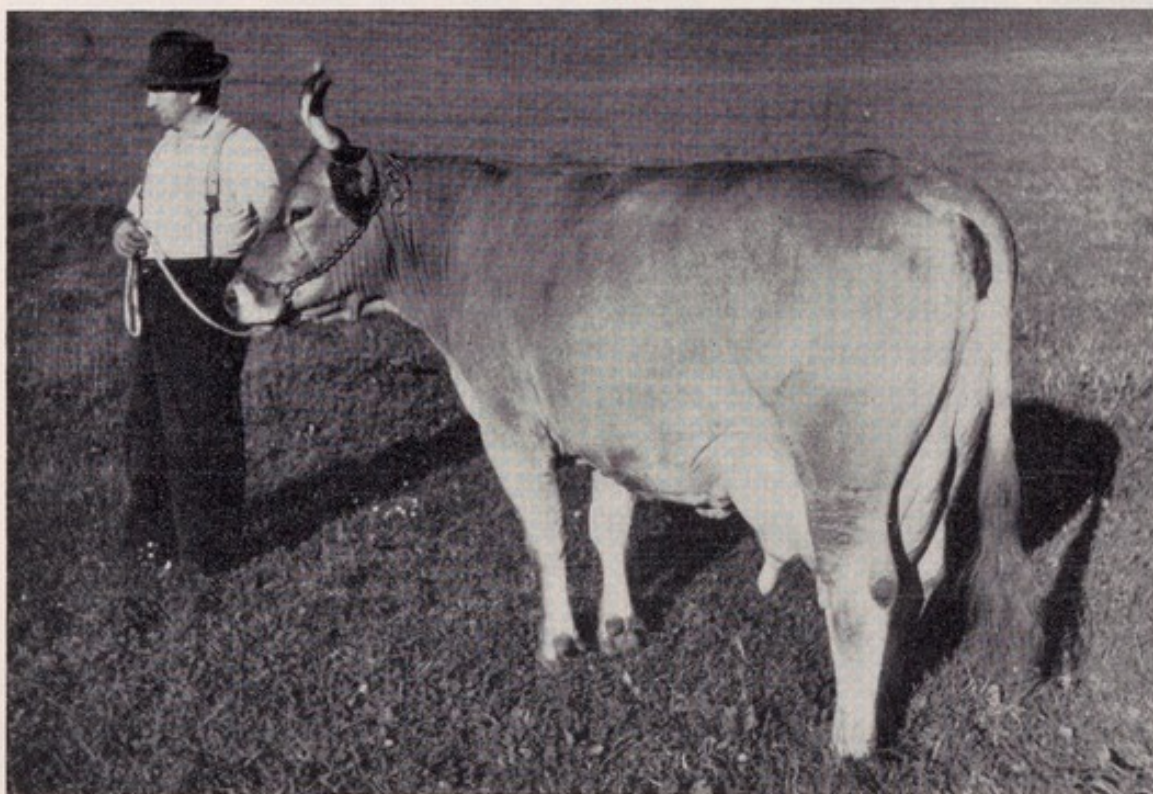


FIGURE 22. — Austrian Brown cow (Ida 39289). Average of 8 lactations: 6,355 kilograms of milk containing 4.05 percent of butterfat.

Courtesy Schwab

CLIMATE

Climatic conditions are typical of the continental region, with the greater portion of rainfall falling in summer and the severity of winter increasing with altitude. Table 26 gives the average climatic conditions at two levels of altitude.

TABLE 26. - AVERAGE CLIMATIC CONDITIONS FOR AUSTRIAN BROWN CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
ALTITUDE (435 m)												
Temperature(°C)	-0.8	0.4	4.1	8.3	13.0	16.1	17.7	16.9	13.6	8.7	4.1	0.7
Relative humid- ity (%)	80	75	71	72	73	75	75	78	81	83	83	84
Rainfall (mm)	80	71	85	120	134	194	202	175	159	108	84	90
ALTITUDE (1 815 m)												
Temperature(°C)	-5.8	-4.8	-3.1	-0.5	5.6	8.5	10.7	10.4	7.8	3.5	-1.7	-4.2
Relative humid- ity (%)	66	64	65	65	70	70	72	73	72	71	69	69
Rainfall (mm)	64	54	60	73	73	102	127	117	95	57	51	73

FEEDING AND MANAGEMENT

In the lower breeding areas, many animals are out grazing during the summer and early autumn months, but dairy producers may be kept indoors the year round and fed cut fodders in the spring and summer. Most stock are housed in the winter and fed hays, straws, roots, etc., but compound feeds are little used except for peri-urban dairy units. In the Alpine area, all cattle graze up the mountains in summer but are pastured at the lower altitudes during spring and autumn. The cattle are housed in winter. Between 60 and 70 percent of calvings occur in the autumn and winter months in the Alpine regions but are spread throughout the year in the valleys and plains.

PHYSICAL CHARACTERS

The physical characters of these cattle are very similar to those described for Swiss animals. Table 27 illustrates their average liveweights and body measurements in Austria.

TABLE 27. — AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF AUSTRIAN BROWN CATTLE

	Males			Females		
	1 year	2 years	Mature	1 year	2 years	Mature
Liveweight (kg)	320	550	900	280	350	520
Wither height (cm)	113	126	137	107	119	128
Chest girth (cm)	155	186	210	140	165	186
Chest depth (cm)	56	66	73	50	60	67
Hip width (cm)	38	46	53	36	44	52

Great stress is laid on the health, constitution and adaptability of Austrian Brown cattle, which originated as a triple-purpose animal but has now been changed into a milk/meat animal.

FUNCTIONAL CHARACTERISTICS

Heifers calve for the first time when 33 to 36 months old and may continue breeding for more than seven lactations. The average birth weight of male calves is 38 kilograms and for females 36 kilograms. Bulls are used for service from 11 to 14 months of age and the better ones are retained up to the age of 10. Average lactation records for 1961 are given in Table 28.

The highest recorded yield in 1961 was 8,792 kilograms of milk containing 4.07 percent of butterfat. Since 27 percent of the cows

TABLE 28. — AVERAGE LACTATION RECORDS OF AUSTRIAN BROWN COWS (1961)

	No. of cows	Milk	Fat
		<i>Kilograms</i>	<i>Percentage</i>
All recorded cows	55 457	3 678	3.90
Registered cows	39 854	3 821	3.90

are sent to summer pasture this reduces the average milk output, while the production of Emmental cheese prevents many cows being given the silage which could improve their winter output.

Austrian Brown cattle are well muscled and give a good-quality beef, although milking cows are fattened only after their milk-producing life is finished. Animals of this breed are fattened both in yards and off grass.

Although they have been used for all types of farm work in the past, the demand is giving way to the advent of the tractor. They have hard, durable hooves and can work long hours.

BREED ORGANIZATION

Out of a total population of about 375,000, there are 45,000 registered animals. The breeders are organized into six Breeders' Associations which join together to form the Federation of Austrian Brown Cattle Breeders' Associations. Artificial insemination has been introduced into all provinces, with the exception of Vorarlberg.

Grey Tirolean (Oberinntal, Grauvieh)

ORIGIN

Grey Tirolean (Oberinntal) cattle are the oldest indigenous breed in Austria and have been known for centuries. They are similar in conformation to the Ratia cattle described by the Romans and are descended from the Lake Village cattle (Pfahlban).

LOCATION, TOPOGRAPHY AND SOILS

Grey Tirolean cattle are found in the Inntal valley from Kempten near Innsbruck (600 meters) to the south in the Nipp valley and Stubaital (1,000-1,500 meters) and to the west in the Ötztal valley (700-2,000 meters), the Pils valley (750-1,700 meters) and in the Upper Inn valley (900-1,650 meters), on the varying soils from the richer valley bottoms to the stony mountain slopes.

CLIMATE

To illustrate the climatic conditions in which Grey Tirolean cattle are found, details for Innsbruck and Hochserfaus are given in Table 29.

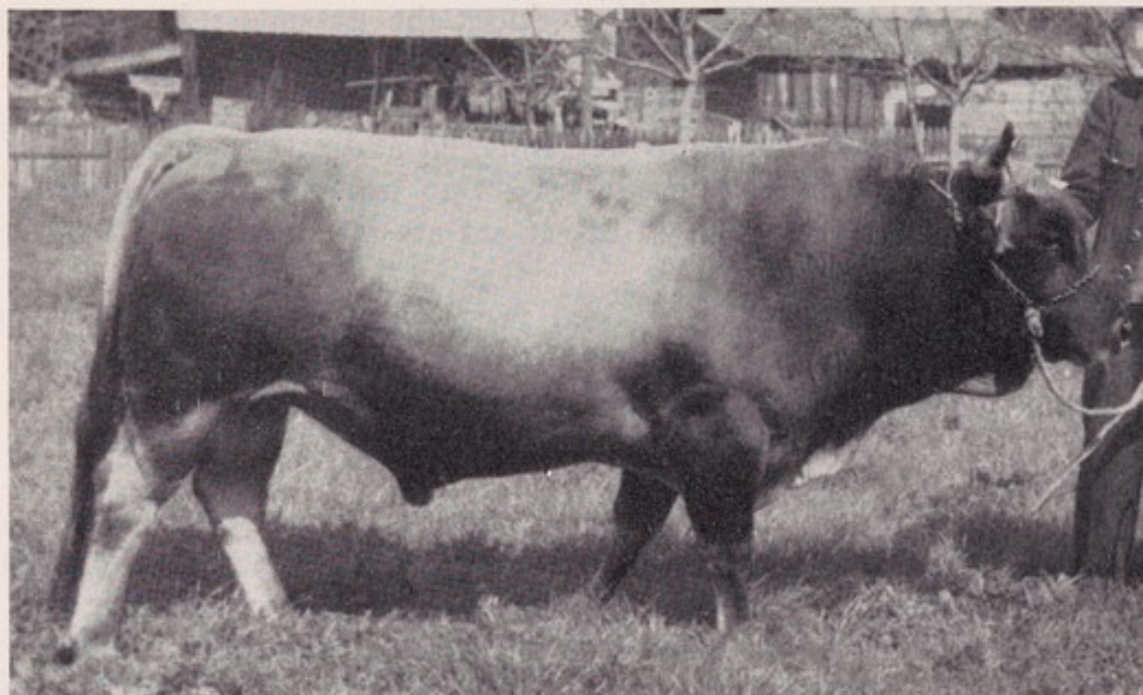


FIGURE 23. — Grey Tirolean bull (Dozent 13692).

Courtesy Waldhart



FIGURE 24. — Grey Tirolean cow.

Courtesy Tirol Grey Herdbook Society

TABLE 29. - AVERAGE CLIMATIC CONDITIONS FOR GREY TIROLEAN CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
INNSBRUCK												
Temperature(°C)	-3.1	-0.2	4.6	8.5	13.6	16.3	17.8	17.0	13.9	8.9	3.0	-1.5
Relative humid- ity (%)	78	73	75	62	63	66	70	74	73	75	79	78
Rainfall (mm)	63	44	54	66	88	116	141	136	94	69	59	66
HOCHSERFAUS												
Temperature(°C)	-5.8	-4.8	-3.1	-0.5	5.6	8.5	10.7	10.3	7.8	3.5	-1.7	-4.2
Relative humid- ity (%)	66	64	65	65	70	70	72	73	72	71	69	69
Rainfall (mm)	64	54	60	73	73	102	127	117	95	57	51	73

FEEDING AND MANAGEMENT

Because of the medium altitude (1,100 meters) of the main area where the Grey Tirolean cattle are domiciled, grass is the most prevalent crop, including meadowlands near the homestead which can be cut two or three times a year, and Alpine meadows. All young and dry stock are turned onto home pastures in spring and then, with some 60 percent of the cows, are sent to the high Alpine grazings for about 100 days. Some of the more productive cows are kept throughout the summer on home pastures in valleys up to 2,000 meters. The Alpine pastures are the property of the community and too many animals are kept, so that there is often a shortage of fodder in the spring. In the winter, the animals are fed on hays, straws, silage, with but small amounts of grains and purchased concentrates.

PHYSICAL CHARACTERS

The thin, loose skin is darkly pigmented and covered with short, soft hair which is gray in color. The gray varies from silver to iron gray, with darker shades on the head, neck, shoulders, belly and the forelimbs. At times, both yellow and white hairs can be found and, in some bulls, white spots occur.

The head is rather narrow with the long *Brachyceros* type of face. The muzzle and body apertures are dark, as are the hard, durable hooves. The horns are of medium length, yellowish white in color with black ends.

The body is medium to small, and the weight is typical of the lighter milch breeds. It is relatively long, of good depth, with well-sprung ribs, and a large abdominal capacity. The back is fairly level, the loins and quarters being both wide and long, although the quarters slope from the spinal column to the sides. The muscles are nicely developed and are carried down at the back to the hocks. The legs are short, strongly boned and muscular. Details of liveweights and body measurements are given in Table 30.

TABLE 30. — AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF GREY TIROLEAN CATTLE

	Males			Females		
	1 year	2 years	Mature	1 year	2 years	Mature
Liveweight (kg)	280	550	750-900	250	300	400-500
Body length (cm)	128	148	172	120	137	154
Wither height (cm)	116	122	132	105	112	122
Chest girth (cm)	155	186	202	140	165	180
Chest depth (cm)	58	66	73	56	60	66
Hip width (cm)	38	46	51	36	44	48

FUNCTIONAL CHARACTERISTICS

The birth weights of male calves are 35 to 40 kilograms and for females 30 to 38 kilograms. Heifers calve for the first time when about 3 years old. The main breeding season is from January to March. Bulls are used from 13 months of age and are at service for around 3 years.

Although these Grey Tirolean cattle have been developed as triple-purpose animals, more attention is now being paid to their milking potential and they probably yield more milk per 100 kilograms body weight than any other Austrian breed. In 1961, there were 4,308 cows milk recorded. The figures are shown in Table 31.

TABLE 31. - AVERAGE LACTATION RECORDS OF GREY TIROLEAN CATTLE (1961)

	No. of cows	Milk	Fat
		<i>Kilograms</i>	<i>Percentage</i>
Nonregistered cows	—	3 080	3.90
Registered cows	3 943	3 292	3.96

Grey Tirolean cows have also been developed as excellent work animals. They are put to work when about 2 years old and a pair will haul a load of 1,800 kilograms on a level road. They are quiet, docile and willing workers but their pace is slow — 2 kilometers per hour. They will work 6 to 8 hours a day for 120 days a year at all ordinary farm operations.

Although the muscular development and meat potential are less than for other Austrian cattle, the meat is finegrained, while the animals fatten readily on grass or in yards. The dressing percentage is good, the muscles are marbled with fat and the bones are fine.

BREED ORGANIZATION

A Breeders' Association directs breeding policy and is responsible for Herdbook entries, etc., while the state provides assistance for purchasing and for herd testing. The number of registered animals is about 5,000 to 6,000 and the number of animals in the Tirol is around 41,000. Their numbers are slowly increasing.

[Black and White Lowland (Schwarzbuntes Niederungsvieh)]

ORIGIN

This breed has developed from importations of black and white cattle from north and central Germany, particularly of the more rugged types. These importations began during the second half of the nineteenth and have continued well into the present century.

LOCATION, TOPOGRAPHY AND SOILS

The main breeding area lies between Linz, Wels and Oftering, with the chief center of the breed in the communes of Hörsching, Pasching, Kirchberg/Thening and Oftering, and a smaller center at Gaspolthofen.



FIGURE 25. — Black and White Lowland bull.



FIGURE 26. — Black and White Lowland cow.

CLIMATE

The climatic conditions for this breed can be illustrated by the data in Table 32 for Linz.

TABLE 32. - AVERAGE CLIMATIC CONDITIONS FOR BLACK AND WHITE LOWLAND CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-1.0	0.1	4.2	8.7	13.7	16.8	18.8	17.9	14.3	8.7	3.7	-0.5
Relative humidity (%)	83	77	71	69	67	70	71	72	75	80	83	85
Rainfall (mm)	58	44	49	69	87	100	125	96	80	54	48	59

FEEDING AND MANAGEMENT

Black and White Lowland cattle have been reared and managed in areas where considerable importance is paid to the growing of root crops, and often the use of roots is so great that the quantities of hay consumed are appreciably reduced. The proportion of meadowland on these average farms is low but the quality of the root crops is excellent. Pasture development is now receiving attention in response to the demand for milk from urban populations. Only enough calves are kept to meet herd replacement needs. Hays, straws, silage, roots and root tops are basic winter feeds, while beans, grains and purchased protein concentrates are utilized on the better farms.

PHYSICAL CHARACTERS

The soft, short hair covers a thin, loose and pliable skin which is pigmented under the black hairs. The coat is black and white in patches and the breed closely resembles the Black and White German cattle from which they have developed (see Vol. I, p. 223). Average liveweights and body measurements are shown in Table 33.

FUNCTIONAL CHARACTERISTICS

Male calves weigh 38 kilograms at birth and females weigh 34 kilograms. Heifers calve for the first time when 28 to 30 months of age and cows normally produce 5 calves in their lifetime. Young

TABLE 33. - AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS
OF BLACK AND WHITE LOWLAND CATTLE

	Males			Females		
	1 year	2 years	Mature	1 year	2 years	Mature
Liveweight (kg)	370	580	800-900	280	450	550-700
Body length (cm)	128	154	165	127	142	150
Wither height (cm)	114	134	139	113	121	130
Chest girth (cm)	167	193	210	154	174	196
Chest depth (cm)	60	73	78	58	65	73
Hip width (cm)	43	54	59	40	50	55

bulls are put to service at 14 months of age and normally remain in the herd for 2 to 3 years. In 1961, the average milk yield of 154 recorded and registered cows was 4,503 kilograms containing 3.66 percent of butterfat.

The breed is normally used for the production of milk, with meat as a by-product, but attention is now focusing on the improvement of beef potential without interfering with milk output. The animals grow well and fatten readily either off grass or in yards. When slaughtered at 550 to 900 kilograms liveweight, the carcass percentage varies from 48 to 62 percent. The muscle is composed of thin fibers, is light in color and of very good quality and culinary properties. Meat from these animals is marbled and commands top prices in Austria.

BREED ORGANIZATION

A Breeders' Association maintains a Herdbook and is responsible for the registration of approved animals. There are about 16,000 of these animals, of which only some 300 cows are registered.

CZECHOSLOVAKIA

Czechoslovakia lies approximately between 12° to 22° east longitude and 48° to 50.5° north latitude in the central region of the European continental mass. Bohemia, in the western area, is an undulating plateau with mountains rising in the central portion

to 925 meters, in the west to 1,245 meters and in the northeast to a maximum of 1,605 meters in altitude. The central part of the country, Moravia, is intersected by hills and valleys and is bordered on the north and east by mountain masses. The Carpathian Mountains occupy the major portion of Slovakia in the eastern part of the country and extend to the altitude of Tatra at 2,635 meters. The southeastern portion of Slovakia is of lower altitude and is a continuation of the Hungarian lowlands.

From its situation, as would be anticipated, the climate is typically continental, with the differences between summer and winter temperatures increasing from west to east. The major precipitation occurs in the summer months, which is very important from the pasture-producing point of view. The annual rainfall varies from 400 millimeters on the Bohemian plateau to 1,500 millimeters on the slopes of the Carpathian Mountains.

About 43 percent of the total land surface is under arable cultivation and 15.6 percent are in pastures and meadows. The soil is of good quality on the plains and in the valleys but is markedly poorer on the mountain slopes. At the lower altitudes, cattle are largely stall-fed throughout the year but, on the mountains, summer pasturing is a normal feature. In winter, the main feeds are hays, straws and silage, supplemented with farm by-products and, to a lesser extent, with purchased concentrates. In the lower regions, soilage is fed in barns, although some strip grazing is practiced.

During the second world war, there was a serious reduction in cattle numbers but the population has regained its prewar size since 1945. Until the end of the last century, the dominant breed in Czechoslovakia was the Bohemian Red but only small numbers are now to be encountered. The majority have been crossed with Simmentals to improve productivity. At the beginning of this century, several Red and White breeds were recognized in Moravia, such as the Berno-Hana, the Kuhland and the Schönhengst, but the latter have now been amalgamated with the Hana. In the southeastern Slovakian plains, Steppe cattle used to be found but have now completely disappeared.

Today, the Red and White breed is the main type of cattle in the western region, while the Slovakian Red and White cattle predominate to the east of the Carpathian Mountains. Both breeds have been influenced significantly by imported Simmental cattle. In the northeastern mountainous area, the Pinzgau is kept. Only small numbers of Friesians and Red Danish cattle have been imported from western Europe.

Some 25 percent of the cow population is milk recorded but artificial insemination has been rapidly adopted and about 85 percent of cows are impregnated by this means. Of the milk recorded cows, only 7.8 percent are registered in the Herdbooks.

Czechoslovak Red and White

ORIGIN

During the last half of the nineteenth century, several imported breeds were employed for grading up the low-producing indigenous breeds. The Simmental ultimately proved to be the most satisfactory and the Red and White breed was developed by continuous topcrossing with Simmental bulls.

Heavier types were required for the lowland areas and lighter cattle for the mountain regions. Of the heavier types, the Berno-Hana eventually emerged as one of the best. To develop the lighter animals, Ayrshire bulls were imported from Great Britain and Finland, while some Red and White bulls were brought in from Sweden. The outcome of these crossbreeding efforts was the recognition of the Kravařsko and Hřbínecké types in northern Moravia. At the beginning of the present century, other Red and White breeds which were recognized were the Kahland and the Schönhengst. Eventually, all Red and White cattle were amalgamated into the present single breed.

LOCATION, TOPOGRAPHY AND SOILS

The Red and White breed is now the dominant breed in Bohemia and Moravia in the western half of Czechoslovakia.

CLIMATE

The climatic conditions are typically continental and are illustrated in Table 34 by the data from Litoměřice in Bohemia and Haná in Moravia.

FEEDING AND MANAGEMENT

The majority and certainly all the better animals are kept in stalls and yards, although some of the younger intensively managed stock may be allowed to graze. These stalled and yarded animals are fed soilage crops in summer and, in winter, legumes and grass



FIGURE 27. — Czechoslovak Red and White bull (Brok 0498/53). Dam averaged 3,583 kilograms of milk containing 4.15 percent of butterfat in 9 lactations.

Courtesy J. Smerha



FIGURE 28. — Czechoslovak Red and White cow (TN 6 Stucka). Average of 7 lactations: 6,565 kilograms of milk containing 3.88 percent of butterfat.

Courtesy J. Smerha

TABLE 34. - AVERAGE CLIMATIC CONDITIONS FOR CZECHOSLOVAK RED AND WHITE CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
^{VV} LITOMERICE												
Temperature(°C)	-2.1	0.4	2.7	7.4	12.7	15.6	17.3	16.4	12.9	8.0	2.7	0.2
Relative humid- ity (%)	84	82	76	71	65	73	73	72	76	82	87	88
Rainfall (mm)	44	34	47	55	73	84	106	82	61	54	48	50
HANÁ												
Temperature(°C)	-1.5	0.7	3.8	8.5	13.9	16.6	18.5	17.4	13.5	8.6	3.3	0.2
Relative humid- ity (%)	85	83	77	67	67	74	76	77	80	84	86	87
Rainfall (mm)	30	27	37	51	70	81	91	85	57	54	40	39

hays, maize and mixed silage, straws, brans, cereals and oilcakes. In the more extensive regions at the higher altitudes, all animals graze the mountain pastures from early May until October on public and co-operatively owned lands, on which both natural grazings and some artificial pastures are found. When they return to the farmsteads for the winter, they are fed on farm produce similar to that given to the more intensively managed cattle.

PHYSICAL CHARACTERS

The skin is thin, soft and supple and carries soft, shiny hair which is red and white in color. The red-colored patches appear over a greater area than the white. The red color is in various shades and intensities, with the white, sharply bordered areas extending over the face, on the belly, on the lower part of the tail, and on the legs. The skin is light in color and the muzzle and body orifices are pink.

The head is of medium length and width and has a straight profile. The horns pass outward from the poll and curve slightly forward and upward.

The body is long, with a fairly level topline and with wide and longish loins and quarters. The chest is deep, the ribs well sprung and the abdomen is voluminous. The legs are strongly

boned and of medium length. In volume, shape and structure, the udder should be nicely developed but this is not always the case. Table 35 gives the average liveweights and some body measurements of mature animals.

TABLE 35. — SOME AVERAGE LIVEWEIGHTS AND BODY MEASUREMENTS OF ADULT CZECHOSLOVAK RED AND WHITE CATTLE

	Light type		Heavy type	
	Males	Females	Males	Females
Liveweight (kg)	800-1 000	500-600	800-1 100	500-700
Wither height (cm)	137-143	128-134	145-156	135-144
Chest depth (cm)	—	—	79	71

FUNCTIONAL CHARACTERISTICS

The standard required for cows is a milk yield of 3,500 kilograms of milk containing 4.1 percent of butterfat in 300 days. Dams of bulls selected for breeding have produced, on the average, 4,367 kilograms of milk containing 4.24 percent of butterfat.

For meat production, this breed, with a medium rate of maturing, is able to fatten well, makes economical use of its feed and yields a juicy, tasty, marbled meat. The carcass yields of the heavier type, when slaughtered at 500 kilograms, are 58 to 60 percent, while the lighter type dresses out at 57 to 59 percent.

Both types have good working ability, are docile and energetic and can be used for all kinds of farm work and for haulage.

BREED ORGANIZATION

Herdbooks are maintained and about 7.8 percent of the milk recorded cows are registered. Milk recording practices are slowly expanding, as is the use of artificial insemination.

Slovakian Red and White

ORIGIN

The Slovakian Red and White is similar to that of the Red and White breed (p. 54) and has been derived from a grading-up policy of crossing local cattle with imported or locally bred Simmentals.



FIGURE 29. — Slovakian Red and White bull (Raballo UTBS 143/59). Dam averaged 4,349 kilograms of milk containing 4.0 percent of butterfat in 4 lactations.

Courtesy J. Smerha

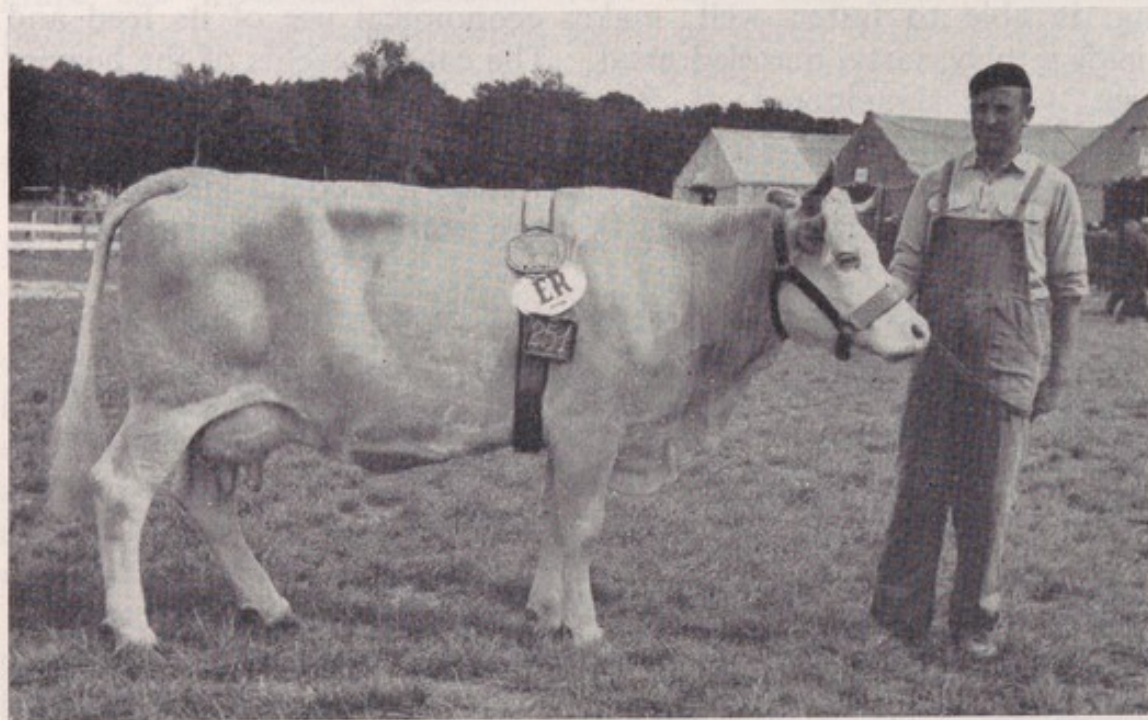


FIGURE 30. — Slovakian Red and White cow. Average yield of 4 lactations: 4,025 kilograms of milk containing 4.35 percent of butterfat.

Courtesy J. Smerha

LOCATION, TOPOGRAPHY AND SOILS

The breed is to be found in Slovakia.

CLIMATE

The data in Table 36 give the climatic conditions in the plains of Slovakia.

TABLE 36. – AVERAGE CLIMATIC CONDITIONS FOR SLOVAKIAN
RED AND WHITE CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-1.5	0.9	5.0	10.3	15.8	19.1	21.0	20.1	16.2	10.9	4.6	0.4
Rainfall (mm)	43	34	53	65	67	69	75	58	60	62	48	51

FEEDING AND MANAGEMENT

Feeding and management practices parallel very closely those described for the Red and White breed (see p. 54).

PHYSICAL CHARACTERS

In physical character there is very little difference between the Red and White Slovakian breed and the breed in the western part of the country (see p. 56).

FUNCTIONAL CHARACTERISTICS

Again, the description for the Red and White breed (see p. 57) very closely applies to its Slovakian counterpart.

Pinzgau

ORIGIN

Of the same type as the Austrian Pinzgau (see p. 37).

LOCATION, TOPOGRAPHY AND SOILS

This breed is found chiefly in the northern mountain areas of Slovakia.



FIGURE 31. — Pinzgau bull (Baldur 25/17). Dam averaged 3,677 kilograms of milk containing 4.02 percent of butterfat.

Courtesy J. Smerha



FIGURE 32. — Pinzgau cow (XSA X 095). Average of 3 lactations : 3,302 kilograms of milk containing 4.32 percent of butterfat.

Courtesy J. Smerha

CLIMATE

The data in Table 37 illustrate the climatic conditions for this breed.

TABLE 37. - AVERAGE CLIMATIC CONDITIONS FOR PINZGAU CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature(°C)	-1.1	-1.1	3.9	8.3	10.4	16.6	18.9	18.3	15.0	8.9	3.9	-0.6
Rainfall (mm)	33	28	28	51	61	74	89	81	51	61	38	35

FEEDING AND MANAGEMENT

Similar to the conditions described for the Red and White breed on p. 54.

PHYSICAL CHARACTERS

The physical characters resemble those described for Pinzgau cattle on p. 39. The wither height of mature bulls is 130 to 140 centimeters, while that for cows is 122 to 132 centimeters. The liveweights encountered are 700 to 900 kilograms for bulls and 450 to 550 kilograms for cows.

FUNCTIONAL CHARACTERISTICS

These animals can be used for milk, meat and work production. The "standard performance" level for the third and subsequent lactations is 3,000 kilograms of milk in 300 days containing 4.1 percent of butterfat.

2. THE IBERIAN PENINSULA AND ITALY

PORTUGAL

Portugal extends from 37° to 42° north latitude and occupies about 15 percent of the Iberian peninsula. Some 38 percent of the land area is arable and 17 percent is in permanent grasslands. The topography and climate are similar to those of Spain, although the influence of the Atlantic maritime climate is more pronounced. In the coastal areas, the summers are moderately warm but become hot and dry in the southeast of the country. Most of the precipitation occurs in the winter.

In proportion to the size of the human population in Portugal, the number of cattle is smaller than in any other European country. Large tracts have soil and climatic conditions more favorable for sheep than for cattle. Reference has been made to a number of breeds but there also exist, within some of these, local strains of similar but somewhat deviating characteristics. Table 38 shows the percentage proportions of the different breeds in Portugal, while Figure 33 indicates their geographical distribution.

TABLE 38. — PERCENTAGE OF DIFFERENT BREEDS IN THE PORTUGUESE CATTLE POPULATION

Breeds	Percentage
Miranda or Ratinha	25
Turino	22
Barrosa	20
Aroucesa	7
Alentejo	6
Mértola	6
Minho	3
Algarve	2
Brava	1
Other breeds and crosses	8

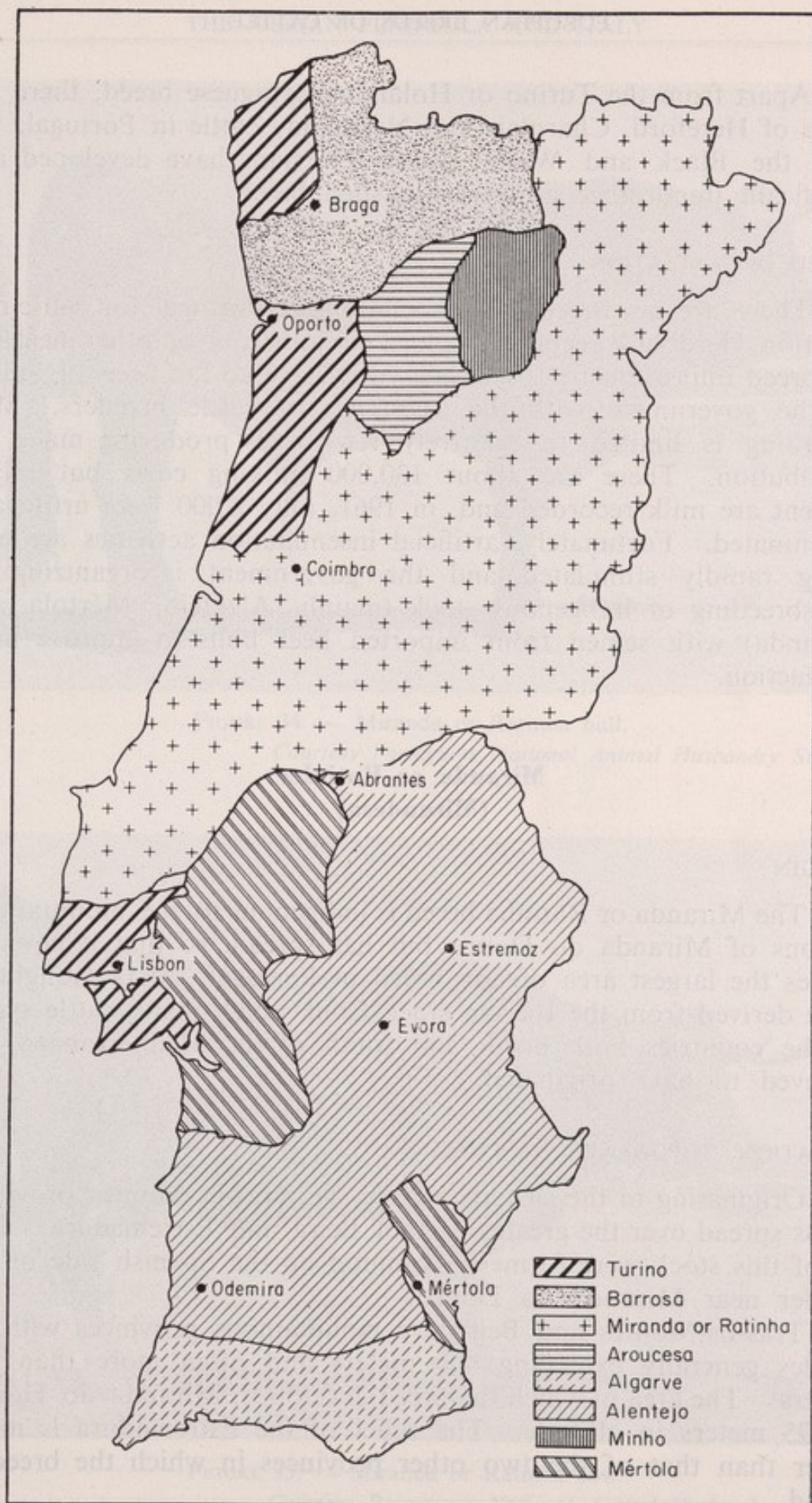


FIGURE 33. — Distribution of Portuguese cattle breeds.

Apart from the Turino or Holando-Portuguese breed, there are herds of Hereford, Charolais and Normandy cattle in Portugal, but only the Black and White Dutch Friesians have developed any significant importance as an established breed.

BREED ORGANIZATION

There are no Breeders' Associations in Portugal for cattle registration, Herdbook keeping, artificial insemination or other measures for breed improvement. Such activities have so far been organized by the government with the assistance of cattle breeders. Milk recording is limited to relatively few herds producing males for distribution. There are about 130,000 milking cows but only 3 percent are milk recorded and, in 1961, only 8,000 were artificially inseminated. Fortunately, artificial insemination activities are now being rapidly stimulated and the government is organizing the crossbreeding of indigenous stock (mainly Alentejo, Mértola and Miranda) with semen from imported beef bulls to improve meat production.

Miranda or Ratinha (Mirandesa)

ORIGIN

The Miranda or Ratinha breed is indigenous to the mountainous regions of Miranda do Douro but has spread, so that it now occupies the largest area of any breed in Portugal. It is thought to have derived from the Iberian stock from which many cattle types, in the countries both north and south of the Mediterranean, are believed to have originated.

LOCATION, TOPOGRAPHY AND SOILS

Originating in the eastern part of the Trás-os-Montes province, it has spread over the greater part of Beira and Estremadura. Cattle of this stock were formerly common on the Spanish side of the border near Miranda do Douro.

Trás-os-Montes and Beira are mountainous provinces with altitudes generally exceeding 400 meters and often more than 700 meters. The area in which the breed developed, Miranda do Douro, is 695 meters in altitude. The relief of the Estremadura is much lower than that of the two other provinces in which the breed is found.



FIGURE 34. — Miranda or Ratinha bull.

Courtesy Portuguese National Animal Husbandry Station

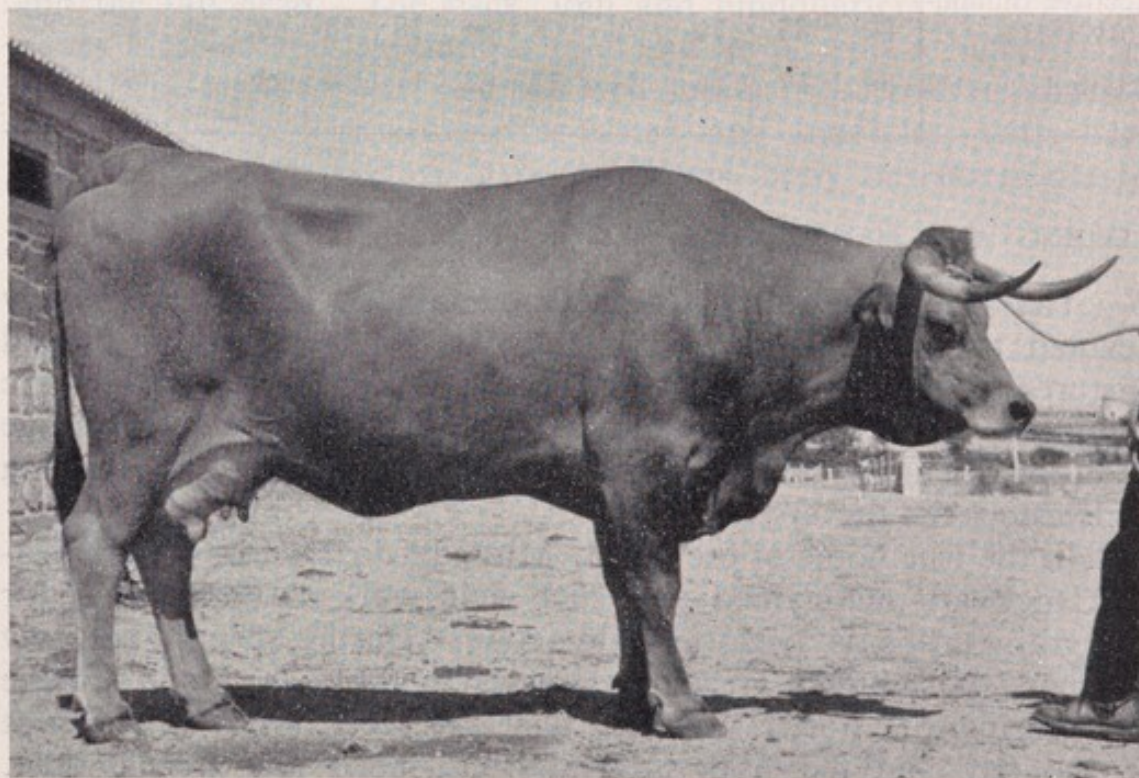


FIGURE 35. — Miranda or Ratinha cow.

Courtesy Portuguese National Animal Husbandry Station

In Trás-os-Montes, there are skeletal, mountain and gray soils as well as podzols, all associated with frequent rock outcrops. In Beira, in addition to these, there are also the thin, gray Alentejo type of soils, derived from clay schists and elsewhere from diorites and granites, as well as gray forest podzols associated with skeletal soils, red Mediterranean soils and regosols.

CLIMATE

The climate in the eastern part of Trás-os-Montes approximates more to the continental rather than to the maritime type but is really a transitory state between the two. The data in Table 39 are taken as representative of the area where the breed is developed, although the rainfall figures are from Miranda do Douro and the others are from Bragança.

TABLE 39. - AVERAGE CLIMATIC CONDITIONS FOR MIRANDA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	3.6	4.9	7.2	9.6	12.3	16.3	19.4	19.6	16.6	11.1	6.4	3.9
Relative humidity (%)	89	85	79	70	68	66	58	58	69	78	85	87
Rainfall (mm)	89	57	66	54	52	32	11	14	25	45	68	85

FEEDING AND MANAGEMENT

The cultivable valleys in the mountainous regions are largely devoted to the growing of rye and oats, while the sparse upland pastures have but a low carrying capacity. The less severe climatic conditions of Estremadura allow the cultivation of a wider range of crops, including maize, which contributes largely to the feeding of livestock in the area.

In the true home of the breed, Miranda do Douro, only breeding stock are maintained and such field work as is necessary for the grain crops is performed by cows. During spring and early summer, the animals graze the grasses in the fallows and stubble but, during the hotter weather, they are taken inside in the heat of the day and fed hays or straws, cut maize and green fodder. During the winter, they are indoors at night and are fed hays, straws, and sometimes rye grain or brans.

Calves are weaned at 5 to 6 months of age. The females necessary for herd replacements are kept but the rest are either slaughtered or sold in Beira or Estremadura, where they are reared for work or meat purposes. The conditions under which this breed is maintained vary appreciably and many animals spend a large part of their nonworking lives in stalls and yards. Most stock intended for slaughter are also stall-fed for a period before being sent to the butcher.

PHYSICAL CHARACTERS

The dark-colored skin is loose, of medium thickness, and carries soft, short hair which is brown in color, the males being darker than the females. The muzzle and eyes are surrounded by lighter colored hair and the poll also carries longer hair of a lighter tint.

The head is medium in size with a broad concave forehead, short face, broad muzzle and a concave profile. The muzzle and body orifices are black. The horns, whitish in color with black tips, are of medium length and circular in cross section. They grow outward from the head, turn first downward and then forward but curl outward and upward at the ends.

The topline sags in the middle portion between the high withers and the tail head. The back, loin and hindquarters are wide and nicely muscled and the rump is long and level, with a high tail setting. The chest is deep and the well-sprung ribs cover a capacious abdomen. The legs are strong boned and muscular, with hard, durable hooves. Average liveweights and body measurements for this breed are summarized in Table 40.

TABLE 40. — AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF MIRANDA CATTLE

	Males			Females		
	1 year	2 years	Mature	1 year	2 years	Mature
Liveweight (kg)	320	550	900	240	420	550
Body length (cm)	131	150	170	126	139	152
Wither height (cm)	118	131	143	116	125	133
Chest girth (cm)	160	194	223	154	174	190
Chest depth (cm)	61	73	83	59	66	72
Hip width (cm)	38	47	54	39	46	53

FUNCTIONAL CHARACTERISTICS

Miranda cattle have so far not been developed as milk producers. The birth weight of calves is 34 kilograms for males and 32 kilograms for females. Heifers calve for the first time when about 3 years of age. Calvings occur throughout the year, with the greatest frequency between February and April. Bulls are used for service from 18 months of age for a number of years and are very active.

Cattle are put to work when about 2 years old. This is considered the best working breed in Portugal, although they are rather slow. A pair will haul a wagon loaded with 1,500 kilograms on bad roads at the rate of 3 to 4 kilometers per hour. The cattle are used for all kinds of farm field work, on all types of soils, and also for haulage purposes. They are worked for 200 days per year and will work for 8 hours per day.

The Miranda has a fair reputation for meat production. Some stock are slaughtered for veal at or soon after weaning. Others are killed for meat before they are 2 years old. Bulls and work oxen are sent to the abattoir from 4 to 7 years of age and cows between 7 and 10 years. Carcase percentages are 50 percent and upward, depending on age and condition.

BREED ORGANIZATION

Efforts are being made to establish registered cattle and Herd-book recordings for the improvement of this breed, which numbers about 240,000 animals.

Turino **(Turina)**

ORIGIN

Dutch Friesian cattle have been imported into Portugal from the eighteenth century until the present day, but it was not until the middle of the nineteenth century that their numbers increased to any considerable extent. Cattle descended from these Dutch importations are variously known as Turino, Holandesa, Frisia or Luse-Holandese. They increased formerly in the environs of large towns to meet the demand for milk but they are now centered around all population densities and wherever dairy plants have been established.

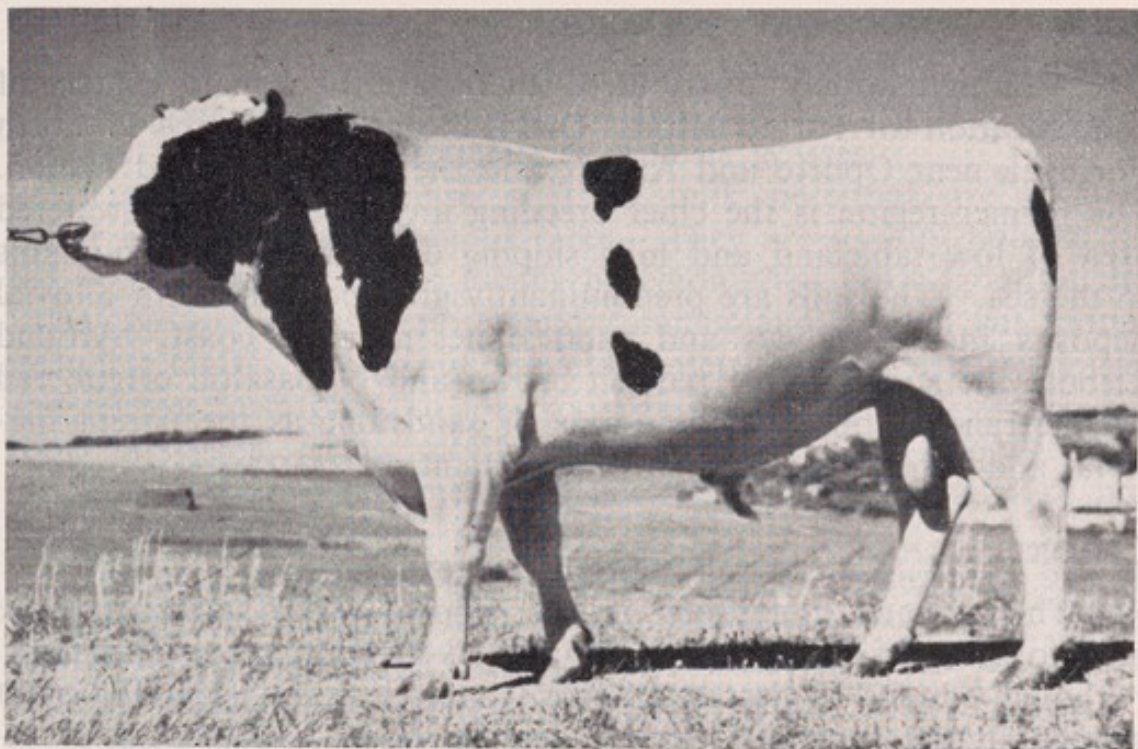


FIGURE 36. — Turino bull.

Courtesy Portuguese National Animal Husbandry Station

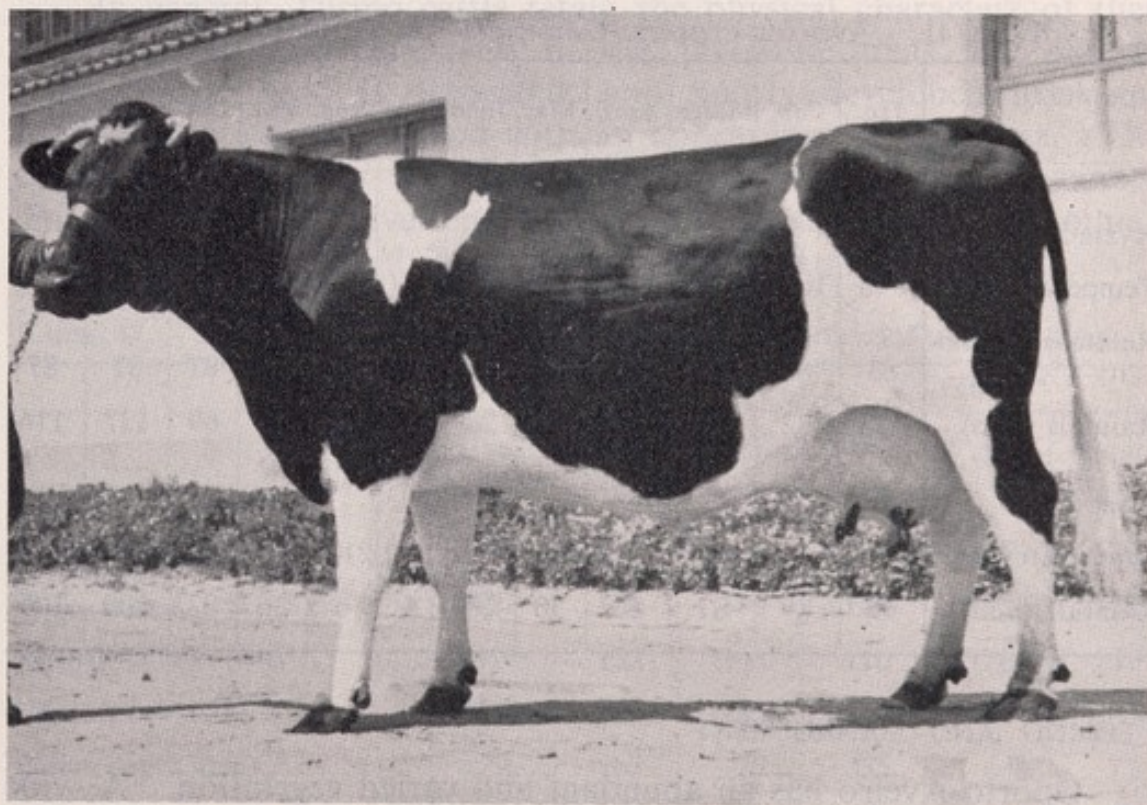


FIGURE 37. — Turino cow.

Courtesy Portuguese National Animal Husbandry Station

LOCATION, TOPOGRAPHY AND SOILS

Although widely distributed, there are two main centers of concentration for Turino cattle. One is in the coastal area of north Portugal, near Oporto and Aveiro, and the other is around Lisbon. The former region is the chief breeding area and is a well-watered area of low tableland and hills sloping down from the mountains to the sea. The soils are predominantly gray podzolic with alluvial deposits in the valleys and sand dunes near the coast. Around Lisbon, the soils may be reddish brown and of basaltic origin, red Mediterranean soils with limestone or sandstone as the parent material and forest soils of high lime content.

CLIMATE

The climatic conditions in the Oporto-Aveiro area are more akin to the west European maritime than to continental conditions. Although rainfall is heaviest in the winter, it is sufficient for plant growth in the summer. Lisbon, on the other hand, has a Mediterranean type of climate with winter rain, little precipitation in the summer and abundant sunshine. Table 41 summarizes the average climatic data for the two regions where this breed is concentrated.

TABLE 41. - AVERAGE CLIMATIC CONDITIONS FOR TURINO CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
AVEIRO												
Temperature(°C)	9.8	10.4	11.9	14.4	15.9	18.0	19.0	19.0	18.4	15.8	12.7	10.4
Relative humidity (%)	83	88	86	85	86	86	85	36	86	87	87	87
Rainfall (mm)	133	82	116	90	65	28	12	9	43	69	137	116
LISBON												
Temperature(°C)	10.3	11.2	12.4	14.2	16.6	19.2	21.1	21.7	20.2	16.8	13.6	10.9
Rainfall (mm)	92	89	87	66	50	18	4	6	36	82	109	109

FEEDING AND MANAGEMENT

Oporto-Aveiro has an abundant and varied vegetation. A wide variety of crops is grown, including large quantities of maize planted in rotation with winter forage such as beets, cabbage and turnips.

Grain crops are grown in the drier Lisbon area and cattle rely entirely on uncultivated stubble for their grazing. This stubble has a reasonable level of productivity and carries various growths of herbage which include legumes as well as grasses.

Turino cattle, because of their milk potential, are normally better fed than the indigenous races. They are usually housed and fed concentrates. In the northern region they graze good-quality valley pastures in the spring and summer and are fed cut fodder, including maize. In the autumn and winter, they are usually housed and receive fresh grass so long as it is available, hays, straws, and roots in season. They receive, throughout the year, a concentrate mixture of bran, cereal meal and maize, together with factory prepared balancing meals.

In the Lisbon region, the animals graze uncultivated stubble in spring and early summer. Hays, straws and cultivated fodder are fed when grazings dry out in the summer and also during the winter. Concentrates are fed to cows in milk.

Calves may suckle their dams for their first month before they are put onto gruel or skimmed milk until they are 3 months old.

PHYSICAL CHARACTERS

In general, Turino cattle retain the physical characters of their Dutch ancestors except that, in less favorable areas, size may be reduced, the head is elongated, and poorly developed loins and hindquarters result, coupled with an appearance of legginess. This degeneration is very largely induced by nutritional circumstances. Table 42 gives the liveweights and body measurements of animals reared at the National Zootechnical Station at Fonte, Boa.

TABLE 42. - AVERAGE LIVEWEIGHTS AND BODY MEASUREMENTS OF TURINO CATTLE

	Males			Females		
	1 year	2 years	Mature	1 year	2 years	Mature
Liveweight (kg)	315	515	895	295	470	570
Body length (cm)	127	150	179	130	146	160
Wither height (cm)	116	132	146	116	128	137
Chest girth (cm)	156	188	230	154	180	200
Chest depth (cm)	56	67	79	55	64	72
Hip width (cm)	38	50	62	38	50	58

SOURCE: Director-General of Animal Husbandry, Lisbon.

FUNCTIONAL CHARACTERISTICS

Heifers calve for the first time at 2 years of age and are considerably more precocious than indigenous breeds. Calvings are spread over the year and the average liveweight at birth is 41 kilograms for males and 40 kilograms for females. Young bulls are put to service when a year old and, although the majority are retired when 4 to 5 years old, some are retained until 10 years of age.

The breed is maintained primarily for milk production and meat is a secondary character. Only records of superior cows are available and no reliable average can be quoted on lactation yields. It has been estimated that the average yield in the northern area is 2,000 kilograms of milk containing 3.5 percent of butterfat. The average of recorded cows in the same area has been 3,500 kilograms containing 3.5 percent of butterfat in 280 days. A superior record is 10,500 kilograms of milk with 3.1 percent of butterfat in 300 days. Good milkers will be retained in the herd for eight or more lactations.

Turino cattle are comparatively quick maturing and fatten easily. Dressing percentages are around 45 percent, which is low compared with Friesians elsewhere. Many calves of less than one month are killed for veal.

Oxen of this breed have proved inferior to local Portuguese breeds as draft animals and consequently are not used extensively for this purpose.

In general, because of their greater growth rate and higher milk potential, Turino cattle are often less hardy than indigenous animals.

BREED ORGANIZATION

There are about 135,000 Turino cattle in Portugal and the number is rising slowly.

Barrosa

ORIGIN

The Barrosa breed has evolved in the Serra do Barroso mountain district, of low fertility, and in the northwest of the Trás-os-Montes province in northern Portugal. It has been suggested that this breed has some ancestral similarity to the *Bos primigenius mauritanicus* cattle of North Africa, from which have developed the Brown Atlas, Libyan and other breeds.

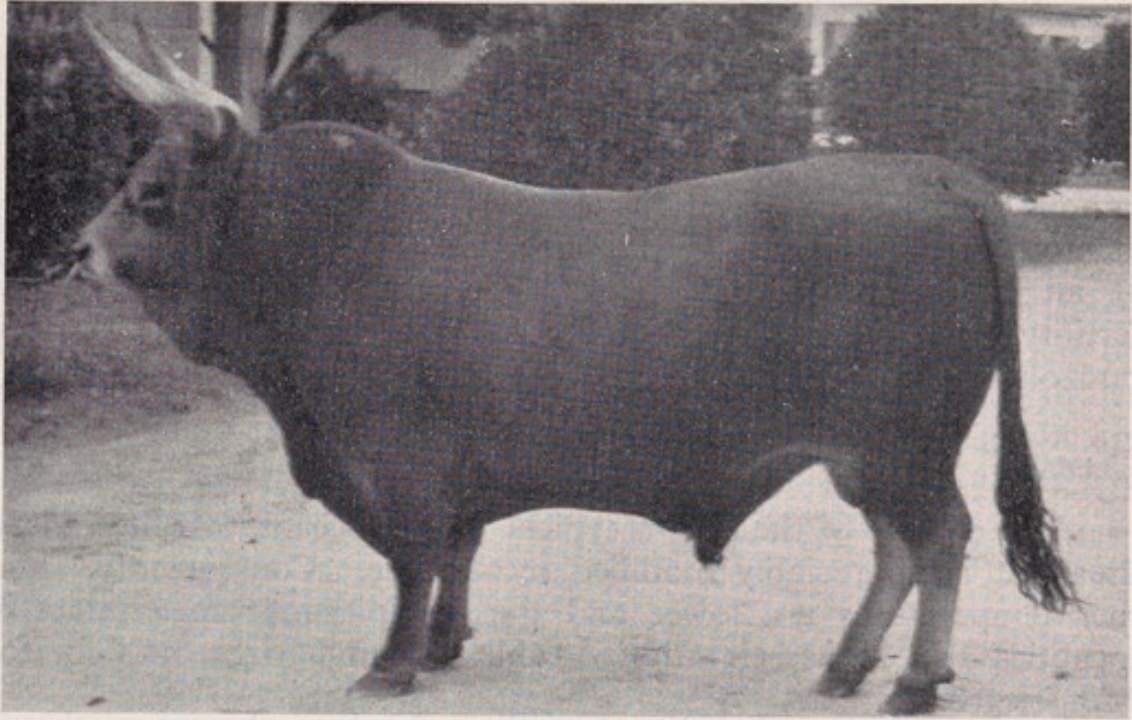


FIGURE 38. — Barrosa bull.

Courtesy Portuguese National Animal Husbandry Station

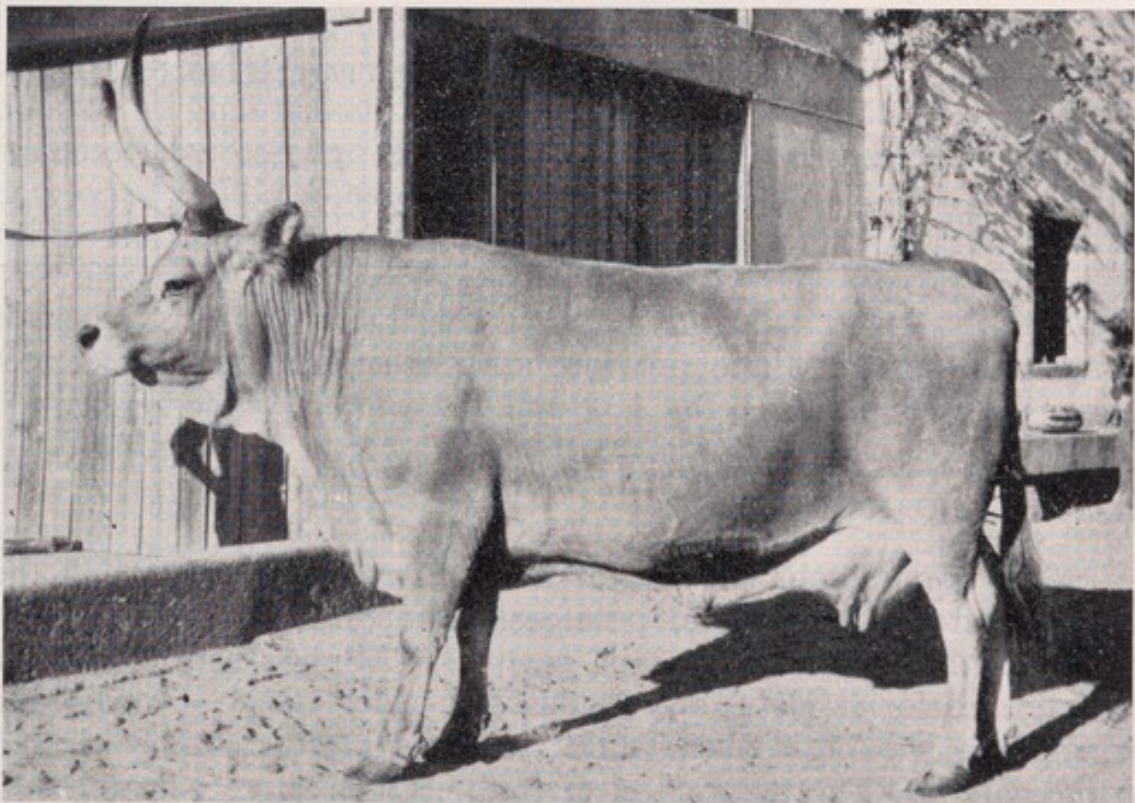


FIGURE 39. — Barrosa cow.

Courtesy Portuguese National Animal Husbandry Station

LOCATION, TOPOGRAPHY AND SOILS

Barrosa cattle have spread from their original home in the Trás-os-Montes through the greater part of Minho province. The topography of the areas where this breed is encountered is mountainous and lies at elevations of over 400 meters and sometimes at more than 700 meters. Montelegro in the Serra do Barroso lies at an elevation of 1,025 meters. Generally, the soils are of low fertility and frequent rock outcrops occur over the gray skeletal podzols and forest soils.

CLIMATE

The climate of the area is typical of the oceanic Mediterranean area but is appreciably modified by altitude. Consequently, summer temperatures are lower and the precipitation greater than in localities at a higher elevation. Table 43 summarizes the data for Montelegro.

TABLE 43. - AVERAGE CLIMATIC CONDITIONS FOR BARROSA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature(°C)	3.8	4.3	5.7	7.3	10.9	14.9	17.0	17.9	15.2	10.8	6.4	4.4
Relative humidity (%)	86	82	78	73	71	64	60	57	65	76	83	85
Rainfall (mm)	104	122	138	87	72	45	19	14	56	107	147	137

Conditions in Minho province are less severe than for Montelegro, the precipitation being less and the winters milder.

FEEDING AND MANAGEMENT

The mountainous Barroso area is of low productivity and the principal crops are rye and potatoes, although most of the region is occupied by poor mountain pastures. Minho, with its milder climate and lower elevation, produces a wider range of crops, the principal one being maize, while rye grass pastures are cultivated in the valleys. The production of feedingstuffs (hays, straws, etc.) permits a higher stocking rate than on the mountains (1 head of cattle to every 5 hectares).

Barroso is essentially a breeding and rearing area and the dry and growing stock spend the summer on mountain pastures, while the breeding cows are housed and stall-fed with freshly cut grass or maize. In winter, all cattle are housed, at least during the night, and are fed hays and cereal straws. After weaning, at 3 to 5 months of age, many calves, especially the males, are sold to the Minho area for work and beef production. Minho is an intensive crop-producing area, and water is freely available there. The cattle are to a large extent housed throughout the year and are fed on green soilage crops and grass in the summer and hays and straws in the winter. Feeding and management for beef production are still rather underdeveloped, but animals for meat production are yarded and fattened to some extent before slaughter.

PHYSICAL CHARACTERS

The skin is loose, of medium thickness and pigmented, and the hair is soft and of medium length. The color is a reddish brown but becomes darker at the extremities.

The head is short, wide in the forehead and concave both between the eyes and in profile. The muzzle is broad and black in color. The horns are well developed, elliptical in section, and lyre shaped, growing outward, upward, inward and backward. The dewlap is fairly prominent, the topline dips somewhat at the loins due to the high withers and tail head. The chest is deep, the ribs adequately sprung and the paunch is large. The shoulders are nicely developed and the loins and hindquarters are suitably muscled but the rump slopes both to the tail head and from the spinal column. The underline rises from chest to flanks, while the legs are light boned, short, and terminate in hard, durable hooves. The Braga Veterinary Bureau has collected the data in Table 44 referring to liveweights and body measurements.

Mature oxen weigh from 400 to 500 kilograms.

FUNCTIONAL CHARACTERISTICS

The Barrosa is a dual-purpose work/beef breed. The birth weights are 25 to 30 kilograms for males and 20 kilograms for female calves. Bulls are used for service when they are about 15 months old and heifers calve for the first time at the age of 3. Calvings occur all through the year and bulls are able to continue in service until 15 years of age, although they are normally retired earlier.

TABLE 44. — AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF BARROSA CATTLE

	Males			Females		
	1 years	2 years	Mature	1 year	2 years	Mature
Liveweight (kg)	200	280	580	150	220	340
Body length (cm)	124	132	154	118	128	144
Wither height (cm)	109	123	129	104	112	122
Chest girth (cm)	152	167	180	148	160	176
Chest depth (cm)	58	62	70	54	59	66
Hip width (cm)	37	43	48	35	40	49

The Barrosa cattle are willing workers and a pair of oxen can pull a 1,000-kilogram load over bad roads at the rate of 3 to 4 kilometers per hour. Whereas cows normally work only half a day, oxen are employed for 8 hours in the wagon or in the fields and work for 200 days a year at all kinds of farm work on the light soils.

Animals of this breed also fatten well and the majority of those killed for meat production are slaughtered as weaners or as young beeves up to 2 years of age. All old work oxen and breeding cows are also sent to the butcher. Carcasses dress out at about 55 percent but higher figures are obtained from young males. The meat from the back and loin is of good quality, although the fore-quarters are not so tender, juicy and attractive. There is some tendency for superficial fatty layers to accumulate but the bone percentage is low.

BREED ORGANIZATION

There is neither a Breeders' Association nor a Herdbook for Barrosa cattle. The 1940 census records about 240,000 animals of this breed in Portugal.

Aroucesa (Arouquesa)

ORIGIN

The Aroucesa breed has certain similarities with, and its derivation has probably been influenced by, the neighboring Barrosa, Miranda and Minho breeds. It has been selected and improved in its region of development.

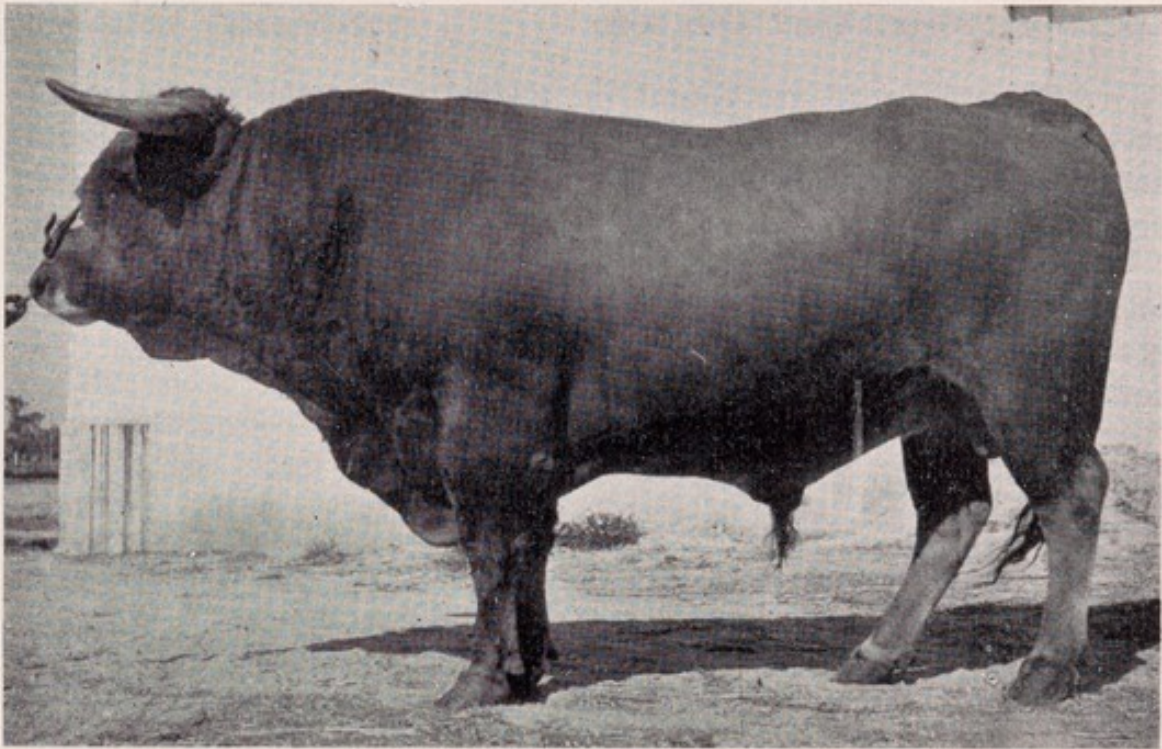


FIGURE 40. — Aroucesa bull.

Courtesy Portuguese National Animal Husbandry Station



FIGURE 41. — Aroucesa cow.

Courtesy Portuguese National Animal Husbandry Station

LOCATION, TOPOGRAPHY AND SOILS

Aroucesa cattle are found in northern Portugal in the south-east of the Duro littoral, northwest of Beira Alta (central Beira) and northeast of the Beira littoral. These districts form a compact area inland from Porto, crossing the valleys of Douro and Vouga.

This region is mountainous and altitudes generally exceed 400 meters, while in certain places they reach 700 meters. Several mountains of over 1,000-meter altitude occur in the area. The soils are mainly gray podzols or mountain soils.

CLIMATE

The climatic conditions are of the maritime type although they are modified by altitude which reduces the temperature but augments the rainfall. Data for Caramulo are presented in Table 45 as typical of the region in which the Aroucesa breed is encountered.

TABLE 45. — AVERAGE CLIMATIC CONDITIONS FOR AROUCESA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	5.5	6.8	8.6	10.9	12.5	17.1	18.8	20.6	17.2	12.7	8.8	5.9
Relative humidity (%)	85	73	74	71	72	67	65	59	68	76	82	82
Rainfall (mm)	413	223	291	186	126	64	39	16	91	189	252	240

FEEDING AND MANAGEMENT

This mountainous region is well wooded but in the valleys and more fertile parts of the mountains, where water is adequate, a variety of crops is grown, the chief of which are rye, potatoes, maize, vines and forage (of which rye grass forms a high proportion).

In spring, the cattle are turned out onto the natural pastures and consume both grass and the leaves of shrubs. When the grasslands become desiccated during the summer, the animals are also given cut green fodder and straws and, in the winter period, when the stock are housed, at least at night, they live on hays, straws, and any other by-products of the farms.

PHYSICAL CHARACTERS

The skin is loose, medium in thickness and pigmented, while the hair is soft, short and brown in color. Hair of a darker color surrounds the ears, eyes and coronet, while the dark or black muzzle is encircled by a strip of white hair.

The head is thick and short, broad in the forehead, concave in profile and wide in the muzzle. The medium-sized horns, elliptical in cross section, grow outward and forward to curl slightly upward at the ends. They are yellowish white in color but have dark ends.

The body is of good length and the withers are not too prominent. The back is wide and the quarters and loins are strongly muscled. The topline dips in the center because of the slightly high tail setting and the downward slope of the rump to the rear. The chest is deep and the paunch is large, while the ribs can be well sprung depending on the development of the animals. The legs are short but strong and end in hooves sufficiently hard and durable to resist wear on the hardest soils. The udder varies but may reach a moderate size. Table 46 gives average liveweights and body measurements supplied by the Director-General of Veterinary Services.

TABLE 46. — AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF AROUCESA CATTLE

	Males			Females		
	1 year	2 years	Mature	1 year	2 years	Mature
Liveweight (kg)	260	400	720	220	345	460
Body length (cm)	118	138	167	113	130	146
Wither height (cm)	107	120	134	103	114	123
Chest girth (cm)	147	173	212	138	166	185
Chest depth (cm)	53	63	70	51	59	64
Hip width (cm)	34	41	53	37	39	50

Oxen often develop to sizes and liveweights greater than either cows or bulls.

FUNCTIONAL CHARACTERISTICS

The birth weights of male calves average 26 kilograms and those of females 24 kilograms. Bulls are put to service at 15 months

of age but are usually withdrawn at the age of 5 to 6, although some are used for a much longer period. Heifers calve for the first time when about 27 months of age and calving occurs during all months of the year.

The Aroucesa is a triple-purpose work/milk/meat breed. Both cows and oxen are used for work purposes and are willing, active but docile. A pair of oxen can haul 1,000 kilograms over bad roads and, although cows are worked for less hours than the males, the oxen can work up to 8 hours per day in the fields or on the roads during 200 days of the year. Farm work includes all normal tillage and haulage operations.

Milk recording in Portugal has been applied only to high-yielding cows but the 1955 data, available for the Aroucesa breed, indicate that the average production of all tested cows is approximately 1,200 kilograms containing 4.5 percent of butterfat in 300 days.

This represents an improvement over the records of a few years ago when only 800 kilograms was the average recorded production. The increase observed indicates the efforts being made to replace the declining demand for work by cows of reasonable milking ability.

The Aroucesa is probably the best Portuguese breed for meat production. They are certainly economical producers, grow fairly quickly if fed appropriately, and the quality of their meat is good. They are easy to fatten when yarded and the dressing percentage is around 55 percent. Many male calves are slaughtered for veal at one month of age, others are fattened off between 1½ to 2 years, but oxen and cows are often 6 to 8 years old before they are slaughtered.

BREED ORGANIZATION

There is neither a Herdbook nor a Breeders' Association for this robust, hardy, although small breed. Investigations are being conducted to evolve superior milking and meat-producing strains, and better bulls are being disseminated with the objective of raising the standards of performance. It is estimated that the breed comprises some 90,000 animals.

Alentejo (Alentejana)

ORIGIN

Alentejo or Transtagana cattle have developed from Aquitanian animals, *Bos taurus aquitanicus*, similar in type to those from which the French Garonne and Limousin breeds originated.

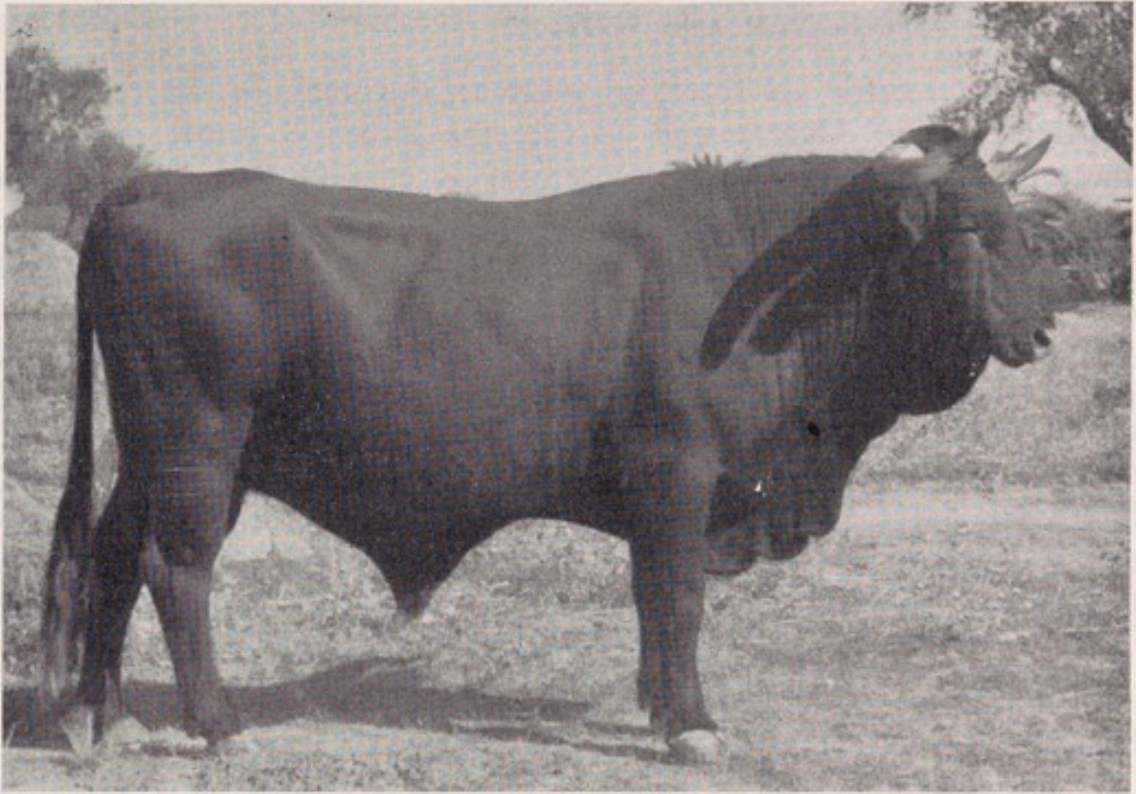


FIGURE 42. — Alentejo bull.

Courtesy Portuguese National Animal Husbandry Station

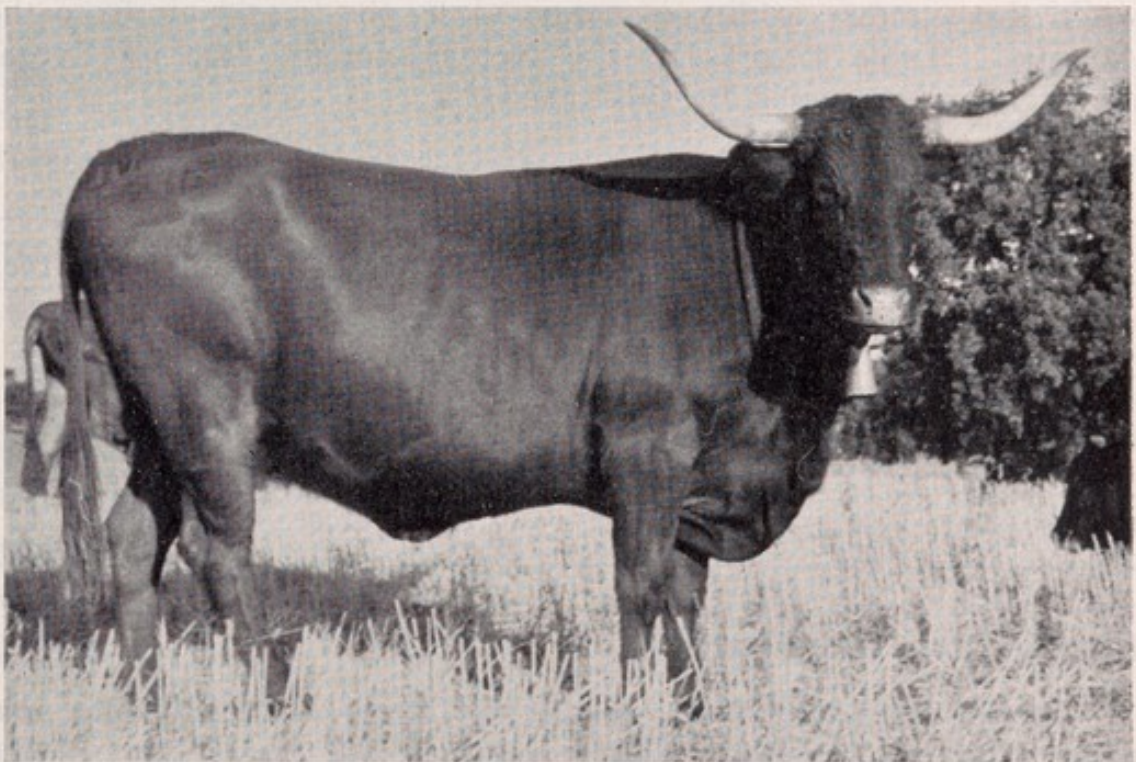


FIGURE 43. — Alentejo cow.

Courtesy Portuguese National Animal Husbandry Station

LOCATION, TOPOGRAPHY AND SOILS

Alentejo cattle are found in southern Portugal, in the provinces of Alentejo and Algarve and also in the extreme south of Estremadura. A gently rolling topography is encountered on the large plain, from sea level to 400 meters, between the Gardunha and Algarvia Mountains, but the altitude in isolated areas may reach 700 meters.

The soils of the region occupied by this breed are generally classified as "brown soils of Alentejo" and "red Mediterranean soils" which are derived from primary, secondary and tertiary rocks but, in the south and west, coarse acid, sandy soils also occur. Scattered areas of acid, phosphorus-deficient, granitic loams are encountered in the eastern part of this region; other loams in this region are derived from primary rocks, schists and shales. The latter are less acid although still phosphorus-deficient.

CLIMATE

The climate of this southern part of Portugal is of the oceanic Mediterranean type, with cool summers and mild winters but with only a small temperature range. There are many hours of sunshine. The greater part of the rainfall is received in the winter months while the summer aridity is tempered by the humid air from the Atlantic. Table 47 presents the average climatic data for Evora, in the region occupied by this breed.

TABLE 47. - AVERAGE CLIMATIC CONDITIONS FOR ALENTEJO CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	8.2	9.2	10.9	12.7	15.9	19.5	22.1	22.7	20.3	16.2	11.7	8.7
Relative humidity (%)	81	76	73	67	83	56	50	47	64	66	77	80
Rainfall (mm)	93	89	86	52	40	22	5	2	30	52	87	83

FEEDING AND MANAGEMENT

Except for small areas, usually on boulder-covered soils, and which form the scanty permanent pastures, the greater part of the land is rotationally cultivated. Cereal crops of two to three years are preceded by a cultivated fallow and, depending on soil fertility,

are followed by from one to six years of uncultivated fallow. The latter provide the major part of the grazings in the area but the productivity of their sparse vegetative cover is very low.

With the exception of work oxen, cattle are reared and maintained in pastures and fallow grazings throughout the year. Work oxen are housed and stall-fed on fresh grass when it is available, and at other times on hays, cereal and legume straws, supplemented with grains, beans or meal. All other cattle graze the fallows in the spring, the stubble in the summer and, during autumn and winter, the "invernadores" or fallow pastures which are closed for this purpose during the spring. Winter feeding is supplemented with cereal straws and the loppings from cork oaks.

Cows calve in the open and their offspring remain with them until they are weaned at about 6 months of age. Male animals are not usually castrated until they are 3 years old. Fattening for beef is carried out on the pastures and fallows.

The stocking rate is low and averages 1 beast to 53 hectares.

PHYSICAL CHARACTERS

The hair is soft, of medium length and red in color on a tight, medium-thick skin of light pigmentation. The head is large with a straight or convex profile and the light-colored horns, with dark tips, spring laterally from the poll before turning upward, or in some males, forward. The dewlap is large and, in some individuals, well folded, starting beneath the chin and ending between the forelegs. As a consequence of the strongly developed spinal processes

TABLE 48. - AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF ALENTEJO CATTLE

	Males			Females		
	1 year	2 years	Mature	1 year	2 years	Mature
Liveweight (kg)	265	520	890	225	350	530
Body length (cm)	129	143	171	118	143	159
Wither height (cm)	121	130	148	108	126	136
Chest girth (cm)	155	175	214	139	172	191
Chest depth (cm)	64	70	88	52	64	72
Hip width (cm)	39	45	56	34	45	56

SOURCE: Director-General of Animal Husbandry, Lisbon.

of the thoracic vertebrae, the backline dips appreciably in the loin region. The back is fairly long and the ribs are well sprung to provide adequate space for the digestive organs. A moderate slope characterizes the rump but the sacral prominence often causes the appearance of a notch before the high tail setting. The hindquarters are light but the limbs are strong boned and the hooves durable. Average liveweights and body measurements given in Table 48 refer to animals at the Southern Animal Improvement Station at Alter do Chão.

FUNCTIONAL CHARACTERISTICS

Heifers normally calve for the first time when they are about 3 years old. The birth weights of male calves average 32 kilograms and of females 30 kilograms. Bulls are first used for service when about 3 years old, they are quick and active and may be retained in use up to 12 years of age. The normal calving season is in winter.

Alentejo cows produce little milk beyond that required for their calves and the breed has been developed as dual-purpose meat and work animals. Because of the heaviness of their bones and the concentration of the carcass weight in the forequarters, together with the poor dorsolumbar and hindquarter development, these animals are not good beef producers. Although some young stock are slaughtered at about 2 years of age, the average age of slaughter for bulls is about 5 to 8 years, and for females when they are 7 to 10 years old. The dressing percentage when slaughtered off grass is from 45 to 50 percent.

The willing but slow oxen are trained for work when about 3 years old and are employed for haulage and for all types of farm work. They can work 8 hours a day for 150 days of the year and a pair of oxen can pull a wagon with a load of 1,500 kilograms on rough roads at a speed of about 3 kilometers per hour.

One of the outstanding characteristics of this breed is their hardiness which fits them to live in difficult climatic situations, hence their development in the Mediterranean/continental conditions in the south of Portugal.

BREED ORGANIZATION

Cattle from Alentejo were among those from which the Caraén cattle of Brazil have been derived from stock which were introduced there by early navigators and subsequently into Africa. There are

about 60,000 of this breed in Portugal but their numbers are slowly declining. The Algarve is a variety of the Alentejo breed and is sometimes grouped with it.

Mértola **(Mertolenga)**

ORIGIN

The origin of this breed is still somewhat obscure but the Mértola breed is undoubtedly of fairly recent origin. It seems probable that this Portuguese breed has been derived very largely from Andalusian stock and particularly from Berenda cattle in Spain, in the area opposite to Mértola, where the breed first became established. From the Mértola area, it penetrated to the valleys of the Sado and Tagus. Mértola cattle, largely because of their docility, have been widely used as leaders of the herds of "Brava" (fighting) cattle which have been imported from Andalusia. It is possible that these nonfighting leaders were allowed to breed and develop to give rise to the present Mértola breed. Besides Berrenda blood, Mértola cattle have Alentejo (p. 80), Brava (p. 91) and Retinta (p. 116) blood in their ancestries.

LOCATION, TOPOGRAPHY AND SOILS

The numbers of this breed have developed during the last 50 years because it is a very adaptable animal, is of use for herding Brava cattle and can work on all types of soils, including the wet lands of the rice fields. Mértola cattle are found chiefly in two areas. The smaller region, where the breed first developed, is around Mértola in the southwest of Alentejo province adjoining the Spanish border. The main concentration of the breed is in the larger zone extending from the Tagus valley, in the Ribatejo, southeast to the interprovincial boundary and on into Alentejo to the Sado valley in the northwest of that province. These are lowland areas with altitudes below 200 meters but the breed is found in numerous herds throughout Alentejo province.

The soils in the Tagus and Sado valleys are largely alluviums, podzols and regosols derived from sandstones. The alluvial soils are well supplied with lime and potash but are deficient in phosphates. The prevailing soil type in the Mértola district is the Alentejo gray soil, derived from schists and containing many rocky outcrops.



FIGURE 44. — Mértila bull.

Courtesy Portuguese National Animal Husbandry Station

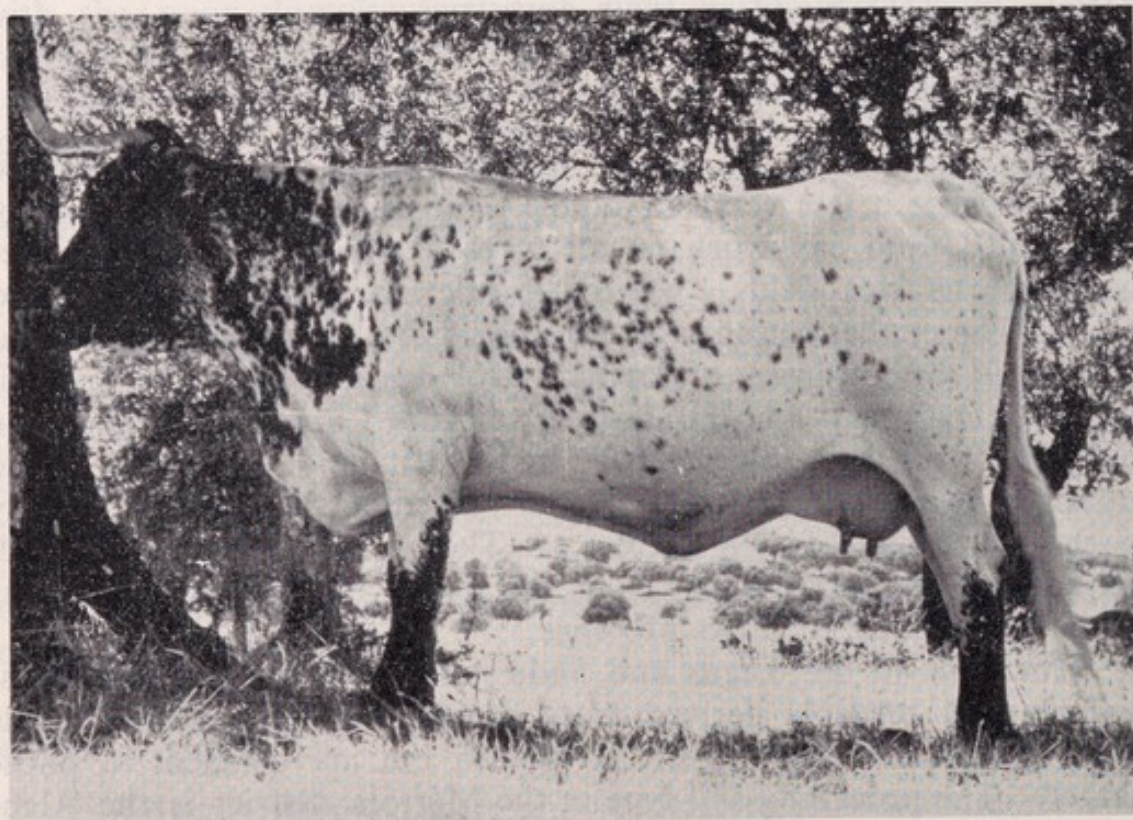


FIGURE 45. — Mértila cow.

Courtesy Portuguese National Animal Husbandry Station

CLIMATE

The climate of southern Portugal is intermediate between the west European maritime and the Mediterranean types, with cool summers and mild winters. Sunshine is abundant (2,740 hours per year in Lisbon) and the greater proportion of the rain falls during the winter half of the year, although the summer aridity is tempered by the moist air blowing in from the Atlantic. Table 49 gives data for the Santarém station as supplied by the Director-General of Animal Husbandry, Lisbon.

TABLE 49. - AVERAGE CLIMATIC CONDITIONS FOR MÉRTOLA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	9.6	10.4	12.9	14.3	16.5	20.2	22.6	23.6	21.6	17.6	12.8	10.2
Relative humidity (%)	87	84	83	78	76	72	69	68	73	80	87	88
Rainfall (mm)	88	73	93	60	38	25	6	3	30	65	95	89

FEEDING AND MANAGEMENT

Except for the small areas of boulder-strewn ground which constitute the permanent pastures, the major portion of the land is under cereal rotation (wheat, oats and barley or rye followed by fallow). These crop rotations are preceded by a cultivated fallow and followed by two to six years of uncultivated fallow, depending on the fertility of the soil. The uncultivated fallows provide the bulk of the pasturage. Some rice is grown in the Tagus valley. Oaks occur throughout the region, particularly on the poorer soils, and the cultivations are carried out between them. It has been estimated that the oaks on most properties provide enough acorns to fatten 1 pig per 5 hectares.

The small units of permanent pastures are populated largely with annual grasses together with small quantities of perennials. The herbage is composed of varying proportions of grasses and legumes. The productivity of the fallows is generally poor but, in the Tagus valley, the soils are more fertile and the plant cover is richer in nutrients. The conditions of forage production in this favorable environment are encouraging the keeping of increasing numbers of cattle which are above-average in liveweight and stature.

PHYSICAL CHARACTERS

This breed is of recent formation and its general characters are not yet fully developed nor fixed. Small size is, however, the general rule. The skin is loose and thin and varies appreciably in the density of pigmentation, while the hair is soft and short. A dark red is the normal color but this may vary from a single color to a combination with white patches or to a white flecking.

The head is of medium size and length, with a broad forehead and a straight or slightly convex profile. The oval-sectioned horns are of medium length, growing outward from the poll before turning forward and then upward at the ends.

The topline is relatively straight with only a small dip in its center area. The body is long, the chest is deep, the ribs well sprung and the abdomen is large. The hindquarters are long, wide, strong and firmly muscled. Only a slight slope occurs in the rump, and the tail setting is level. The legs are relatively short and lightly boned and the hooves are hard and durable. The liveweights are 700 kilograms for a mature bull and 400 to 500 kilograms for mature cows.

FUNCTIONAL CHARACTERISTICS

The Mértola is used for producing work and beef but not for milk. The heifers usually calve for the first time when about 3 years old and most calvings occur during the winter months. Young bulls are first put to service when 3 years old. They are quick in service and can continue breeding until over 12 years of age, although they are usually retired before then.

Mértola cattle are somewhat ill-tempered but are good workers and employed for light work which has to be carried out rapidly under wet soil conditions. Cows are not normally used for draft purposes but oxen are trained when 3 years old. They are employed for haulage and general tillage operations. A pair will haul a wagon loaded with 1,000 kilograms at a rate of 4 kilometers per hour on poor roads. They are normally worked for 100 to 150 days in a year and 8 hours per day.

The milking ability of the cows suffices for the rearing of their calves. The Mértola are easy to fatten on grass, without supplementary feeds and, because of their well-proportioned loins and hindquarters and the lightness of their skeletal structures, yield well-balanced carcasses. The dressing percentage averages around 55 percent. Although all classes of stock are sent for slaughter-

ing, most of the butcher trade comes from males less than 5 years of age.

BREED ORGANIZATION

The Mértola breed is becoming of increasing importance and its study and improvement are being actively stimulated by the Veterinary Department. The number of animals in this breed is not known with certainty, although the numbers are steadily increasing.

Minho (Galega or Minhota)

ORIGIN

This breed is identical with the Galicia breed in Spain (see p. 96).

LOCATION, TOPOGRAPHY AND SOILS

The Minho stock are found in the northwest of Portugal in the region of Viana do Castelo and are separated from Spain by the Minhota river.

CLIMATE

See p. 96.

FEEDING AND MANAGEMENT

See p. 98.

PHYSICAL CHARACTERS

The physical characters are similar to those for the Galicia breed described on p. 98, except that the hair is golden-yellow and the body orifices are nonpigmented.

FUNCTIONAL CHARACTERISTICS

See the characters described on p. 99. The milk yield of these cows is around 1,800 kilograms containing 4 percent of butterfat.

BREED ORGANIZATION

This breed is decreasing in numbers due to the preference being given by farmers to the Turino cows which are better milk producers.

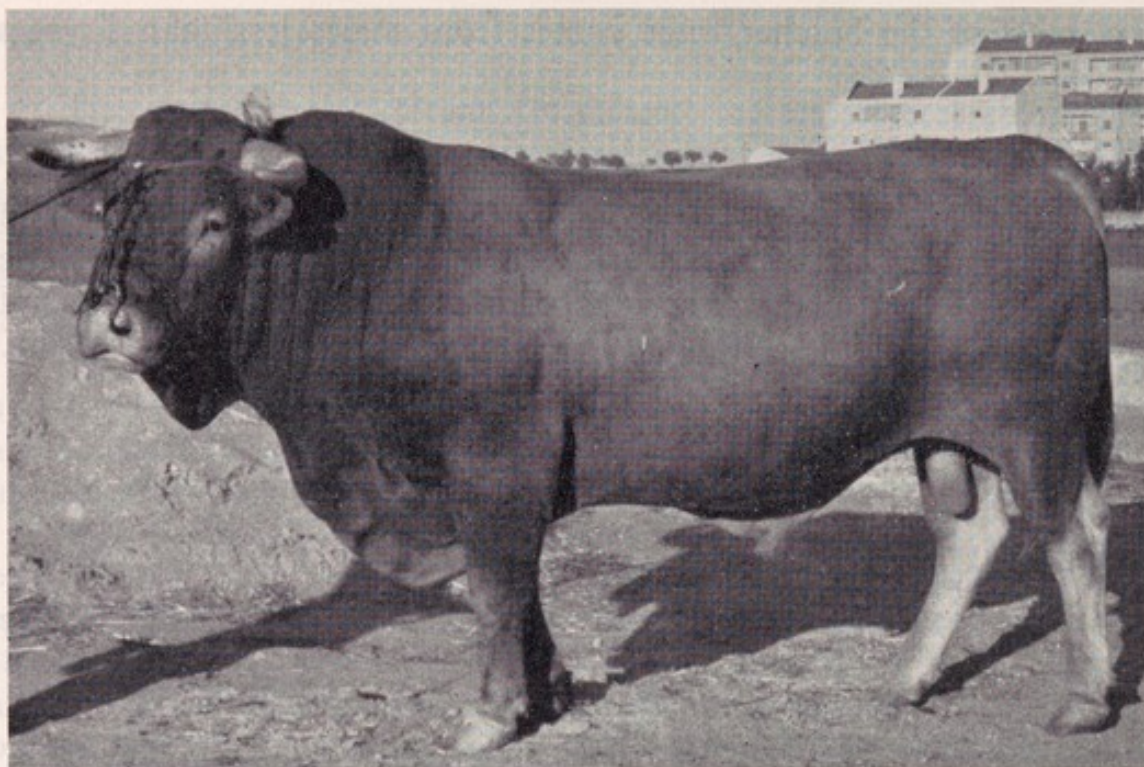


FIGURE 46. — Minho bull.

Courtesy Portuguese National Animal Husbandry Station

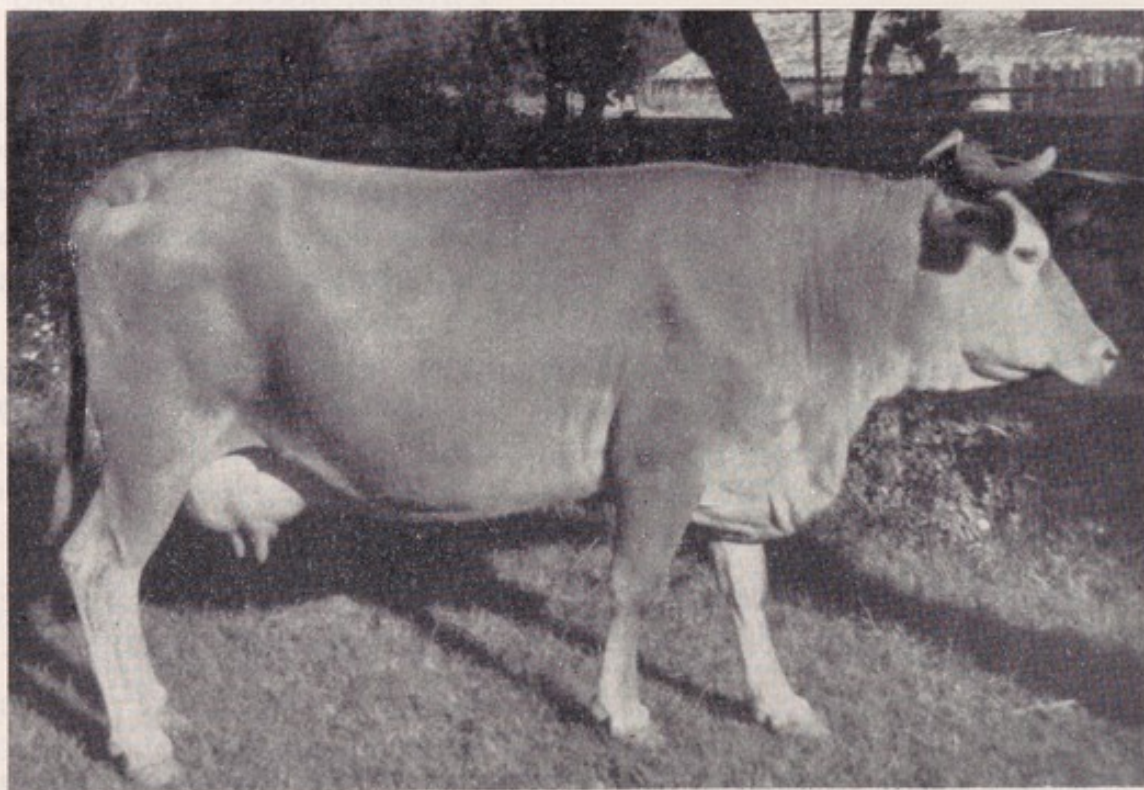


FIGURE 47. — Minho cow.

Courtesy Portuguese National Animal Husbandry Station

Algarve (Algarvia)

ORIGIN

Similar to that of the Alentejo breed (see p. 80).

LOCATION, TOPOGRAPHY AND SOILS

This subbreed is encountered in the extreme south of the province of Algarve, where the soils are derived from schists, secondary, tertiary and quaternary rocks.

CLIMATE

Similar to that described for the Alentejo breed, although slightly warmer and drier in the summer (see p. 82).

FEEDING AND MANAGEMENT

Again this follows the lines already described for Alentejo cattle. The feeding conditions may be slightly better, as here there is a livestock density of 1 animal to 38 hectares.

PHYSICAL CHARACTERS

The hair is dark red and the skin and mucous membranes are nonpigmented. Otherwise, Algarve cattle are similar to the Alentejo breed, except that the backline is more regular and the hind-quarters and musculature are better developed.

FUNCTIONAL CHARACTERISTICS

These animals are better meat producers and the quality of their meat is higher than for Alentejo cattle. Calves of 6 to 8 months of age are slaughtered for veal which is in great demand.

Brava (Fighting bull)

ORIGIN

This breed is identical to the Spanish Toro de lidia (see p. 141).

LOCATION, TOPOGRAPHY AND SOILS

The Brava is bred mainly in the Ribatejo region and to some extent in Alentejo.



FIGURE 48. — Algarve bull.

Courtesy Portuguese National Animal Husbandry Station

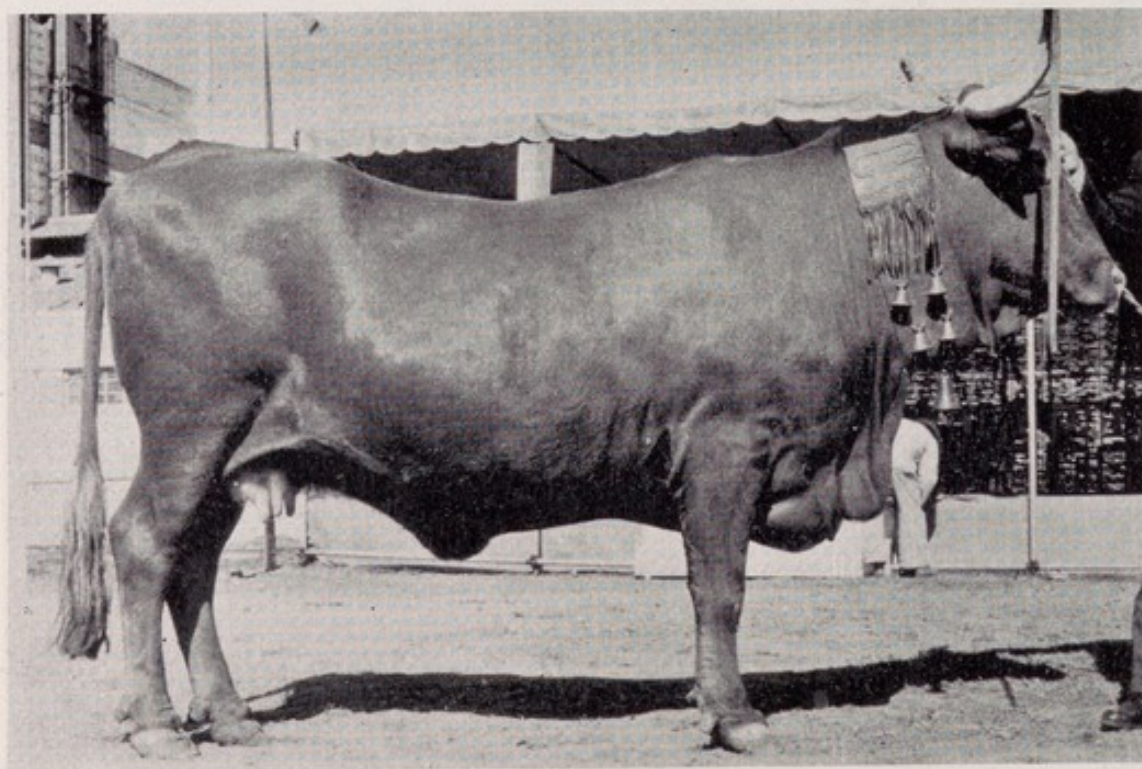


FIGURE 49. — Algarve cow.

Courtesy Portuguese National Animal Husbandry Station



FIGURE 50. — Brava bull.



FIGURE 51. — Brava bull.

CLIMATE

See p. 82.

FEEDING AND MANAGEMENT

See p. 82.

PHYSICAL CHARACTERS

The main characters are similar to those of the Spanish fighting bulls (p. 144). Brava cattle are usually black but are sometimes spotted or brown. The breeding stock are selected on the basis of their fighting spirit as judged when heifers 18 to 24 months old. At the age of 3 to 4, males weigh about 600 kilograms and females around 300 kilograms. There are some 15,000 animals of this breed in Portugal.

SPAIN

Spain covers the major portion of the Iberian peninsula between the Atlantic and the Mediterranean and lies between 36° and 44° north of the equator. The central plateau ("la meseta"), with an average elevation of 700 meters above sea level, is divided into northern and southern parts by the Castilian Mountains, which rise to a height of 2,570 meters. The northern plateau extends north to the Cantabrian and Iberian Mountains, while the southern region is limited in the south by the Sierra Morena. In addition, there are several other plateaus at less elevated altitudes, such as the Andalusian plateau to the southeast of the Guadalquivir river and the Aragon plateau in the northeast of Spain near the Ebro river. The Pyrenean Mountains form a natural barrier with France, with elevations reaching up to 3,405 meters. In the south, the Sierra Nevada, near Granada, attains a height of 3,480 meters above sea level.

The climate is very variable and is appreciably conditioned by altitude, latitude and distance from the sea. In the northwest, the coastal area is dominated by the Atlantic maritime climate with mild winters and moderately warm summers and with a rainfall distributed throughout the year. In the central area, the continental and Mediterranean climatic conditions become more marked, with colder winters, hotter summers and little precipitation during the summer.

Some 40 percent of the land area of Spain is arable and about 19 percent is in permanent meadows and pastures. Cattle production probably reaches its highest level in the northern area where the conditions encourage pasture development. In the southern regions, where the herbage growth is limited in summer by drought and in the winter by cold, sheep and goats become more important than cattle.

Spanish breeds of cattle can be divided into three main groups, as shown in Table 50.

TABLE 50. — SPANISH BREEDS OF CATTLE

Milk and meat	Work and meat	Imported dairy breeds
Chiefly in the north	Mainly in the center and the south	Wherever economical
Galicia Pyrenean or Basque Tudanca Asturian Leonese	Retinta or Extremeña Avila Berrenda Black Andalusian Salamanca or Morucho Zamora Extremadura Cáceres Murcia or Levantine	Black and White Lowland Brown Swiss Simmental

In addition, Spain has for long been famous for its fighting bulls and the Toro de lidia has been included in the subsequent descriptions.

Of the imported dairy breeds, the Brown Swiss and Friesians are by far the most important, but others, such as the Simmental, have also been successfully imported.

Many attempts have also been made to improve the beef-producing characters of Spanish breeds and animals of the Hereford, Aberdeen Angus and Beef Shorthorn breeds have been introduced but their influence has been far less important than that of the milk breeds.

Breeds such as the Angeln, Red Danish, Normandy, Limousin, etc., have also been introduced but have had relatively little influence on the Spanish breeds.

BREED ORGANIZATION

Promotion of cattle breeding by the government is through the General Directorate for Animal Production under the Ministry of

Agriculture. The Directorate is responsible for the keeping of Herdbooks, pure breed registers and for bull administration. Local Provincial Councils for the Promotion of Breeding, which are semi-governmental, are responsible for breeding activities in the different provinces. These local organizations collect and register the necessary data. Official government regulations specify the working methods to be employed and the breeds which will be registered. This work is financed by central and provincial organizations and breeders pay no membership nor registration fees.

Herdbooks are kept for the following breeds: Galicia, Asturian, Pyrenean, Retinta, Andalusian, Toro de lidia, Black and White Lowland and Brown Swiss. It is unfortunate that up-to-date cattle breeders and owners show little interest in Herdbook registration and less than 1 percent of the total number of cows are milk recorded.

MILK AND MEAT BREEDS

Galicia **(Nubia gallega)**

ORIGIN

This breed is indigenous to the Galician area in the northwest of the Iberian peninsula. It was the only breed in this part of Spain until the end of the nineteenth century but, since the beginning of this century, these rustic, mountainous, mixed-purpose animals have been crossed successively with the Shorthorn, Barrosa, Brown Swiss and Simmental to improve their milk production. Consequently, the pure Galicia cattle are now found only in small groups in scattered localities.

LOCATION, TOPOGRAPHY AND SOILS

The Galicia breed is found in the provinces of La Coruña, Pontevedra, Lugo and Orense. This region is mountainous and varies in altitude from some 15 to 20 meters on the coast up to 700 meters inland, with an average elevation of 300 meters. The soils are of varied geological formation, paleozoic in the area bordering Asturia and primitive in the rest of Galicia. They are siliceous and low in lime.

CLIMATE

The northwest of Spain has the west European maritime type of climate, with mild winters and cool summers, and a rainfall

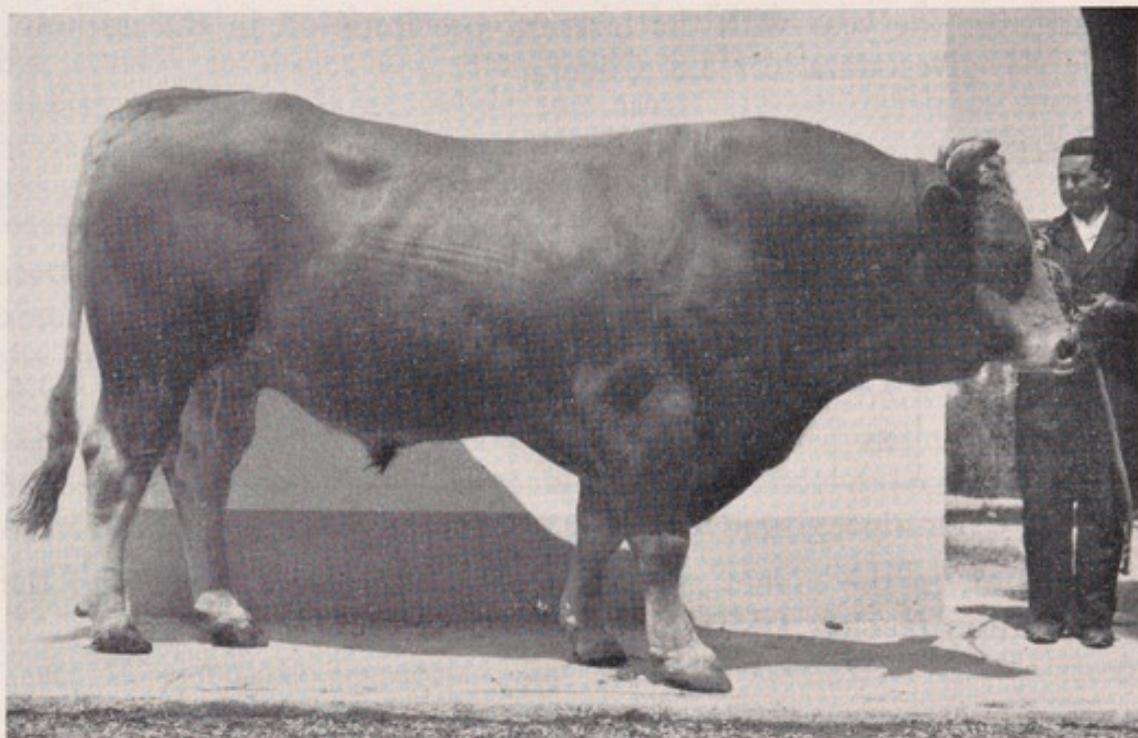


FIGURE 52. — Galicia bull.

Courtesy Archives Ministry of Agriculture, Madrid



FIGURE 53. — Galicia cow.

Courtesy Archives Ministry of Agriculture, Madrid

spread over the year with the heaviest precipitation in the autumn. Table 51 gives data for La Coruña.

TABLE 51. — AVERAGE CLIMATIC CONDITIONS FOR GALICIA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	9.4	10.0	10.6	11.7	13.9	16.1	17.8	18.3	17.2	14.4	11.7	10.6
Rainfall (mm)	81	79	81	63	56	36	23	30	56	89	107	112

Inland, in the higher altitudes, temperatures are lower and the precipitation reaches 1,650 millimeters.

FEEDING AND MANAGEMENT

The northwest of Spain has a varied natural vegetation, from the well-watered lower altitude and valley pastures to the wooded higher land. A variety of cereals are grown, including maize, wheat, barley, oats and rye together with other crops such as turnips, kale, potatoes, etc.

Galicia is a region of small farms where arable activities are devoted to the above crops and to cattle husbandry and breeding. Except for marketing purposes, little livestock movement occurs. Calvings are distributed throughout the year and about 80 percent of the calves are sold. Cattle are kept for milk production for domestic purposes, for work and for meat. Many young stock are slaughtered for veal production when 7 to 8 months old.

Cattle are maintained on the natural pastures and on the fodder crops used for livestock feeding. During summer, in addition to natural grazings, the animals receive freshly cut maize while, in winter, hays, straws, crop residues, brans and roots supplement the limited grazings. Cattle destined for slaughter are usually fed in yards to improve their condition.

PHYSICAL CHARACTERS

The thick, rather tight skin is lightly pigmented and the hair is coarse and of medium length. The hair color is red but the depth of color varies between different subtypes. The natural orifices are pink and the mucous membranes are nonpigmented.

The head is nicely proportioned, the forehead is flat in females but convex in males and the profile is also slightly convex. The pinkish muzzle is large, while the horns are yellowish or mother-of-pearl in color with reddish or greenish tips. They are large and grow outward from the head but curl forward at the ends.

The topline is straight, although the withers and tail settings are prominent. The chest is deep, the ribs well sprung and the abdomen capacious; the forequarters are somewhat heavier than the hindquarters. The muscular development depends on the plane of nutrition but, in general, it is adequately proportioned. The legs are strong and well placed in the better fed animals but may be thin and not sufficiently developed in stock under extensive management conditions. The hooves are hard and lightly colored. Average liveweights and body measurements are presented in Table 52.

TABLE 52. — AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF GALICIA CATTLE

	Males			Females		
	1 year	2 years	Mature	1 year	2 years	Mature
Liveweight (kg)	280	450	600	240	320	410
Body length (cm)	145	158	165	130	140	145
Wither height (cm)	127	136	139	120	125	130
Chest girth (cm)	174	193	202	162	170	180
Chest depth (cm)	67	73	76	62	65	68
Hip width (cm)	43	45	48	41	43	44

The above body measurements are given in a personal communication from J. Carballan Palmeiro from observations on 2,000 cattle.

FUNCTIONAL CHARACTERISTICS

The average liveweights at birth are 38 to 43 kilograms for males and 30 to 38 kilograms for females. Heifers calve for the first time at about 3 years of age (from 2½ to 4 years). Young bulls are used for service when 18 months old or, if they are well grown, at 15 months of age. They are active in service but are retained for only 1 or 2 years.

Cows usually remain in the herd for up to eight or nine lactations which, with average lactation intervals of 18 months, indicates their longevity. Table 53 gives details of milk productions for 1954.

TABLE 53. — AVERAGE LACTATION RECORDS OF GALICIA COWS (1954)

Locality	Type	No. of cows	Milk	Fat	Days in milk
			Kilograms	Percentage	
Galicia	All recorded cows	1 000	1 680	4.00	240
Lugo and La Coruña	Purebred cows	108	3 000	5.00	300
Lugo	Superior cows	18	4 400	3.80	240

Given good feeding conditions, Galicia cattle fatten well in yards. The carcasses of mature animals average 180 to 200 kilograms and the carcass return is from 55 to 60 percent, while the proportions of muscle:fat:bone in the carcass are 72:8:20.

Cows are used for agricultural and haulage work and are first employed when 3 to 4 years old. They are willing, even-tempered, but slow workers. A pair of cows will haul 600 kilograms for 16 kilometers during a day, at a rate of 2.5 kilometers per hour. When used for ordinary farm work on light soils, they may work 90 days in a year for 7 hours per day.

Emaciation and defective bone growth is apparent in animals reared in poor areas where the nutritional plane is low. In certain herds hereditary umbilical hernias occur.

BREED ORGANIZATION

A Herdbook is maintained and animals can be registered through the Central Regional Agricultural Offices. There are about 180,000 Galicia cattle in Spain.

Pyrenean or Basque (Pirenaica)

ORIGIN

This breed is indigenous to the northeast of Spain, north of the river Ebro, where it has been reared in the mountains for centuries. According to Laffitte, it originated from Navarra.



FIGURE 54. — Pyrenean or Basque bull.

Courtesy Archives Ministry of Agriculture, Madrid



FIGURE 55. — Pyrenean or Basque cow.

Courtesy Archives Ministry of Agriculture, Madrid

LOCATION, TOPOGRAPHY AND SOILS

The location includes the mountainous areas of Vascongadas and the Spanish side of the Pyrenees in the provinces of Navarra and Huesca. The soils are siliceous clays in Vascongadas and lime-silica clays in Navarra and Huesca. The altitude varies from about 25 meters near the coast to 1,000 meters in the Pyrenean valleys (Benasque, Plan Bielsa).

CLIMATE

The climate is the west European maritime type, modified by altitude, so that the annual temperature range is intermediate between the maritime and continental types but the rainfall is heavier. Table 54 gives data for Pamplona.

TABLE 54. - AVERAGE CLIMATIC CONDITIONS FOR PYRENEAN CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature(°C)	3.7	6.5	8.0	10.3	13.7	17.6	20.0	20.7	18.1	12.8	8.5	5.2
Rainfall (mm)	66	58	57	66	61	65	36	32	46	60	91	59

FEEDING AND MANAGEMENT

Calves, except for the better males and females required for herd replacements, are sold for veal when weaned at 5 to 6 months of age. The herds graze the local pastures in spring and early summer and then are moved to the communal grazings at higher altitudes. Hays are made from home pastures and the cattle graze the aftermath growths when they return from the communal grazings. In winter, they may be yarded or allowed to go out to the fields but receive their feed inside in the form of hays, silage, fodder beets, brans and grains.

PHYSICAL CHARACTERS

The skin is thick and slightly loose, while the hair is medium in length and thickness. The hair is light brown in the Basque country and reddish brown in the Navarra and Huesca Pyrenean valleys.

The head is of average length, broad in the forehead and rectilinear in profile. The strong horns are of medium length, white but with yellowish, slightly dark points. The most acceptable shape is for the horns to grow outward from the poll, upward and forward to form a half-moon shape, but other shapes are also encountered in the cow, including those which grow outward, forward and upward. The muzzle is preferably dark in color and, like the eyes, is surrounded by a ring of whitish hair.

The body is long, the topline roughly straight but with the withers and tail head somewhat elevated. The chest is deep, but the ribs are rather flat and the body is often tucked up at the flanks. The body is wide and, if the animal is in good condition, fleshy. The hindquarters slope downward from the spinal column and the quarters are well filled toward the hocks in animals in good condition but frequently are poorly developed through inappropriate feeding. The legs are rather long but strongly boned. Table 55 shows the average liveweights and body measurements of 400 cattle reported by the Ministry of Agriculture in Madrid.

TABLE 55. — AVERAGE LIVEWEIGHTS AND BODY MEASUREMENTS OF PYRENEAN CATTLE

	Males			Females		
	1 year	2 years	Mature	1 year	2 years	Mature
Liveweight (kg)	290	460	610	250	350	500
Body length (cm)	141	152	154	138	140	152
Wither height (cm)	125	134	137	122	127	130
Chest girth (cm)	180	199	208	168	176	181
Chest depth (cm)	66	71	76	63	65	70
Hip width (cm)	46	48	49	43	47	48

FUNCTIONAL CHARACTERISTICS

Pyrenean cattle are essentially triple-purpose animals, with the meat potentialities capable of considerable development. The birth weights of calves are 40 to 44 kilograms for females. Heifers calve for the first time between 2½ and 3½ years, depending on condition, and the parturitions are spread over the year. Young bulls are active and are put to service when 18 months old. The average reproductive life is from 3 to 5 years.

Average recorded lactation yields in 1954 were as shown in Table 56.

TABLE 56. — AVERAGE LACTATION RECORDS OF PYRENEAN COWS (BASQUE PROVINCE)

	Milk	Fat
	<i>Kilograms</i>	<i>Percentage</i>
All recorded cows	1 800	3.9
All registered cows	2 900	4.0
Superior production	4 200	3.6

The interval between calvings is approximately 18 months and up to eight lactations can be obtained from a cow. The length of lactations as recorded in Table 56 was 300 days.

Cattle are put to work when 3 years old and prove to be active, willing and even-tempered. With a 1,000-kilogram load, a pair can haul a cart at the rate of 3 kilometers per hour for 8 hours a day. They are used for all types of farm operations and for the haulage of timber, crops and manure. At these operations, they are worked for 120 days a year and for 8 hours a day.

Pyrenean cattle have a great ability for fattening and are normally fed at night in yards after being at pasture during the day. Their carcasses average between 50 and 60 percent of their liveweight and the proportion of meat:fat:bone in the carcasses is 73:8:19.

BREED ORGANIZATION

A Herdbook was established in 1933 by the Director-General of Animal Husbandry Services in association with Provincial Livestock Associations. The livestock numbers are slowly increasing and in 1954 there were 18,000 animals of this breed.

Tudanca

ORIGIN

Cattle which resemble the present-day Tudanca breed have apparently been in existence in the Santander province for a considerable time. Documents relating to pasture regulations, which extend back for 300 years, refer to cattle of this type in the valleys

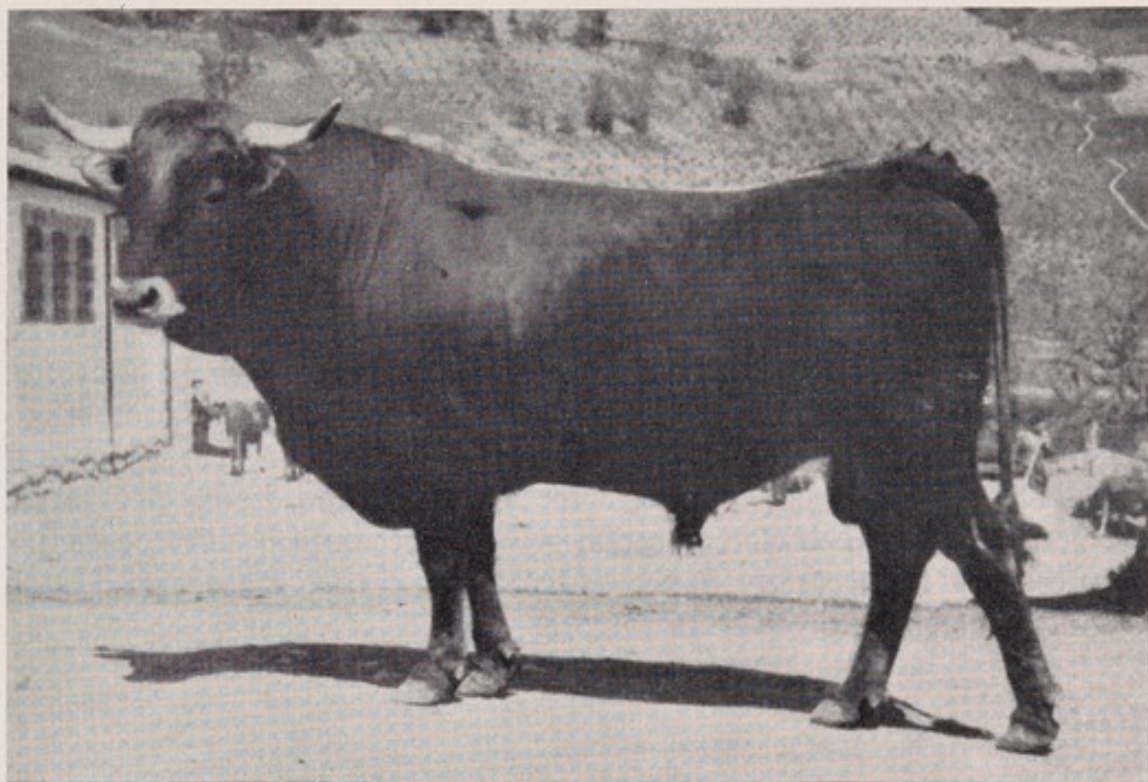


FIGURE 56. — Tudanca bull.

Courtesy Archives Ministry of Agriculture, Madrid

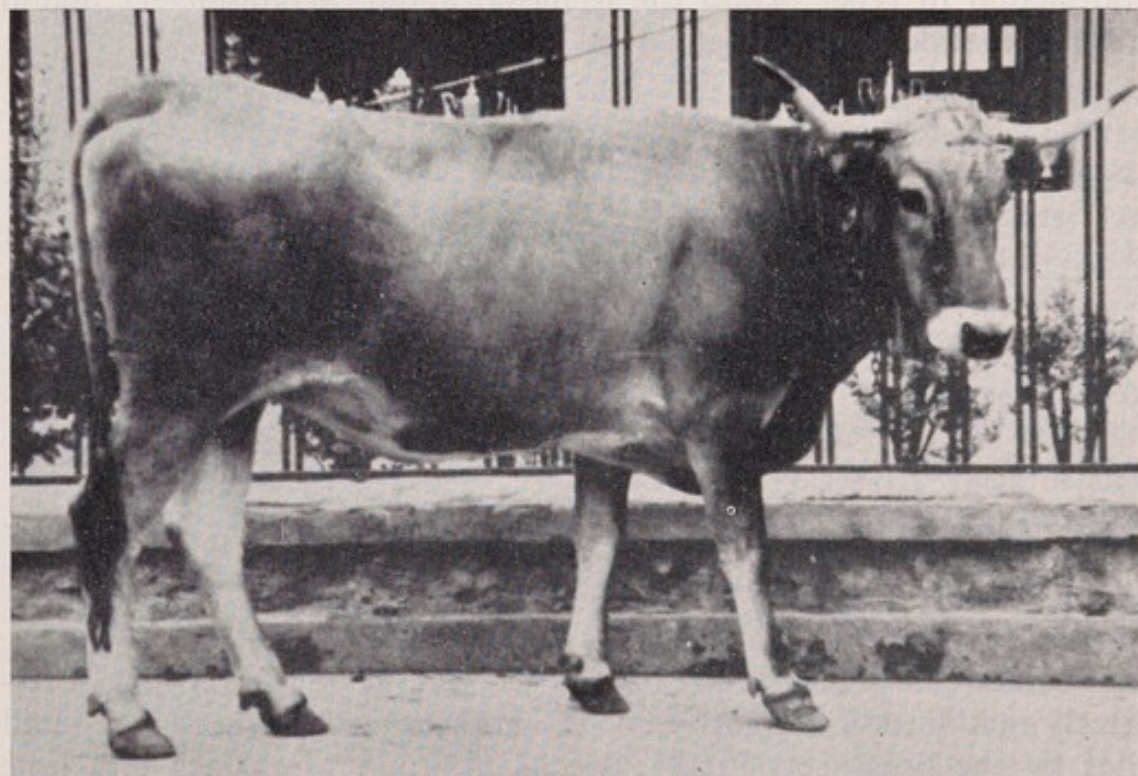


FIGURE 57. — Tudanca cow.

Courtesy Archives Ministry of Agriculture, Madrid

of Cabuérniga and Campóo. A variety of this breed, which is a consequence of their long development in pastures of superior nutritive value, attains a greater body size and is known as Campuriana or Campóo.

LOCATION, TOPOGRAPHY AND SOILS

At present, Tudanca cattle are found mainly in the Saja de Nansa and Campóo valleys, in Santander province, where they are maintained in the hilly country at altitudes varying from 40 to 1,300 meters, on poor and shallow soils. They are also to be encountered in smaller numbers in Asturias and León provinces. Previously, the breed had a much wider distribution but the better pastures are increasingly being utilized for cattle, mainly of Dutch origin, with superior milk-producing abilities.

CLIMATE

The north coast of Spain has the west European maritime climate with warm winters, mild summers and a rainfall in excess of 1,200 millimeters, the greater part of which is received during the winter. Further inland, the climate becomes more typically continental in type. Data for Reinosa, about 50 kilometers inland from Santander, are presented in Table 57.

TABLE 57. — AVERAGE CLIMATIC CONDITIONS FOR TUDANCA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature(°C)	2.1	1.6	6.2	7.5	10.7	14.1	15.4	16.7	14.4	10.6	5.7	3.4
Relative humidity (%)	84	80	71	71	74	69	74	77	72	77	78	85
Rainfall (mm)	154	164	80	87	68	61	42	49	71	78	105	119

FEEDING AND MANAGEMENT

Santander province, because of its climatic conditions, has a relatively rich natural vegetative cover, characterized in more sheltered sites by the presence of oaks, beech, chestnut, birch, ash and lime trees. There is also a good ground cover of grasses and herbs, both in the valley and upland pastures.

Cattle are kept on the small farms typical of this part of Spain and the village herd can be regarded as the breeding unit. In May or June, the entire village cattle population is moved as a herd from the environs of the village to communal grazing grounds on the higher hill slopes, where it remains throughout the summer. Before the migration occurs, village meetings decide the conduct of the cattle movements, its ultimate destination and select the single bull which is to accompany the cows. The distance of the upland pastures from the village is often appreciable and may take several days to accomplish. While the stock are away, the village grazings are cut for hay. The herd returns in October to graze the aftermath grass growths but, as this becomes exhausted, the stock are housed in stalls or yards where they are fed hays. Night housing is the normal practice in the winter months.

A few cows are milked to produce domestic milk and butter requirements, during the late winter and early spring period while the cows are still around the villages, but the main objective and income is the sale of draft animals to the Cantabrian coastal regions. Calvings are arranged so that the young calves are at least one month old before migration from the village to the summer upland pastures.

PHYSICAL CHARACTERS

The thick, flexible skin is of uniform pigmentation, although at first sight there appear to be variations in the darkness or lightness of its color. The apparent variations are caused by the differences in the hair colors. In bulls, the coat is darker than in females and often appears to be a shiny black with lighter shades along the back, around the muzzle and on the interior of the legs. Females have a variable brown color depending on the proportions of the three hair colors in the coat composition, e.g., black, red and brown. The hair is long and sleek in the summer but becomes thicker and rougher under the more severe conditions of winter.

The Tudanca is of small to medium size, with a medium-length head which has a straight profile and a wide muzzle. The horns are of medium length and grow outward from the head before turning sharply upward to end with their tips turned outward. The dewlap is small, the shoulders strong and powerful but the backline, particularly in cows, drops behind the withers to rise again from the hock bones to the tail head. The rump is long, level but narrow. The legs are strong, well muscled and long, and end in small, black and hard hooves. The hind legs may be "cow-

hocked." The animals are very vivacious, robust and healthy. Table 58 presents the average liveweights and body measurements of Tudanca cattle.

TABLE 58. — AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF TUDANCA CATTLE

	Males			Females		
	1 year	2 years	Mature	1 year	2 years	Mature
Liveweight (kg)	150	250	450	120	200	300
Body length (cm)	136	145	156	127	135	146
Wither height (cm)	122	128	134	116	122	130
Chest girth (cm)	171	180	191	150	170	183
Chest depth (cm)	63	67	71	60	64	69
Hip width (cm)	40	46	49	37	41	46

SOURCE: C. del Pozo Pelayo, personal communication.

FUNCTIONAL CHARACTERISTICS

The birth weights of male calves average 30 kilograms and female calves 26 kilograms. Heifers calve for the first time when they are 4 years old, although better fed animals may calve as early as 3 years of age. This late calving reflects the general late-maturing characters of the breed. Bulls are used for service at 2 years and, if exceptionally vigorous, may be retained until they are 6 years of age. All mating takes place on the summer grazing areas and so particular attention is needed to see that the bulls are sufficiently active.

Tudanca cattle are reared primarily for work purposes but surplus stock are slaughtered for meat and some cows are milked to supply domestic requirements. With this restriction of milk to family needs, reliable data on milk production are difficult to obtain. During the late winter and early spring milkings, before the cows are sent to the summer grazings, some 400 to 500 kilograms of milk containing between 5 to 6 percent of butterfat are obtained. The cream from this milk has gained a reputation for the flavor, color and appearance of the butter manufactured therefrom.

Tudanca cattle have little aptitude for beef production, although when properly fed they fatten readily. Their general body propor-

tions and their slow rates of maturity mitigate against their usefulness for commercial beef production.

The main purpose of this breed has been to serve as work animals to the valleys and coastal regions. Today little field work is required of them and they are used for hauling fodder or for spreading manure. It is unusual for a pair of animals to be worked for more than 60 to 70 full days in a year. A pair can haul a load of 1,000 kilograms at a speed of 3 kilometers per hour but such loads and speeds are rarely required in Santander. Normally, a working day consists of 5 to 6 hours but these cattle can haul a load for 9 hours when long distances are involved.

BREED ORGANIZATION

A considerable amount of crossbreeding, particularly with Brown Swiss cattle, is taking place in and around Santander, mainly to produce better quality milk/work animals.

There are around 25,000 Tudanca cattle in Santander province (nearly 10 percent of the population) but the numbers of this breed are decreasing because farmers are changing to more productive animals.

Asturian (Asturiana)

ORIGIN

The Asturian breed of today has derived from ancient stock which have inhabited this northern part of Spain for centuries and whose origin is lost in antiquity.

LOCATION, TOPOGRAPHY AND SOILS

This breed is found in the mountainous regions of Galicia and Asturias from the Ribadeo river to the Picos de Europa, both in the many deep Asturian valleys and on the mountain slopes. Because of the wide morphological differences between cattle from the valleys and from the mountains, the breed is often divided into the two corresponding types. The Asturian Valley (Asturiana de las Valles) cattle live in regions along the Cantabrian coast up to about 500 meters in altitude, between the rivers Nalón, Nora, Piloña and Selle on the densest populated area of Carreño.

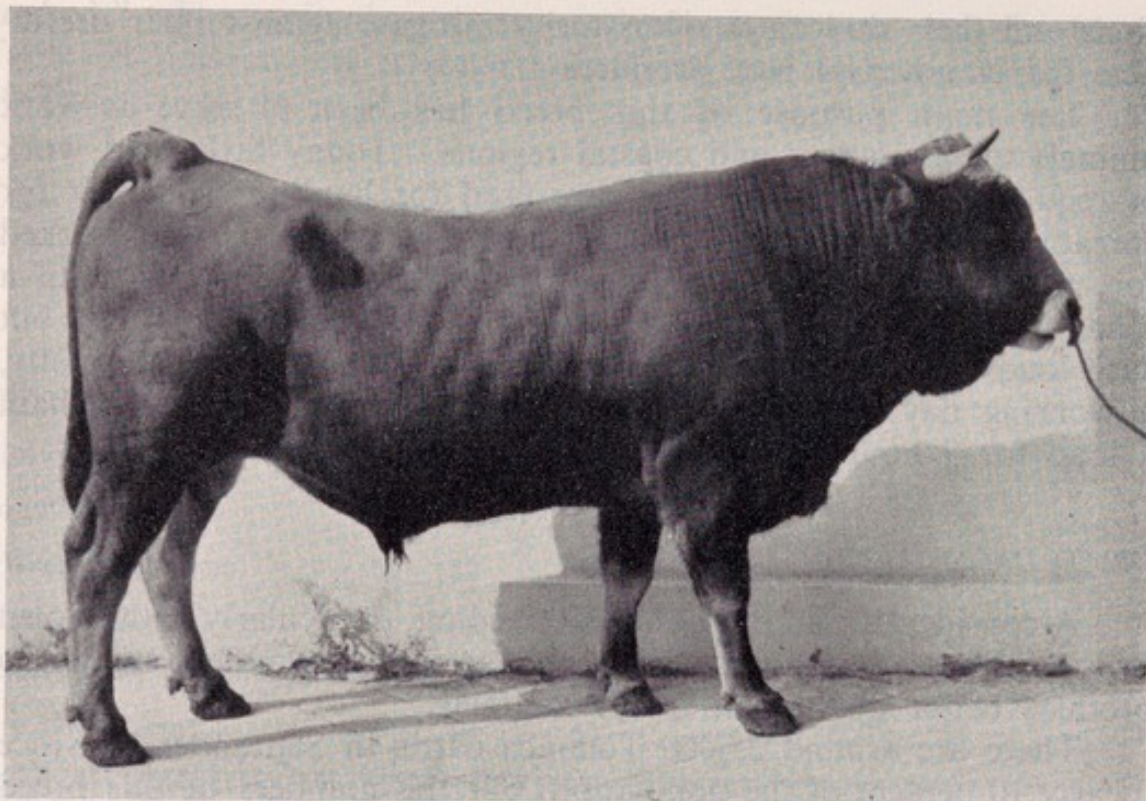


FIGURE 58. — Asturian bull: Mountain type.

Courtesy Archives Ministry of Agriculture, Madrid



FIGURE 59. — Asturian heifer: Mountain type.

Courtesy Archives Ministry of Agriculture, Madrid



FIGURE 60. — Asturian bull: Plains type.

Courtesy Archives Ministry of Agriculture, Madrid

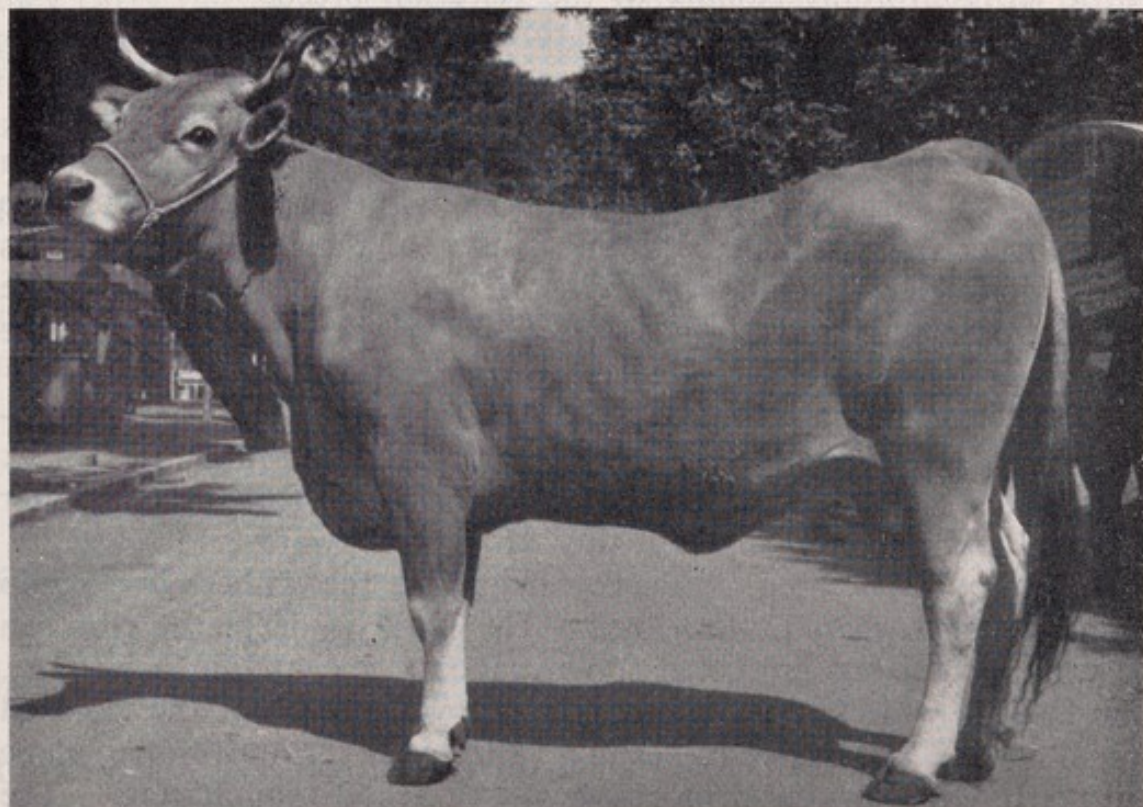


FIGURE 61. — Asturian heifer: Plains type.

Courtesy Archives Ministry of Agriculture, Madrid

CLIMATE

The climate of the coastal region is typical of the west European maritime region but naturally as one ascends the Cantabrian Mountains, temperatures decline while rainfall augments. The valley climates can vary appreciably according to their exposure to Atlantic breezes and their ability to trap the sun's heat. Details of the coastal conditions at Oviedo are given in Table 59.

TABLE 59. - AVERAGE CLIMATIC CONDITIONS FOR ASTURIAN CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	6.5	7.6	8.9	10.5	13.0	15.7	17.5	17.9	16.8	12.9	9.8	7.9
Rainfall (mm)	70	75	100	94	67	67	50	40	73	88	94	90

FEEDING AND MANAGEMENT

Conditions vary appreciably between the valley farms and the mountain ranges; those described for Galicia (p. 98) and Pyrenean cattle (p. 102) apply equally to the Asturian breed.

PHYSICAL CHARACTERS

Both groups of these cattle are of a single red color which varies from dark red to clear chestnut, with always a light shade of coloring on the belly and the insides of the legs. The hair is of medium length and thickness on a medium-thick skin. The muzzle, skin and body orifices are dark to black in color and the muzzle and eyes are surrounded by rings of whitish hair.

The head is long, broad in the forehead and rectilinear in profile. The horns, which are white or yellowish white with black ends, grow outward from the poll and then turn forward and later upward and often have their tips turned backward.

The body is long, with the height at the withers and rump slightly higher than at the loins. The chest is deep, the ribs can be well sprung but are often somewhat flat; the abdomen is large. The back is wide but the rump slopes downward from the elevated spinal cord. The degree of fleshing varies with the nutritional plane but the forequarters carry more weight than the hindquarters. The legs are strongly but not heavily boned and the dewlap is moderately prominent. The mammary development is small.

Imposed on these general characters is the variation due to mountain or valley nutritional and management conditions. Table 60 gives liveweights and wither heights for the two types of Asturian cattle.

TABLE 60. — SOME LIVeweIGHTS AND BODY MEASUREMENTS OF MATURE ASTURIAN CATTLE

	Mountain type		Lowland type	
	Males	Females	Males	Females
Liveweight (kg)	500	400	700	600
Wither height (cm)	128	122	140	135

FUNCTIONAL CHARACTERS

In recent years, more attention has been paid to the milking capacity of the valley types of these work/meat animals. Milk yields of 3,000 kilograms containing 4 percent of butterfat have been recorded.

The animals have a well-known reputation for work, which they carry out at a medium pace. With increasing attention being given to their beef-producing characters, coupled with improved feeding and fattening techniques, the yield of meat has improved and so has its quality.

BREED ORGANIZATION

A Herdbook and system of registration were introduced in 1933 and, of the 300,000 animals in Asturias, some 10 percent are now registered.

Leonese (Mantequera Leonesa)

ORIGIN

The Leonese breed is of antique origin, although probably heterozygous due to various crossings in the past.

LOCATION, TOPOGRAPHY AND SOILS

This breed is spread throughout the southern slopes of the Cantabrian Mountains in León province. Its area of dispersion



FIGURE 62. — Leonese bull.

Courtesy Archives Ministry of Agriculture, Madrid



FIGURE 63. — Leonese cow.

Courtesy Archives Ministry of Agriculture, Madrid

extends from the Villablino in the west to Riaño in the Esla valley. It is also found in the mountain areas of the Lugo, Orense and Palencia provinces and in the zone north of Burgos.

CLIMATE

The climatic conditions at Burgos are presented in Table 61 as typical of this breed.

TABLE 61. - AVERAGE CLIMATIC CONDITIONS FOR LEONESE CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	2.3	4.4	6.0	9.0	11.9	15.7	18.6	18.9	15.5	10.5	6.0	2.7
Rainfall (mm)	44	48	50	58	67	54	20	18	45	51	54	44

FEEDING AND MANAGEMENT

These can be gathered from the descriptions given for the Galicia breed (p. 98).

PHYSICAL CHARACTERS

The hair is short and soft on a medium-thick skin. The hair color varies from red to chestnut brown with various shades of fluctuation. Around the muzzle and on the insides of the ears the hair is white. It is also lighter around the eyes. The large muzzle, the hooves, and the brush of the tail are black, and the tongue, buccal mucosa and body orifices are dark colored.

The head is nicely proportioned, of medium length, with a wide forehead and a straight or slightly concave profile. The medium to long horns grow outward from the head, curving slightly forward at first and then abruptly upward and with the ends bending outward or backward. They are whitish at the base but black at the ends.

The body is long, deep in the chest, with fairly well-sprung ribs and a discontinuous dewlap. The topline dips slightly at the loins, the belly is nicely proportioned and the abdominal organs are capacious. The loins are long although sometimes the rump is rather short. It also slopes downward from the rather high spinal column. The shoulders are well fleshed and the legs are rather long but strongly boned.

The average weight of bulls is 700 kilograms and cows average 600 kilograms. The wither heights are 136 centimeters for males and 132 centimeters for females.

FUNCTIONAL CHARACTERISTICS

Leonese cattle are typically triple-purpose milk/work/meat animals. Attention is focusing on raising the milk yield, which is about 1,200 kilograms. The butterfat content is high, 6.17 percent on average, while 9 percent has been recorded. In fact, it is because of this high fat content and its value for butter making that the Spanish name for the breed includes the adjective "mantequera."

The breed is also robust, quick moving and docile and well adapted to haulage and farm work. The animals are strong and resistant to the strain of long hours in the plow.

Although attention is focusing on the milking potentialities of this breed, the meat qualities are not being neglected. The animals fatten easily when provided with adequate food and the quality of their meat is good.

BREED ORGANIZATION

No Herdbook has been established for this breed which numbers about 30,000. Considerable crossing has been undertaken in recent years with Brown Swiss cattle to improve milk productivity.

WORK AND MEAT BREEDS

Retinta or Extremeña

(Retinta Andaluza de la cuenca del Guadalquivir)

ORIGIN

The Retinta or Extremeña breed has developed from local cattle populations which for centuries have inhabited the provinces of Córdoba, Seville and Badajoz. So far as is known, these cattle have not been evolved from the crossing of the indigenous animals with imported exotic breeds but have evolved in conformity with the local needs and environmental conditions.

LOCATION, TOPOGRAPHY AND SOILS

This breed is found in the valleys of the Guadalquivir and Guadiana rivers and in the country between them. In the northern

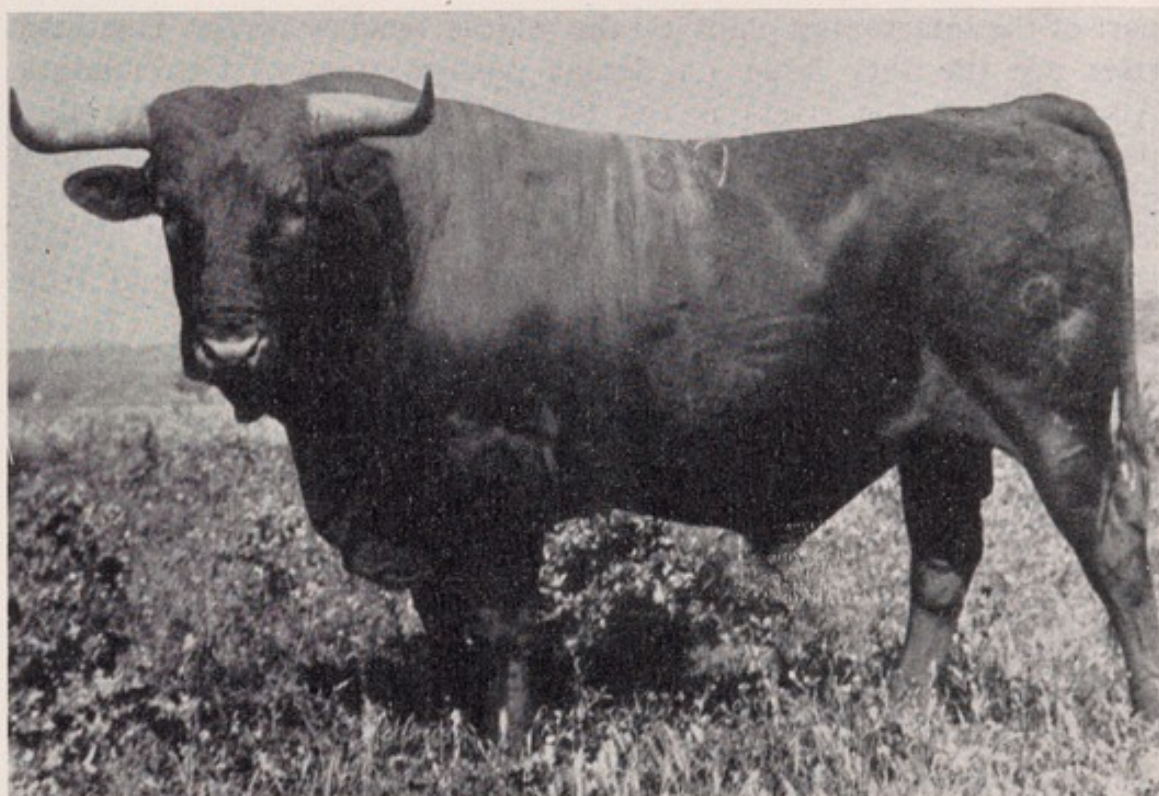


FIGURE 64. — Retinta or Extremeña bull.

Courtesy Archives Ministry of Agriculture, Madrid

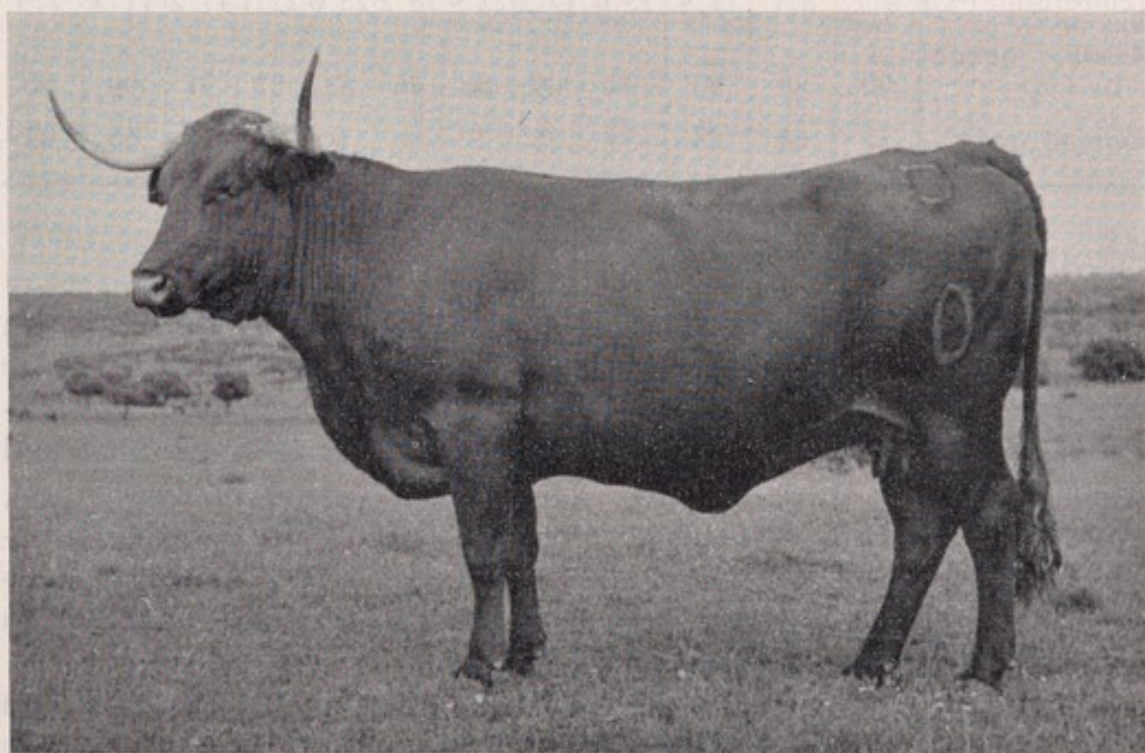


FIGURE 65. — Retinta or Extremeña cow.

Courtesy Archives Ministry of Agriculture, Madrid

part of the intervening plain, on the middle reaches of the Guadiana river are the very large La Serena pasture areas of Extremadura. Also between the rivers is the Sierra Morena, an area of rolling pastures, scrub and woodlands. The Campina, in the Guadalquivir plain, again provides good pasture and agricultural land on the lower levels before it rises to the rolling country at the foot of the Sierra Nevada. In the Guadalquivir valley, it is found from Villafranca to the low marshes on the southwestern coast. It also reaches a high density in Posadas, Hornachuelos, Palma del Río, Peñaflo and Lora del Río.

The soils in these areas are of varying geological origin but in the valleys they are deep and fertile. The altitude ranges from 10 to 350 meters.

CLIMATE

Climatic data for Carmona in Seville are given in Table 62.

TABLE 62. - AVERAGE CLIMATIC CONDITIONS FOR RETINTA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	6.7	8.7	11.4	15.6	17.2	22.4	25.2	25.0	22.1	17.2	11.5	7.9
Relative humidity (%)	90	89	90	90	89	86	86	87	81	91	90	90
Rainfall (mm)	42	64	88	38	28	5	3	0	37	51	66	63

FEEDING AND MANAGEMENT

The cattle normally live on the extensive grasslands in open fields but with yards or shelters for the night. The animals graze throughout the year on the variable quantity of herbage. The latter is abundant from February to June but is then parched and dried for two to three months. During this period of desiccation, the stock lose weight but recuperate on the autumn regrowths. However, with the onset of winter, liveweights again drop. Winter feeding is restricted to a few farmers who provide hays and arable crop residues in yards.

The lower land is very fertile but the extent of crop cultivation forces the cattle onto the resting fallows or onto land unsuitable for cropping. Often the crop residues do not compensate for the lack of fodder.

PHYSICAL CHARACTERS

The loose skin is of medium thickness and is covered with soft, sleek hair in summer but which is rather longer and rougher in the winter. The skin is uniformly and darkly pigmented and the hair is a dark, glossy red, except around the eyes and the whitish tail switch.

The head is of average proportions and size, although it often appears larger because of the impressive, well-set horns. The latter are thick in the base, spread outward from the poll and later curve forward and upward. In color the horns are yellow or greenish yellow with dark ends. The muzzle, hooves and body orifices are black.

The body is long but dips slightly in the middle. The chest is deep, the ribs nicely sprung and the abdomen is capacious. The back, loins and quarters are wide, the tail head is often set high and the quarters slope away from the spinal ridge. The legs are short and strong and the musculature, in properly fed animals, is well developed. Table 63 gives liveweights and body measurements of this breed.

TABLE 63. - AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF RETINTA CATTLE

	Males			Females		
	1 year	2 years	Mature	1 year	2 years	Mature
Liveweight (kg)	180	300	650	160	250	380
Body length (cm)	137	161	171	132	151	162
Wither height (cm)	124	136	141	118	131	136
Chest girth (cm)	172	192	202	161	182	192
Chest depth (cm)	65	72	76	61	68	73
Hip width (cm)	38	43	46	35	40	44

FUNCTIONAL CHARACTERISTICS

The birth weight of male calves is 35 kilograms, while female calves average 30 kilograms. Heifers calve for the first time at about 3 years of age, although many calvings tend to be concentrated in the late spring. Bulls are put to service when 2 years of age and normally have an active breeding life of 2 to 3 years.

The breed is used for meat and work purposes and the animals are put to work when 2 years old. They are active and will-

ing workers, although many become somewhat vicious with age. There is a tendency to use them for only 2 to 3 years. A pair will haul a load of 1,000 kilograms at a speed of 2 to 2½ kilometers per hour. They are used extensively on the farms, working for half a day for 150 days a year.

The breed has an excellent ability to fatten on grass and because of this performs a most useful function. While the animals do not provide the carcass quality encountered in the better beef breeds, they yield a very acceptable carcass with a yield of 52 to 58 percent and 35 percent of the carcass weight is of first-quality meat.

BREED ORGANIZATION

There are about 250,000 head of Retinta cattle and crossbreds but the number of purebreds is decreasing steadily owing to cross-breeding policies.

Avila (Piedrahitense)

ORIGIN

The Avila breed is known to have been in central Spain and Andalusia from oldest times but its origin and the history of its more recent development are unknown. It is sometimes referred to as the Black Carpetana breed.

LOCATION, TOPOGRAPHY AND SOILS

The breed is encountered in the province of Avila, in central Spain and in northern Andalusia.

CLIMATE

The climatic data for Avila is presented in Table 64.

TABLE 64. - AVERAGE CLIMATIC CONDITIONS FOR AVILA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature(°C)	1.8	4.0	5.6	8.0	11.6	16.0	19.7	19.9	15.8	9.7	5.9	2.5
Rainfall (mm)	34	44	50	77	89	70	33	30	77	72	60	77

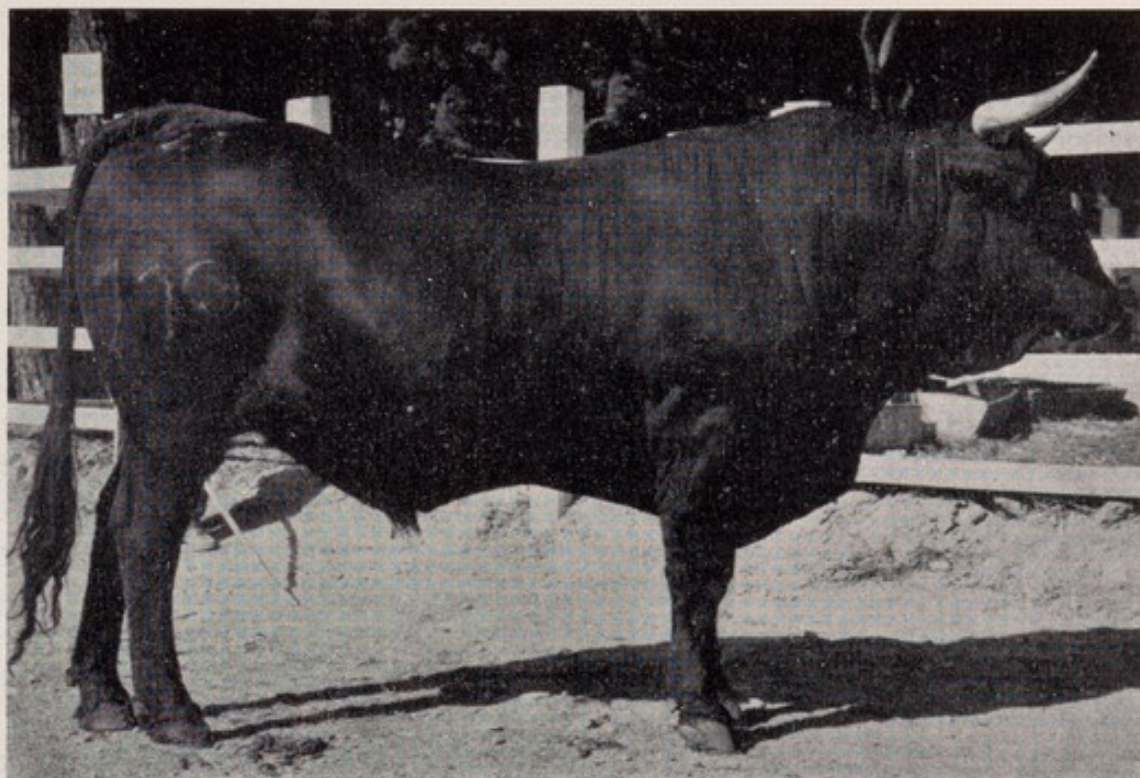


FIGURE 66. — Avila bull.

Courtesy Archives Ministry of Agriculture, Madrid

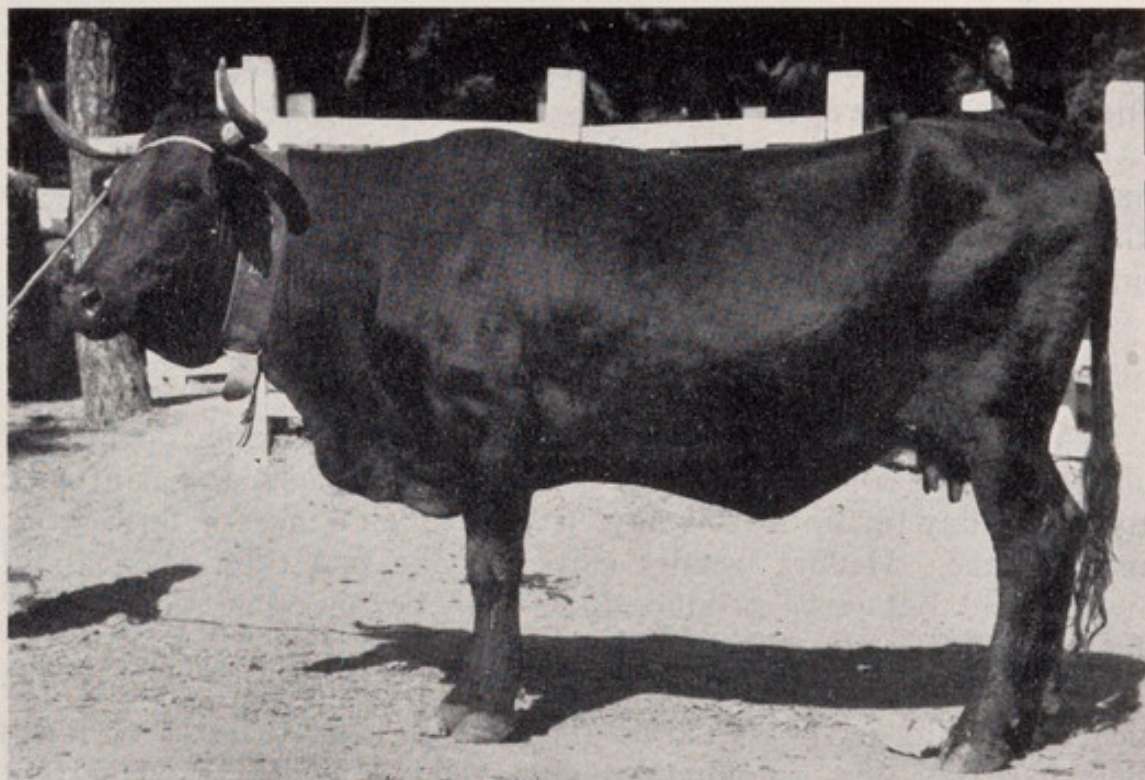


FIGURE 67. — Avila cow.

Courtesy Archives Ministry of Agriculture, Madrid

FEEDING AND MANAGEMENT

The animals spend from April until October grazing on the higher slopes and then are brought back to the farmsteads for the winter, where they are fed hays from grasses and leguminous crops, straws and other crop residues.

PHYSICAL CHARACTERS

The hair of this breed is short and fine on a medium-thick pigmented skin. In color, the hair is black over all parts of the body, while the muzzle, body orifices and hooves are of the same color.

The head is of medium size, wide in the forehead and muzzle and straight in profile. The horns are very long, yellowish at the base and black at the ends; they grow outward, forward and upward. The neck is not too long and carries a heavy dewlap in the posterior portion.

The forequarters are very well developed and the back is long but dips slightly at the loins. The quarters usually slope toward the tail and from the spinal column toward the sides. The chest is deep, the ribs well sprung and the abdominal cavity is large. The degree of musculature naturally varies with the condition of the animals, and the medium width of the body and its depth provide an ample base for its development. The legs are strong and of medium length.

Bulls attain a liveweight of from 900 to 1,000 kilograms when mature and in condition, whereas cows will average up to 650 kilograms liveweight. The wither height of bulls averages 146 centimeters, while for cows the average is 140 centimeters.

FUNCTIONAL CHARACTERISTICS

Avila cattle are good draft animals, willing, strong, docile and of very robust constitution. They are quick walkers and can work an 8-hour day for up to 200 days a year at all kinds of farm work and haulage. Heifers usually calve for the first time when about 3 years old but cows produce little milk beyond that required for the rearing of their calves.

Depending on the feeding plane, the value of Avila cattle for meat-producing purposes varies appreciably. If fed inside to finish their carcasses, the slaughter weights yield some 50 to 55 percent in the form of carcase. The proportion of fore-end is rather large, so that the quantity of the better quality joints is relatively small.

BREED ORGANIZATION

No Breed Society or Herdbook has been founded and the estimates of the breed population are not very exact.

Berrenda
(**Berrendas Españolas**)

ORIGIN

Again, the history of the development and evolution of this breed is lost but the existing stock have derived from ancient forms that have inhabited the southern part of Spain for many centuries

LOCATION, TOPOGRAPHY AND SOILS

Both the Black and White Berrenda cattle and the more numerous Red and White type are widely difused in small groups through the provinces of Salamanca, Badajoz, Córdoba and Seville.

CLIMATE

The climate can be illustrated by the data in Table 65 for Seville.

TABLE 65. - AVERAGE CLIMATIC CONDITIONS FOR BERRENDIA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature(°C)	11.7	13.2	15.5	18.2	21.2	24.0	29.1	29.6	26.0	20.6	15.6	11.3
Rainfall (mm)	59	33	65	44	41	14	1	2	18	53	74	69

FEEDING AND MANAGEMENT

The breed feeds on the pastures of the higher land and on the fallows and uncultivated parts of the lower, richer, cultivated areas. Its feeding and management are similar to that of the Retinta breed (p. 118) but it does not enjoy such good pasturage opportunities.

PHYSICAL CHARACTERS

The hair is soft and fine on a medium-thick skin which is pigmented. There are two main color patterns in these two-colored



FIGURE 68. — Berenda bull.

Courtesy J. Martín de Frutos

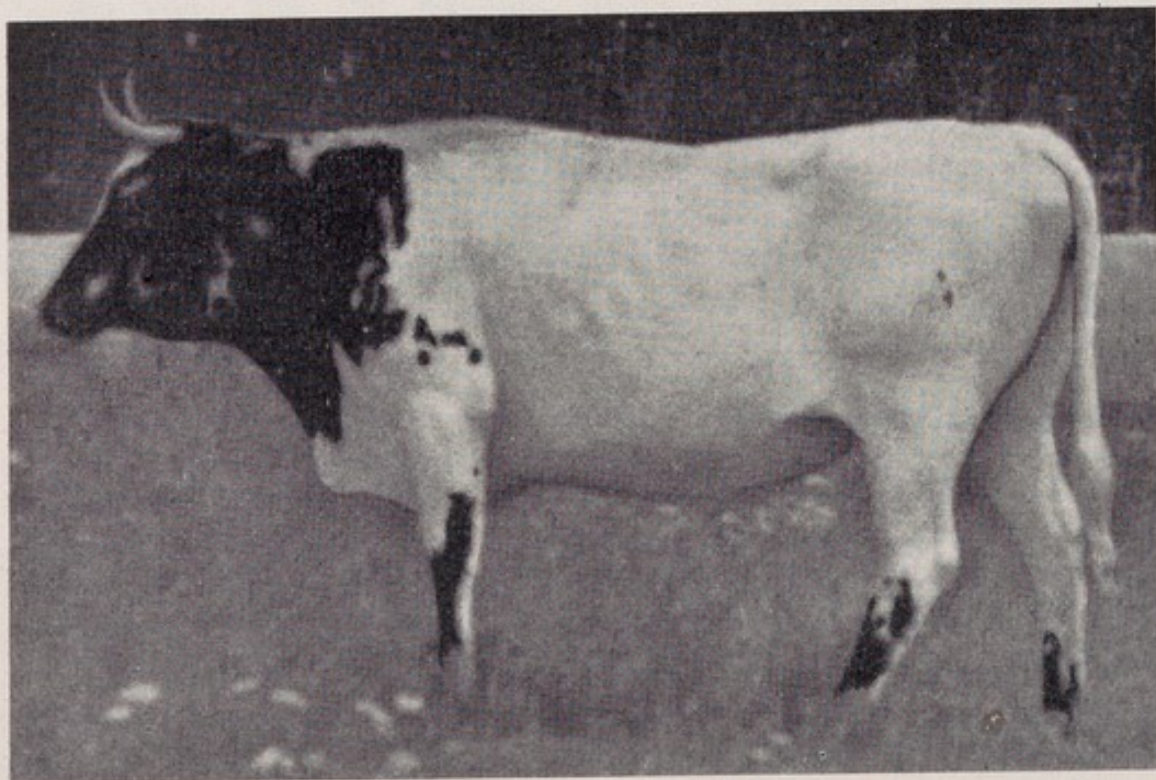


FIGURE 69. — Berenda cow.

Courtesy J. Martín de Frutos

animals. In the small group, the color is white with black or red-black patches, and in the other and most prevalent type, a mixture of red and white.

The hair pattern in the black and white type is normally made up of distinct black and white patches but sometimes spots of these colors occur and, at other times, the two colors are mixed. The colored areas are not uniformly distributed over the body but tend to be concentrated in the fore-end. In the red and white type, the colors are distributed in well-defined red and white patches. In the latter type, the horns are white with pinkish black ends, the muzzle, natural orifices and the mucosae are flesh pink. In the former type, the horns are white with black ends and the muzzle and orifices are also black. The long horns spread outward from the head, turn forward and then upward and slightly backward.

The head is of medium size with a wide forehead, a slightly convex profile and a wide muzzle. The neck is relatively short and muscular, the back is long and straight and the trunk is cylindrical. The chest is deep, the ribs well sprung and the abdominal organs have ample space. The back, loins and quarters are wide and the hindquarters are strongly muscled but slope away from the backbone. The dewlap is deep in the posterior portion, the legs are short but nicely boned.

Mature males weigh about 800 kilograms and females around 650 kilograms liveweight.

FUNCTIONAL CHARACTERISTICS

The breed is a dual-purpose work and beef producer and the milk yields are sufficient only to rear their calves.

As working animals Berrenda cattle are extremely good, being docile, steady in their movements, willing and hard workers. Their robust constitution permits them to do long hours of hard farm work or haulage on roads and they can be worked for 200 days a year.

At the same time, they are good producers of meat with the capacity to fatten well when fed and housed. The meat is of good quality and the carcass yield is around 56 to 59 percent of the liveweight.

BREED ORGANIZATION

There is neither a Breed Society nor a Herdbook in operation.

Black Andalusian (Negra Andaluza)

ORIGIN

Andalusian cattle are derived from stock of ancient origin believed to be similar to those from which the Retinta breed developed.

LOCATION, TOPOGRAPHY AND SOILS

This breed is spread over a large area and its forms vary from those adapted to the Central Mountain area to others more in conformity with the Andalusian plains and the heavy soils of Córdoba and Seville provinces. So varied is the range of conditions that different body forms are clearly apparent, from the largest size in Piedrahita and El Barco in Avila province to the smallest type in the Salamander and Zamora provinces and with the average-sized specimens in Andalusia.

CLIMATE

Conditions typical of the rather varied areas are difficult to illustrate with reference to a single site, but Table 66 gives the climatic data for Salamanca.

TABLE 66. — AVERAGE CLIMATIC CONDITIONS FOR BLACK ANDALUSIAN CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	3.7	6.1	7.8	10.8	14.1	18.9	22.4	21.6	18.3	12.4	7.7	3.9
Rainfall (mm)	20	21	22	25	32	25	14	2	30	33	32	24

FEEDING AND MANAGEMENT

The levels of nutrition vary appreciably between the conditions in the lower fertile and sheltered valleys and those on the higher slopes of the mountains and are responsible for the marked differences in body conformation of the different subtypes.

Some of the animals spend the summer communally herded on the higher mountain slopes from May to October. Others are managed more intensively in the more sheltered lower areas, sometimes being kept inside or in yards throughout the year and in other cases with restricted summer grazing and soiling.

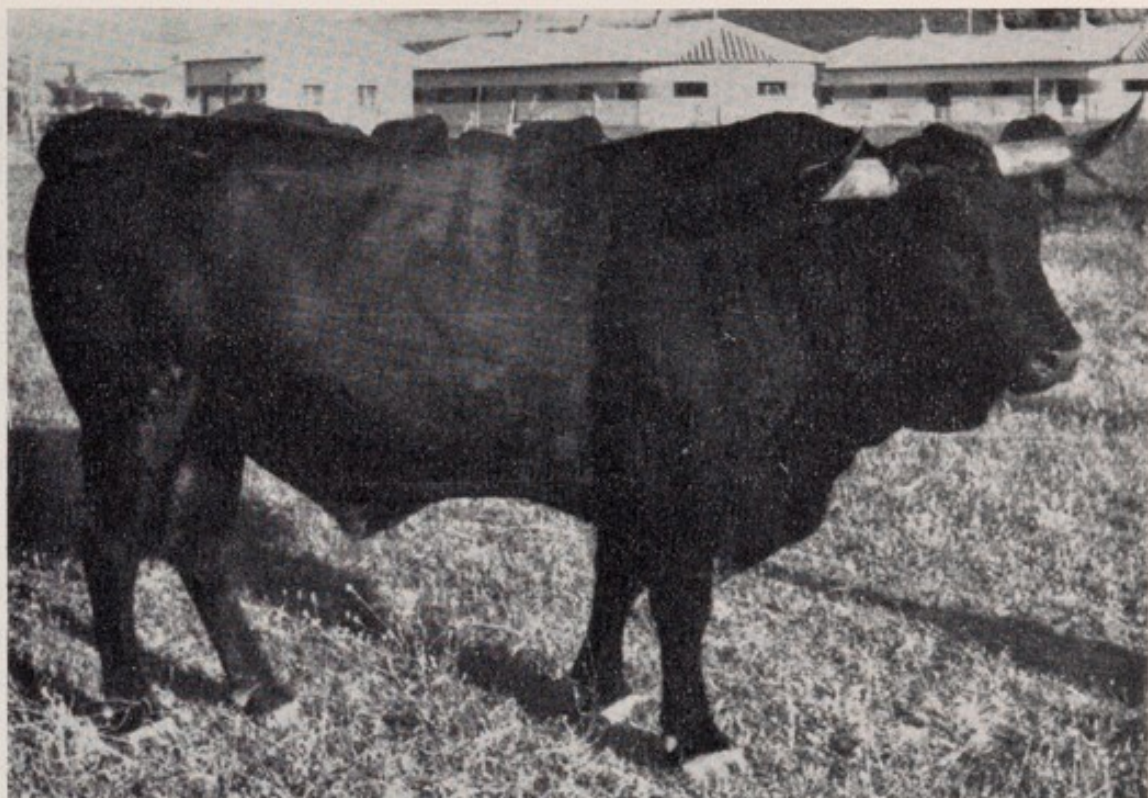


FIGURE 70. — Black Andalusian bull.

Courtesy J. Martín de Frutos

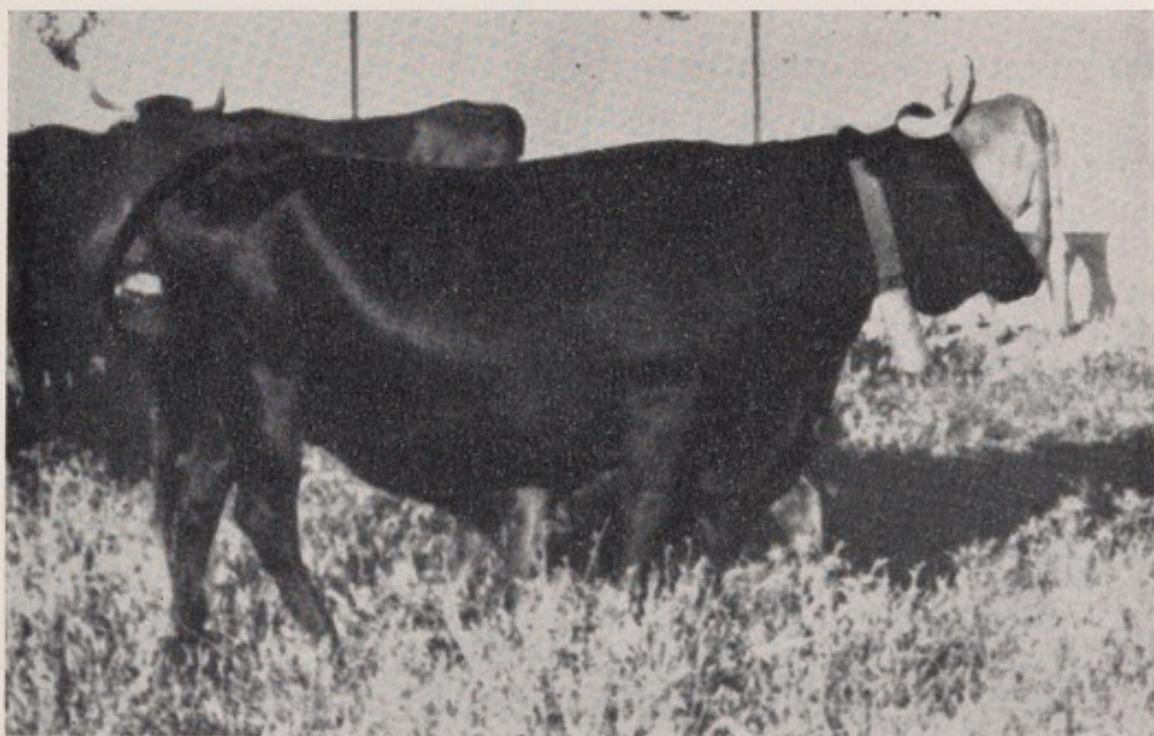


FIGURE 71. — Black Andalusian cow.

Courtesy J. Martín de Frutos

PHYSICAL CHARACTERS

The hair color is a single black without any variations of intensity. The hair is of medium thickness and length and the skin is also of medium thickness. The muzzle, body apertures and hooves are also black.

The head is of small to medium size and the impression of smallness is accentuated by the size of the largest types of animal. The forehead is wide and concave between the eyes, while the profile is rectilinear. The horns are of a medium length and grow outward from the poll and later curl forward and slightly upward. They are of a whitish color in the lower portions but are black in the more distal parts.

The body is long and the dorsolumbar region is slightly below the level of the withers and tail head. The chest is deep, and although the ribs may be nicely sprung in some individuals, they can be flat-sided in others. The abdominal organs are of good size and, in properly fed animals, the trunk is cylindrical. The back is wide and the loins and quarters are long, although the latter fall away from the high spinal cord. The legs are well boned and strong, while the degree of muscular development is also in proportion to the plane of nutrition under which the animals have been raised.

A small number of similar stock are encountered in the southwest of Andalusia but these have a yellowish brown hair color.

FUNCTIONAL CHARACTERISTICS

Andalusian cattle are a dual-purpose work/meat type. They are hardy, robust, fertile and well adapted to the climatic and feeding conditions. They do well on rather frugal diets, are quiet and docile and, when suitably fed, fatten at economic rates. The quality of their meat is good and their carcasses represent around 50 percent of their liveweights. They are active animals and carry out hard work in the heavier, lower soils as well as haulage and general farm work.

BREED ORGANIZATION

No Breeders' Association exists.

Salamanca or Morucho (Salmantina)

ORIGIN

The same as for the Black Andalusian breed (see p. 126).

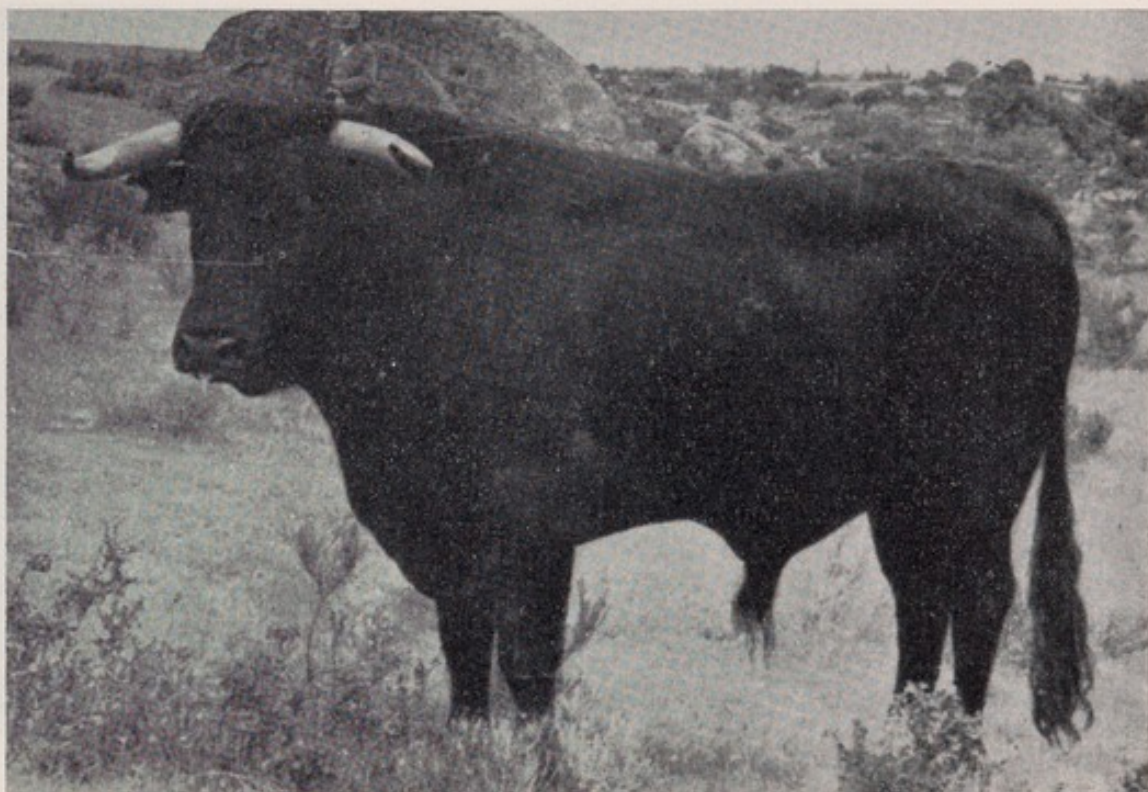


FIGURE 72. — Salamanca or Morucho bull.

Courtesy J. Martín de Frutos



FIGURE 73. — Salamanca or Morucho cow.

Courtesy J. Martín de Frutos

LOCATION, TOPOGRAPHY AND SOILS

This breed is restricted to Salamanca province.

CLIMATE

The climatic conditions of Salamanca are given in Table 67.

TABLE 67. - AVERAGE CLIMATIC CONDITIONS FOR SALAMANCA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	3.7	6.1	7.8	10.8	14.1	18.9	22.4	21.6	18.3	12.4	7.7	3.9
Rainfall (mm)	20	21	22	25	32	25	14	2	30	33	32	24

FEEDING AND MANAGEMENT

See the Black Andalusian breed (p. 126).

PHYSICAL CHARACTERS

This breed is a small variety of the Black Andalusian and its general characters are the same as described on p. 128.

FUNCTIONAL CHARACTERISTICS

Similar to the Black Andalusian breed (p. 128) but, in addition to being smaller, these animals are extremely active and lively and so are often crossed with the Toro de lidia (bullfighting) breed to produce fighting bulls.

Zamora
(Sayaguesa)

ORIGIN

The same as for the Black Andalusian breed (p. 126).

LOCATION, TOPOGRAPHY AND SOILS

This breed is found in the province of Zamora. (p. 126).

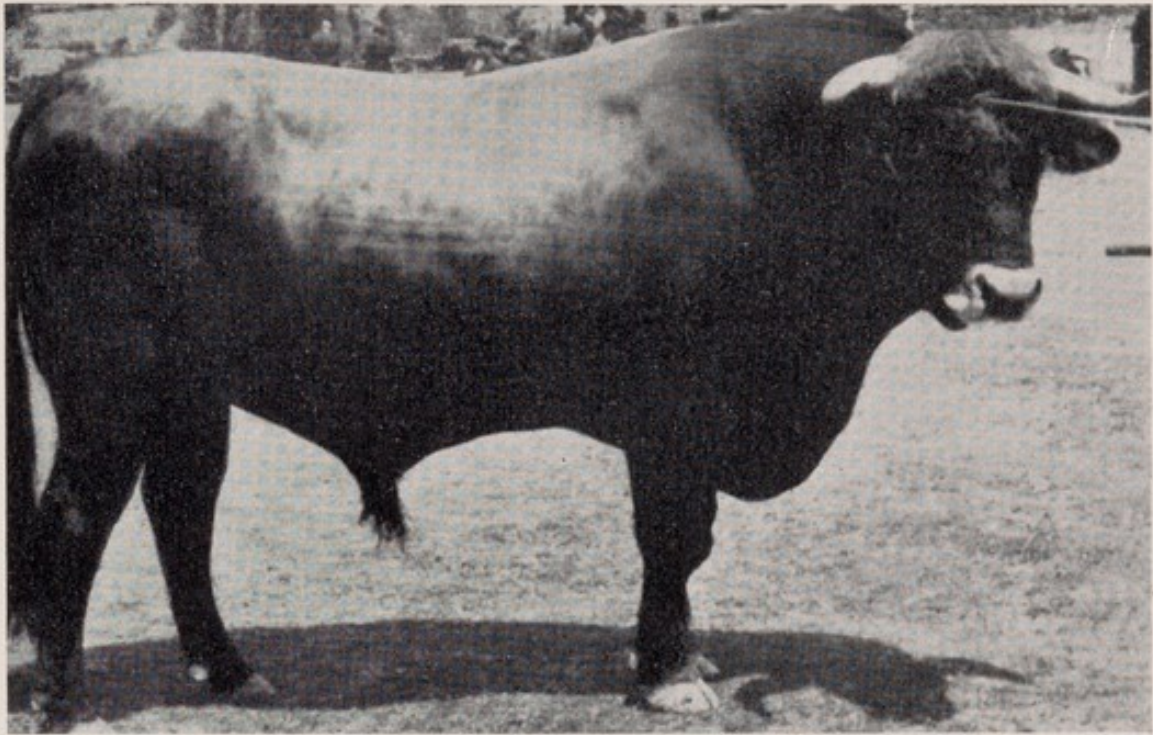


FIGURE 74. — Zamora bull.

Courtesy Archives Ministry of Agriculture, Madrid

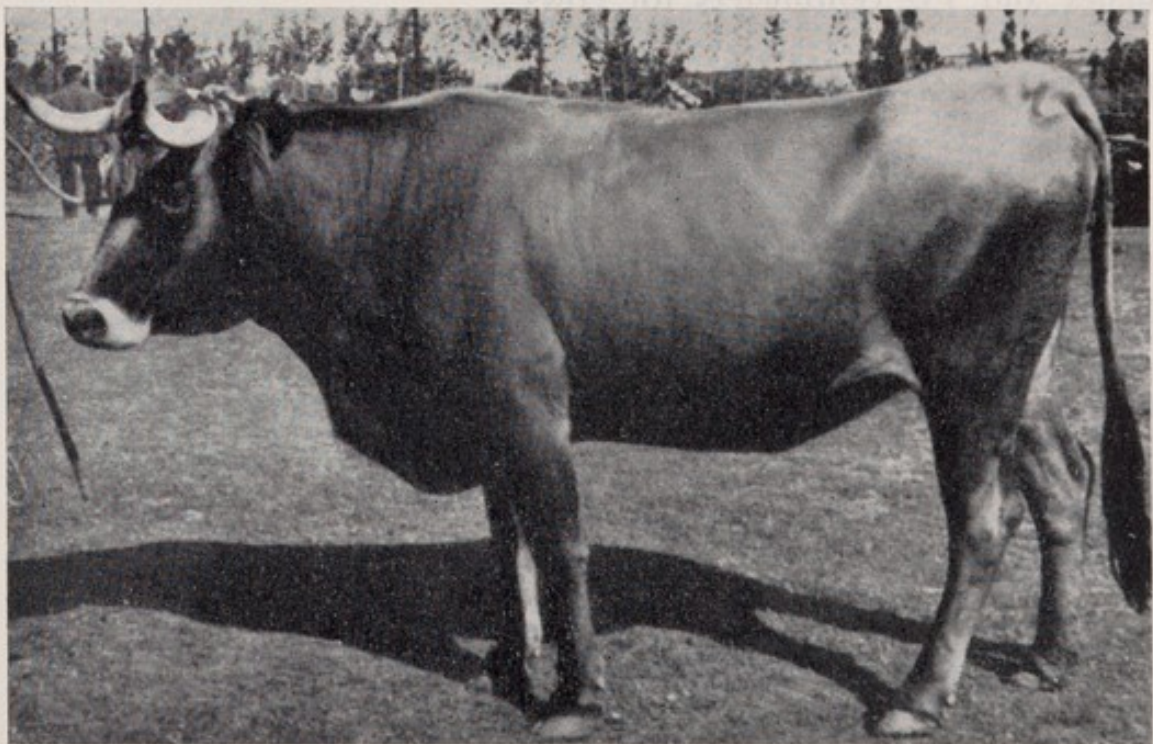


FIGURE 75. — Zamora cow.

Courtesy Archives Ministry of Agriculture, Madrid

CLIMATE

The climatic conditions of Zamora in Table 68 illustrate the environmental conditions under which this breed lives.

TABLE 68. — AVERAGE CLIMATIC CONDITIONS FOR ZAMORA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature(°C)	3.3	6.1	7.4	10.3	14.0	17.7	21.4	21.3	17.5	12.0	7.1	3.8
Rainfall (mm)	20	22	26	27	40	29	9	9	33	31	36	23

FEEDING AND MANAGEMENT

See the details for the Black Andalusian breed (p. 126).

PHYSICAL CHARACTERS

These are the same as for Black Andalusian cattle (p. 128), except that the stock are smaller in size and similar to the Zamora breed. Males weigh up to 750 kilograms, while cows mature around 550 kilograms. The wither heights are 138 centimeters for adult males and 132 centimeters for cows.

FUNCTIONAL CHARACTERISTICS

The same as for Black Andalusian cattle (p. 128).

Extremadura
(Colorada Extremeña)

ORIGIN

Similar to that of the Retinta breed (p. 116).

LOCATION, TOPOGRAPHY AND SOILS

The province of Badajoz, on less fertile soils but under conditions somewhat similar to those of the Retinta cattle (p. 116).

CLIMATE

The meteorological data for Badajoz is given in Table 69.



FIGURE 76. — Extremadura bull.

Courtesy J. Martín de Frutos



FIGURE 77. — Extremadura cow.

Courtesy J. Martín de Frutos

TABLE 69. - AVERAGE CLIMATIC CONDITIONS FOR EXTREMADURA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature(°C)	7.2	10.2	12.5	14.8	18.1	22.4	25.9	26.3	22.5	17.4	12.4	8.1
Rainfall (mm)	43	51	41	37	33	14	3	4	24	42	44	45

FEEDING AND MANAGEMENT

Similar, although on a less nutritive plane, to that of the Retinta cattle (p. 118).

PHYSICAL CHARACTERS

The physical characters of this breed also resemble those of the Retinta breed. They are of a single red color with a pigmented skin and black muzzle, body orifices and hooves. The liveweights of males can reach 750 kilograms and 550 kilograms for cows.

FUNCTIONAL CHARACTERISTICS

Similar to those of the Retinta breed (p. 119).

Cáceres
(Cacereño)

ORIGIN

The origin is lost in antiquity but the breed has developed along the lines of the Retinta and Extremadura breeds.

LOCATION, TOPOGRAPHY AND SOILS

The breed is found in the province of Cáceres.

CLIMATE

Table 70 sets out the climatic data for Cáceres.

TABLE 70. - AVERAGE CLIMATIC CONDITIONS FOR CÁCERES CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature(°C)	7.1	8.7	10.4	11.6	16.8	20.8	24.7	25.8	20.7	14.7	10.7	7.1
Rainfall (mm)	75	52	105	111	83	28	6	12	47	71	85	60

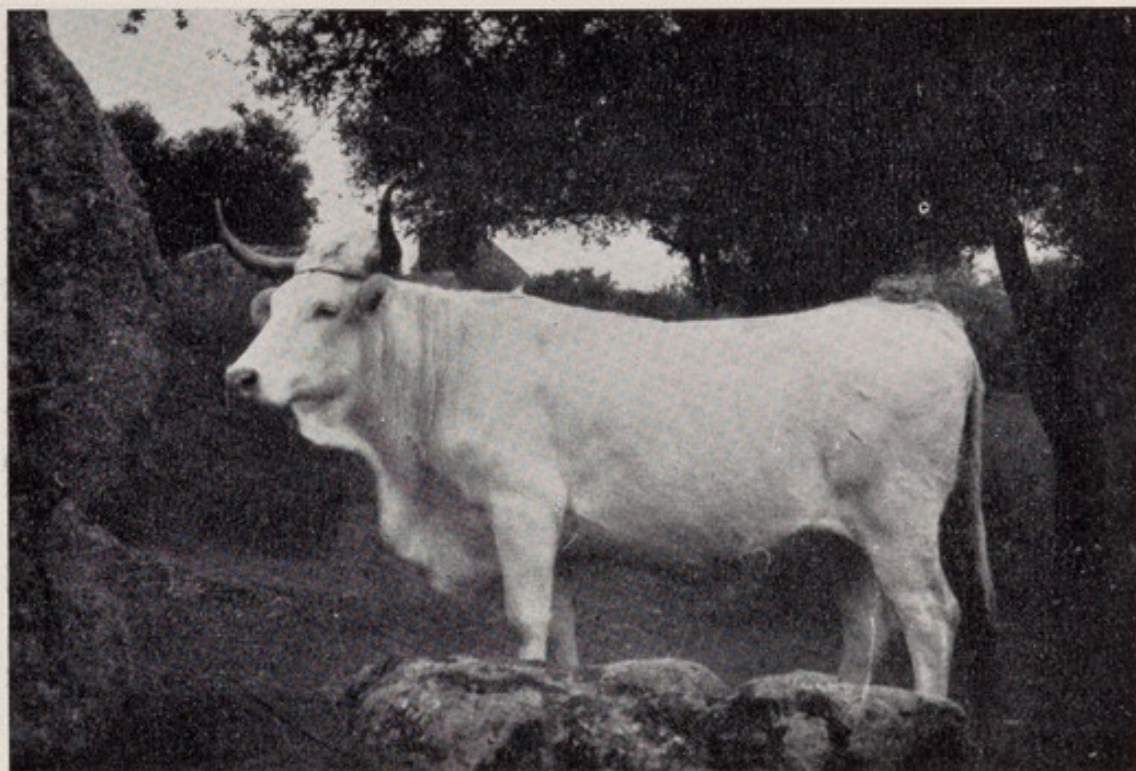


FIGURE 78. — Cáceres bull.

Courtesy Archives Ministry of Agriculture, Madrid



FIGURE 79. — Cáceres heifer.

Courtesy Archives Ministry of Agriculture, Madrid

FEEDING AND MANAGEMENT

These are similar to the Retinta and Extremadura breeds (see p. 118 and 134).

PHYSICAL CHARACTERS

The breed resembles the Extremadura cattle very closely (p. 134), except that the hair is light yellow in color.

FUNCTIONAL CHARACTERISTICS

Not quite so good as those reported for the Retinta breed (p. 119).

**Murcia or Levantine
(Murciana or Levantina)**

ORIGIN

The Murcia breed has developed from local types of ancient origin.

LOCATION, TOPOGRAPHY AND SOILS

The center of the most purebred animals of this breed is in the province of Murcia and it is spread in the levantine zone between the river Júcar in the north and the Almanzora in the province of Almería in the south. From this coastal belt it spreads in smaller numbers to the province of Almería and Granada. The altitude varies from the littoral to the mountain heights and the soils likewise vary significantly.

CLIMATE

Typical for the breed are the climatic conditions in Murcia, which are summarized in Table 71.

TABLE 71. — AVERAGE CLIMATIC CONDITIONS FOR MURCIA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature(°C)	10.2	12.0	13.5	16.2	19.2	22.9	26.2	26.5	23.8	19.1	14.7	10.9
Rainfall (mm)	32	28	39	31	30	21	4	9	43	45	33	39

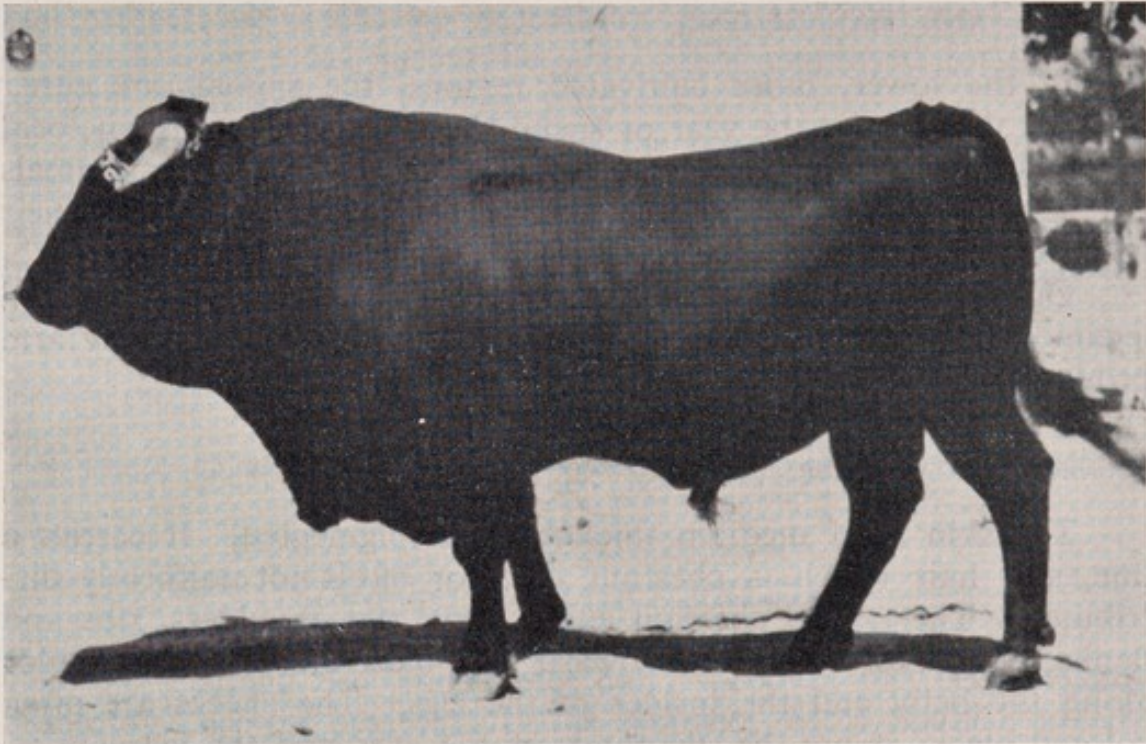


FIGURE 80. — Murcia or Levantine bull.

Courtesy J. Martín de Frutos



FIGURE 81. — Murcia or Levantine heifer.

Courtesy J. Martín de Frutos

FEEDING AND MANAGEMENT

In the lower, more cultivated regions, the animals are either stall-fed throughout the year or spend the summer months on local pastures if the lands are unsuitable for cropping. Other animals are herded up the mountain slopes and may be away from their homesteads for up to six months in the spring and summer.

During the winter feeding period, the animals receive grass and legumes, hays, straws, legume haulms, roots, brans and other farm produce.

PHYSICAL CHARACTERS

The skin is of medium thickness and pigmented. It carries a fine, soft hair which is chestnut in color but is not uniformly distributed. The typical chestnut covers only the shoulders, ribs and flanks but becomes lighter toward the back and deeper in color along the belly and the insides of the legs. The cheeks are often colored black, as are the surrounds of the eyes and the extremities. The area around the muzzle is often reddish, although in some animals it may be gray. The mucous membranes, muzzle, tongue and natural orifices are black.

The head is of medium length, with a wide convex forehead and a face which is also convex in profile. The yellowish horns are set below the ridge of the poll. They spread outward and downward, often reaching to the cheeks and requiring trimming. The neck is well formed and muscular and the dewlap is fairly well developed in the lower part of the neck.

The body is long, the withers are prominent, and the topline sags at the loins. The chest is deep, the ribs well sprung and the abdomen is large. The trunk is cylindrical in form, the back is wide, the loins and quarters are long but the quarters slope to the rear and to the sides. The legs are short, firmly boned, strong and often well muscled, although the muscles of the hindquarters rarely extend to the hock.

Mature bulls weigh up to 750 kilograms and cows scale around 600 kilograms liveweight.

FUNCTIONAL CHARACTERISTICS

The forequarters are much heavier than the hindquarters and the breed is bred particularly for its value as a work animal, although its meat-producing qualities are assuming greater economic significance. As a work animal it is docile, very strong, willing

and robust. It walks at a medium pace and will work for 200 days at 8 hours a day during the year. It is employed for all types of farm work and for haulage purposes.

For meat-production purposes, the breed is steadily gaining in reputation. However, although its meat is tender, too much of the weight lies in the forequarters and further work will be needed to breed stock with a desirable amount of meat on the hindquarters. The average carcase yield is around 50 percent.

BREED ORGANIZATION

There is neither a Breeders' Association nor a Herdbook.

IMPORTED DAIRY BREEDS

The demand for milk and dairy produce has been steadily mounting since the beginning of the century. Most Spanish breeds, even those in the more fertile northern regions, are dual- or triple-purpose animals with little aptitude for milk production. However, five indigenous breeds are being improved as milk producers but such policies take time and far quicker results are achieved by introducing proven milk breeds from other countries. Not only have many purebreds been introduced and multiplied within the country but many local animals have been graded up to these exotic breeds.

The Brown Swiss, Friesian and Simmental breeds have been the main imports for increasing milk production and now are present in large numbers and are widely spread around urban and rural consuming or manufacturing centers.

There is no need to describe these breeds in detail as their characteristics can be obtained from the sections where they are described under their home conditions. The following notes, however, are relevant.

Black and White Lowland (Holandesa Española)

Importations of Friesians began toward the end of the nineteenth century and have continued until the present day. Friesians now represent more than 10 percent of all the cattle in Spain and most have derived from Dutch origins.

The largest number of this breed is to be found in the north, particularly in Santander and in Catalonia provinces, where condi-

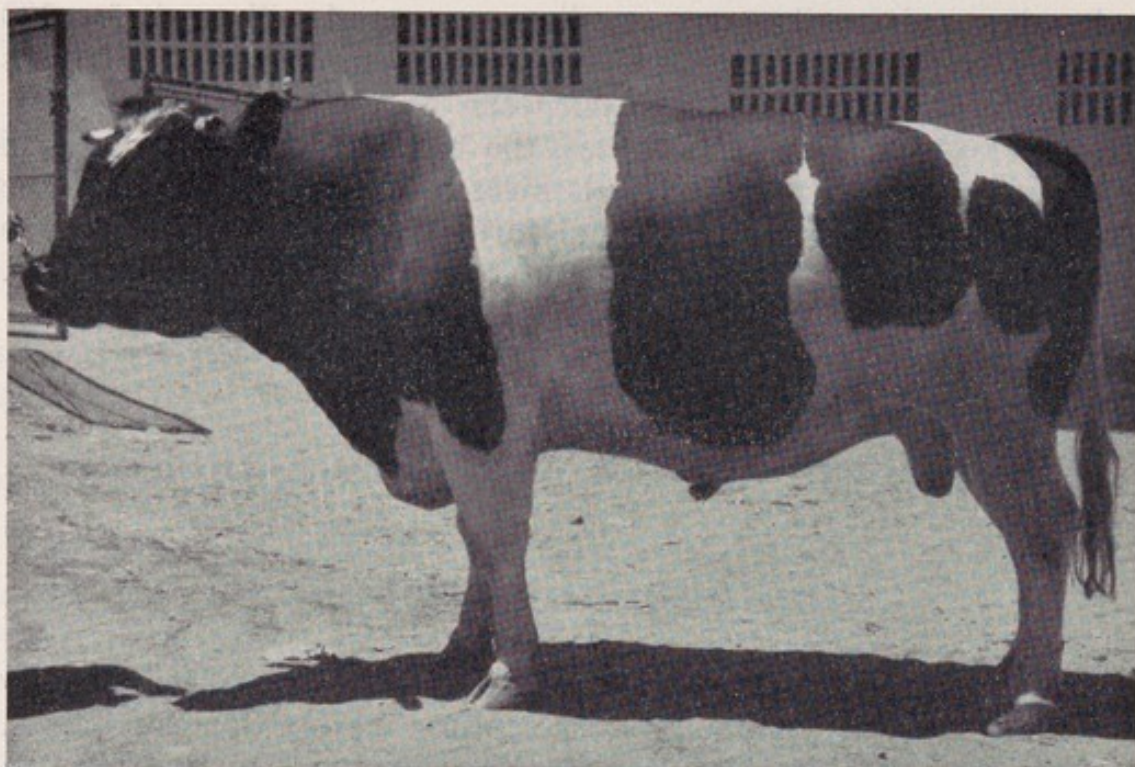


FIGURE 82. — Black and White Lowland bull.

Courtesy Archives Ministry of Agriculture, Madrid



FIGURE 83. — Black and White Lowland cow.

Courtesy Archives Ministry of Agriculture, Madrid

tions are suitable for managing high-producing dairy stock. The breed is also found further south and particularly in the environs of the larger cities where feed is grown under irrigation and where the sale price of milk offers sufficient inducement for the purchase and balancing of feeds.

The Spanish "Holandesas" do not have the same body development nor milk production levels as are achieved in the Netherlands and other developed European countries, largely because feeding and management are not so intensive nor efficient. A herd average of 3,000 to 3,500 kilograms of milk is considered good, especially as it is higher than can be produced by local breeds under similar circumstances.

Brown Swiss **(Schwyz Española)**

Most foundation stock of this breed were imported from Switzerland between 1880 and 1910 but the earliest introductions were made about 1850 and are still continuing. The largest numbers are also found in the north, in the provinces of Oviedo and Gerona. Even in the best districts, this breed has not been able to compete with the Friesian but it has been widely used to grade up Spanish stock, particularly with the Asturian, Leonese and Tudanca breeds. The Brown Swiss adapt more easily than the Friesians to adverse conditions and have consequently found considerable favor in Spain.

Simmental

This breed has been imported over a long period of years and has been used particularly in Galicia. Considerable crossing has also taken place with the local Rubia Gallega breed but the experience with Simmentals has been less favorable than with the Brown Swiss breed.

Fighting bull **(Toro de lidia)**

ORIGIN

The breed probably stems from one of the earlier forms which inhabited Andalusia and from which the modern Black Andalusian cattle have also been derived.

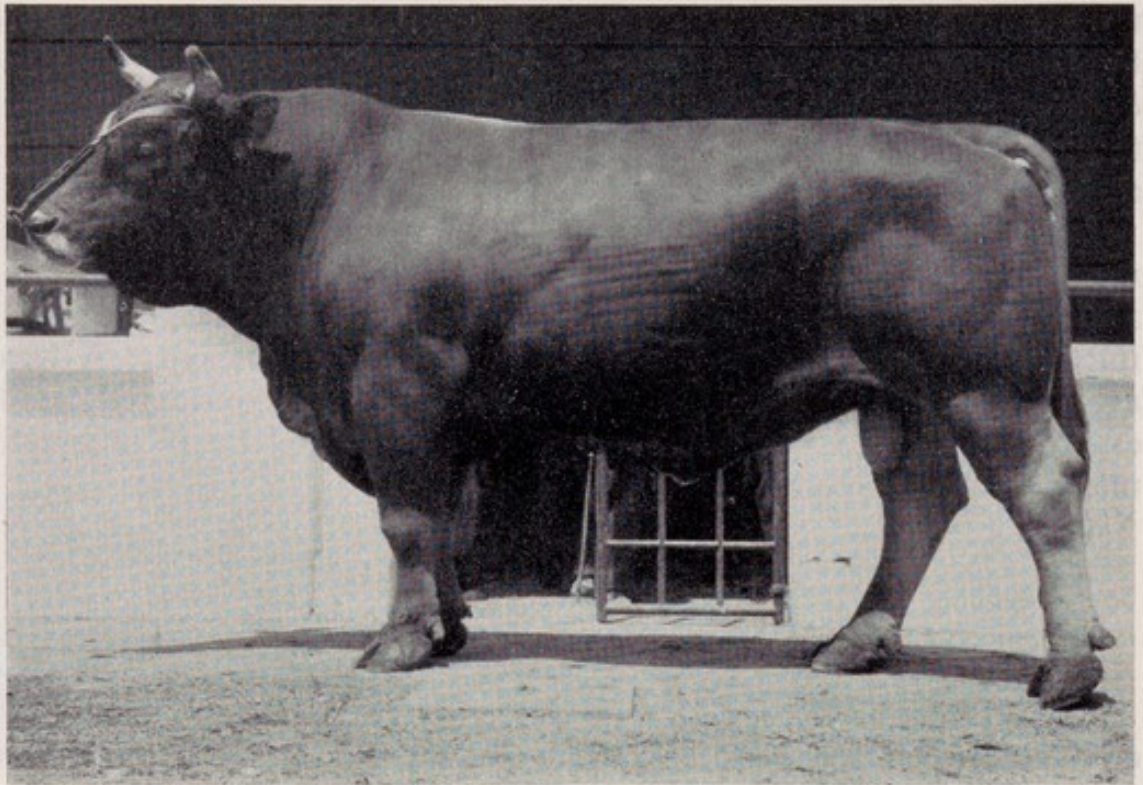


FIGURE 84. — Brown Swiss bull.

Courtesy Archives Ministry of Agriculture, Madrid

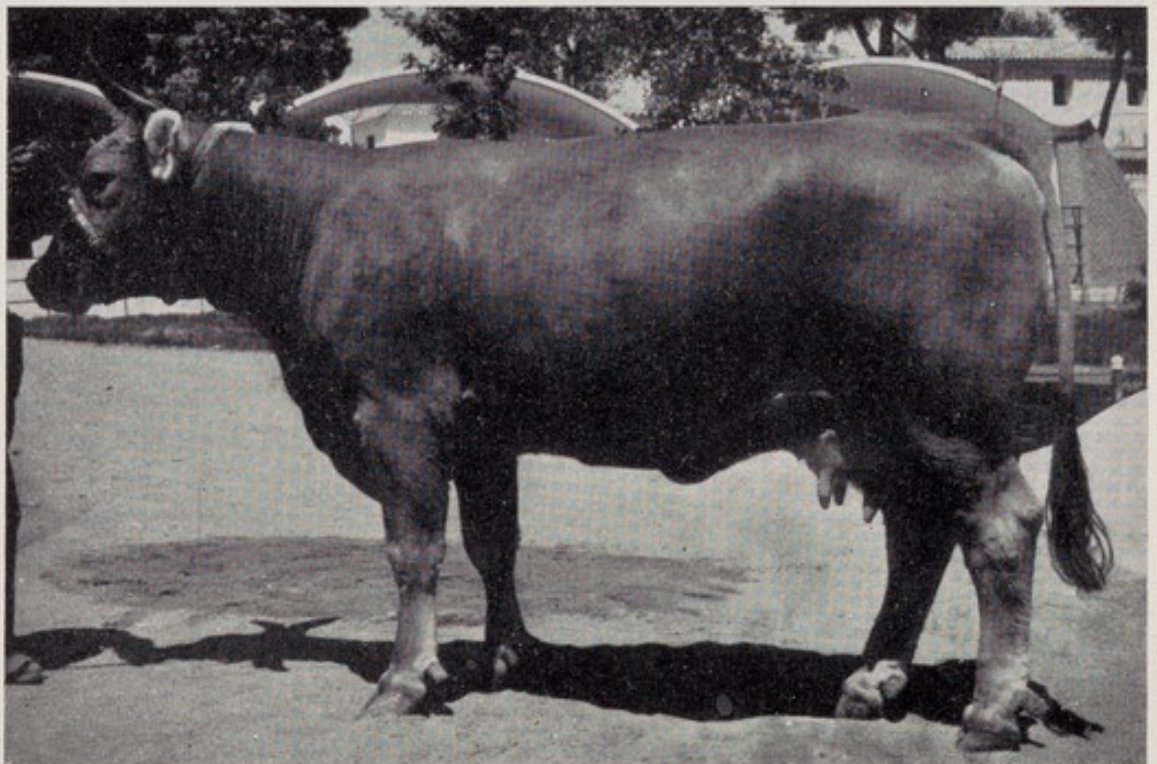


FIGURE 85. — Brown Swiss cow.

Courtesy Archives Ministry of Agriculture, Madrid



FIGURE 86. — Fighting bull.

Courtesy de Regueral

FIGURE 87. — Fighting bull.

Courtesy de Regueral

LOCATION, TOPOGRAPHY AND SOILS

In the provinces along the northern, eastern and southeastern boundaries of Spain, the Fighting Bull breed is not reared except in the province of Navarra. It is found in scattered areas from Zagarosa to the southern tip of Tarifa and from the Portuguese border to roughly the longitude of Albacete. The breeding estates are probably most frequent around Madrid, Salamanca and Seville. It is found on sedimentary soils, in the central mountainous regions and on the Andalusian plains.

CLIMATE

The climatic conditions naturally vary appreciably with locality and altitude but may be represented by the data from Madrid in Table 72, although reference to Tables 65 and 66 will give further information.

TABLE 72. - AVERAGE CLIMATIC CONDITIONS FOR THE FIGHTING BULL BREED

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature(°C)	4.4	6.1	8.9	12.2	15.6	20.0	23.3	23.3	19.4	13.9	8.3	5.6
Rainfall (mm)	28	43	43	45	38	30	10	8	30	48	56	41

FEEDING AND MANAGEMENT

The cows calve in the open, in isolated and hidden spots, even in winter, and the calves run with their mothers until weaning at 8 months of age. The calves are branded and separated according to sex and subsequently graded by testing their reactions to assault and annoyance. The faint-hearted are eliminated from the future breeding or fighting groups. They are then run in herds to find their own feed, on what are often sparse grazings, until 3 years of age. The bulls are again tested for their dynamic and energetic propensities and their reaction to annoyance. Those which are not satisfactory are reared for beef but those chosen for fighting are given better pastures, sometimes supplemented in winter with grains and other feeds and, as they approach their fifth year, are brought into the necessary lean and muscular condition for combat.

PHYSICAL CHARACTERS

A decided difference between sexes is a characteristic of this race, but as selection is made for bravery, aggressiveness, a marked

defensive attitude, impetuosity, persistence, rapidity of movement, strength and vigor, considerable variation in physical characters is the normal rule. In fact, the morphological and color details, so specifically required by other Breed Societies, are subservient to the identification of bravery, strength and aggressiveness, particularly when provoked. Colors consequently vary from grays, white patched, brindled, roans, reds, chestnuts and blacks.

The head is relatively short, with a small face, profile straight or slightly concave, a fringed poll and a convex forehead. The horns curve outward from the head and then forward and upward. The neck is short and muscular, the body cylindrical, the chest is deep and the ribs well sprung. The body is very long and high at the withers but may dip somewhat in the loin region before rising to the sacrum. The hindquarters are proportionally short and may be level or drop to the tail head. The legs are strong but rather fine in the bone. The mucus membranes, body extremities and muzzle are usually black, as are the horn tips and hooves.

Mature bulls weigh 600 to 700 kilograms, while cows scale 300 to 400 kilograms. The birth weight of calves is only 20 to 25 kilograms.

FUNCTIONAL CHARACTERISTICS

This breed has been preserved only for its fighting ability and all other characteristics are subservient to this. Even the breeding females must have passed a test for bravery and aggressiveness and cows, with calves, can be approached only with care because they resent intrusion and their reactions are rapid and fierce. Many cows calve only every other year.

The males which possess the necessary vigor and aggressiveness are destined for the bull ring. The more timid and docile animals of both sexes are weeded out at special tests and are eventually sold for beef. The carcass yields are often surprisingly good and may reach 60 percent, but the carcass contains a high proportion of fore-end cuts which are of lower culinary quality.

BREED ORGANIZATION

The "Unión de criadores de toros de lidia" disappeared during the war and was later replaced by the "Subgrupo de criadores de toros de lidia" within the Sindicato Vertical de Ganadería. The subgroup is divided into three zones, central, south and Salamanca, and breeders may be classified into various categories for

registration purposes, according to the standard of the rings in which the bulls may fight.

It is not easy to secure reliable data on the numbers of this breed but some 7,500 bulls are used annually in the recognized rings in Spain and the total population is probably around 70,000 animals.

ITALY

Italy, which ranges from 37° to 47° north of the equator, comprises a northern area joined to the European Massif Central and a peninsula jutting out into the Mediterranean. As would be expected, soil types vary significantly from north to south and soil fertility differs appreciably between the mountain slopes, the lower hills and the rich valley plains. The Alpine arc, bordering Italy along the frontiers with Switzerland and Austria, spreads southward in a number of mountain ridges which reach to Aosta, Como, Bergamo, Verona, Belluno and to within 20 to 30 kilometers of Udine. Altitudes in this northern region vary from valley bottoms at about 200 meters to mountain peaks reaching up to around 4,000 meters.

Further south is the very fertile plain drained by the Po and the peninsula, with its backbone of the Apennine mountain chain intersected by valleys and areas of low hills. The shallow soils in these lower regions are less fertile than in the Po valley, while the rainfall distribution and quantity are less favorable for agricultural purposes. As would be anticipated, the climate in the north of Italy approximates to the continental type, while on the peninsula it is typically Mediterranean. Yet, in spite of these generalities, the varied topography gives rise to many distinct local climates and creates surprising differences even within short distances.

The cultivation possibilities can be very diverse, the grazing conditions are equally varied, and it is not surprising that a relatively large number of local cattle breeds are to be encountered, in spite of the amalgamations between breeds that have taken place in the last hundred years due to improved communications, a better knowledge of husbandry, and increasing purchasing power of the large populations which have developed in the main consuming centers.

Whereas cattle were often essentially working breeds which were slowly changed to meat and work, or to milk, meat and work-

producing entities, the rising standards of living in this century have stimulated milk production for liquid milk rather than for butter or cheese production. While the demand for work oxen still remained fairly pressing, there was a great development of the Brown Swiss breed but, as the tractor has displaced the ox for farm work at lower altitudes, more recently the swing has been to the Friesian. As a result, whereas the Brown Swiss are found in all Italian provinces, the Friesian is still relatively unimportant in four (Aosta, Sondrio, Bolzano and Belluno), although its numbers are slowly overtaking those of the Brown Swiss.

TABLE 73. — PERCENTAGE OF DIFFERENT BREEDS IN THE ITALIAN CATTLE POPULATION

Breeds	Percentage
DAIRY	
Brown Swiss	21.0
Friesian	15.5
Red and White Valdostana	1.5
Black and White Valdostana	0.1
Rendena	0.1
Burlina	0.1
DUAL-PURPOSE MEAT/WORK BREEDS	
Romagna	6.7
Chiana	6.0
Marche	8.1
Maremma	1.1
Pugliese	1.8
TRIPLE-PURPOSE MEAT/MILK/WORK BREEDS	
Piedmont	7.6
Grey Alpine	3.4
Modena	1.6
Simmental	2.8
Reggio	1.2
Modica	1.4
Grey Adige	0.5
Pinzgau	0.5
White Tortona	0.5
Pontremoli	0.1
Garfagnana	0.3
Pisa	0.1
Tarine	0.1
Modico-Sardinian	0.3
Sardinian	0.3
Other breeds and crosses	17.3

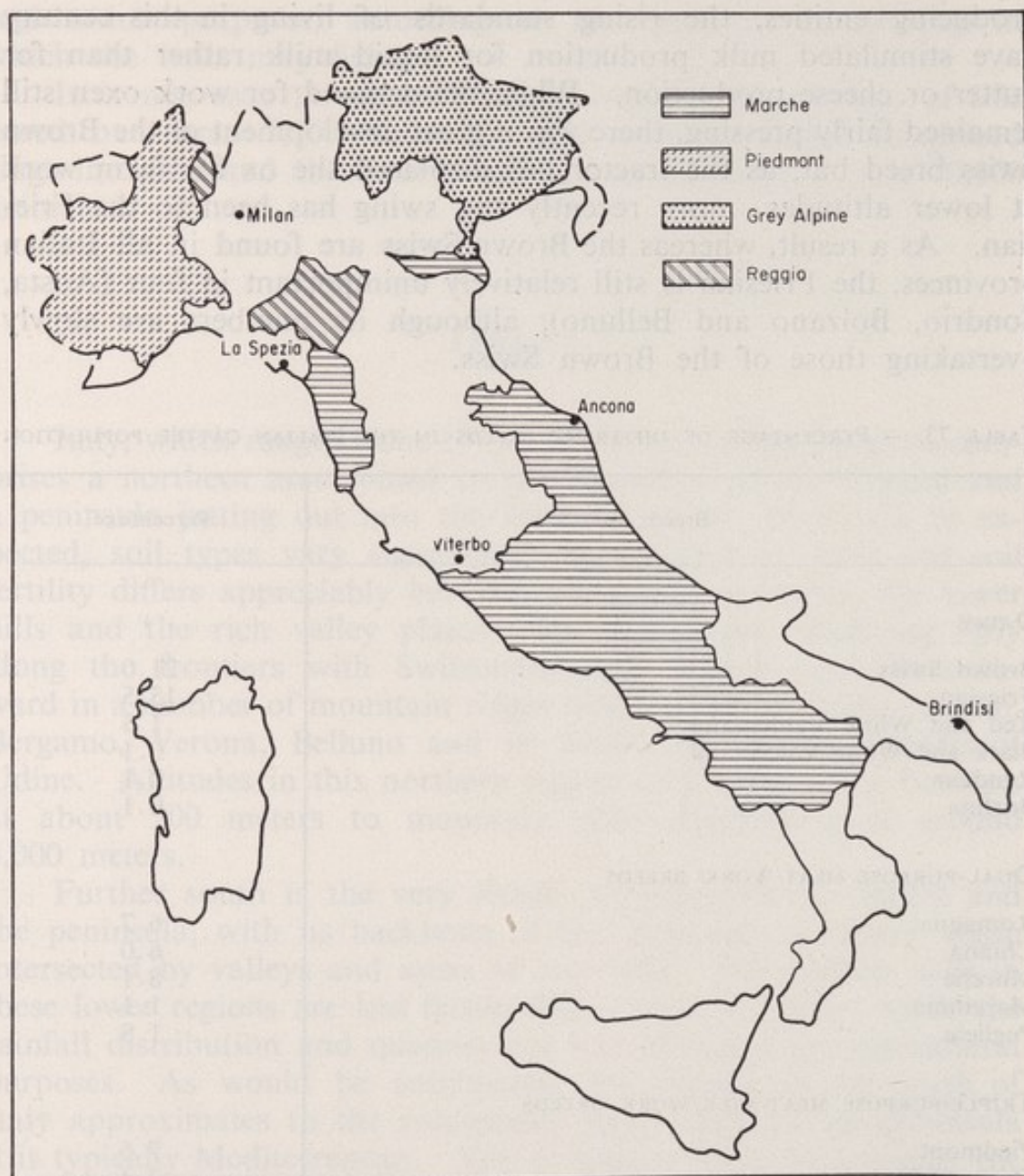


FIGURE 88 (A). — Distribution of Italian cattle breeds.

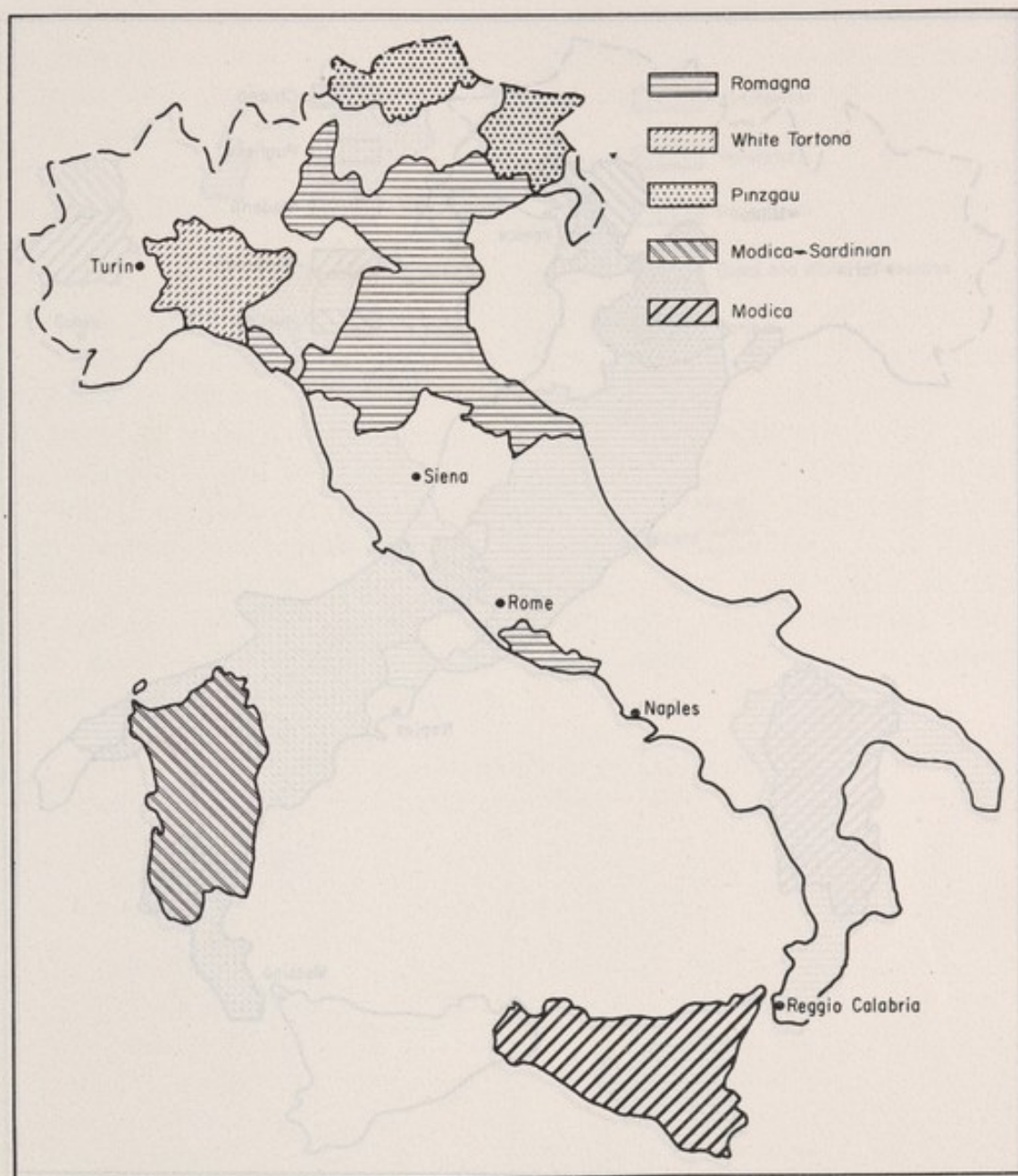


FIGURE 88 (B). — Distribution of Italian cattle breeds (*continued*).

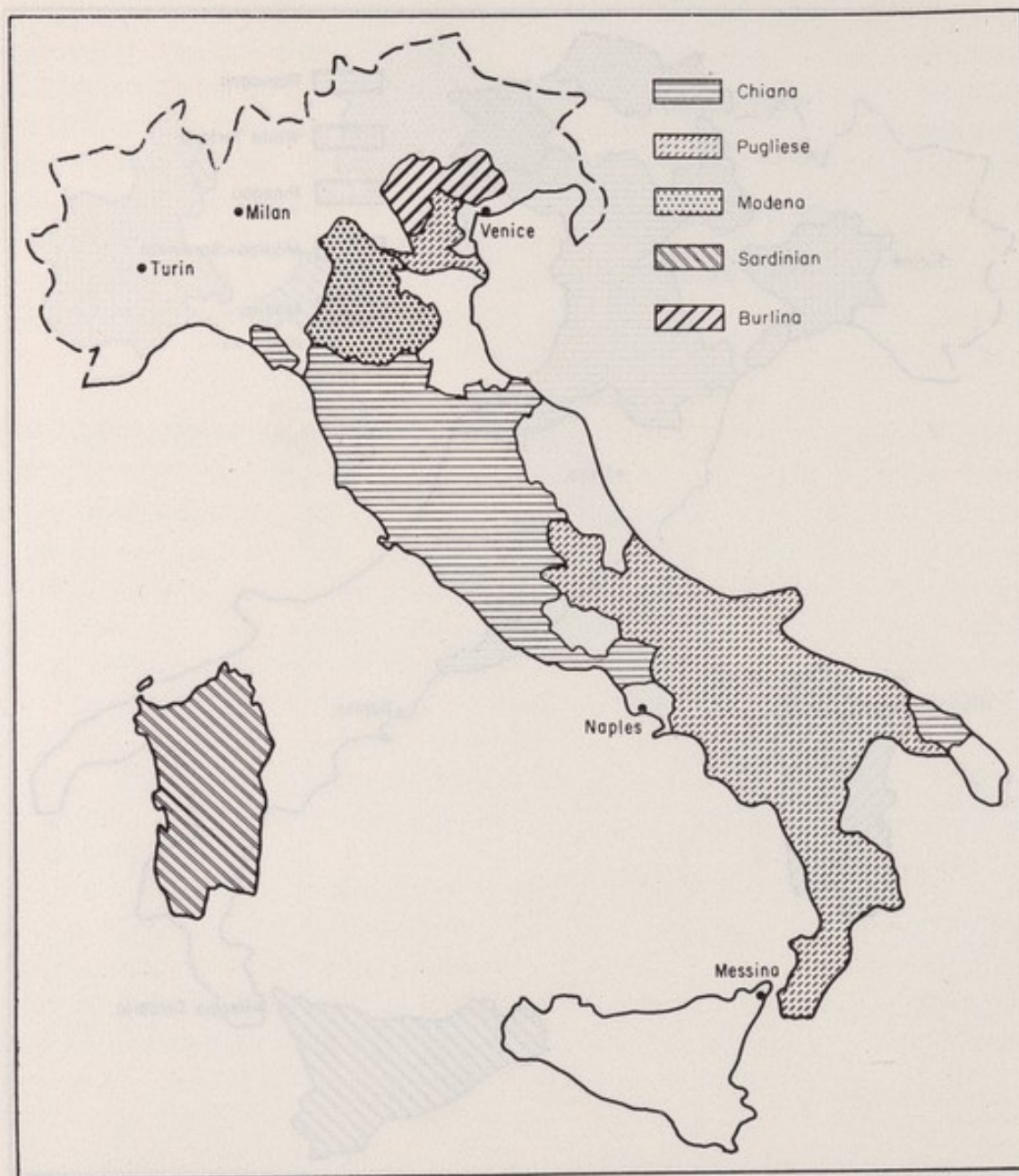


FIGURE 88 (C). — Distribution of Italian cattle breeds (*continued*).

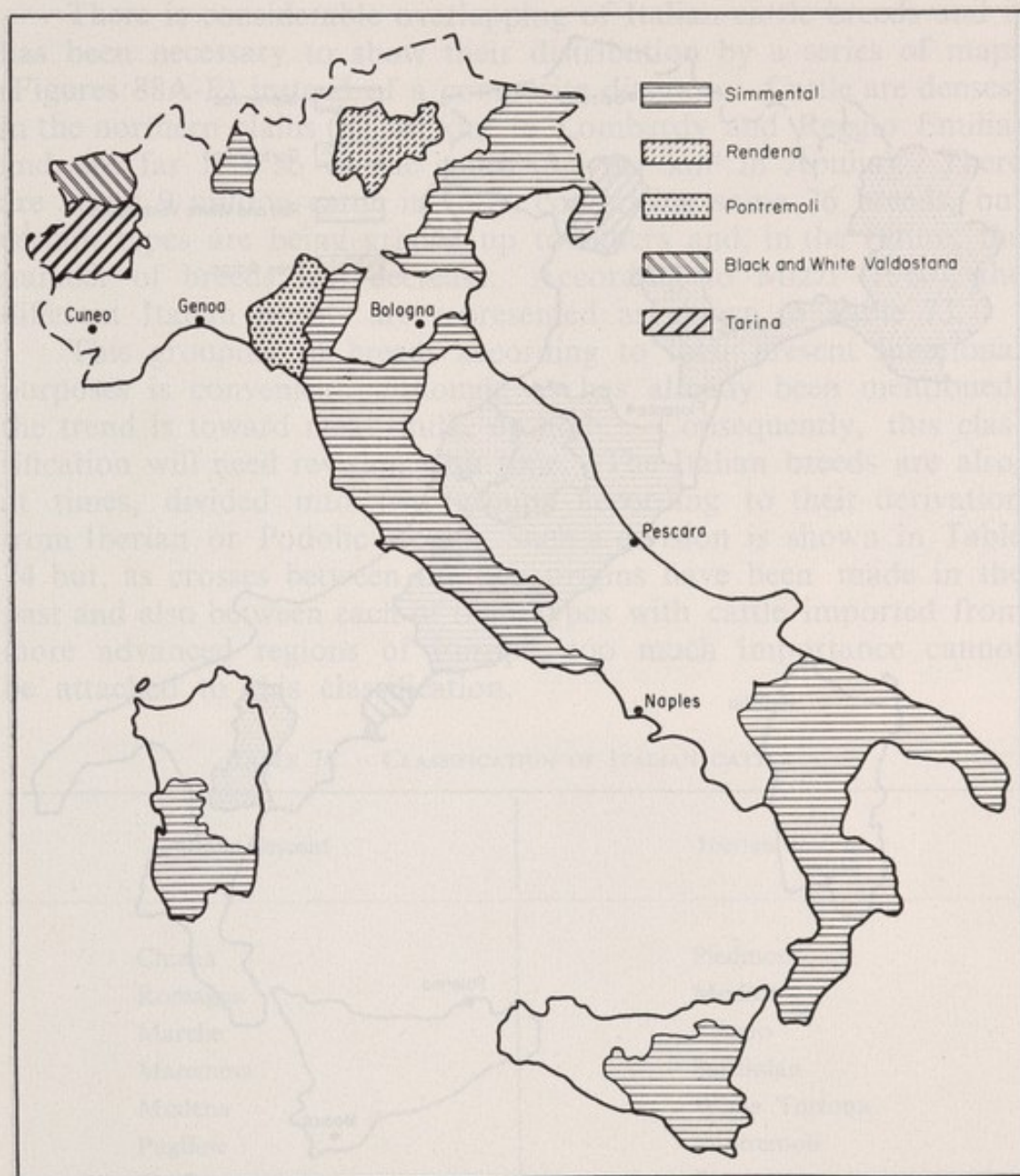


FIGURE 88 (D). — Distribution of Italian cattle breeds (*continued*).

As will be seen from the breed descriptions which follow, many Italian cattle have been significantly influenced by imported Swiss and Austrian mountain breeds, and considerable points of resemblance are obvious. Although not descended from their small numbers of their respective breeds, a number of Jersey, Guernsey and Red Danish cattle have been imported, but so far these have not exerted any significant influence on the Italian cattle population.

Breeders' Associations have been established for more important Italian breeds and Herdbook recording and performance tests

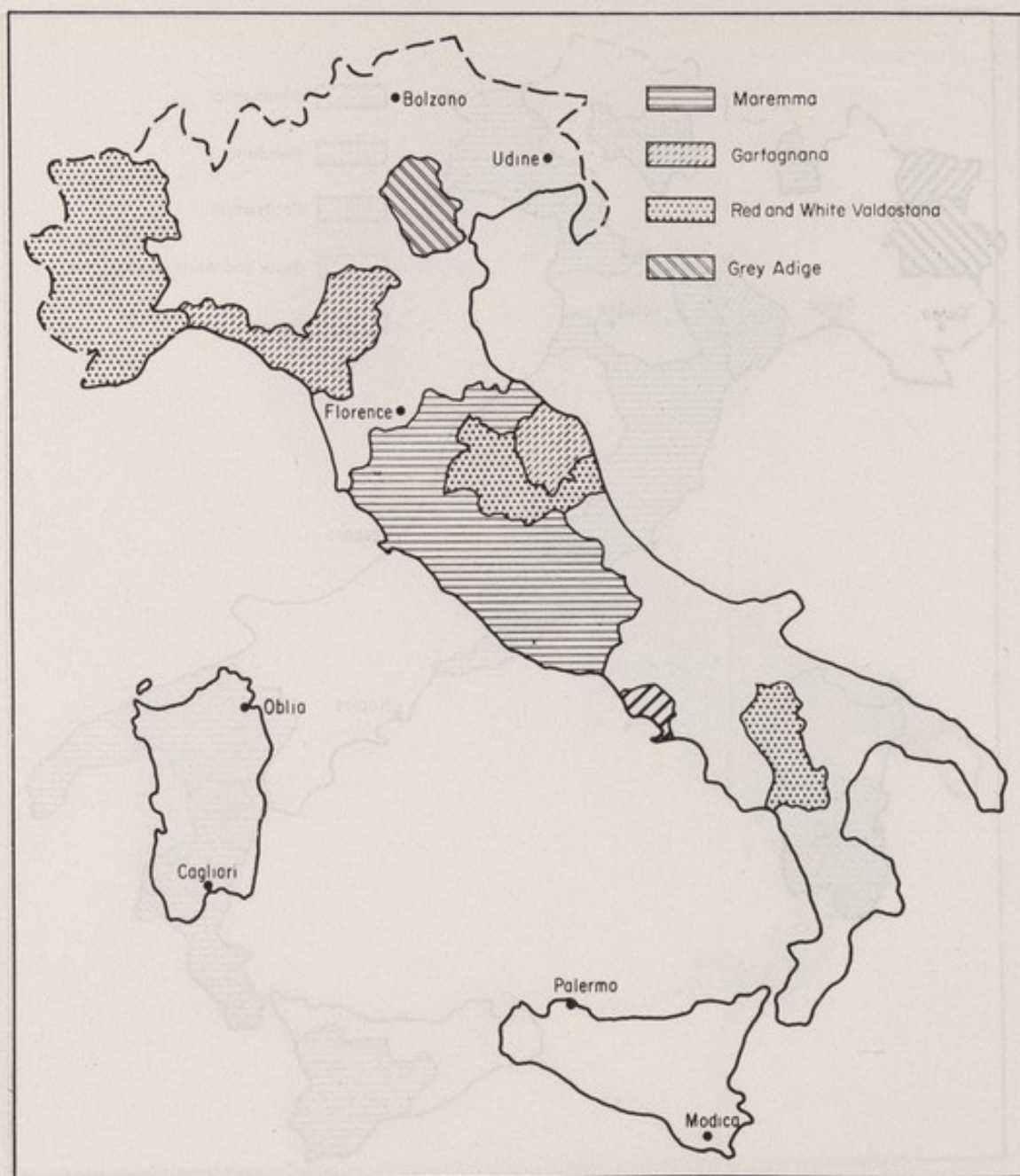


FIGURE 88 (E). — Distribution of Italian cattle breeds (*concluded*).

There is considerable overlapping of Italian cattle breeds and it has been necessary to show their distribution by a series of maps (Figures 88A-E) instead of a composite diagram. Cattle are densest in the northern plains (69 per km² in Lombardy and Reggio Emilia) and are far less so in the south (5.5 per km² in Apulia). There are about 9 million cattle in Italy, comprising some 26 breeds, but certain types are being graded up to others and, in the future, the number of breeds will decrease. According to Mizzi (1960), the different Italian breeds are represented as shown in Table 73.

This grouping of breeds according to their present functional purposes is convenient, although, as has already been mentioned, the trend is toward meat, milk, or both. Consequently, this classification will need revision with time. The Italian breeds are also, at times, divided into two groups according to their derivation from Iberian or Podolic stock. Such a division is shown in Table 74 but, as crosses between the two origins have been made in the past and also between each of these types with cattle imported from more advanced regions of Europe, too much importance cannot be attached to this classification.

TABLE 74. - CLASSIFICATION OF ITALIAN CATTLE

Podolic descent	Iberian descent
Chiana	Piedmont
Romagna	Modica
Marche	Reggio
Maremma	Sardinian
Modena	White Tortona
Pugliese	Pontremoli
Garfagnana	Pisa

As will be seen from the breed descriptions which follow, many Italian cattle have been significantly influenced by imported Swiss and Austrian mountain breeds, and considerable points of resemblance are obvious. Although not described because of their small numbers or their restricted influence, a number of Jersey, Guernsey and Red Danish cattle have been imported, but so far these have not exerted any significant influence on the Italian cattle population.

Breeders' Associations have been established for more important Italian breeds and Herdbook recording and performance tests

are under the supervision of the Ministry of Agriculture and Forests and function through a Technical Committee, with a Central Office for each breed. Recording is compulsory for animals entered in the Herdbook and the Provincial Agricultural Inspectorates supervise these activities. Milk recording and fat testing are carried out in accordance with standard European procedures and bulls may be entered in the Herdbook when 12 months old and cows when they have completed their first recorded lactation.

DAIRY BREEDS

Brown Swiss (Bruna Alpina)

ORIGIN

The Brown Swiss in Italy has been derived from importations of this breed from Switzerland.

LOCATION, TOPOGRAPHY AND SOILS

The breed is now widespread in Italy, Sicily and Sardinia, but over 50 percent of the total population are to be found in the hills and in the rich plains of Lombardy.

CLIMATE

To illustrate the climatic conditions under which the breed is found, Table 75 shows the average monthly data for Venice and Bolzano.

TABLE 75. - AVERAGE CLIMATIC CONDITIONS FOR BROWN SWISS CATTLE IN ITALY

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
VENICE (19 m)												
Temperature (°C)	7.2	8.3	11.1	13.9	16.7	21.1	23.9	23.9	21.1	16.7	12.2	9.0
Rainfall (mm)	35	43	53	56	71	76	46	51	66	69	56	41
BOLZANO (180 m)												
Temperature (°C)	0.0	2.8	7.2	12.8	16.7	20.6	22.2	21.7	17.8	12.2	5.5	1.1
Rainfall (mm)	25	25	43	56	71	81	96	91	71	79	53	33



FIGURE 89. — Brown Swiss bull (Lilien 29062). Dam yielded 6,918 kilograms of milk containing 4.00 percent of butterfat in fourth lactation.

Courtesy Italian Ministry of Agriculture and Forests



FIGURE 90. — Brown Swiss cow (Nina MM 7596). Yielded 4,363 kilograms of milk containing 3.99 percent of butterfat in first lactation.

Courtesy Italian Ministry of Agriculture and Forests

FEEDING AND MANAGEMENT

In the more intensive herds, the management standard is high and the level of feeding on home-grown fodders, supplemented with the essential concentrated feeds, is also very good. On the less intensive farms, there is more dependence on natural meadows, planted fodders, hays, straws, cereals, beet residues, and less reliance on purchased concentrates. On the higher ground, the use of concentrates is even less and the level of productivity suffers in consequence. These animals are grazed in the open for as long as possible but are fed during the winter in stalls and yards.

PHYSICAL CHARACTERS

Brown Swiss cattle in Italy resemble very closely the breed in its native home (see p. 14). Data for physical characteristics are presented in Table 76.

TABLE 76. — AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF BROWN SWISS CATTLE IN ITALY

	Males			Females		
	1 year	2 years	Mature	1 year	2 years	Mature
Liveweight (kg)	270-400	500-650	800-1 200	200-350	350-500	500-700
Body length (cm)	122-135	144-158	166-180	114-125	131-145	148-163
Wither height (cm)	115-120	127-135	142-148	108-114	122-128	125-135
Chest girth (cm)	150-170	180-205	190-240	140-155	160-180	175-200
Chest depth (cm)	55-60	65-74	77-83	46-54	57-65	63-72
Hip width (cm)	38-46	47-54	56-66	36-42	43-50	46-56

FUNCTIONAL CHARACTERISTICS

The functional characteristics of Brown Swiss cattle in Italy resemble those of this breed in Switzerland. The weight at birth of male calves averages 40 to 45 kilograms and of females 35 to 40 kilograms.

Data for average milk production (305 days) given in Table 77 show the variations recorded in 1957 on the good zones of high productivity, on the less intensive units, and on the poorer areas or mountain slopes.

TABLE 77. - AVERAGE LACTATION RECORDS OF BROWN SWISS COWS IN ITALY (1957)

	No. of cows	1st lactation	2nd lactation	3rd lactation and higher	Fat
	 Kilograms			Percentage
Zones of high productivity	4 951	3 349	3 973	4 389	3.75
Less intensive units	146	3 121	3 612	4 345	3.68
Zones of poor productivity	6 216	3 114	3 416	3 726	3.80

SOURCE: *Bollettino del Controllo del Latte e del Grasso* N° 9. 1957.

In 1961, the average yield of 39,004 tested cows of all ages was 3,573 kilograms containing 3.77 percent of butterfat.

BREED ORGANIZATION

Physical characters and minimum standards of production are prescribed for Herdbook registration and approved by the Ministry of Agriculture and Forests. Three categories are maintained depending on the milk yield and are intended to provide for the varying nutritional and management levels encountered in (a) the rich, fertile plains; (b) the less fertile zones; and (c) the less favorable localities such as the mountain regions.

According to data furnished by the ministry (Bonadonna, 1959), there were 3,622,286 Brown Swiss cattle in Italy in 1957. This breed is still the most numerous, although some decrease in its numbers has probably occurred in recent years.

Friesian (Frisona Italiana)

ORIGIN

Although the name "Frisona Italiana" was suggested only in 1951, and the present population stems from Friesians from the Netherlands, Canada and the United States, importations were first made in 1872 and 1874, followed by small additions until 1914. After the first world war, further importations were made and interest in this breed has developed rapidly since the end of the second world war.



FIGURE 91. — Friesian bull (Colosseo 1004). Dam averaged 9,090 kilograms of milk in 8 lactations.

Courtesy Italian Ministry of Agriculture and Forests



FIGURE 92. — Friesian cow (Berta CR 5956). 9-year average: 8,995 kilograms of milk containing 3.75 percent of butterfat.

Courtesy Italian Ministry of Agriculture and Forests

LOCATION, TOPOGRAPHY AND SOILS

Except in the high mountain areas, the Friesian has now spread over the whole of Italy, Sicily and Sardinia. It is found in greater concentrations in the Po valley and in the provinces of Rome, Latina and Salerno.

CLIMATE

With such a wide distribution, it is difficult to cover the climatic conditions in which the Friesian is encountered. Table 78 shows the climatic data for Milan and Rome.

TABLE 78. - AVERAGE CLIMATIC CONDITIONS FOR FRIESIAN CATTLE IN ITALY

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
MILAN (147 m)												
Temperature (°C)	1.3	4.0	8.3	12.9	17.6	21.6	23.8	23.4	19.2	13.1	6.6	4.0
Rainfall (mm)	62	57	71	87	98	82	71	80	87	120	107	77
ROME												
Temperature (°C)	7.0	8.2	10.5	13.7	18.0	21.6	24.5	24.2	20.9	16.5	11.5	8.0
Rainfall (mm)	82	68	73	66	55	40	17	26	64	128	112	98

FEEDING AND MANAGEMENT

Owing to variations in the feedingstuffs available in the different provinces of Italy, standards of feeding vary. In the better herds, the level of nutrition compares with those in other countries, but in the small units and in those which are turning to the Friesian, the owners are not yet fully aware of the need for intensive feeding, so that the Italian Friesian on the average tends to be lighter and carries less meat than its counterpart overseas.

PHYSICAL CHARACTERS

The Italian Friesian conforms closely to the Dutch characters described in Vol. I, p. 201. Table 79 summarizes the liveweights and body measurements.

TABLE 79. - AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF FRIESIAN CATTLE IN ITALY

	Males			Females		
	1 year	2 years	Mature	1 year	2 years	Mature
Liveweight (kg)	300-450	500-800	900-1.300	250-400	360-600	550-900
Body length (cm)	130-145	155-170	175-190	125-140	145-160	152-170
Chest girth (cm)	150-170	185-210	210-245	150-165	175-195	188-210
Chest depth (cm)	57-63	65-75	75-85	55-65	63-72	68-80
Hip width (cm)	40-48	50-60	58-75	35-50	45-55	52-60

FUNCTIONAL CHARACTERISTICS

In Lombardy, where the greatest concentration of Friesians occurs, the lactation records for 1956, for cows which reached the prescribed minimum requirements for the breed are as shown in Table 80.

In 1961, the average milk yield of 51,047 cows of all ages was 4,505 kilograms of milk containing 3.81 percent of butterfat.

Many calves are killed for veal and the carcasses of discarded cows are used for beef.

TABLE 80. - AVERAGE LACTATION RECORDS OF FRIESIAN COWS IN ITALY (1956)

	No. of cows	Milk	Fat
		<i>Kilograms</i>	<i>Percentage</i>
1st lactation	2 690	4 262	3.46
2nd lactation	2 414	4 797	3.52
3rd lactation and higher	5 780	5 105	3.38

BREED ORGANIZATION

The rapid rise in popularity of this breed is seen from the following figures of the Friesian population in Italy.

1908.	68 310
1940.	188 916
1956.	2 047 952

In fact, the Friesian is the second most numerous breed in Italy and is steadily overtaking the Brown Swiss breed. More than 118,000 animals have been registered in the Herdbook.

Red and White Valdostana (Valdostana Pezzata Rossa)

ORIGIN

The Valdostana mountain breed derives from the Red and White European breeds which were originally brought to Italy in the fifth century. It has therefore considerable affinities with the Simmental and Fribourg stock.

LOCATION, TOPOGRAPHY AND SOILS

The breed is spread throughout the northwest of Italy, i.e., Aosta, Piedmont, Turin, Savona, Genoa, Imperia and La Spezia. Smaller numbers are also kept in the provinces of Como, Milan and the region of Lucania.

CLIMATE

To illustrate the climatic conditions in which Red and White Valdostana cattle are found, the data in Table 81 are presented from Imperia and Turin.

TABLE 81. — AVERAGE CLIMATIC CONDITIONS FOR RED AND WHITE VALDOSTANA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
IMPERIA												
Temperature (°C)	9.6	11.0	11.2	13.7	18.8	21.6	24.7	24.5	22.2	17.6	13.8	10.3
Rainfall (mm)	10	41	118	149	70	56	13	25	25	120	174	291
TURIN												
Temperature (°C)	1.7	4.7	8.3	12.6	19.7	22.4	25.6	23.3	20.1	13.1	7.9	2.0
Rainfall (mm)	2	57	56	137	93	112	73	81	47	102	175	95

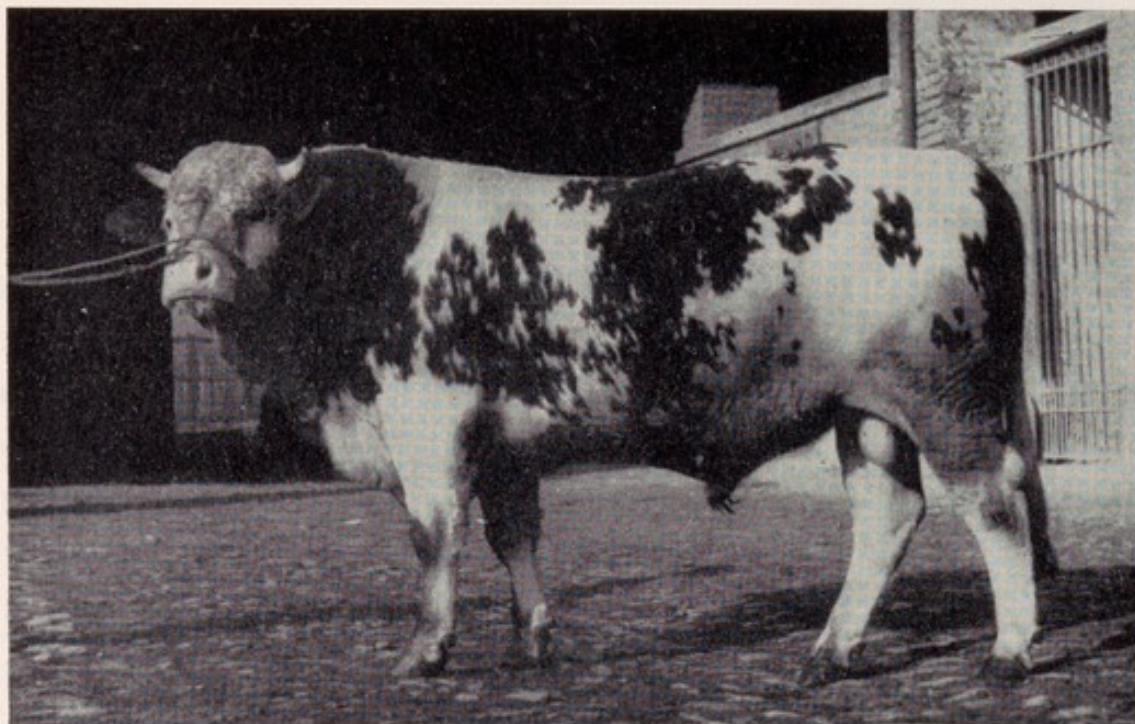


FIGURE 93. — Red and White Valdostana bull (Ruitor 1530). Dam averaged 6,001 kilograms of milk containing 3.69 percent of butterfat in 4 lactations.

Courtesy Italian Ministry of Agriculture and Forests



FIGURE 94. — Red and White Valdostana cow (Dahua 113). Yielded 6,446 kilograms of milk containing 3.70 percent of butterfat in sixth lactation.

Courtesy Italian Ministry of Agriculture and Forests

FEEDING AND MANAGEMENT

The Valdostana is primarily a mountain breed adapted to sparse pastures at high altitudes (2,000 to 2,500 meters). Between 1,000 to 1,500 meters, in the agricultural zone, it lives in the natural summer mountain pastures as well as on the cultivated fodders in the valley bottoms. In winter, the hay is supplemented with cereal and leguminous straws and by-products such as brans. The varying levels of nutrition are naturally reflected in the greater size and better condition of the more satisfactorily maintained animals.

PHYSICAL CHARACTERS

The fine hair is short in animals at lower altitudes but is longer and more "woolly" in cattle in the open during the winter on the mountains. The color varies from red to yellowish red or violet. The head is white, the ears are red (with sometimes a little white in front), the abdomen is also white, as are the neck, the lower parts of the limbs and the tail brush. In addition, white patches of varying sizes are found on the body.

The head is medium to long, with a large forehead and straight profile. The muzzle is broad and the yellowish horns spread out horizontally with the terminal portion turned forward and sometimes upward. The muzzle and the body orifices are pink in color. The thorax is deep and wide, the back is straight and muscular and the underline is roughly parallel to that of the back. The loins and quarters are long and wide but the quarters drop to the sides away from the spinal column, which is often very pronounced near

TABLE 82. - AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF RED AND WHITE VALDOSTANA CATTLE

	Males		Females	
	1 year	Mature	2 years	Mature
Liveweight (kg)	320	650-850	350	400-575
Body length (cm)	132	160-175	137	140-155
Wither height (cm)	108	128-136	115	116-125
Chest girth (cm)	157	180-220	154	166-186
Chest depth (cm)	56	72-80	55	58-68
Hip width (cm)	40	50-58	39	40-48

the tail junction. The udder is large, well attached, covered with fine hair and carries teats of medium size. Table 82 gives details of liveweights and body measurements.

The larger animals are naturally those reared under better nutritional conditions and there has been a marked improvement in body proportions in recent years.

FUNCTIONAL CHARACTERISTICS

Red and White Valdostana cattle are a dual-purpose milk and meat breed. Although lactation records of 3,500 to over 4,000 kilograms are registered with reasonable frequency, the average production of these cows is around 2,300 kilograms in 280 days. The average level is reduced by the cows recorded on the poor feeding conditions at the higher altitudes, while the better herds on the plains yield at least 1,000 kilograms more than the herd average.

The birth weight averages 35 to 40 kilograms and the rate of growth varies with the nutritional level. When the latter is satisfactory, liveweights of 100 to 110 kilograms with a carcass percentage of 62 percent are reached at 3 months of age. Similarly, properly fed males will attain 400 kilograms and females 250 kilograms at the age of one.

This breed has a lively temperament, particularly apparent in the wilder mountain herds, which is encouraged by spring tournaments between cows for the title of "Queen of the Alps."

BREED ORGANIZATION

The Ministry of Agriculture and Forests defined breed standards in 1937, which were revised in 1958 when 1,116 animals were registered in the Herdbook. There were about 125,000 Red and White Valdostana cattle in 1958.

Black and White Valdostana (Valdostana Pezzata Nera)

ORIGIN

Similar to that of the Red and White Valdostana cattle.

LOCATION, TOPOGRAPHY AND SOILS

Black and White Valdostana cattle are found in Aosta and, in some sectors, they outnumber the Red and White breed.



FIGURE 95. — Black and White Valdostana bull (Fecondo), 1¼ years old.

Courtesy Italian Ministry of Agriculture and Forests

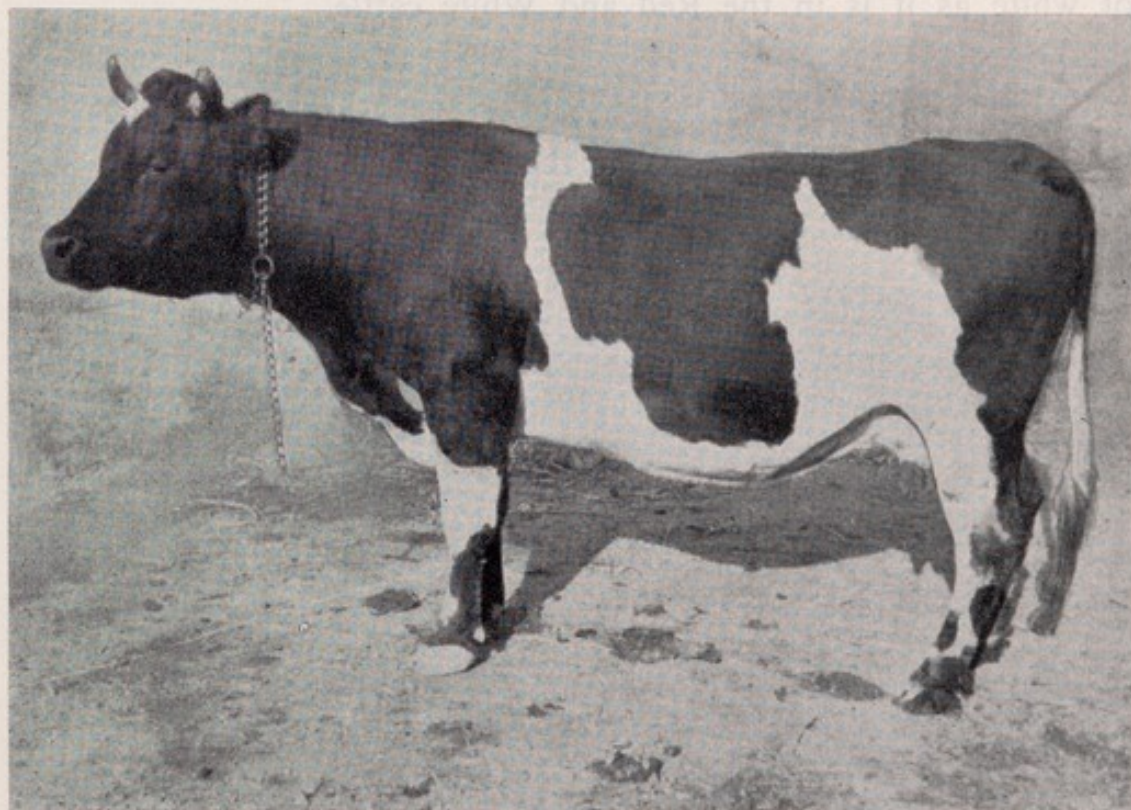


FIGURE 96. — Black and White Valdostana cow (Bella), 5 years old.

Courtesy Italian Ministry of Agriculture and Forests

CLIMATE

The climate of Aosta is summarized in Table 83.

TABLE 83. — AVERAGE CLIMATIC CONDITIONS FOR BLACK AND WHITE VALDOSTANA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	1.6	6.3	7.1	10.5	15.8	18.7	21.2	20.1	16.8	11.0	5.9	2.8
Rainfall (mm)	38	12	18	64	58	47	25	40	14	68	58	82

FEEDING AND MANAGEMENT

Similar to that described for the Red and White breed (p. 163).

PHYSICAL CHARACTERS

Except for the difference in hair color, the Black and White Valdostana is almost identical with the physical characters of the Red and White breed (p. 163). The main difference is that in this breed the head is black (with a white star on the forehead) and not white as it is in the Red and White cattle.

FUNCTIONAL CHARACTERISTICS

These are also comparable to those of the Red and White Valdostana.

BREED ORGANIZATION

Breed recognition and organization has paralleled that of the Red and White Valdostana. In 1953, there were 17,517 Black and White cattle.

Rendena

ORIGIN

Similar to that of the Brown Swiss (p. 11).

LOCATION, TOPOGRAPHY AND SOILS

The main center of this breed is in the Rendena valley and it is found in the provinces of Padua and Vicenza.

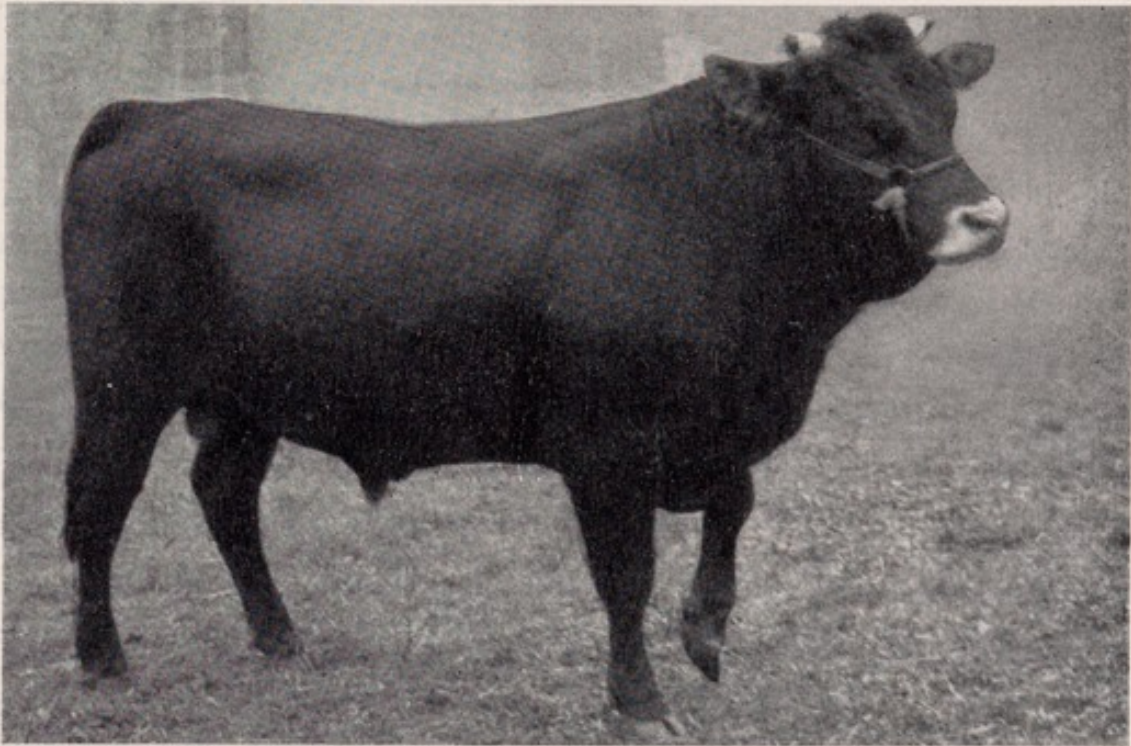


FIGURE 97. — Rendena bull (Conte), 3 years old.

Courtesy Italian Ministry of Agriculture and Forests

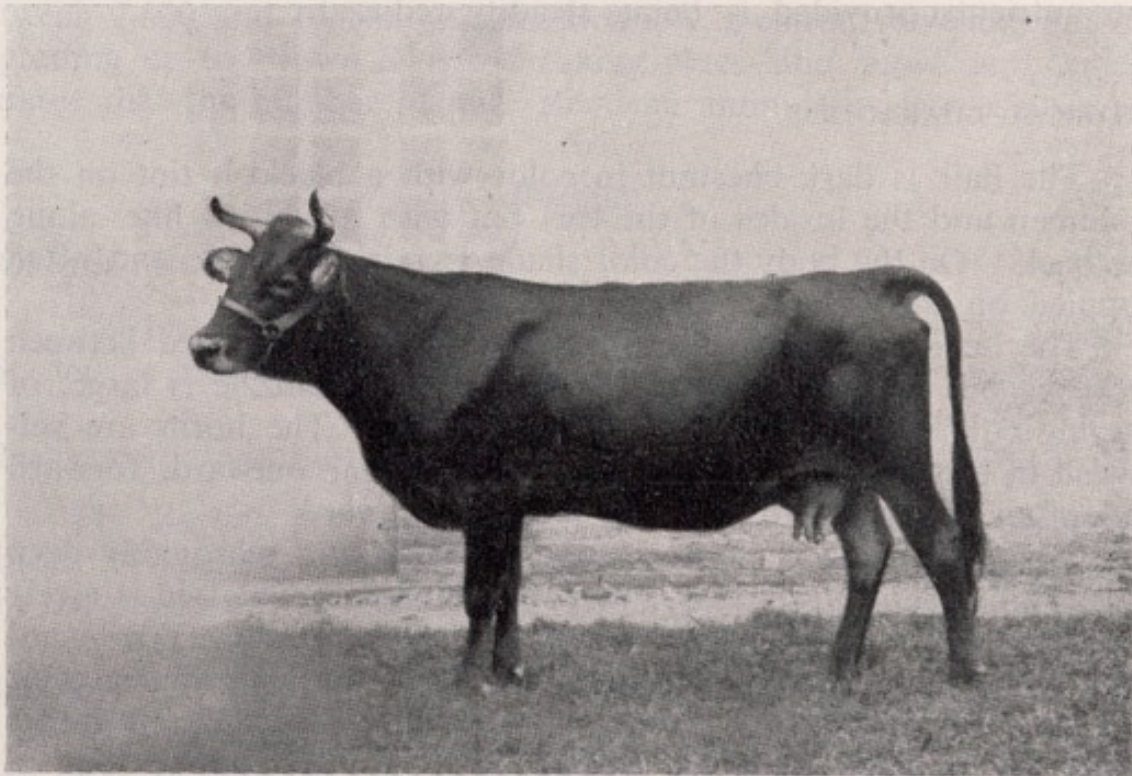


FIGURE 98. — Rendena cow (Maria), 7 years old.

Courtesy Italian Ministry of Agriculture and Forests

CLIMATE

Typical of the climatic conditions in the area of origin of this breed are the data for Tione given in Table 84.

TABLE 84. - AVERAGE CLIMATIC CONDITIONS FOR RENDENA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-2.1	2.9	6.0	9.6	16.0	18.6	21.0	20.0	16.8	11.1	8.2	-0.3
Rainfall (mm)	23	60	93	170	97	97	96	59	61	196	196	171

FEEDING AND MANAGEMENT

The Rendena has long been adapted to mountain conditions, including a shortage of feed in the winter. Naturally, it responds to better feeding and attention is now focusing on its milk potential, although frequently it is crossed with the Brown Swiss to augment its productivity. Under milk-producing conditions, it receives hays, straws and other supplemental feeds, and the management standards are such that the gap between requirements and the nutrients provided is being steadily reduced.

PHYSICAL CHARACTERS

The hair is dark chestnut in color with a blackish tint on the abdomen and the insides of the legs but with a whitish line along the back. On the body the color shade is fairly variable and often dappled on the ribs.

The head is wide in the forehead, fairly long, dished between the eyes but generally straight in profile. The muzzle is large, of varying color, and surrounded by white hair. The horns are yellowish in the base with black ends. They spring outward, forward and often upward, with the tips curled backward.

The body has a fairly straight backline, a reasonably deep chest, well-sprung ribs and a capacious abdomen. The loin is nicely developed and the quarters are long and wide but slope downward from the spinal ridge. The animals are not particularly muscular and the skeleton is not heavily developed. The udder is rather small and irregular in shape and the teats are medium to long in size. The liveweights and body measurements available are shown in Table 85.

TABLE 85. — SOME AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF ADULT RENDENA CATTLE

	Males	Females
Liveweight (kg)	490	370
Body length (cm)	—	145
Wither height (cm)	124	118
Chest girth (cm)	—	166

FUNCTIONAL CHARACTERISTICS

Rendena cattle are used for milk production. Between 1939 and 1941, an average of 2,900 kilograms was recorded by the Trento Agricultural Department and the mean for various herds varied between 2,450 and 2,800 kilograms of milk containing 3.2 to 3.5 percent of butterfat.

BREED ORGANIZATION

The number of Rendena animals is stated variously as between 7,800 and 14,000. Unquestionably, a considerable amount of grading up to Brown Swiss is taking place and most authorities agree that the number of pure Rendena animals is decreasing.

Burlina

ORIGIN

The history of this breed is unknown but, according to V. Chiodi, it derives from the Black and White breeds of northern Europe.

LOCATION, TOPOGRAPHY AND SOILS

The Burlina breed is now found in small numbers in the provinces of Vicenza, Treviso and Verona. It is encountered mainly in the plains but extends up the lower slopes of the mountains.

CLIMATE

The climatic conditions in which Burlina cattle are to be found can be illustrated by the figures from Vicenza in Table 86.



FIGURE 99. — Burlina bull (Trento), 2 years old. 530 kilograms liveweight.

Courtesy Lino Manfrotto

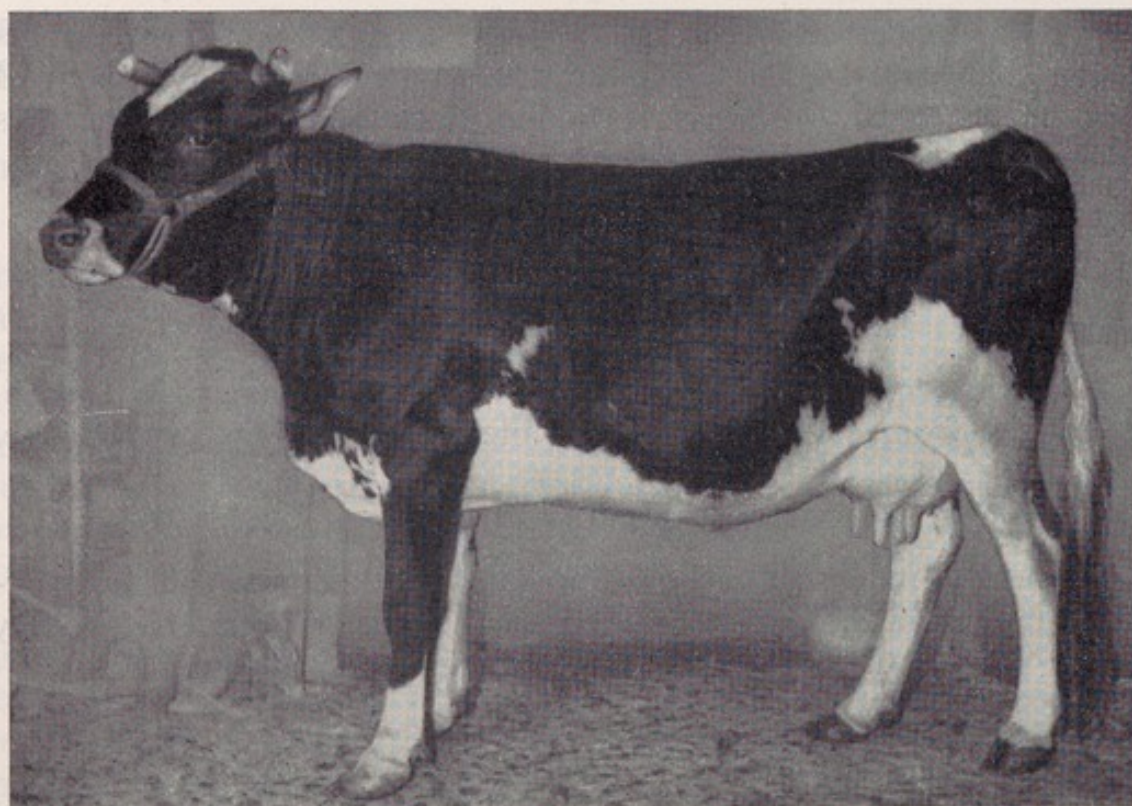


FIGURE 100. — Burlina cow (Alpina), 12 years old. 460 kilograms liveweight. Average lactation: 3,600 kilograms of milk.

Courtesy Italian Ministry of Agriculture and Forests

TABLE 86. — AVERAGE CLIMATIC CONDITIONS FOR BURLINA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	3.4	6.1	9.7	11.7	18.8	21.0	24.2	23.0	17.6	13.8	9.8	3.7
Rainfall (mm)	7	25	34	79	70	99	83	74	26	109	91	76

FEEDING AND MANAGEMENT

Similar to that of the Brown Swiss in Italy (p. 156).

PHYSICAL CHARACTERS

The hair color is black and white with the black covering the larger part of the body. A white star on the forehead is characteristic and, although some white patches may appear on the back and sides, this color is always irregularly distributed on the belly, legs and tail. The hair is short, fine and lustrous. The head is of medium length, concave between the orbital arches and has a large muzzle surrounded by an irregular patch of white hair. The horns spread outward, but curve forward in the male and upward in the female, and are of a yellowish color with black ends in adults.

The body is long and the back is straight. The lumbar region is nicely formed and the hindquarters are rectangular but slope downward from the backbone. The ribs are adequately sprung but body depth is variable. The udder is well shaped, globular, with relatively large teats and is covered with fine, soft hair. Certain physical characters are indicated in Table 87.

TABLE 87. — AVERAGE LIVeweIGHTS AND HEIGHTS OF BURLINA CATTLE

			Liveweight	Height
			<i>Kilograms</i>	<i>Centimeters</i>
Males	}	1 year old	300	112
		2 years old	600	130
		Mature	750	132
Females	}	1 year old	270	—
		2 years old	350	118
		Mature	400	125

FUNCTIONAL CHARACTERISTICS

The breed is maintained largely for its milk production. Bonadonna gives the average yield for mountain cows as 2,500 kilograms per year. For cows in the plains the annual yield is from 2,500 to 3,000 kilograms.

BREED ORGANIZATION

In 1956, there were only 11,283 animals in this breed and there is a continuing tendency to cross the Burlina stock and to grade them up to Brown Swiss or Friesians.

MEAT AND WORK BREEDS

Romagna (Romagnola)

ORIGIN

This ancient Italian breed has developed from crossings between incoming Podolic cattle and local animals and the stabilization of these descendants in the local environment. The Romagna Improved (*gentile*) breed, which has developed in the plains, is larger and more precocious than the Romagna Mountain (*di montagna*) breed, although the latter is the better work animal. The modern improvement of this breed commenced about 1800 with Tosi's acquisition of several fine herds and led to the breed's outstanding success at the Paris International Show in 1900.

LOCATION, TOPOGRAPHY AND SOILS

Romagna cattle are dominant in the provinces of Forli and Ravenna and have spread over the provinces of Bologna, Faenza, Pesaro, Rovigo, Padua and Venice. Oxen are sold to other areas. It is found on the rich lowland soils, on the lower hills, and up the mountain slopes.

CLIMATE

To illustrate the climatic conditions under which this breed is found, Table 88 gives the data for Bologna and Faenza.

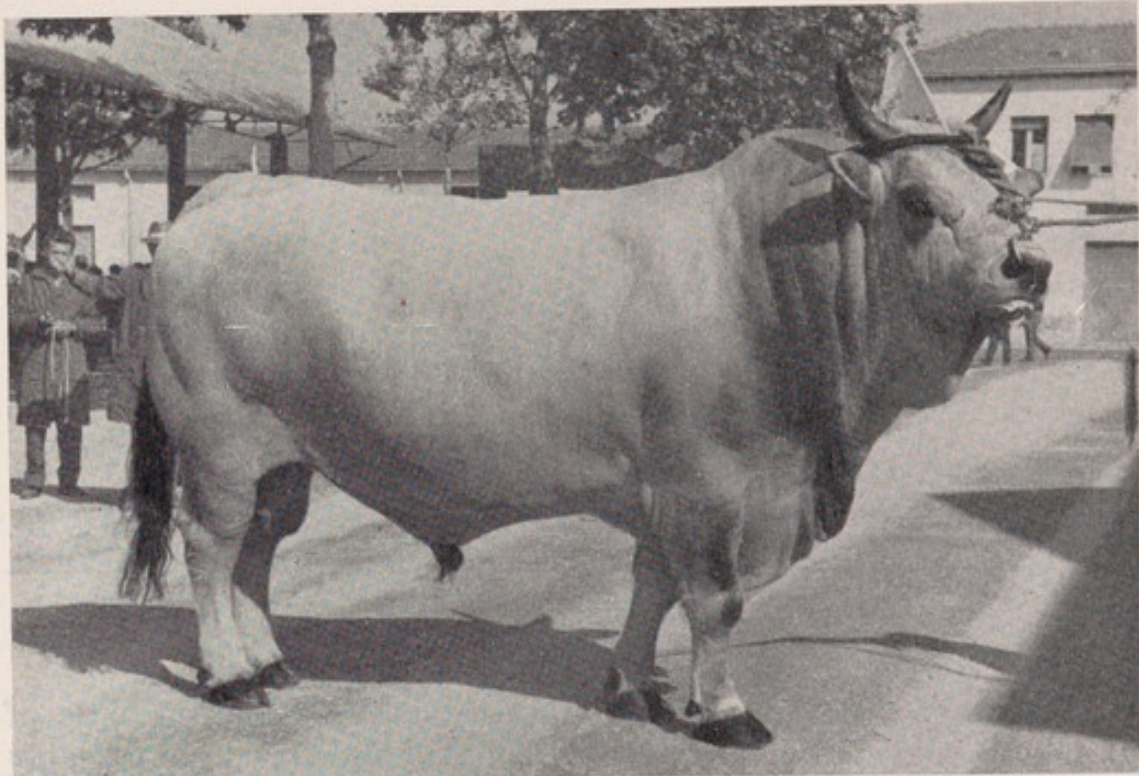


FIGURE 101. — Romagna bull. First-class bull, 5 years old, weighing 600 kilograms liveweight.

Courtesy Tartagni



FIGURE 102. — Romagna cow (Alia). First prize at Rimini Show, 1958.

Courtesy D. Minghini

TABLE 88. - AVERAGE CLIMATIC CONDITIONS FOR ROMAGNA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
BOLOGNA												
Temperature (°C)	3.6	7.0	8.8	12.9	19.3	22.3	25.6	25.5	20.7	15.1	9.3	4.4
Rainfall (mm)	9	32	121	133	66	51	32	62	72	46	155	46
FAENZA												
Temperature (°C)	3.3	7.0	8.4	12.4	18.5	21.3	25.0	24.2	20.0	14.5	9.7	4.8
Rainfall (mm)	26	42	110	119	47	50	20	67	67	30	138	38

FEEDING AND MANAGEMENT

The intensification of agricultural activities in many parts of the area in which Romagna are found has contributed appreciably to the improvement of this breed. The great variety of by-products has raised the nutritional level, particularly in the winter, and allowed the genetic potential to be expressed. These animals are now raised on improved summer pastures and receive hays, straws, cereals and leguminous by-products and concentrates as balancing supplements.

PHYSICAL CHARACTERS

The short, silky hair is gray in color, with darker shades on the neck, shoulders, around the eyes and on the limbs. The color is less dark in the females. The skin is pigmented and the tongue, muzzle and body orifices, tail brush and hooves are black. The skin is pliable, loose and of medium thickness.

The head has a rectilinear profile, broad forehead, relatively short face and a large muzzle. The horns are of medium length, black at first but becoming yellow at the base, with black tips. They spring outward and upward and forward in males but twist back at the tips in the females. The trunk is cylindrical and rectilinear in profile, the chest is deep and the ribs well sprung, the shoulders are muscular, the loins and back are wide and of medium length. The hindquarters are long and wide, sloping downward from the backbone. The legs are relatively short, muscular and nicely boned. Table 89 gives data on liveweights and body measurements of Romagna cattle.

TABLE 89. — SOME AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF ROMAGNA CATTLE

	Males			Females		
	1 year	2 years	Mature	1 year	2 years	Mature
Liveweight (kg)	455	725	1 100	335	500	640
Wither height (cm)	—	146	158	—	136	144

FUNCTIONAL CHARACTERISTICS

Birth weights for males average 46 to 51 kilograms and for females 41 to 45 kilograms. These well-shaped animals have been developed for meat and work purposes, they are robust and healthy, relatively low on the legs when well fed, and very muscular. They are docile and powerful, active and willing workers but yet have an excellent ability for growth, body development and fattening. The muscles are carried well down on the legs so that the carcass proportions are satisfactory. The meat quality is good, being tasty, marbled, tender and with a fine fiber structure. Carcass yields of 58 to 60 percent are obtained for baby beef and 55 to 60 percent for oxen and fat cows.

BREED ORGANIZATION

The Romagna Herdbook was approved by the Ministry of Agriculture and Forests in 1956 when 7,823 animals were registered from a total population of 1,116,128.

Chiana
(Chianina)

ORIGIN

The Chiana is the oldest breed of cattle in Italy and was a sacrificial beast when Rome was at its height in ancient times. It was praised by the georgic poets, Columella and Virgil, and features in remaining Roman sculptures.

Some authorities claim that the Chiana is derived from Podolian stock, while others think it derives from crossings between *Bos taurus primigenius* and *B. taurus brachyceros*, but its origins are so far undetermined.

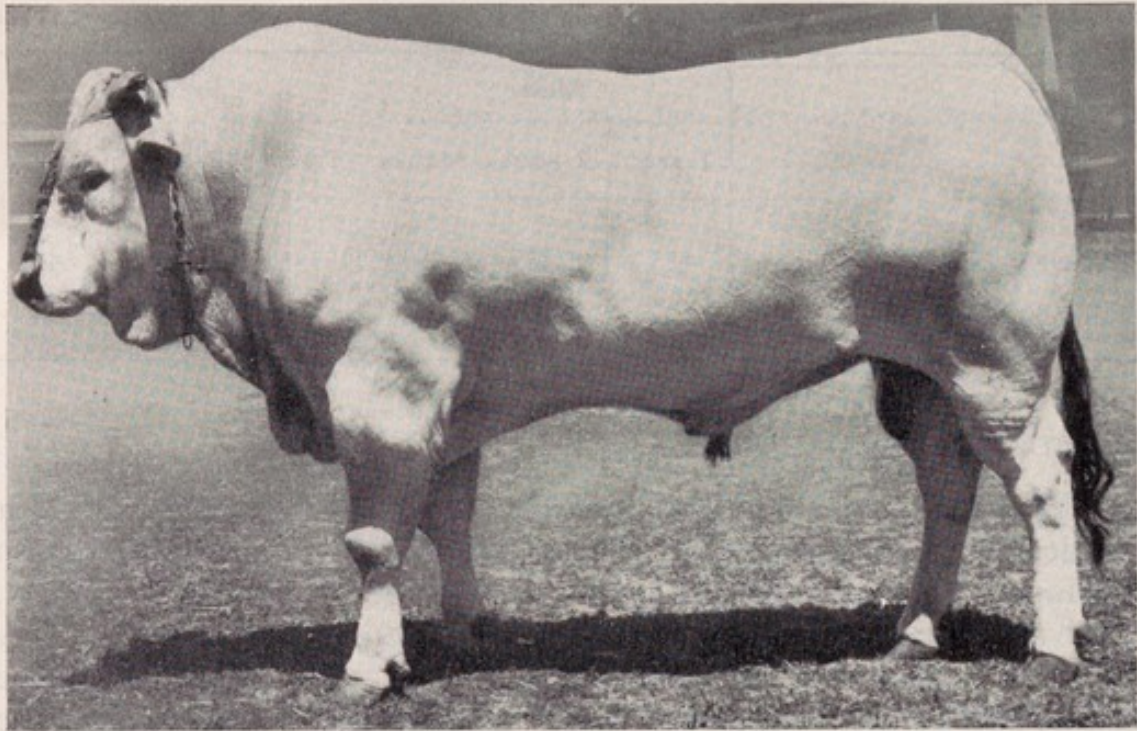


FIGURE 103. — Chiana bull (Lionello 2607 M). 1,650 kilograms liveweight.

Courtesy Grassi

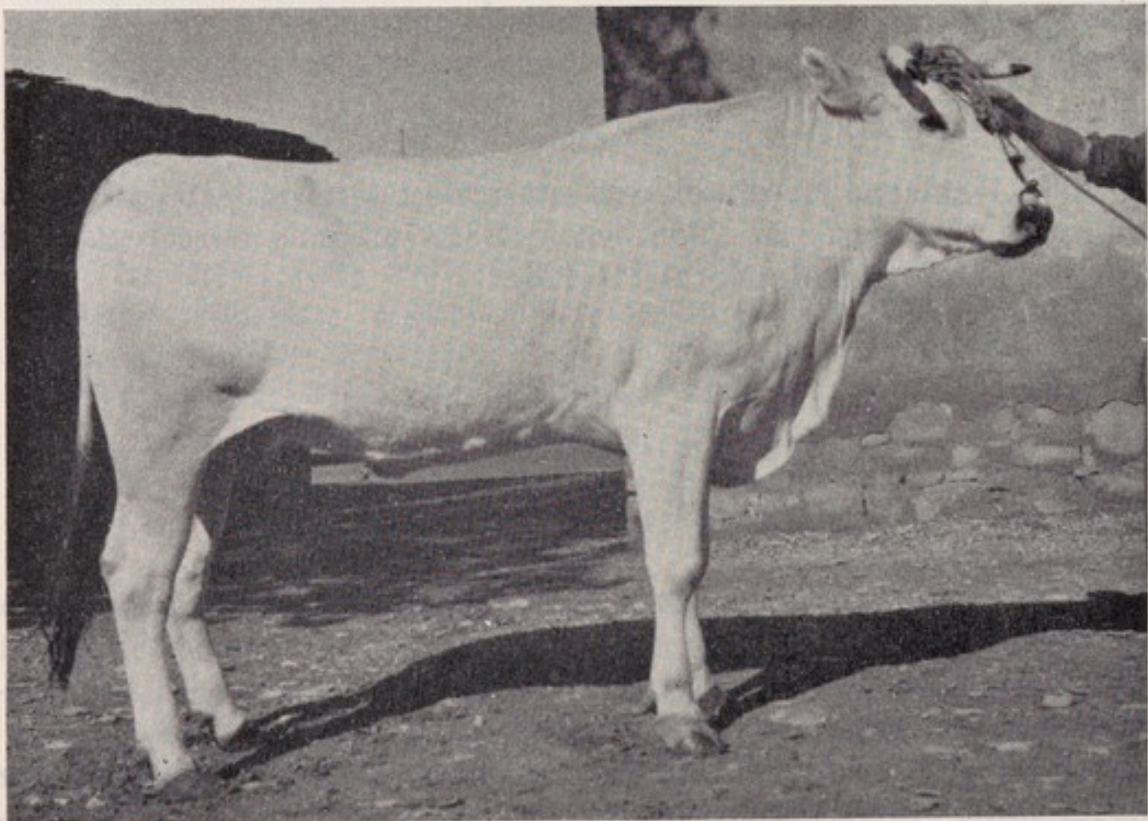


FIGURE 104. — Chiana cow (Dratta 2711), 6 years old. 875 kilograms liveweight.

Courtesy Italian Ministry of Agriculture and Forests

LOCATION, TOPOGRAPHY AND SOILS

The Chiana breed is found in the provinces of Arezzo, Siena, Perugia, Florence and Pisa and has spread into certain parts of Abruzzi and Campania. It is encountered on the plains, hills and mountain slopes over a variety of soil types.

CLIMATE

To illustrate the climatic conditions under which this breed is found, Table 90 gives the data for Pisa and Perugia.

TABLE 90. - AVERAGE CLIMATIC CONDITIONS FOR CHIANA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
PISA												
Temperature (°C)	7.2	8.4	12.1	12.9	17.1	20.7	24.2	23.6	20.4	14.7	11.3	9.6
Rainfall (mm)	80	16	74	68	51	20	7	45	53	57	130	101
PERUGIA												
Temperature	4.5	7.6	10.5	11.2	15.2	19.6	23.3	21.2	17.7	12.9	9.2	7.5
Rainfall (mm)	55	39	77	57	55	65	18	54	70	83	94	85

FEEDING AND MANAGEMENT

There are four phenotypic varieties of Chiana cattle which vary more in accordance with the diverse conditions of feeding and management than with the ambient conditions.

The Val di Chiana, the largest variety, is raised on the plains of Arezzo and Siena. The Valdarno is found on the plains and low hills of Arezzo, Pisa, Siena (excluding the Chiana valley). The Calvana, from Florence, is of reduced body size and conformation owing to its habitat on the mountains — icy in winter and low in forage. The Perugia variety comes from Perugia and, like the Valdarno, is intermediate in size between the Val di Chiana and the Calvana. These differences clearly underline the tremendous influence of the plane of nutrition on body development, a difference which is further accentuated by certain feeding systems employed with confined animals. From the mountain grazings, supplemented with poor winter hays and straws, to the latter intensive

fattening units, there is a wide variety of systems. Grass and legume hays are employed, supplemented with molasses, beans and flours of cereals and legumes, silage, straws, concentrates and special local mixtures concocted from the boiling of ruminal contents, fresh blood, olive residues after pressing, potato peelings and surpluses from the manufacture of human foods.

PHYSICAL CHARACTERS

The soft hair is porcelain white in color. In bulls, however, gray is tolerated in the ears and anterior portions of the body, but in both sexes black hairs are found on the eyelids, eyebrows and the tail brush. The muzzle, the points of the horns and body orifices are black, as are the hooves. The skin is pigmented, supple and easily lifted.

The head has a straight profile, a slightly long face, while the horns are black in young animals but become yellowish white, except at the extremities, after 2 years of age. The horns are short, spread outward from the head and curl forward and slightly upward. The dewlap is well developed and the cylindrical body is large and deep. The shoulders are somewhat higher than the backline, muscular and wide. The back dips slightly in the middle, the loins are long and wide, as are the muscular hindquarters, while the quarters slope downward from the spinal column. The muscular convex thighs are carried down to the hocks. The ribs are well sprung and the chest is deep. The muscular legs are relatively short but strongly boned. As would be expected in a meat/work animal, the udder is often not adequately developed. Certain physical characters are given in Table 91.

TABLE 91. — AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF CHIANA CATTLE

	Males			Females		
	1 year	2years	Mature	1 year	2 years	Mature
Liveweight (kg)	460-680	900-1 000	1 150-1 280	350	550	720-980
Body length (cm)	145	170	200	137	156	190
Wither height (cm)	136-157	155-165	169-172	139-146	144-149	151-166
Chest girth (cm)	—	—	247	—	—	202
Chest depth (cm)	—	—	86	—	—	75
Hip width (cm)	52	59	68	46	51	60

FUNCTIONAL CHARACTERISTICS

Since the tractor has been displacing the demand for work oxen, attention has focused on the beef characters of Chiana cattle. Formerly in all cattles and even now in hill cattle, the legs are rather long, permitting a rapid gait, while the muscularity of the body and the large strong frame give great strength and traction power. The robust constitution and health of these animals is well known and they have earned a reputation for speed of work both in the fields and on the roads. They are willing workers of great stamina, docile but active and have an adaptability to high ambiental temperatures. They can be worked for long hours.

The massive muscularity, and the ability to grow rapidly, make them good beef animals, while the fineness of their muscle fibers, the marbling of their flesh and its tastiness have allowed them to build up a reputation for the quality of their meat. Indoor feeding on intensive rations has proved their high rate of growth, early maturity and their economical conversion rates of feed into meat. Their carcass dressing weights (54 to 61 percent) and the percentage of meat:bone are both very satisfactory.

BREED ORGANIZATION

The Ministry of Agriculture and Forests approved the Herd-book establishment in 1956 when 12,920 animals were inscribed out of a total population of 585,196.

Marche (Marchigiana)

ORIGIN

Marche cattle have been developed as a separate breed during relatively recent years. The indigenous stock have been successively intermixed with the Chiana and the Podolic types (Pugliese and Romagna). In 1933, there were distinguished the Improved Marche (*Marchigiana gentile*) and the less defined mountain types but the latter are being progressively reduced.

LOCATION, TOPOGRAPHY AND SOILS

Marche cattle are found chiefly in the provinces of Ancona, Macerata, Ascoli Piceno, Abruzzi, Benevento, Frosinone, Lazio, Campania and Marche but have a wide distribution in small numbers in other areas.



FIGURE 105. — Marche bull (Minato 212), 2 years old. 936 kilograms liveweight.
Courtesy Italian Ministry of Agriculture and Forests

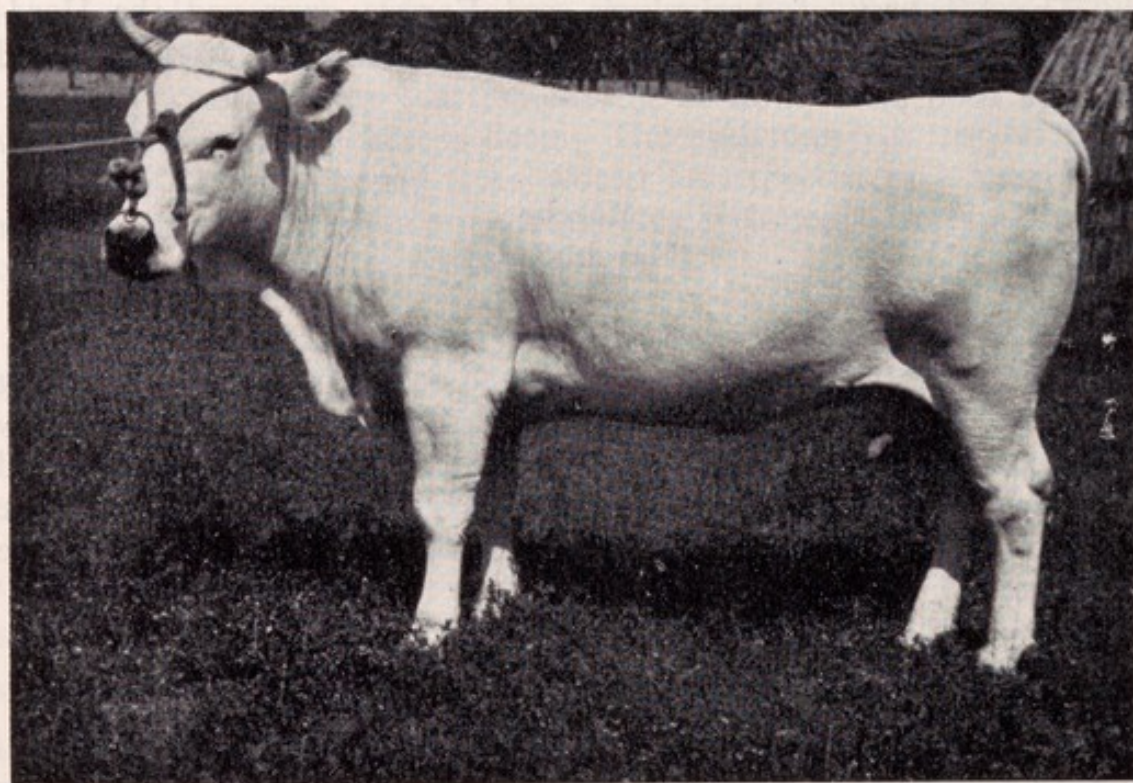


FIGURE 106. — Marche cow (Orata 2706), 2 years old. 683 kilograms liveweight.
Courtesy Italian Ministry of Agriculture and Forests

CLIMATE

To illustrate the climatic conditions under which this breed is found, Table 92 quotes data for Macerata and Aquila.

TABLE 92. — AVERAGE CLIMATIC CONDITIONS FOR MARCHE CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
MACERATA												
Temperature (°C)	5.7	7.0	11.4	13.2	16.3	20.3	24.7	22.2	18.6	13.7	9.5	8.0
Rainfall (mm)	55	22	91	35	60	36	15	51	59	63	45	21
AQUILA												
Temperature (°C)	4.5	6.1	6.7	8.8	15.5	18.2	20.9	21.4	18.0	11.3	9.5	5.2
Rainfall (mm)	53	22	74	80	47	73	23	41	59	59	75	75

FEEDING AND MANAGEMENT

The conditions under which the Marche breed are kept vary appreciably between districts, from the lower plains to the mountain slopes. In some regions, cereal and legume cultivations provide fodder, in others they are dependent largely on natural grazings and hays. Concentrates are used in various forms and quantities, depending on circumstances.

PHYSICAL CHARACTERS

The short hair is light gray in color, in some cases almost white, but is dark in the tail brush, in the ears and on the eyelashes. The skin is pigmented, the tongue, muzzle and external orifices are black. The head is short but wide, with a rectilinear profile. The medium-sized horns, yellowish at the base, white in the middle and black at the ends, are directed laterally but curve forward in the males and upward in the females.

The body is voluminous and cylindrical in shape. It is of medium length with a straight topline. The shoulders are very muscular, the loins and hindquarters are long, the chest is deep and the ribs well sprung. The legs are short, with strong bones, and the muscles of the hindquarters are nicely filled and carried down to the hocks. Some liveweights and body measurements are presented in Table 93.

TABLE 93. — SOME LIVeweIGHTS AND BODY MEASUREMENTS OF MARCHE CATTLE

	Males			Females	
	1 year	2 years	Mature	2 years	Mature
Liveweight (kg)	425–450	750–830	1 100–1 200	480–550	630–680
Wither height (cm)	134	150	160	136	145

FUNCTIONAL CHARACTERISTICS

Marche cattle have been developed for meat production and for work. In recent years, the tractor has reduced the demand for work oxen on the flatter lands and this has led to greater attention and care being devoted to the meat-producing qualities of this breed and to its rate of growth.

The most common and economical system is to produce baby beef at 14 to 16 months of age weighing up to 550 kilograms and with a carcass yield of 60 to 65 percent. Marche cattle have a quiet temperament, an efficient utilization of feed, and respond well to better levels of nutrition and management. Certain superior lines have been selected and multiplied so that the future meat-producing abilities of this breed are well safeguarded.

BREED ORGANIZATION

A Herdbook for this breed was established by the Ministry of Agriculture and Forests in 1957 and there were 9,642 animals registered in that year. The total population at that time was 1,072,000.

Maremma

ORIGIN

The origin of this ancient breed is lost in antiquity and scholars argue whether its ancestors derive from Podolic stock which [migrated from the Asiatic steppes, or whether it has developed *in situ* from *Bos silvestris* in pre-Roman times.

LOCATION, TOPOGRAPHY AND SOILS

The Maremma breed has for thousands of years been found on the lowlands and on the hilly regions of the Tuscan and Latian

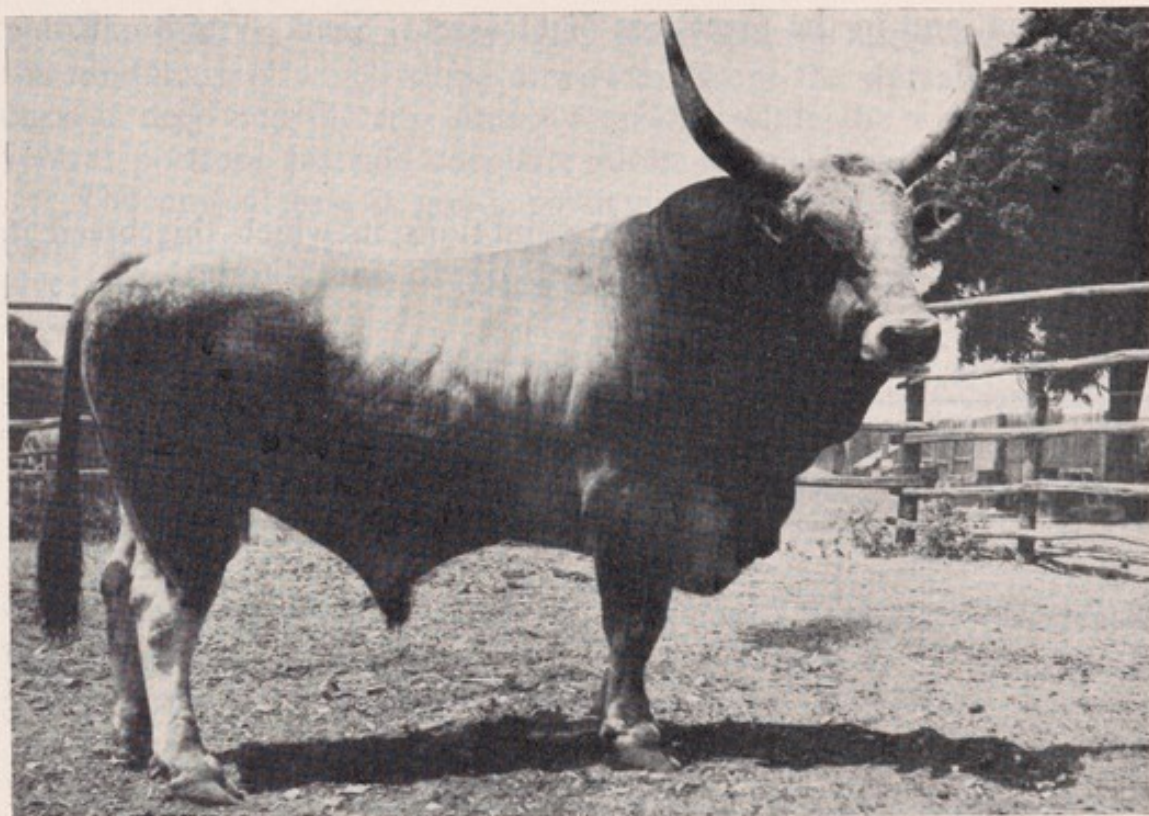


FIGURE 107. — Maremma bull (Barone 110), 4 years old. 1,265 kilograms liveweight.
Courtesy Italian Ministry of Agriculture and Forests

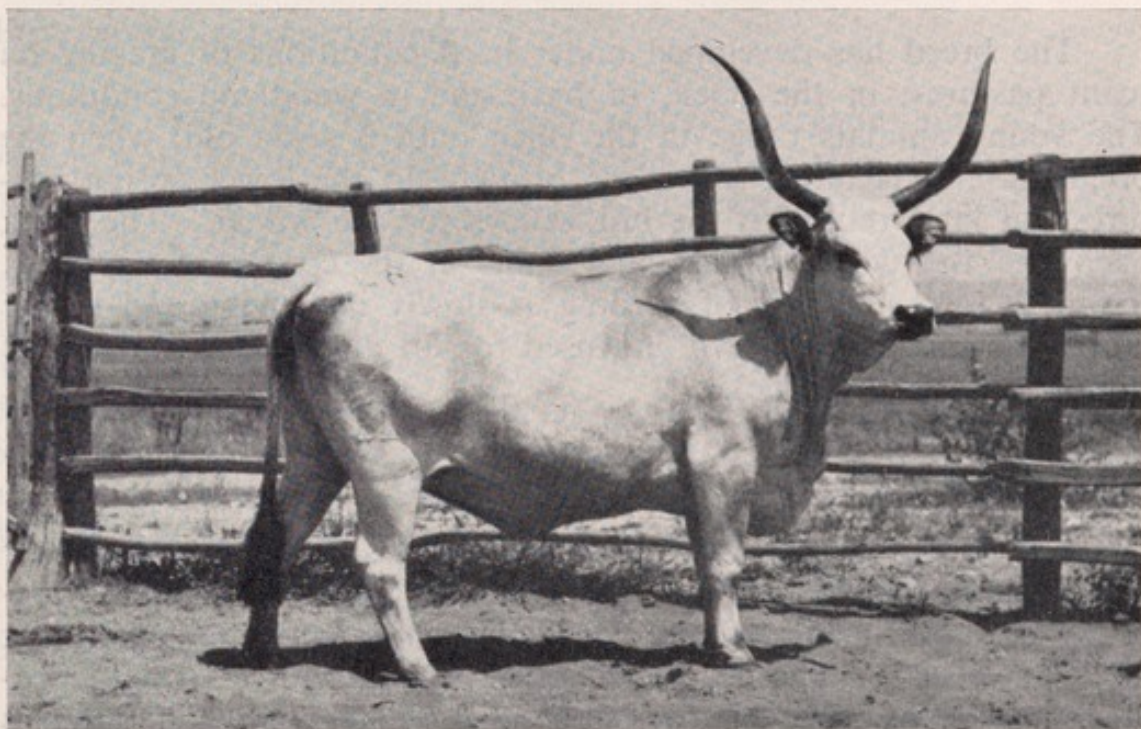


FIGURE 108. — Maremma cow (Tarantola 265), 3 years old. 625 kilograms liveweight.
Courtesy Italian Ministry of Agriculture and Forests

Maremma, and in the provinces of Grosseto, Siena, Viterbo, Rome and Terni.

CLIMATE

As examples of the climatic conditions in which this breed is found, Table 94 gives the data for Grosseto and Viterbo.

TABLE 94. - AVERAGE CLIMATIC CONDITIONS FOR MAREMMA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
GROSSETO												
Temperature (°C)	7.8	9.5	9.9	12.0	17.0	20.6	23.8	24.1	21.2	16.4	12.6	9.2
Rainfall (mm)	37	11	71	78	49	55	18	23	44	52	74	81
VITERBO												
Temperature (°C)	5.4	7.8	8.1	10.3	16.3	19.5	23.6	23.3	20.9	16.4	11.4	6.8
Rainfall (mm)	41	36	133	105	52	32	14	35	67	79	145	125

FEEDING AND MANAGEMENT

The breed has developed under hard conditions of grazing on scant pastures, in the open, in bush and in woodland conditions. The young animals range in the open until 3 years old, when the pregnant and lactating cows are brought to the lower spring pastures but later return to the hill valleys for the winter. The work oxen use the crop residues and some of the conserved hays, but the past low standard of feeding is slowly improving and forage crops are now being grown and used for all animals in some areas (lupins, clovers, lucerne).

PHYSICAL CHARACTERS

The short hair is gray in varying shades, to black, the darker hair occurring particularly in the fore-end, the tail brush, the eyebrows and the insides of the ears. The skin is pigmented, rather thick but elastic. The head is relatively small, with a straight profile and black muzzle which is surrounded by light hair. The horns are fairly long, ivory colored and spring outward and upward, with a curved terminal portion, giving a lyre-shaped appearance.

The back is long and straight, the loins are fairly long, as are the hindquarters which slope downward from the dorsal line. The chest is deep and the ribs suitably sprung, while the well-developed ventral portions provide adequate room for the digestive organs.

The musculature is good, particularly in the fore-end, and the bony structure of the legs is sound and neatly formed. Table 95 gives some data on the physical characters of Maremma cattle.

TABLE 95. — SOME LIVeweIGHTS AND BODY MEASUREMENTS OF ADULT MAREMMA CATTLE

	Males	Females
Liveweight (kg)	750-850	550-650
Wither height (cm)	150-155	143-150

The Maremma, as can be gathered from these figures, is a massive animal, although differences occur between cattle from different districts.

FUNCTIONAL CHARACTERISTICS

The Maremma breed is very rustic, energetic and a good, willing worker with a docile temperament. Animals partially housed, however, often possess less resistance to disease and adverse conditions and exhibit a less massive skeleton than those reared under harder environments. Although a long-lived animal, it is also rather late in developing. Due to its vigor and robustness, it has long justified its reputation as a good work animal and is now being developed for beef production, as it is a very economical feeder. Selection nuclei are now being developed from which improved bulls are being issued and in which the cows have a sufficient milk production to feed their progeny well.

BREED ORGANIZATION

The Ministry of Agriculture and Forests established breed standards of achievement and opened a Herdbook in 1935. The breed population was 298,900 in 1956.

Pugliese
(**Podolica Italiana**)

ORIGIN

The name Podolica Italiana indicates the ancient Podolic origin of the Pugliese cattle, a breed which is still widely diffused in the south of Italy. No details of its more recent history were available to the authors but various local breeds were developed in the past, in response to the different ecological-agricultural environments, and these are now amalgamated into a single breed, albeit a breed which is being appreciably crossed with others, such as the Simmental and Romagna.

LOCATION, TOPOGRAPHY AND SOILS

The breed is found in a small area in the south of the province of Venice, the lowlands of Padua, in Verona, Vicenza and central Istria. Its main area of diffusion is, however, in southern Italy in Apulia, Lucania and parts of Campania, Molise and Abruzzi.

CLIMATE

The climatic conditions of Potenza and Foggia are given in Table 96 to illustrate the environmental conditions to which this breed is adapted.

TABLE 96. - AVERAGE CLIMATIC CONDITIONS FOR PUGLIESE CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
POTENZA												
Temperature (°C)	3.6	6.2	7.5	9.0	14.8	18.1	21.3	21.0	17.8	12.4	9.5	5.4
Rainfall (mm)	81	26	87	96	54	46	29	53	95	55	132	84
FOGGIA												
Temperature (°C)	7.5	9.7	11.8	13.2	18.9	22.2	25.8	26.6	23.2	17.6	13.6	9.5
Rainfall (mm)	28	5	46	55	84	31	16	14	32	21	90	51

FEEDING AND MANAGEMENT

Owing to the great variation in the feeding and management conditions on the rich plains and the poor mountainsides, two separate types of Pugliese cattle are produced. The plains cattle are



FIGURE 109. — Pugliese bull (Milano III), 3 years old. 900 kilograms liveweight.
Courtesy Italian Ministry of Agriculture and Forests

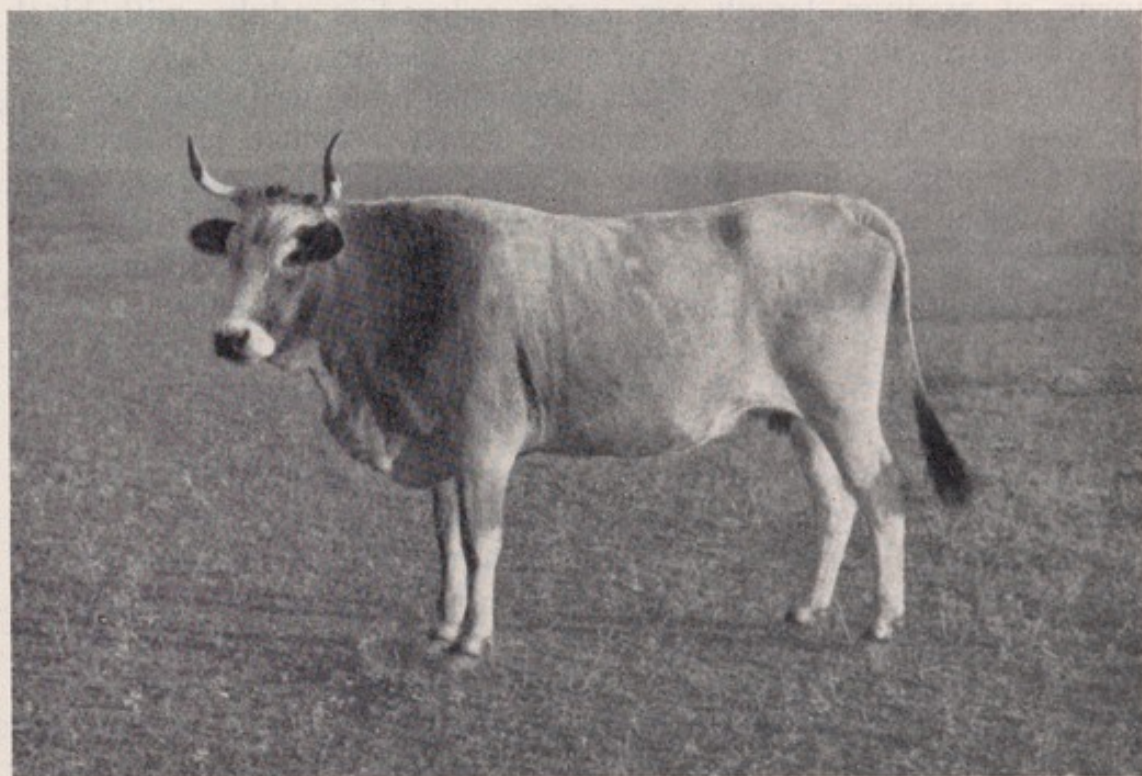


FIGURE 110. — Pugliese cow (Primavera), 4 years old.
Courtesy Italian Ministry of Agriculture and Forests

generally white, more docile and certainly larger than the small, more rustic mountain types, which also have a deeper hair pigmentation.

Attempts to cross the Pugliese with more productive Simmental cattle have also varied with the levels of nutrition and management available. The slower growing mountain types are adapted to hard conditions and great seasonal differences in the availability of natural fodders. The plains cattle, on the other hand, are faster growing because they receive hays, straws, crop residues and brans.

PHYSICAL CHARACTERS

The hair is gray with various gradations of color, which vary between animals and seasons. The gray becomes very dark in males around the eyes, on the neck, shoulders and lower two thirds of the trunk. The back is a lighter shade of gray and a whitish band of hair surrounds the muzzle. The skin is dark colored, the muzzle, body orifices and tail brush are black, although some lighter and pinkish colors are accepted for the vulva. The skin is of medium thickness, elastic and easily moved.

The head is of medium length, straight in the profile, wide between the eyes and has a wide muzzle. The upright, lyre-shaped horns of medium length are ivory colored in adults, with black tips, but are black all over in young animals.

The body is cylindrical but deep and long, with high withers, the loin and hindquarters are long, firmly attached and level but with the spinal column slightly elevated above the quarters. The chest is deep and muscular and the hindquarters are carried down to the hocks. The limbs are nicely spaced, well boned and carry a good muscle development.

As in many other breeds of Podolic origin, the calves are born with a red tint in the coat color which changes slowly to the gray adult shade.

Although the size varies with the nutritional level, the average dimensions of Pugliese cattle are indicated in Table 97.

In Apulia, Lucania and Calabria, adult bulls weigh 700 to 800 kilograms and attain a height of 150 to 155 centimeters, while cows weigh 500 to 550 kilograms and have a wither height of 140 to 145 centimeters. On the other hand, in the Venice basin, bulls easily scale 1,000 to 1,100 kilograms and measure 155 to 165 centimeters in stature. Under the latter conditions, cows will weigh 600 to 700 kilograms and have a wither height of 142 to 150 centimeters.

TABLE 97. - AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF PUGLIESE CATTLE

	Males			Females	
	1 year	2 years	Mature	2 years	Mature
Liveweight (kg)	500	720	1 050	600	750
Wither height (cm)	138	146	159	140	148
Body length (cm)	156	174	195	169	176
Chest girth (cm)	182	200	231	192	205
Chest depth (cm)	67	74	84	70	76

FUNCTIONAL CHARACTERISTICS

Although the tractor is reducing the demand for these animals for work purposes, it is still predominantly a work/meat-producing animal. They have a well-earned reputation as work animals, are quiet, docile and very strong. When properly fed, they have a reasonable rate of growth and many calves are slaughtered for veal. Adult stock yield useful, muscular carcasses with a good meat distribution over the carcass.

Attention in recent years is also focusing on the milk productivity of Pugliese cattle but, besides rearing calves, the average milk yield per lactation is around 900 to 950 liters.

BREED ORGANIZATION

The standard for Pugliese cattle was set in 1931 and a Herd-book was established. The breed numbers around 160,000 animals.

TRIPLE-PURPOSE BREEDS

Piedmont
(Piemontese)

ORIGIN

The Piedmont is believed to have derived from an ancient local cattle breed descended from *Bos taurus brachyceros*. Other cattle types infiltrated (Podolic, Jurrassic and Iberian) and a number of local breeds developed which, since 1840, have been amalgamated into the Piedmont. The systematic improvement of the latter started

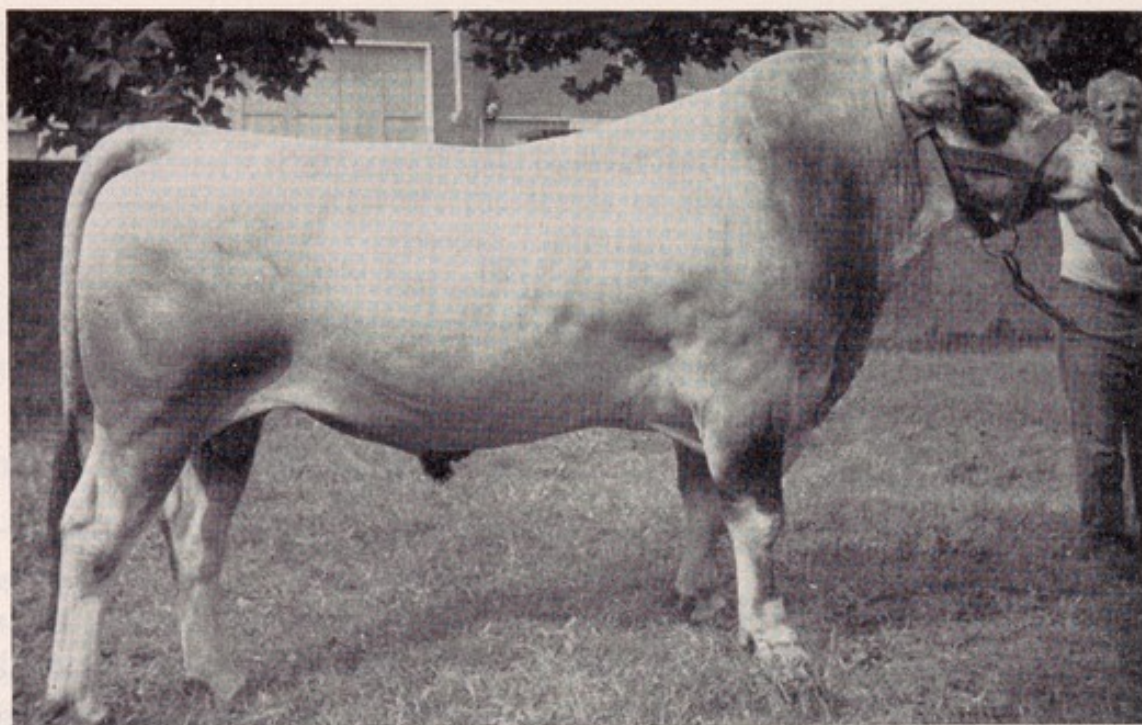


FIGURE 111. — Piedmont bull (Cuneo), 5 years old.

Courtesy Italian Ministry of Agriculture and Forests

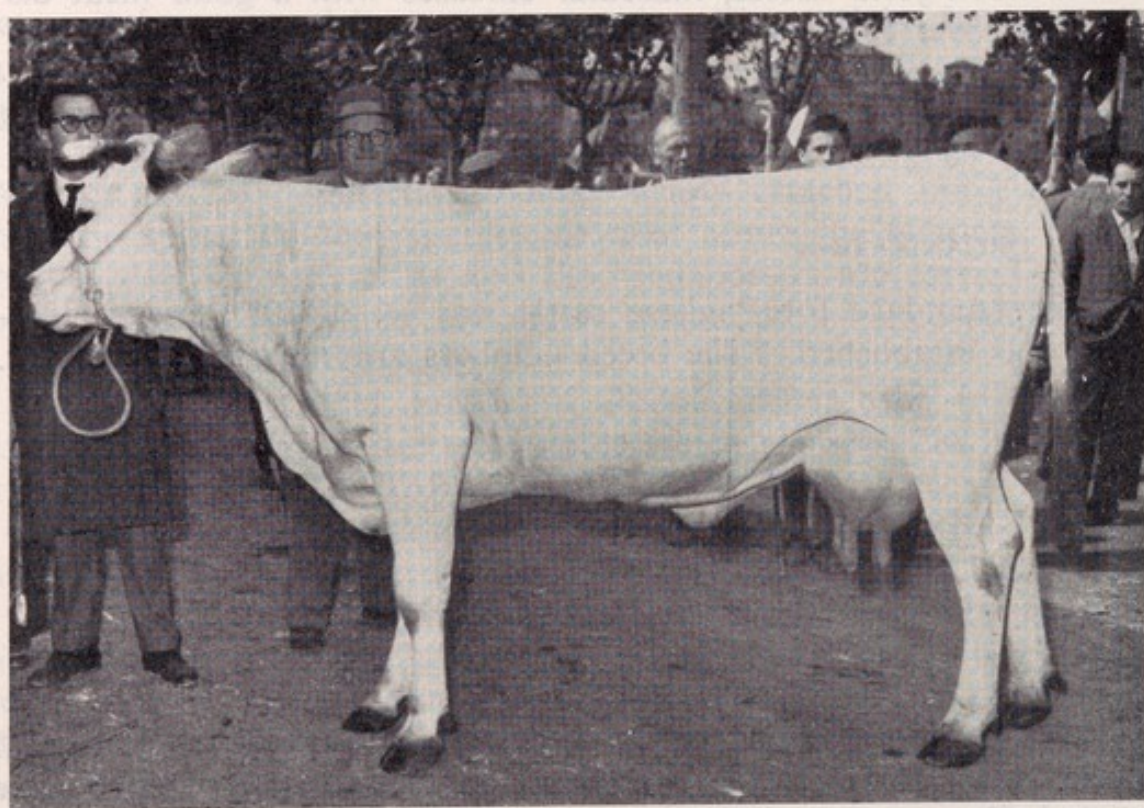


FIGURE 112. — Piedmont cow (Pisana), 6 years old. Yielded 3,471 kilograms of milk in third lactation.

Courtesy Astifoto

around 1920, although the breed exhibits considerable variation in morphology and functional properties.

LOCATION, TOPOGRAPHY AND SOILS

The Piedmont is the principal breed in the provinces of Turin, Cuneo and Asti. It also occurs in Alessandria and, to a more limited extent, in Vercelli and Novara. It lives in the river plains, the hills, and on the mountain slopes.

CLIMATE

The climatic conditions to which Piedmont cattle are adapted can be represented, as in Table 98, by the data for Alessandria and Cuneo.

TABLE 98. - AVERAGE CLIMATIC CONDITIONS FOR PIEDMONT CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
ALESSANDRIA												
Temperature (°C)	1.9	4.7	8.3	11.9	18.3	21.4	25.0	23.5	19.8	13.2	8.3	2.6
Rainfall (cm)	12	11	71	100	43	45	54	49	5	137	98	80
CUNEO												
Temperature (°C)	1.6	4.4	6.0	9.2	15.3	18.6	21.6	20.3	17.1	11.2	7.5	1.9
Rainfall (mm)	9	47	129	123	125	65	55	73	88	107	216	143

FEEDING AND MANAGEMENT

This breed is used for milk, meat and work purposes and so is subjected to a wide range of feeding and management conditions. In the hilly and mountain districts, the amount of supplementary winter feeds is very restricted but on the lower, more intensive farming zones, including the irrigated lands, the feeds are variable but include crop residues, such as straws, chaffs and brans, cultivated green forage, hays, home-grown and purchased concentrates.

In conformity with this, prior to the 1840 amalgamation, there were the plains cattle, with a yellowish color, large in size, with long legs, and which were good dynamic workers and good beef producers, although possessing very mediocre milk production char-

acters. In addition, there were the hill cattle, of smaller stature but adapted to the less favorable nutritional levels, which were used largely for work and which produced enough milk only for their calves. A third variety, the Demonte, which was smaller and more angular, was adapted to the mountain areas while, lastly, there was the double-muscled variety Alba, the characters of which will be discussed later.

PHYSICAL CHARACTERS

Young calves (up to 3-4 months old) have a light wheaten color which changes to the adult gray. In cows, the adult hair color is light gray with white tips. The gray in bulls is darker and mixed with black hairs on the head, neck, shoulders, on the lower parts of the legs and on the underparts of the trunk. The muzzle, the hair of the eyebrows, ears, and on the brush of the tail and the skin of the body orifices are black. The hair of the coat is short and fine, while the skin is of medium thickness and easily manipulated. The horns are black until 20 months of age, but then the base becomes yellow although the tips remain black. They spread laterally in the males but, in the females, the tips turn forward and upward.

The head is short in the males but larger in the cows, wide between the eyes and straight in the profile. The muzzle is large. The body is long, the withers are of reasonable width and the back is wide and straight. The ribs are well sprung and the chest is deep, the loins and quarters are wide and long, the abdomen is capacious and the hindquarters are muscular and carried down to

TABLE 99. — AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF PIEDMONT CATTLE

	Males			Females	
	1 year	2 years	Mature	2 years	Mature
Liveweight (kg)	400	650	850	450	570
Wither height (cm)	123	135	145	128	136
Body length (cm)	145	152	184	146	162
Chest girth (cm)	170	194	218	172	186
Chest depth (cm)	60	68	78	64	70
Hip width (cm)	41	48	54	42	48

the hocks in properly fed animals. The legs are well boned and muscular and the udder is of medium size and carries rather large teats. Table 99 illustrates the liveweights and body measurements of Piedmont cattle.

FUNCTIONAL CHARACTERISTICS

The breed was at one time triple-purpose but the emphasis is now swinging to a milk- and meat-producing type. Piedmont cattle have a solid frame, a robust constitution and an active disposition. Outside as well as inside their region of development, they have earned a reputation for their growth and fattening abilities. They make good use of their feeds, and their carcasses have fine-fibered muscles which are well marbled and tasty. Their rates of growth compare well with those of other meat breeds and they can exceed 600 kilograms at 20 months of age. Carcase percentages are around 53 percent for adult stock and 65 percent for young animals weighing 380 to 420 kilograms at one year of age. The relative frequency of liveweights of 400 kilograms for males and 330 kilograms for females at one year of age indicates the possibilities for selecting rapidly growing beeves. The high slaughter rate of calves of less than one year of age could easily restrict the development of this breed.

Milk yields are slowly being improved but averaged only about 2,000 kilograms in 1947.

Interest has been expressed for over 50 years in the number of Piedmont cattle that show the double-muscling character in the rump and thighs. Such animals of the Alba variety have a marked development in meat production characters and the first records of this date back to 1886 but investigations and studies began only in 1926. In 1947, 144,000 calves and young stock with double muscling were slaughtered and, of the 5,125 bulls at service, 65 percent have this character partially or totally evident, although only 9 percent truly exhibit the character. Relatively fewer cows possess this character, since it is often associated with a lower fertility in females. Young animals with double muscling are the cause of damage leading to the deaths of themselves and their dams at parturition. Such calves give up to 10 percent greater carcase yields than normal animals.

BREED ORGANIZATION

In 1955, there were 652,119 head of Piedmont cattle. The first Herdbook was opened in 1887 but was closed in 1891. In 1934,

a rational improvement campaign was initiated and a standard of merit was approved. The standards have been successively revised and selection nuclei have been established for the development of superior strains for meat production while, in 1947, nuclei with better milk production abilities were also isolated for development.

Grey Alpine (Grigia Alpina or Bigia Alpina)

ORIGIN

The Grey Alpine breed has an ancient origin similar to that of other Alpine cattle.

LOCATION, TOPOGRAPHY AND SOILS

It is found in the mountain zone of the Dolomites in the north-east of Italy, particularly in the provinces of Belluno, Treviso, Udine, Venice, Bolzano and Trento.

CLIMATE

To illustrate the climatic conditions under which Grey Alpine cattle live, Table 100 quotes data for Belluno and Treviso.

TABLE 100. — AVERAGE CLIMATIC CONDITIONS FOR GREY ALPINE CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
BELLUNO												
Temperature (°C)	0.2	4.6	7.1	10.2	17.3	19.3	22.3	21.1	18.5	12.7	7.3	2.0
Rainfall (mm)	15	43	46	45	101	104	90	95	49	102	101	79
TREVISIO												
Temperature (°C)	3.4	6.1	8.4	11.9	18.8	21.3	24.5	22.8	19.4	13.8	9.8	4.9
Rainfall (mm)	40	24	82	149	68	85	81	69	58	108	170	125

FEEDING AND MANAGEMENT

The standards of feeding and management have been steadily rising and the production of forage is now being more intensively pursued. The dependence on hays, straws, crop residues and concentrated feeds varies with locality and local farming practices.

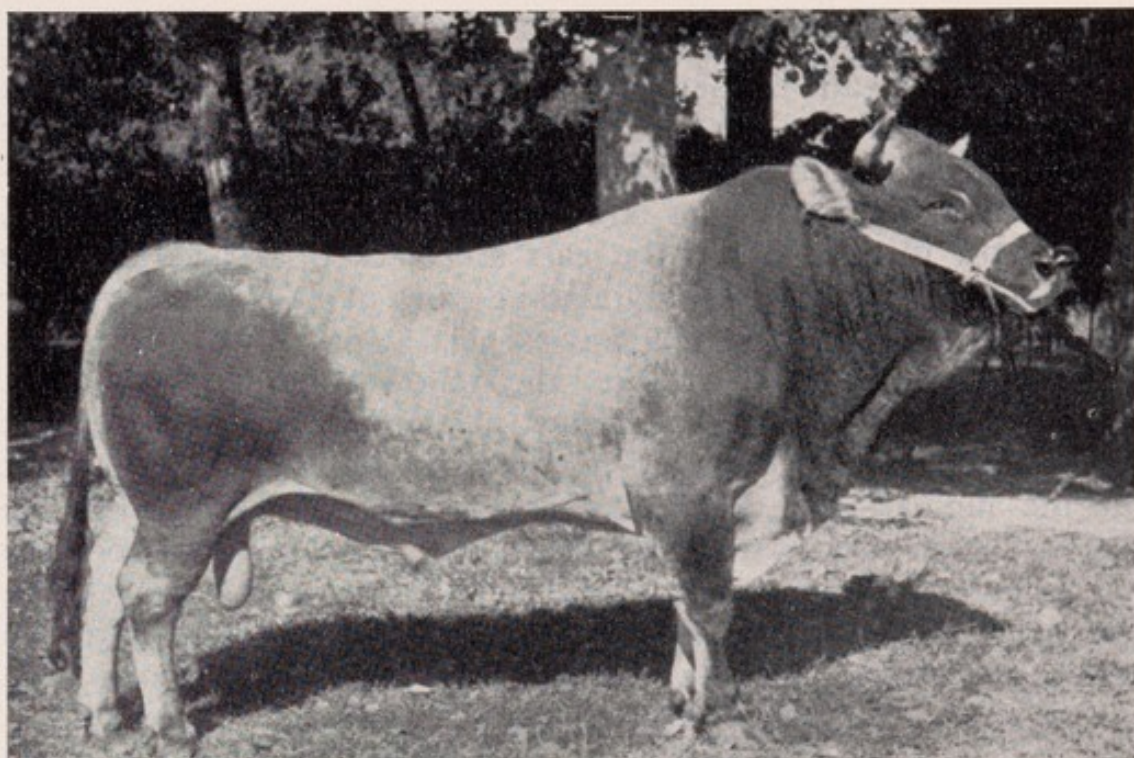


FIGURE 113. — Grey Alpine bull (Lindo), 6 years old.

Courtesy Prof. T. Bonadonna

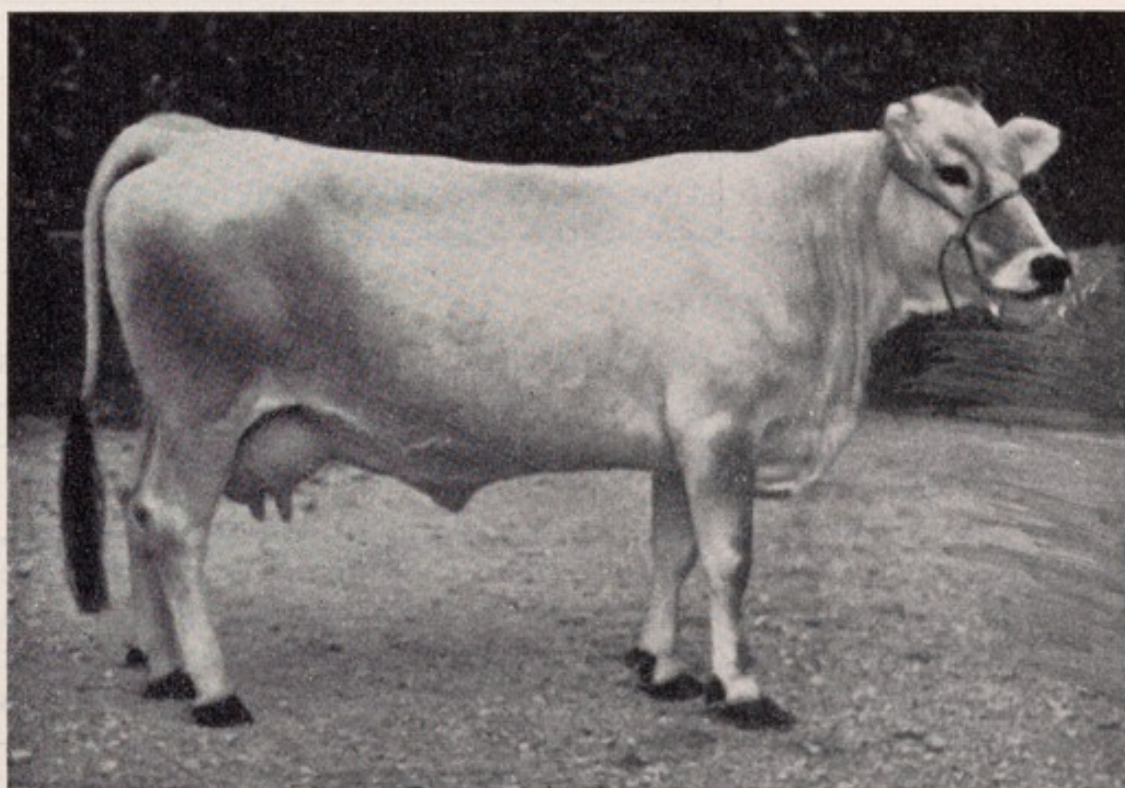


FIGURE 114. — Grey Alpine cow. Second lactation.

Courtesy Prof. T. Bonadonna

PHYSICAL CHARACTERS

The short hair is mainly gray in color, with some brownish hairs included in the general coat, but darker gray to black hair appears in patches on the head, forequarters and sides. The dorso-lumbar and ventral regions are usually gray but the tail brush, eyelids and the insides of the ears are black or dark gray. The broad muzzle, surrounded by a white ring of hair, and the body orifices are black, as are the hooves.

The head has a short face, the yellow horns are small and directed forward, with a tendency to curl upward or inward at their black ends. The shoulders are wide and slightly prominent but the lumbar and sacral regions are long and wide, while the quarters slope downward from the spine. The quarters are wide and rectangular, the chest is deep and the ribs well sprung. The legs are strongly boned and the muscles are carried down to the hocks. The udder is nicely developed. Table 101 gives some data on liveweights and body measurements.

TABLE 101. — SOME AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF GREY ALPINE CATTLE

	Males			Females	
	1 year	2 years	Mature	2 years	Mature
Liveweight (kg)	320-400	400-500	700-800	350-450	450-550
Wither height (cm)	118-120	130-132	135-140	123-127	128-134

FUNCTIONAL CHARACTERISTICS

The Grey Alpine is a triple-purpose breed but the emphasis on work is slowly waning and, with the improvements now possible in feeding and management, attention is focusing on the production of milk and meat.

Because of the past tendency to have a triple-purpose animal, many people have been disappointed in the milk potential of these animals and there has been a distinct tendency to grade them to Brown Swiss. Of 2,236 cows tested in 1956, the average milk yield was 3,138 kilograms containing 3.98 percent of butterfat. Cows which give less than 2,500 kilograms of milk are now being relegated to work or are being upgraded to Brown Swiss.

The breed is very robust and vigorous, has an excellent health record and is well adapted to hard or mountainous conditions. The

carcasses of properly fed animals are well covered and carry a high percentage of meat. Whereas young stock prepared for veal or baby beef yield carcase percentages of 55 to 62 percent, oxen and bulls yield 52 percent and old cows 42 percent.

BREED ORGANIZATION

A Herdbook was opened after the first world war and in 1956 there were 7,400 animals registered out of a total cattle population of 300,000.

Modena **(Modenese or Bianca Val Padana)**

ORIGIN

The Modena breed is believed to have developed from a crossing of the local indigenous cattle with Podolic stock in the past and with the Romagna breed. They must have been similar to those which developed later into the Reggio and Parmense breeds. Certainly cattle with yellowish hair were mentioned as being in Modena around 800 A.D., but it was not until 1860 that the modern breed began to be improved.

LOCATION, TOPOGRAPHY AND SOILS

Modena cattle are found throughout the province of Modena, particularly in Carpi, Correggio and Mirandola, and were once divided into the *Modenese di pianura* and the *Carpigiana*. They also occur in the provinces of Bologna, Mantua, Reggio Emilia, Ferrara and oltre Po.

CLIMATE

The climatic data of Modena and Carpi are given in Table 102 as typical of the conditions under which this breed lives.

FEEDING AND MANAGEMENT

This breed, when kept for work purposes, is fed on the natural pastures, supplemented with hays and straws, but it has a remarkable ability to respond to higher levels of nutrition and management. Under the latter conditions, its meat characteristics have been augmented and many cows have, in recent years, developed as milk producers. Feeding and management vary appreciably with location and the knowledge and financial ability of the owners.



FIGURE 115. — Modena bull (Zorro 856), 6 years old, used for artificial insemination. 575 kilograms liveweight.

Courtesy Zagni



FIGURE 116. — Modena cow (Zamba 5402). Yielded 5,376 kilograms of milk containing 3.53 percent of butterfat in third lactation.

Courtesy Bandieri

TABLE 102. - AVERAGE CLIMATIC CONDITIONS FOR MODENA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
MODENA												
Temperature (°C)	2.5	5.8	8.0	12.7	18.3	21.5	25.1	23.8	19.6	13.8	8.8	3.3
Rainfall (mm)	13	21	116	105	51	64	17	32	39	30	158	45
CARPI												
Temperature (°C)	5.3	6.6	9.8	13.1	16.7	21.5	24.7	23.0	18.7	12.7	7.2	4.3
Rainfall (mm)	14	16	113	133	46	77	40	33	50	34	151	46

PHYSICAL CHARACTERS

The skin is supple, handles well, is of medium thickness, and is covered with short, white, or milky white hair. The skin is non-pigmented, the muzzle is dark with a central area of depigmentation, but the tongue, palate and tail brush are black, while the other body orifices are pinkish.

The head is of medium size, slightly concave between the eyes, broad in the forehead and straight in profile. The muzzle is large but the horns are somewhat short, spreading laterally from the head but curving slightly forward and upward. They are yellowish white at the base and black at the tips.

The topline is horizontal, the withers are muscular in bulls, while the back is long and muscular. The thorax is deep, the ribs

TABLE 103. - AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF MODENA CATTLE

	Males		Females	
	2 years	Mature	2 years	Mature
Liveweight (kg)	640-700	700-1 000	400-530	480-600
Body length (cm)	150-175	165-194	150-170	155-175
Wither height (cm)	125-135	135-152	130-135	132-140
Chest girth (cm)	190-205	205-232	170-195	184-200
Chest depth (cm)	65-78	70-85	60-75	65-80
Hip width (cm)	45-55	50-58	45-55	45-58

well sprung and the shoulders muscular. The abdomen is spacious, the loins and hindquarters are nicely filled and muscular and the muscles at the rear are carried down to the hocks. The legs are strongly boned, while the globular udder is of a good size, well hung and covered with fine hair. Table 103 gives some details of the liveweights and body measurements of Modena cattle.

FUNCTIONAL CHARACTERISTICS

For work purposes, the skeletal development, strength, willingness and activity of Modena cattle combine to make them most appreciated both for work on the farm and on the roads. The reduction in demand, following the advent of the tractor, can be judged from the fact that between 1875 and 1930 the cows and their followers increased from 36.4 to 64 percent of the population numbers.

As meat producers, the Modena have established a reputation for their early and appreciable rates of growth, for their carcass returns, the flavor and marbling of their meat, and for their efficiency in converting nutrients into meat. Calves easily reach 110 kilograms at 50 to 60 days of age, while at 12 months liveweights of 350 to 400 kilograms are obtained. Milk-produced veal for slaughter between 1 and 2 months of age is the common practice in the plains, while many of the producers on higher land sell their young stock at 16 to 20 months of age. Cows yield a carcass percentage of 51 percent on the average, but higher returns (60 percent) are secured from fat male animals (55 to 63 percent).

During the last 20 years, increasing attention has been paid to milk production. Considerable variation exists between individual strains and farms but, in 1957, the following yields were recorded.

TABLE 104. - AVERAGE LACTATION RECORDS OF MODENA COWS

	No. of cows	1st lactation	2nd lactation	Subsequent lactations
		<i>Kilograms</i>		
All recorded cows	1 580	2 940	3 324	3 845
Yields of cows which attained the prescribed minimum for registration	995	3 110	3 597	4 196

The butterfat content naturally varies with milk production, but on the average it is 3.5 to 3.7 percent.

BREED ORGANIZATION

The Herdbook of the Breeders' Association was approved by the Ministry of Agriculture and Forests in 1957 when breed standards were affirmed and 2,296 animals were registered from a total cattle population of 200,000.

Simmental (Pezzata Rossa Friulana)

ORIGIN

The Italian Simmental has developed from importations of this breed from Switzerland and has been increased by upgrading with the Valdostana and Reggio cattle.

LOCATION, TOPOGRAPHY AND SOILS

The Italian Simmental has been developed particularly in Udine (Friuli), Gorizia and Venice provinces. A less dense population has spread from the provinces of Florence, Pistoia and Pisa, along the west-central region. The breed is also encountered in the "toe and heel" of Italy and reaches a high density in Reggio di Calabria.

CLIMATE

Illustrative of the climatic conditions where this breed is encountered are data for Reggio di Calabria and Udine in Table 105.

TABLE 105. - AVERAGE CLIMATIC CONDITIONS FOR SIMMENTAL CATTLE IN ITALY

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
REGGIO DI CALABRIA												
Temperature (°C)	11.2	12.2	13.6	14.8	19.2	22.7	25.7	27.0	24.2	19.8	16.7	13.0
Rainfall (mm)	74	20	53	76	62	17	45	3	40	64	162	79
UDINE												
Temperature (°C)	3.4	5.8	8.2	11.5	18.6	20.4	24.0	22.5	19.1	13.6	9.6	5.5
Rainfall (mm)	63	49	65	164	94	184	98	82	114	121	173	163



FIGURE 117. — Simmental bull (Argo), 4 years old. 1,350 kilograms liveweight.
Courtesy Italian Ministry of Agriculture and Forests

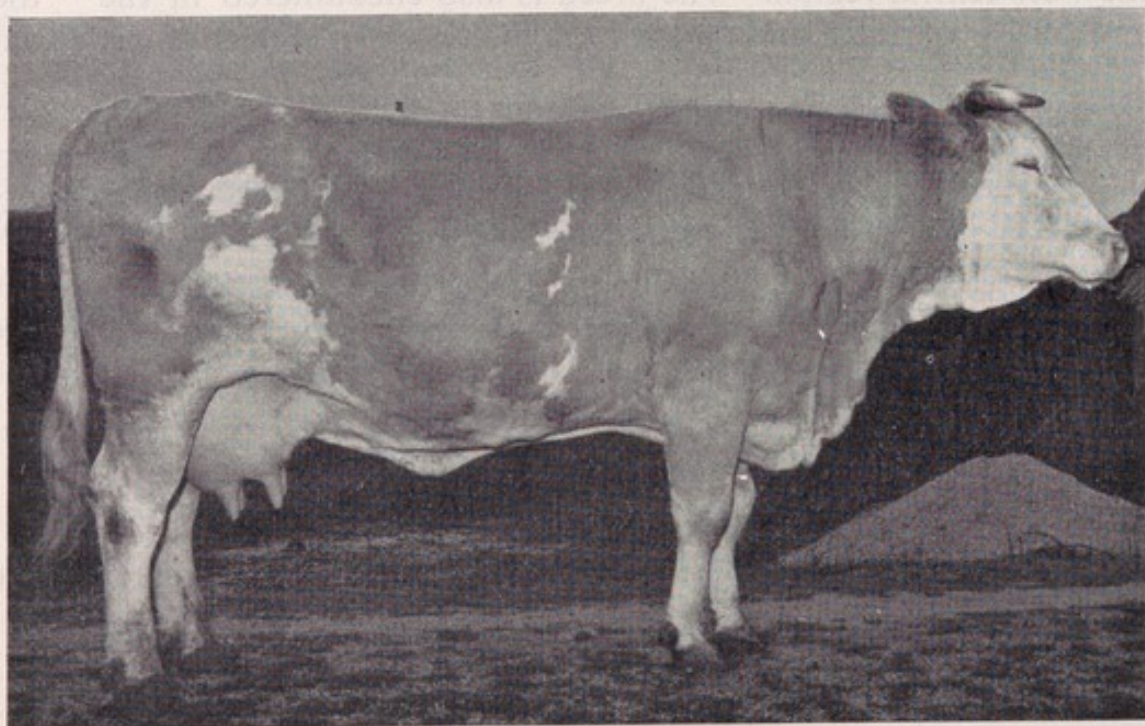


FIGURE 118. — Simmental cow (Bianca), 9 years old. 1,064 kilograms liveweight,
milk production 4,700 kilograms.

Courtesy Italian Ministry of Agriculture and Forests

FEEDING AND MANAGEMENT

Since Simmental cattle are kept on rich lowland farms, on hillsides and on poor mountain pastures, the range of feeding and management conditions varies appreciably.

PHYSICAL CHARACTERS

Italian Simmental closely resemble in physical appearance the Swiss ancestors described on p. 7. Table 106 summarizes live-weights and body measurements.

TABLE 106. — AVERAGE LIVEWEIGHTS AND BODY MEASUREMENTS OF SIMMENTAL CATTLE IN ITALY

	Males			Females		
	1 year	2 years	Mature	1 year	2 years	Mature
Liveweight (kg)	520	830	1 200	400	600	750
Body length (cm)	150	165	185	140	155	170
Wither height (cm)	133	148	156	125	138	144
Chest girth (cm)	183	220	250	164	192	210
Chest depth (cm)	64	75	85	59	70	76
Hip width (cm)	46	54	60	42	50	54

FUNCTIONAL CHARACTERISTICS

The weight at birth of male calves averages 55 kilograms and of females 48 kilograms. The mean milk yield, in 305 days, is 2,800 kilograms for the first, 3,200 kilograms for the second, and 3,600 kilograms for successive lactations (corrected to 3.75 percent butterfat).

As meat producers, the Italian Simmental, like their Swiss counterparts, have a good reputation and respond well to higher planes of nutrition. Their value for veal production is well known. Rates of gain, from birth to one year of age vary from 1,000 to 1,250 grams per day (even up to 2,000 grams per day) and can average 1 kilogram per day from 1 to 2 years of age.

As draft animals, this breed has a well-earned reputation, although their demand for work purposes is now reduced.

BREED ORGANIZATION

Standards of performance for registration in the Herdbook have been in existence since 1931 and, in 1957, 12,725 animals were recorded. At that time, the number of Simmental cattle of all ages in Italy was 412,673.

Reggio
(Reggiana)

ORIGIN

The Reggio breed is thought to have descended from *Bos taurus brachyceros*.

LOCATION, TOPOGRAPHY AND SOILS

This breed is found in Reggio Emilia and Parma provinces. It is encountered on the lower hills and on the mountain slopes as well as on the higher zones of the plains. To a smaller extent, it is also spread over the lower plains bordering the Po.

CLIMATE

Table 107 gives data typical of the regions in which the Reggio breed is encountered.

TABLE 107. - AVERAGE CLIMATIC CONDITIONS FOR REGGIO CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
REGGIO EMILIA												
Temperature (°C)	3.0	5.9	7.6	11.0	17.6	20.3	24.2	23.2	19.3	13.6	8.6	3.1
Rainfall (mm)	12	27	110	123	46	56	74	33	79	47	151	54
PARMA												
Temperature (°C)	2.6	5.9	8.2	12.1	18.8	21.7	25.2	24.3	20.1	13.6	9.2	2.6
Rainfall (mm)	13	26	99	141	61	65	43	36	72	46	140	64

FEEDING AND MANAGEMENT

Although cattle on the mountains and hills are largely dependent on naturally produced fodders, the advent of the tractor in the lower altitudes has increased the possibilities of cultivating fodder and thereby of raising the productivity of the cattle. In con-

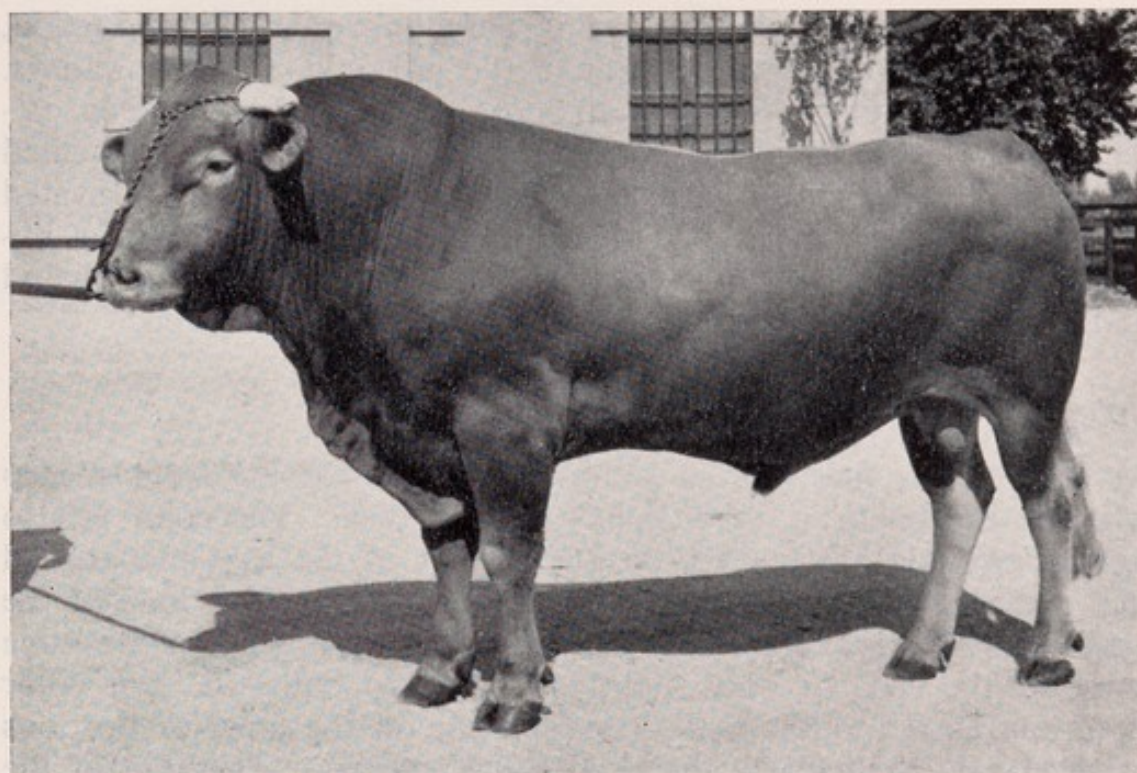


FIGURE 119. — Reggio bull (Libero 167/86). Dam yielded 6,530 kilograms of milk containing 3.81 percent of butterfat in third lactation.

Courtesy Vaiani



FIGURE 120. — Reggio cow (Siria 20721). Yielded 5,621 kilograms of milk containing 4.05 percent of butterfat in fourth lactation.

Courtesy Italian Ministry of Agriculture and Forests

sequence, there has been increasing emphasis on milk production, which is spreading from the plains to the hill and mountain valleys.

The conditions are similar to those described for Modena cattle, with a waning interest in work potential and an augmented attention to meat and milk production. Hays, straws and cultivated leguminous hays are being increasingly used as well as the by-products of cash and food crops. For milk production, purchased and home-grown concentrate feeds are also being utilized.

PHYSICAL CHARACTERS

The short, fine hair is yellowish brown, varying from a deep wheaten shade to a very light yellow-brown. The color is also lighter around the muzzle, on the insides of the legs and around the eyes but white patches are not acceptable. The hair of the eyelashes, the insides of the ears and the tail brush are the same color as the coat or only slightly lighter. In bulls, the hair color is a bit darker, often with a redder tint on the anterior portions of the body, particularly the neck and shoulders. The skin of the muzzle, tongue, palate and other external orifices is pink, while the udder and teats are without black markings.

The head has a wide, slightly concave forehead and a rectilinear profile. The muzzle is large and the lips are well developed. The horns spread sideways and turn slightly upward and forward at the ends. They are of medium length and are yellowish white in color.

The backline is straight with the withers only slightly pronounced. The thorax is long and deep, the shoulders muscular and the abdomen is large. The loins are wide and the hindquarters are rectangular, long, wide and horizontal and the musculature is carried down to the hocks. The legs are well boned and strong, while the udder is regular in shape but not excessively voluminous. The teats are of medium length. Some body characteristics are summarized in Table 108.

TABLE 108. - SOME AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF REGGIO CATTLE

	Males			Females	
	1 year	2 years	Mature	2 years	Mature
Liveweight (kg)	400	700	900-1 000	500	600-700
Wither height (cm)	123	140	145-150	—	135-140

FUNCTIONAL CHARACTERISTICS

The active and robust Reggio cattle are renowned as work animals and their strength, docility and willingness have long been proven. With the lessened demand for work oxen, attention in recent years has focused on their milk and meat-producing abilities.

Nuclei of milking cows were established in 1935 and selected strains were isolated for multiplication and dispersal. From the 955 recorded cows in 1956, the following data were obtained: average milk yield, 3,624 kilograms in 259 days, while of the 668 cows on the plains, the average yield was 4,001 kilograms and, for the remaining 287 maintained on the mountains, the output averaged 3,248 kilograms. Of the 679 cows registered in the Herdbook, 478 were maintained on the plains and produced 4,180 kilograms of milk in 262 days, while the 201 cows on the mountains yielded 3,362 kilograms in the same interval. The average butterfat content in 1956 was 3.69 percent.

The average carcase yield is 55 to 56 percent and the quality of the muscular carcasses is good.

BREED ORGANIZATION

The Ministry of Agriculture and Forests opened a Herdbook for Reggio cattle in 1935, when 1,783 animals were registered. In 1957, when the population of this breed was 139,695, the breed standards were revised.

Modica (Modicana)

ORIGIN

The Modica breed of Sicily has descended from *Bos taurus macroceras* and from *Bos taurus ibericus* and so has a common origin with other cattle on both sides of the Mediterranean.

LOCATION, TOPOGRAPHY AND SOILS

Modica cattle originated in Ragusa province (southeastern Sicily) but have since extended to all other provinces in the island.

CLIMATE

The climatic conditions of these Sicilian cattle can be represented by the data for Ragusa and Palermo as shown in Table 109.

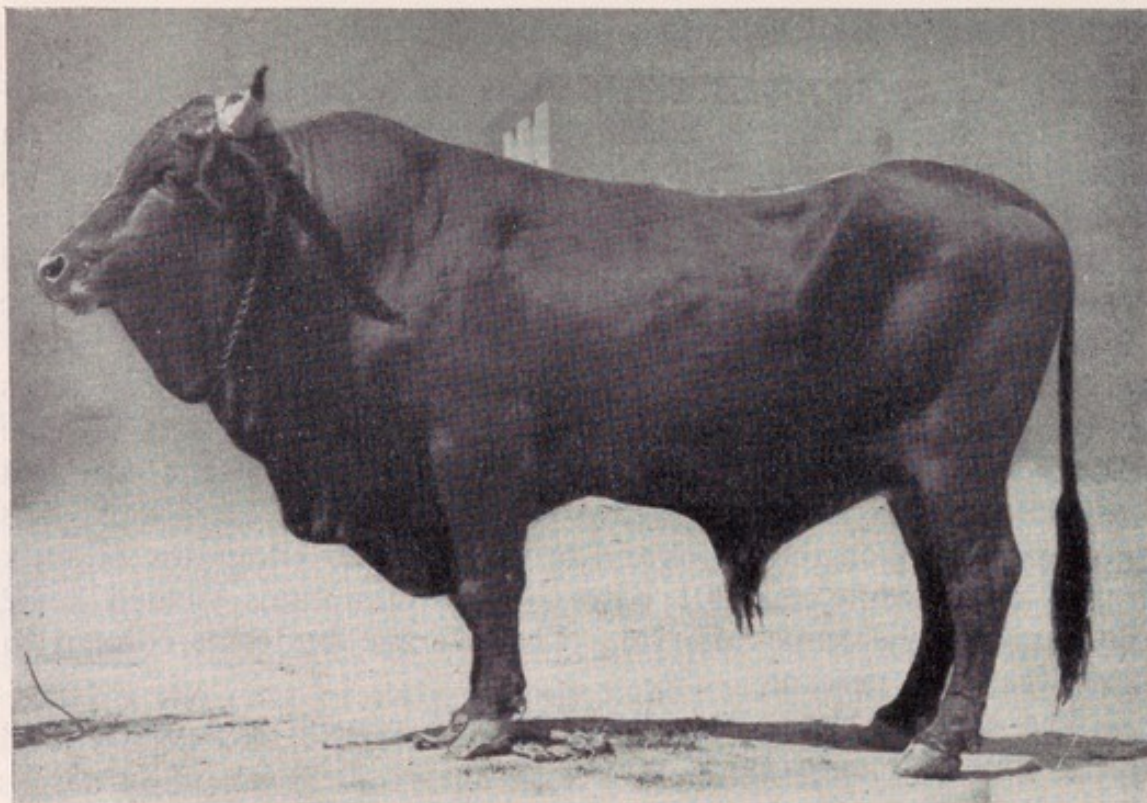


FIGURE 121. — Modica bull (Pomello), 4 years old. 750 kilograms liveweight.

Courtesy Contino



FIGURE 122. — Modica cow (Capparossa), 8 years old. 580 kilograms liveweight.

Courtesy Italian Ministry of Agriculture and Forests

TABLE 109. - AVERAGE CLIMATIC CONDITIONS FOR MODICA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
RAGUSA												
Temperature (°C)	5.2	8.1	8.8	9.5	16.0	20.6	23.7	24.7	21.5	15.7	11.0	8.3
Rainfall (mm)	48	35	26	56	35	8	9	1	14	53	225	107
PALERMO												
Temperature (°C)	11.9	13.0	14.2	15.2	18.8	22.5	24.9	26.1	24.0	20.4	17.1	14.2
Rainfall (mm)	49	31	56	55	15	2	13	1	21	50	82	90

FEEDING AND MANAGEMENT

The natural forages are limited in quantity and feeding value, so that were it not for the rusticity of the Modica breed, their foraging ability and their economy of conversion of feed components into body nutrients, their rates of development would be considerably hampered. The output of work and the yield of meat are both modest, although in recent years, with more emphasis on milk and the greater interest of farmers in better nutritional and management levels, the standards of feeding are being augmented. Apart from the normal grazings, some natural and cultivated hays are made, straws and crop residues are conserved and, in the best herds, supplementary concentrates are now being utilized.

PHYSICAL CHARACTERS

The hair in adult animals has a wine-red color with a black tint on the head, neck, shoulders, hindquarters and body. Various gradations of the red, from deep red to yellowish brown, are tolerated but the depth of color is usually greater in males than in females. In young animals, the color variations are less pronounced on the back and belly. The muzzle is pink, the surroundings of the eyes are black or dark colored, as are the brush of the tail and the external orifices. The yellowish red udder is covered with fine, sparse dark or black hairs.

The head is pyramidal in shape, somewhat small and straight in profile, and has a wide muzzle. The horns in the bull spread

outward and upward and are grayish yellow at the base but black or dark colored at the tips. In females, the horns are longer and spread outward, upward and backward.

The body underline is roughly parallel to the back, the withers are somewhat pronounced, the loins are long and wide, the quarters are also long and wide but slope downward from the spinal column. The chest is deep and voluminous with well-sprung ribs. The legs are strong, finely boned and nicely proportioned. The udder is of good shape, firmly attached and of good proportions, while the teats are somewhat large.

There are three types of Modica cattle, depending on the nutritional status, namely: (i) the true Modica, which is the most numerous and lives on the plains; (ii) the Mezzalino, which is found in the hills from 300 to 700 meters in altitude; and (iii) the Montanino, which lives above 700 meters. These three types are the result of selection and adaptability to the environment.

Birth weights average 37 to 42 kilograms for males and 25 to 40 kilograms for female calves. Table 110 gives data on the average liveweights and body measurements.

TABLE 110. — SOME AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF MODICA CATTLE

	Males			Females		
	1 year	2 years	Mature	1 year	2 years	Mature
Liveweight (kg)	220-250	—	500-600	200-220	—	450-500
Wither height (cm)	—	138	150	—	133	138

FUNCTIONAL CHARACTERISTICS

The Modica used to be considered a work and milk animal but, because the emphasis on work is decreasing, it is evolving as a meat/milk or a triple-purpose animal. As the breed is not very precocious and the feeding conditions are poor, the meat-producing characters are not outstanding. Carcase yields are 45 to 48 percent for cows and adult oxen, 50 percent for bulls, and 53 to 54 percent for young animals.

Milk yields are also modest during a short lactation of five to six months in the plains and four to five months on the mountains.

During the years 1949-56, the average milk productions were as shown in Table 111.

TABLE 111. - AVERAGE LACTATION RECORDS OF MODICA COWS (1949-56)

	No. of cows	Milk
		<i>Kilograms</i>
1st lactation	135	1 686
2nd lactation	109	2 042
3rd lactation	474	2 467

Cows registered in the Herdbook from Syracuse gave lactation records as shown in Table 112 during the years 1950-52.

TABLE 112. - AVERAGE LACTATION RECORDS OF REGISTERED MODICA COWS FROM SYRACUSE (1950-52)

	No. of cows	Milk
		<i>Kilograms</i>
1st lactation	33	2 321
2nd lactation	33	2 486
3rd lactation	38	2 221
4th lactation and over	179	2 491

The average butterfat content of the milk is now 3.9 to 4.5 percent, but it is also interesting to record that, in 1932, the average milk production of Modica cows was only 1,200 kilograms per lactation.

BREED ORGANIZATION

The breed standards were approved by the Ministry of Agriculture and Forests in 1952 and a Herdbook was established in which 512 animals were then registered. In 1956, there was a total population of 107,144 Modica cattle.

Grey Adige (Grigia di Val d'Adige)

ORIGIN

The Grey Adige breed belongs to the group of gray cattle which spread from the Alpine area but developed their own morphological characters in conformity with the ambiental conditions in which they have been settled.

LOCATION, TOPOGRAPHY AND SOILS

The Grey Adige has developed in the valleys of Ultimo and Sarentino in Bolzano province, in the medium-altitude regions of the provinces of Verona, Vicenza and Padua, and the hilly parts of Verona and Vicenza.

CLIMATE

The climatic conditions in which this breed lives in Italy can be illustrated by the data from Verona and Padua presented in Table 113, and that for Bolzano on p. 154.

TABLE 113. - AVERAGE CLIMATIC CONDITIONS FOR GREY ADIGE CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
VERONA												
Temperature (°C)	3.8	6.5	8.5	11.7	18.7	20.2	22.9	21.6	18.9	13.6	10.4	5.6
Rainfall (mm)	27	40	44	222	72	88	31	36	52	72	121	73
PADUA												
Temperature (°C)	3.4	6.1	9.7	11.7	18.8	21.0	24.2	23.0	17.5	13.8	9.8	3.7
Rainfall (mm)	36	28	100	225	86	141	46	49	35	103	177	152

FEEDING AND MANAGEMENT

As is to be expected when a breed is maintained for the triple purpose of furnishing milk, meat and work and is kept on the varying planes of nutrition essential for these productive functions. The plane of nutrition and the standard of management will vary appreciably between farms and districts. This is in effect what happens with the Grey Adige breed. Supplemental feeding at the higher altitudes is limited and restricted to farm-grown fodders - hays and



FIGURE 123. — Grey Adige bull (Falco), 3 years old. 940 kilograms liveweight.

Courtesy L. Manfrotto

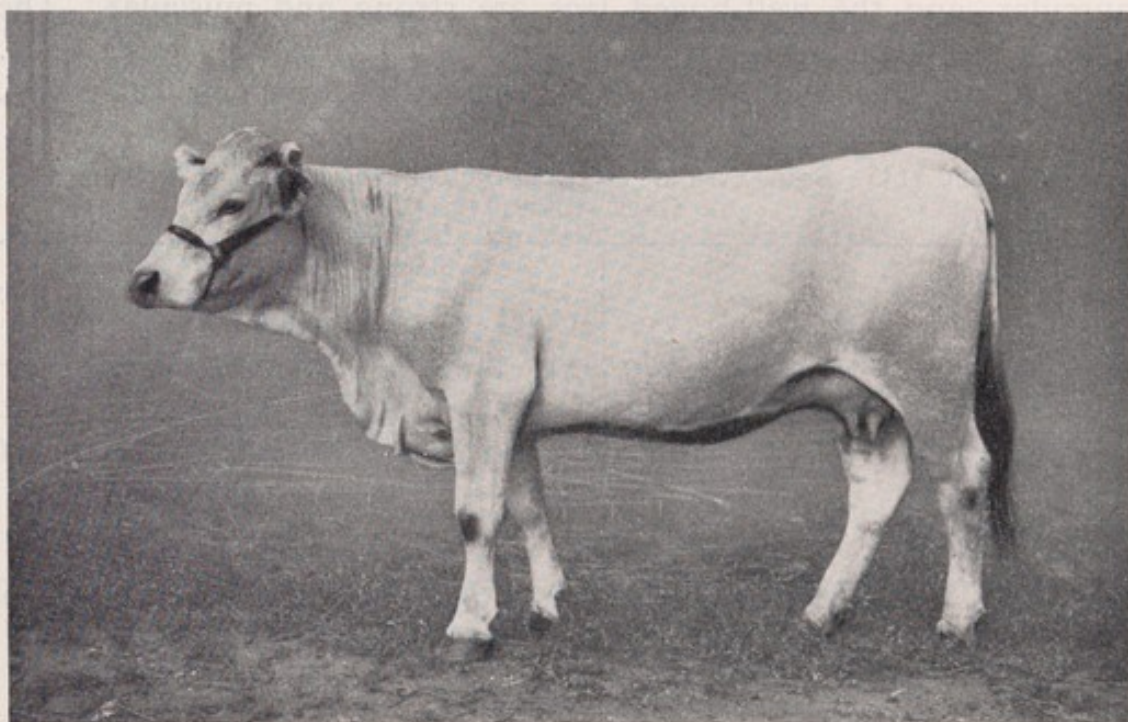


FIGURE 124. — Grey Adige cow (Bionda 2043), 3½ years old. 590 kilograms liveweight.

Courtesy Italian Ministry of Agriculture and Forests

straws. At lower levels, and where fattening is undertaken, there is more stall or yard-feeding and a greater dependence on conserved fodders and farm-grown supplements. When milk production becomes more important, the reliance on purchased concentrates becomes more pronounced in order to balance the farm-produced feeds for milk production purposes.

PHYSICAL CHARACTERS

In females of all ages the hair is light gray, with a tendency toward whiteness in the plains and a darker gray in the mountain areas. In bulls, the gray, resulting from a mixture of white, black and yellow hairs, is usually of a darker color than in females. The tongue, the surroundings of the eyes and the tail brush are black, while the muzzle is slate colored.

The breed profile in bulls is convex, the forehead is wide and the front rectangular, while the face is of medium length. The horns, yellow at the base and black at the ends, grow outward to curl forward and upward.

The body is relatively long, with a deep chest and well-sprung ribs. The withers are wide and slightly elevated, the loins are wide and the quarters are rectangular, although sloping away from the slightly elevated spinal ridge. The sternum is of good size and muscular, and the well-boned legs are strong and muscular. The udder is globular, wide in the rear, and carries relatively large teats. Some liveweights and body measurements are given in Table 114.

TABLE 114. - SOME AVERAGE LIVEWEIGHTS AND BODY MEASUREMENTS OF GREY ADIGE CATTLE

	Males			Females	
	1 year	2 years	Mature	2 years	Mature
Liveweight (kg)	350-450	500-700	700-850	350-450	480-600
Wither height (cm)	123	126	132	118	127

FUNCTIONAL CHARACTERISTICS

Work was for long the dominant function of this breed, and the animals are docile, as well as willing workers. Cattle reared on the mountains are less massive and strong than those grown and

managed on the plains under superior nutritional and management conditions. In recent years, the demand for work oxen has diminished and greater attention has focused on meat characters. Animals of this breed are, however, somewhat slow in growing and maturing, although the quality of their carcasses is good. As milk producers, their yields are slowly being improved, as shown in Table 115.

TABLE 115. — AVERAGE LACTATION RECORDS OF GREY ADIGE COWS

	1st lactation	2nd lactation	3rd lactation
 Kilograms		
Average 1937-41	2 136	2 146	2 714
Average 1953	2 418	2 714	2 998

BREED ORGANIZATION

Quality standards were prescribed in 1931 and accepted by the Ministry of Agriculture and Forests in 1934, when a Herdbook was opened. In 1956, there were 50,048 Grey Adige cattle, of which some 6,200 were registered. The breed is continuously being crossed with the Brown Swiss to improve its meat and milk productivities.

Pinzgau (Mölltal, Pezzata Rossa Norica)

ORIGIN

These cattle have derived from pure Pinzgau importations and from the grading up of the local Mölltal cattle to the Pinzgau.

LOCATION, TOPOGRAPHY AND SOILS

Pinzgau cattle are to be encountered in the provinces of Bolzano (Val Pusteria and Val Aurina), Gorizia, Udine (Prealpi Giulia, Gemona and Canal del Ferro).

CLIMATE

The conditions in which this breed is found in Italy are illustrated by the data for Gorizia and Udine in Table 116.



FIGURE 125. — Pinzgau bull (Anker 7849), 2 years old. 1,020 kilograms liveweight.
Courtesy Rapid

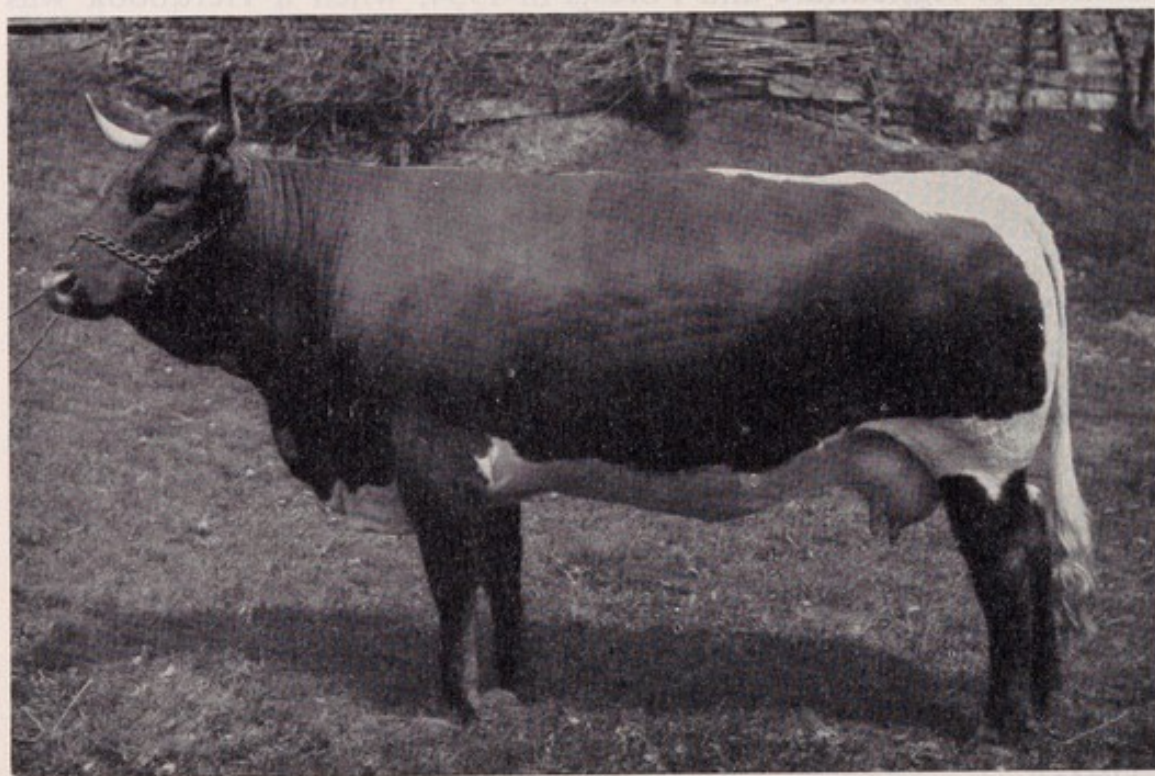


FIGURE 126. — Pinzgau cow (Gunda 5555), 6 years old. Yielded 3,939 kilograms of milk containing 4.01 percent of butterfat.
Courtesy Rapid

TABLE 116. - AVERAGE CLIMATIC CONDITIONS FOR PINZGAU CATTLE IN ITALY

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
GORIZIA												
Temperature (°C)	3.3	5.3	10.4	12.5	16.1	20.0	22.2	21.5	17.3	12.2	10.0	6.3
Rainfall (mm)	54	10	133	133	142	163	105	118	113	95	195	217
UDINE												
Temperature (°C)	3.4	5.8	8.1	11.6	18.6	20.4	24.0	22.5	19.2	13.6	9.6	5.5
Rainfall (mm)	63	49	65	164	94	184	97	81	114	121	173	164

FEEDING AND MANAGEMENT

As would be expected for a breed which is well adapted for meat production and is at the same time capable of yielding reasonable amounts of milk, the feeding and management have to be rather good. On the other hand, the Pinzgau has the ability to subsist on hard mountain pastures but, naturally, its productivity is then very much reduced.

PHYSICAL CHARACTERS

These are similar to those described on p. 39. Details of live-weights and body measurements are given in Table 117.

TABLE 117. - SOME AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF PINZGAU CATTLE IN ITALY

	Males			Females	
	1 year	2 years	Mature	2 years	Mature
Liveweight (kg)	250-300	450-500	600-700	300-500	400-500
Wither height (cm)	123	126	132	118	127

FUNCTIONAL CHARACTERISTICS

Similar to those described on p. 40, although the average Italian milk yield for 2,535 cows was 2,892 kilograms containing 3.97 percent of butterfat.

BREED ORGANIZATION

The Federazione Razza Pinzgau maintains a Herdbook in which 6,280 of a total population of 40,000 animals are recorded.

White Tortona
(Bionda Tortonese, Varzese, Ottonese, Montana rossa)

ORIGIN

Tortona cattle are descended from the Iberian group of cattle.

LOCATION, TOPOGRAPHY AND SOILS

White Tortona cattle are raised in the Apennines in the provinces of Alessandria (Valli Borghera, Grue and Curone), Pavia (Val Staffora, Valle di Nizza and Varzese), Piacenza (Ottone, Zerba and Cerignole) and Genoa. It is found in the lower plains, valleys, hills and mountains.

CLIMATE

The climatic conditions in which White Tortona cattle are found can be seen from the data for Genoa and Piacenza in Table 118.

TABLE 118. - AVERAGE CLIMATIC CONDITIONS FOR WHITE TORTONA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
GENOA												
Temperature (°C)	8.0	10.5	12.0	13.2	18.5	21.2	24.2	24.1	21.8	17.2	12.3	9.5
Rainfall (mm)	24	53	82	140	67	36	20	49	60	190	148	210
PIACENZA												
Temperature (°C)	2.0	4.8	9.5	11.5	15.2	20.5	23.6	21.7	17.7	12.0	7.4	2.8
Rainfall (mm)	10	11	127	90	140	73	31	83	87	121	184	140

FEEDING AND MANAGEMENT

The White Tortona is well adapted to the conditions of sparse herbage which are encountered in the mountain areas but, as has happened with many other small breeds in Italy, it has suffered

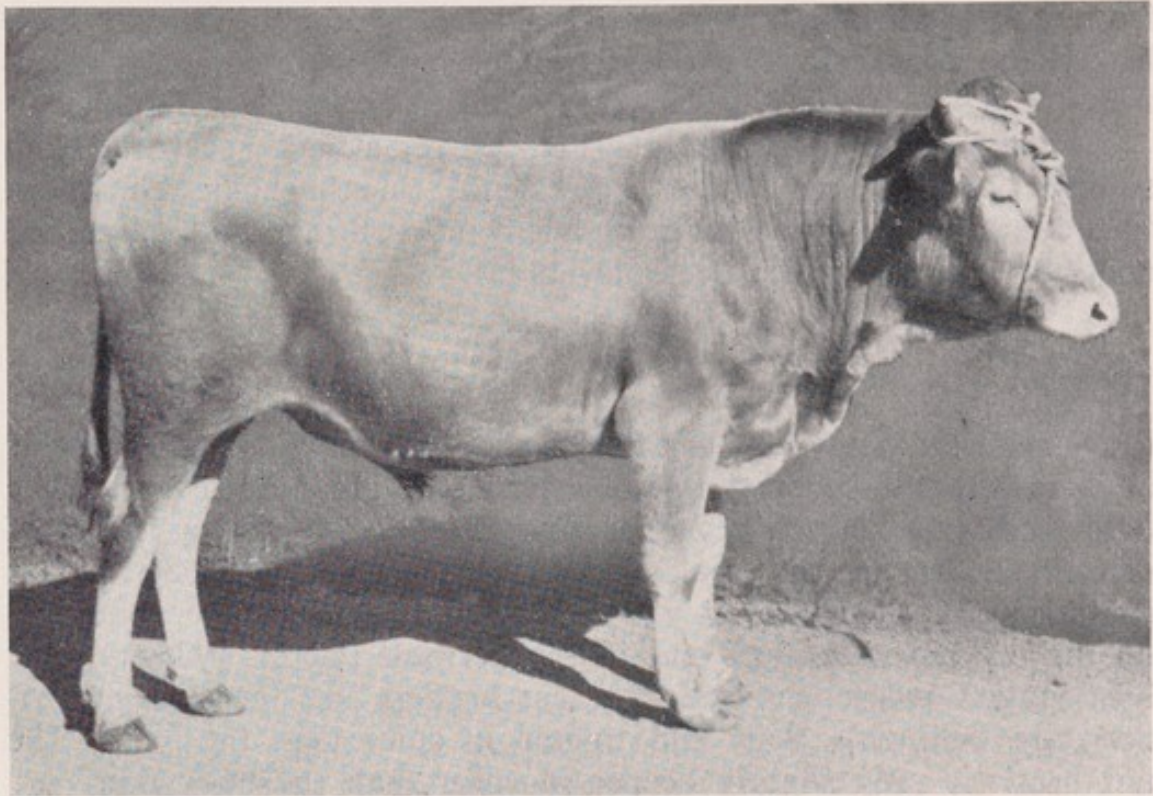


FIGURE 127. — White Tortona bull (Balin), 2 years old. 460 kilograms liveweight.
Courtesy Italian Ministry of Agriculture and Forests



FIGURE 128. — White Tortona cow (Grilla), 6 years old. 460 kilograms liveweight.
Yielded 1,574 kilograms of milk in 200 days.

Courtesy Italian Ministry of Agriculture and Forests

from lack of finances and from the fact that mountain farmers have lacked the economic incentive to adopt modern practices of selection.

Feeding and management systems cover a wide spectrum from summer grazing and winter subsistence on the higher mountain sites to intensive farms, with supplementary forage and purchased concentrates, in the fertile valley areas.

PHYSICAL CHARACTERS

The short, shiny hair is a dark yellowish brown or wheat color at birth but this becomes lighter after 3 to 4 months of age. The adult coat is a whitish wheat or straw color with various zones of denser shades in the males, e.g., on the head, on the ribs and shoulders. Lighter, almost white, hairs are found on the abdomen, on the insides of the legs and in the perineal region. The muzzle, lips, tongue, palate, the eyelashes, ear borders and the external orifices are yellowish pink and lighter in color than the hair. The tail brush is only slightly deeper in color than the body hair.

The skin is elastic and easily manipulated, while the head is relatively long with a straight profile (or slightly convex in the female), a broad forehead and moderately broad muzzle. The horns are small, spread sideways from the head and then forward, to end with turned-in points. The color of the horns is yellowish at the base and dark at the points.

The cylindrical trunk is long, the chest deep and the ribs are nicely sprung. The withers are slightly pronounced and the sternum is well muscled. The loins are short, wide and level and the hind-quarters tend to be horizontal, although the spine is somewhat elevated near the tail junction. The udder is small, with regular teats, while the legs are firmly boned and strong. The quarters are fairly well muscled. Table 119 gives data for liveweights and body measurements.

FUNCTIONAL CHARACTERISTICS

The breed is very rustic and is raised for milk, meat and work, with the emphasis on the latter in the poorer areas and with increasing attention to milk and meat where feeding and management conditions are suitable.

In 280 days, the average milk production, in 1942, was around 1,200 kilograms containing 4 percent of butterfat. Similarly, the meat production abilities are also rather modest. Male calves at

TABLE 119. - AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF WHITE TORTONA CATTLE

	Males		Females	
	2 years	Mature	2 years	Mature
Liveweight (kg)	350	500	240	335
Wither height (cm)	126	132	118	120
Body length (cm)	—	—	—	142
Chest girth (cm)	—	—	—	161
Chest depth (cm)	—	—	—	59

6 months of age weigh 129 kilograms and females one year old scale 147 kilograms, but the scarcity of feed is extremely limiting. Milk-fed veal calves yield 56 to 58 percent of carcase weight, ordinary calves 52 to 54 percent, adult bulls and oxen render 50 percent and adult cows 38 percent.

The working ability naturally varies with size and nutrition but the animals from the Piacenza province are preferred for draft purposes.

BREED ORGANIZATION

Much crossing of the White Tortona breed is now occurring in an attempt to increase its productive powers and only approximately 21,000 animals remain pure.

Pontremoli (Pontremolese)

ORIGIN

The origin of this breed is unknown to the authors but it probably derives from stock brought to Italy from the central Alpine area.

LOCATION, TOPOGRAPHY AND SOILS

The remains of this breed are to be found in the provinces of Massa Carrara, La Spezia and Parma while, in smaller numbers, it is encountered in the mountain regions of Piacentino and oltre Po.

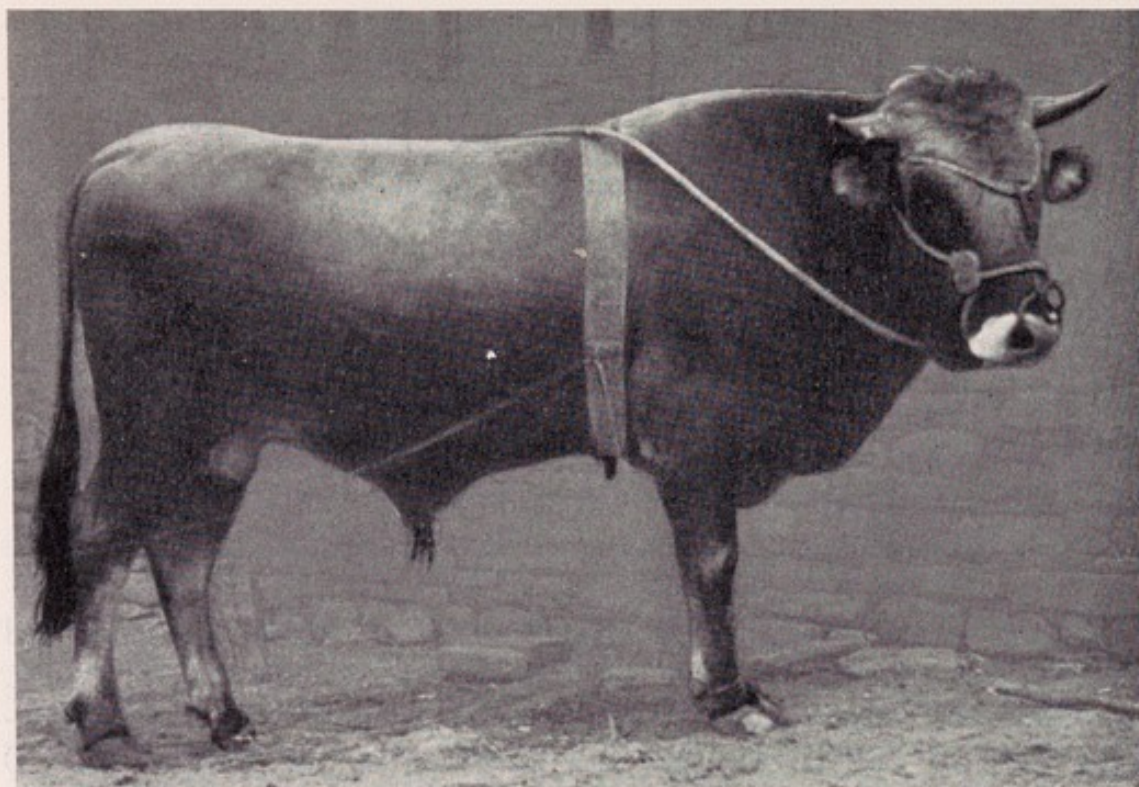


FIGURE 129. — Pontremoli bull (Moro), 3 years old.

Courtesy Italian Ministry of Agriculture and Forests

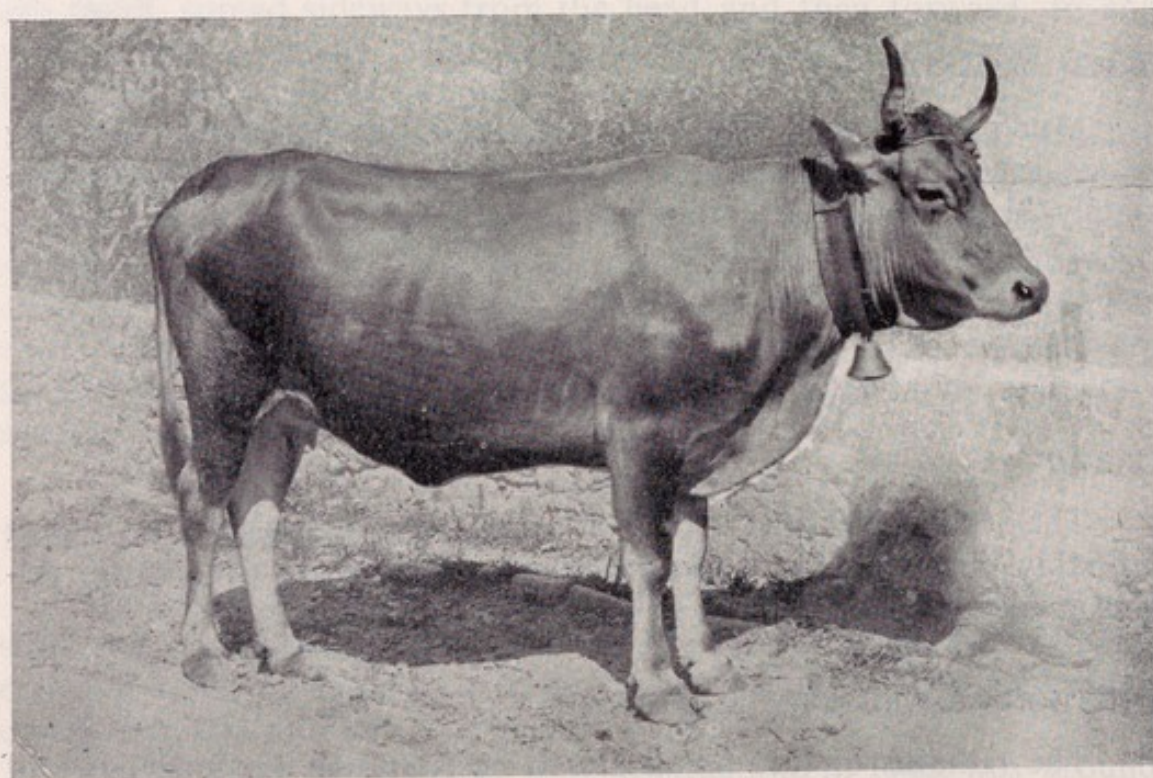


FIGURE 130. — Pontremoli cow (Fanny), 6 years old.

Courtesy Italian Ministry of Agriculture and Forests

CLIMATE

The climatic conditions of this area can be illustrated, as in Table 120, by data from Bagnone and Pontremoli.

TABLE 120. - AVERAGE CLIMATIC CONDITIONS FOR PONTREMOLI CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
BAGNONE												
Temperature (°C)	5.9	8.4	8.6	11.0	17.2	20.4	23.8	23.5	19.2	14.3	9.8	7.8
Rainfall (mm)	67	84	82	127	87	82	41	120	144	238	158	324
PONTREMOLI												
Temperature (°C)	5.7	7.4	8.7	11.3	16.7	18.8	21.6	21.5	18.1	13.2	9.8	6.5
Rainfall (mm)	86	74	109	188	60	81	43	60	90	309	250	377

FEEDING AND MANAGEMENT

The Pontremoli is adapted to mountainous conditions, where feed is scarce in the winter and the stock are subjected to varying periods of subsistence. On the lower land, the productivity resulting from the better feeding and management conditions has not been sufficiently encouraging to justify any extension of this breed.

PHYSICAL CHARACTERS

The hair is yellowish brown (deep wheat color), with a clear stripe along the back and with varying darker shades on the head, around the eyes, on the side of the neck and shoulders, on the front of the legs and the lower third of the body.

The hair is short and fine on a medium-thick skin, which is flexible and handles well. The head is rather long, rectilinear in profile and slightly depressed between the eyes. The horns, yellowish white at the base and black at the ends, grow outward from the head of the bull and then curve slightly forward and upward. In cows, the horns may also curl backward and upward.

The body is somewhat short, while the withers stand above the backline but are not always sufficiently muscular. The loins are short and wide but the quarters slope from the spinal column to

the sides and downward from the loins to the ischium. These poor quarters constitute a serious defect of the Pontremoli cattle. The ribs are often not well sprung, although the chest is deep. The sternum is rather narrow, the legs are lightly boned and not very muscular, and the udder, globular in shape, is well attached but small. Table 121 gives data on liveweights and body measurements.

TABLE 121. — SOME AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF ADULT PONTREMOLI CATTLE

	Males			Females		
	1 year	2 years	Mature	1 year	2 years	Mature
Liveweight (kg)	200	400	600	165	280	450
Wither height (cm)	120	—	135	—	115	128

FUNCTIONAL CHARACTERISTICS

The diminished demand for working oxen, the inferior meat returns and the low milk outputs have acted seriously against this breed and encouraged crossings with other breeds such as the Brown Swiss. In 1938, a milk yield of 1,615 kilograms in 280 days' lactation and containing 4.0 percent of butterfat was recorded but the war interrupted this improvement program and it has not been started again.

BREED ORGANIZATION

A Herdbook and Breeders' Association were approved in 1935, when there were some 5,700 animals of the Pontremoli breed. In 1954, there remained only some 1,700 to 2,000 animals, and the crossing program with Brown Swiss makes it fairly certain that this breed will slowly disappear.

Garfagnana (Garfagnina)

ORIGIN

According to some authorities, the Garfagnana breed has derived from the primitive Podolic cattle.



FIGURE 131. — Garfagnana bull (Olimpo), 4 years old. 900 kilograms liveweight.
Courtesy Italian Ministry of Agriculture and Forests

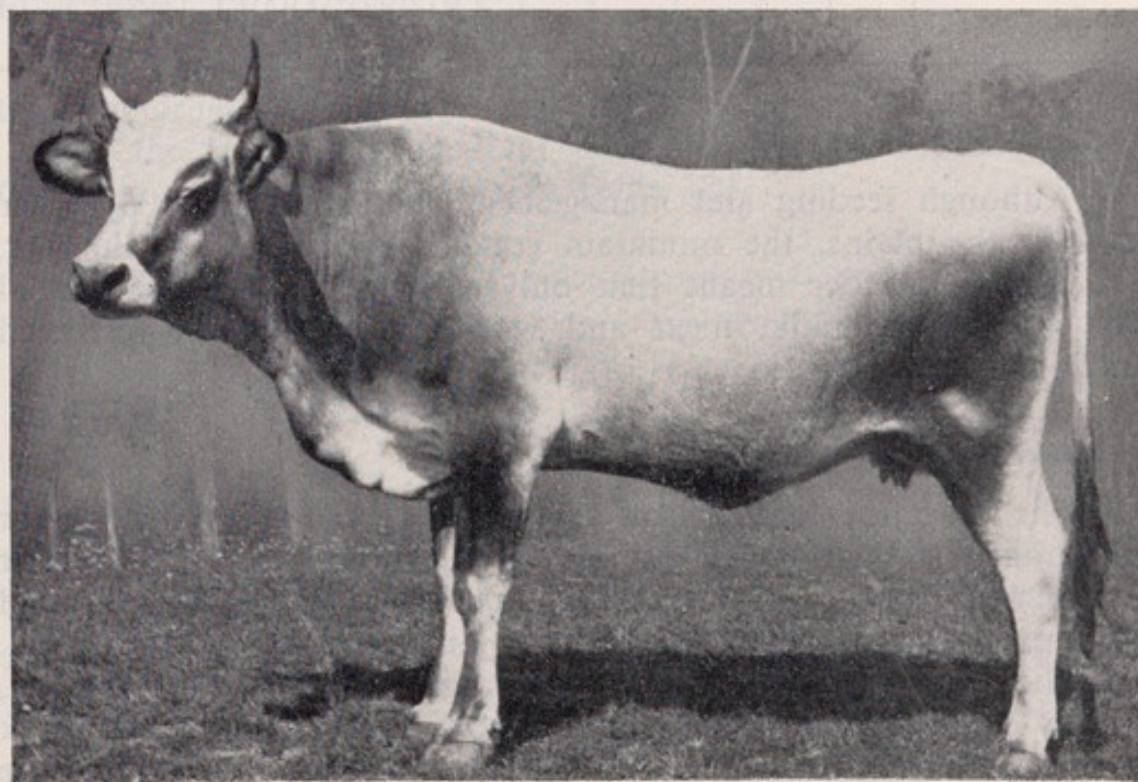


FIGURE 132. — Garfagnana cow (Onorata 2388), 4 years old.
Courtesy Italian Ministry of Agriculture and Forests

LOCATION, TOPOGRAPHY AND SOILS

The Garfagnana breed is found chiefly in the provinces of Lucca and Modena but also occurs in the provinces of Reggio Emilia, Massa, La Spezia and Genoa. It exists on the plains and lower hills as well as on the mountain slopes.

CLIMATE

Typical climatic conditions for this breed are shown in Table 122.

TABLE 122. - AVERAGE CLIMATIC CONDITIONS FOR GARFAGNANA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
LUCCA												
Temperature (°C)	6.5	8.9	9.9	12.3	17.8	20.9	24.2	24.0	20.7	15.4	11.6	7.7
Rainfall (mm)	147	65	166	101	102	33	11	48	52	138	160	167
MASSA												
Temperature (°C)	5.8	7.8	8.8	11.4	17.3	20.7	24.5	24.5	20.5	16.0	12.2	6.9
Rainfall (mm)	45	14	126	85	47	29	9	88	67	138	104	120

FEEDING AND MANAGEMENT

Although feeding and management standards are at a higher level in the plains, the mountain conditions can be very limiting. The lack of fodder means that only a robust, economical animal can succeed for milk, meat and work purposes in the restricted nutritional environment.

PHYSICAL CHARACTERS

The fine hair is light to iron gray in color but the general color appearance is conditioned by the quantity of white or black hair mixed with the gray. The darker hair is more apparent around the eyes, ears, shoulders, on the limb joints and on the tail brush.

The head is of medium length, fine, wide in the forehead, slightly dished and furnished with horizontal ears, and a large black muzzle which is surrounded by white hairs. The body orifices are also black. The horns are somewhat long, black in stock less than 2 years old but becoming yellowish white in older cattle, except at

the end. They spread outward and forward and then twist upward and inward.

The shoulders stand above the generally straight back, the loins are wide and long, while the hindquarters are long but slope downward from the spinal ridge. Body depth is not always so satisfactory, although the ribs are, in general, adequately sprung. The legs are nicely set, with medium-thick bones on good, hard, black hooves. The udder is not large but is reasonably well hung. Table 123 gives data on liveweights and body measurements.

TABLE 123. - SOME AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF GARFAGNANA CATTLE

	Males		Females	
	2 years	Mature	2 years	Mature
Liveweight (kg)	500	650	415	455
Wither height (cm)	131	156	128	131

FUNCTIONAL CHARACTERISTICS

The breed is kept as a triple-purpose animal and the objectives, in order of importance, are milk, meat and work.

In the lower and medium altitude plains, the milk yield of Garfagnana cows is as shown in Table 124.

TABLE 124. - AVERAGE LACTATION RECORDS OF GARFAGNANA COWS

	No. of cows	Milk	Fat
		<i>Kilograms</i>	<i>Percentage</i>
1st lactation	260	1 755	4.33
2nd "	241	1 992	4.37
3rd "	229	2 163	4.39
4th "	215	2 246	4.38
5th "	190	2 306	4.38
6th "	170	2 302	4.38
7th "	122	2 274	4.34

The weight of calves at birth is 36 to 38 kilograms and these can be slaughtered for veal between 40 to 60 days of age weighing from 75 to 95 kilograms liveweight. For adult bulls, weighing 550 to 700 kilograms and for cows weighing 400 to 455 kilograms, the carcass yield is approximately 50 percent.

BREED ORGANIZATION

A Herdbook was approved by the Ministry of Agriculture and Forests in 1935. During the second world war the breed was seriously diminished. Although never a very large breed, the 18,000 head in 1938 were reduced to 6,196 in 1954 and there is now a considerable effort to rehabilitate the breed by grading it up to the Brown Swiss.

Pisa (*Mucca Pisana*)

ORIGIN

This is not known to the authors, although it probably derives from stock brought in from the Alpine region.

LOCATION, TOPOGRAPHY AND SOILS

The Pisa breed is found in the provinces of Pisa and Lucca.

CLIMATE

The climatic conditions may be represented, as in Table 125, by data from Viareggio and Lucca, while the conditions at Pisa can be seen on p. 177.

TABLE 125. — AVERAGE CLIMATIC CONDITIONS FOR PISA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
VIAREGGIO												
Temperature (°C)	6.6	8.2	8.9	10.8	15.5	18.5	21.2	21.3	18.6	14.5	10.9	8.1
Rainfall (mm)	97	33	85	74	59	21	9	66	35	111	115	127
LUCCA												
Temperature (°C)	6.5	8.9	9.8	12.3	17.8	20.9	24.2	24.1	20.7	15.4	11.6	7.7
Rainfall (mm)	147	65	117	101	101	33	10	48	52	138	160	167



FIGURE 133. — Pisa bull (Pisano), 3 years old. 900 kilograms liveweight.

Courtesy Italian Ministry of Agriculture and Forests

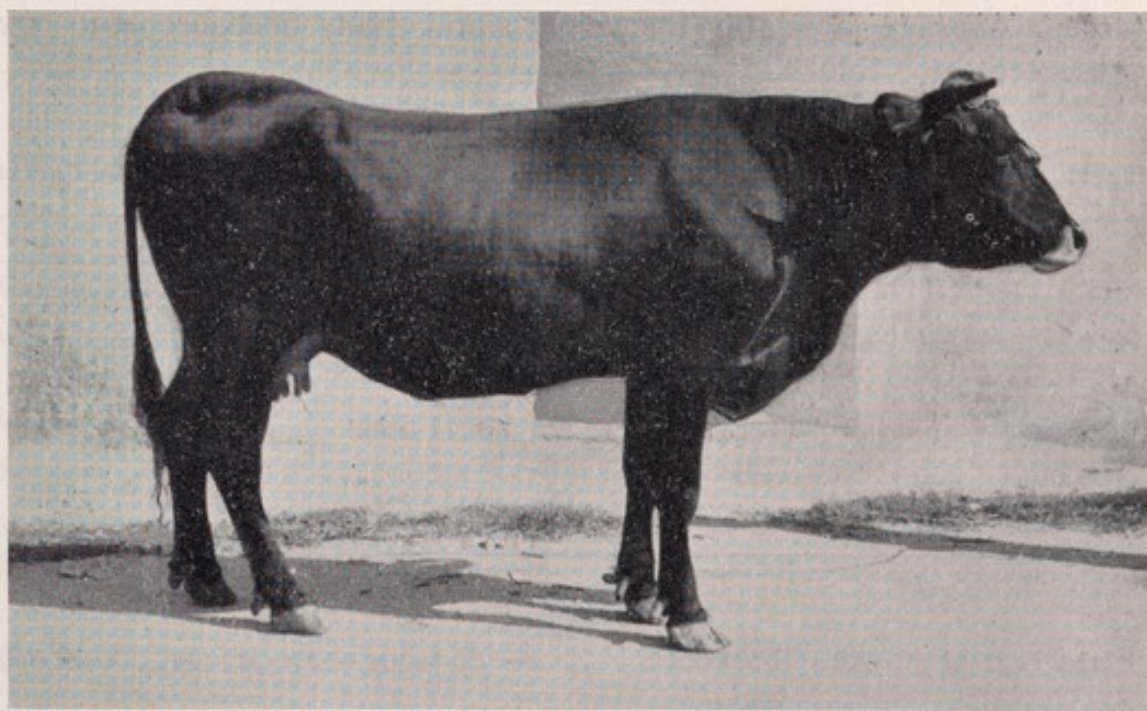


FIGURE 134. — Pisa cow (Nedà), 5 years old. 600 kilograms liveweight. Yielded 2,146 kilograms of milk.

Courtesy Italian Ministry of Agriculture and Forests

FEEDING AND MANAGEMENT

The breed has been expected to feed itself on the available pastures in the mountains and to get the coarser straws and hays on the lower lands. It has not responded well to supplementation and is slowly being discarded.

PHYSICAL CHARACTERS

The hair is chestnut colored with varying shades from light to dark. Along the back is a reddish line. The muzzle is blackish and is surrounded by white hair, the tongue and external orifices are also dark in color and the tail brush is dark chestnut.

The forehead is wide with a depression between the eyes, while the profile is straight or slightly dished. The muzzle is large but the head is relatively short. The horns are short, spread outward and then slightly forward and downward. They are yellowish with black ends.

The body is long and the chest is deep but the ribs are not too well sprung. The withers are slightly above the level of the back, the loins are wide but short, while the quarters are rectangular but fall away from the spinal column. The legs are long but fairly well muscled. The udder is small but the teats are relatively large. Average data on liveweights and body measurements are presented in Table 126.

TABLE 126. - SOME AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF PISA CATTLE

	Males		Females	
	2 years	Mature	2 years	Mature
Liveweight (kg)	725	1 500	500	800
Wither height (cm)	145	160	138	150

FUNCTIONAL CHARACTERISTICS

The animals were of a meat/work type but the emphasis on work has decreased while the meat characters have not been proportionally developed.

BREED ORGANIZATION

There are some 7,500 cattle of the Pisa breed but no Breeders' Organization exists as the Pisa is slowly being bred out by crossings with other animals.

Tarina

ORIGIN

The Tarina originated from cattle of the Tarentaise breed imported from France.

LOCATION, TOPOGRAPHY AND SOILS

These animals are found only in a restricted area in the Susa and Chisone valleys in Turin province.

CLIMATE

The climatic conditions under which this breed is kept can be seen from the data in Table 127 which refer to Susa and Lanzo.

TABLE 127. - AVERAGE CLIMATIC CONDITIONS FOR TARINA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
SUSA												
Temperature (°C)	3.0	5.3	8.7	10.8	14.7	19.1	22.3	19.5	16.5	11.9	6.7	2.2
Rainfall (mm)	10	60	62	123	81	61	47	77	46	83	115	104
LANZO												
Temperature (°C)	-1.9	2.2	5.3	7.2	11.2	15.1	18.0	15.8	12.5	6.8	1.8	-0.7
Rainfall (mm)	3	75	98	229	126	94	56	156	33	156	187	190

FEEDING AND MANAGEMENT

The breed is well adapted to living on the poor, short pastures and fodder plants but naturally this is very restrictive on productivity unless supplemental feeds such as hays, straws, crop residues



FIGURE 135. — Tarina bull (Lindo), 2 years old.

Courtesy Italian Ministry of Agriculture and Forests

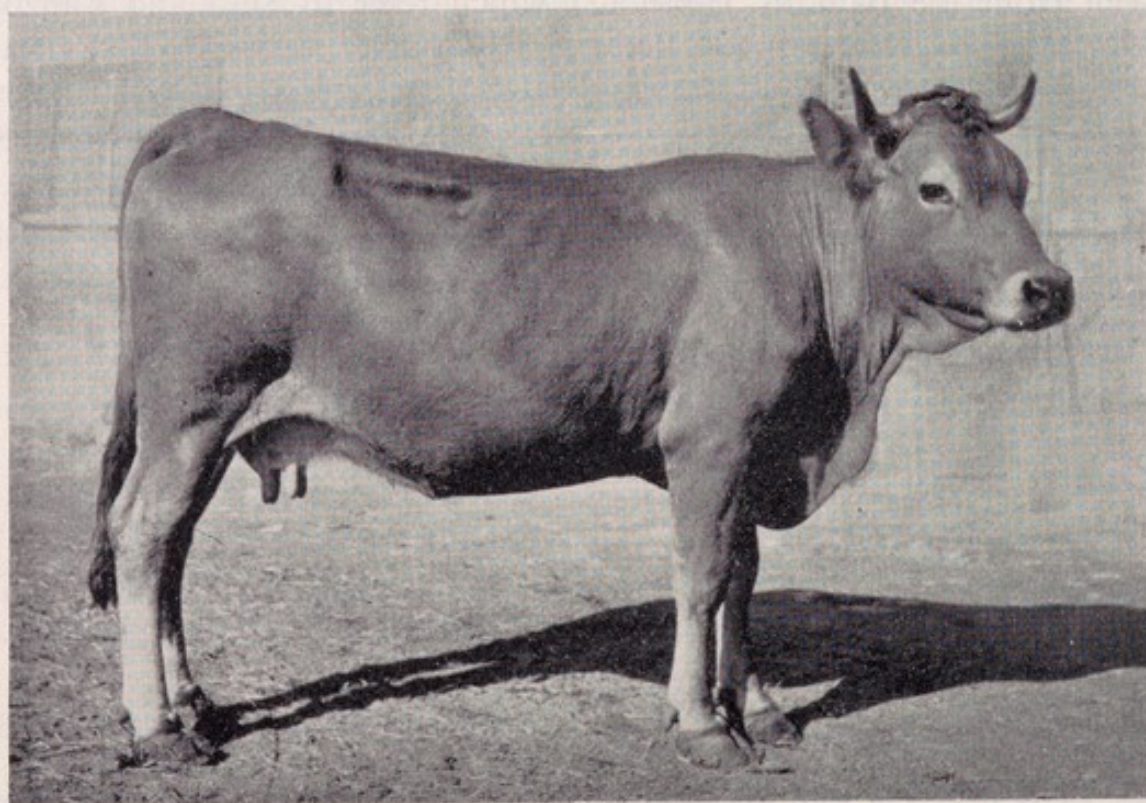


FIGURE 136. — Tarina cow (Dora), 4½ years old. 450 kilograms liveweight.

Courtesy Italian Ministry of Agriculture and Forests

and concentrates can be supplied. Great variations in conditions occur between the valley farms and those encountered in the mountain regions.

PHYSICAL CHARACTERS

These have been described for Tarentaise animals in France (see Vol. I, p. 380).

FUNCTIONAL CHARACTERISTICS

The milking potentials of this breed have been restricted by nutrition but determined efforts are now being made to select and propagate better dairy animals. In selected and improved herds, lactation records of 2,500 kilograms are averaged, while bulls are being selected from the superior producers.

The meat qualities are good and the animals give carcase yields of 48 to 50 percent and their meat is noted for its tastiness and tenderness.

BREED ORGANIZATION

There are only 12,500 head of Tarina cattle in Italy, of which 650 were registered in the Herdbook in 1955. The first attempt to establish a Breed Organization and Herdbook was made in 1888, but the greatest step forward was made when this earlier attempt was restarted in 1949.

Modica-Sardinian (Sardo Modicana)

ORIGIN

Modica cattle were originally imported from Sicily in 1880 and have done well as work animals. At the same time, crosses with the local Sardinian cattle have given rise to the present Modica-Sardinian breed.

LOCATION, TOPOGRAPHY AND SOILS

The breed is distributed throughout Sardinia but occurs in greater numbers in the southern two thirds of the island, particularly in Cagliari province.

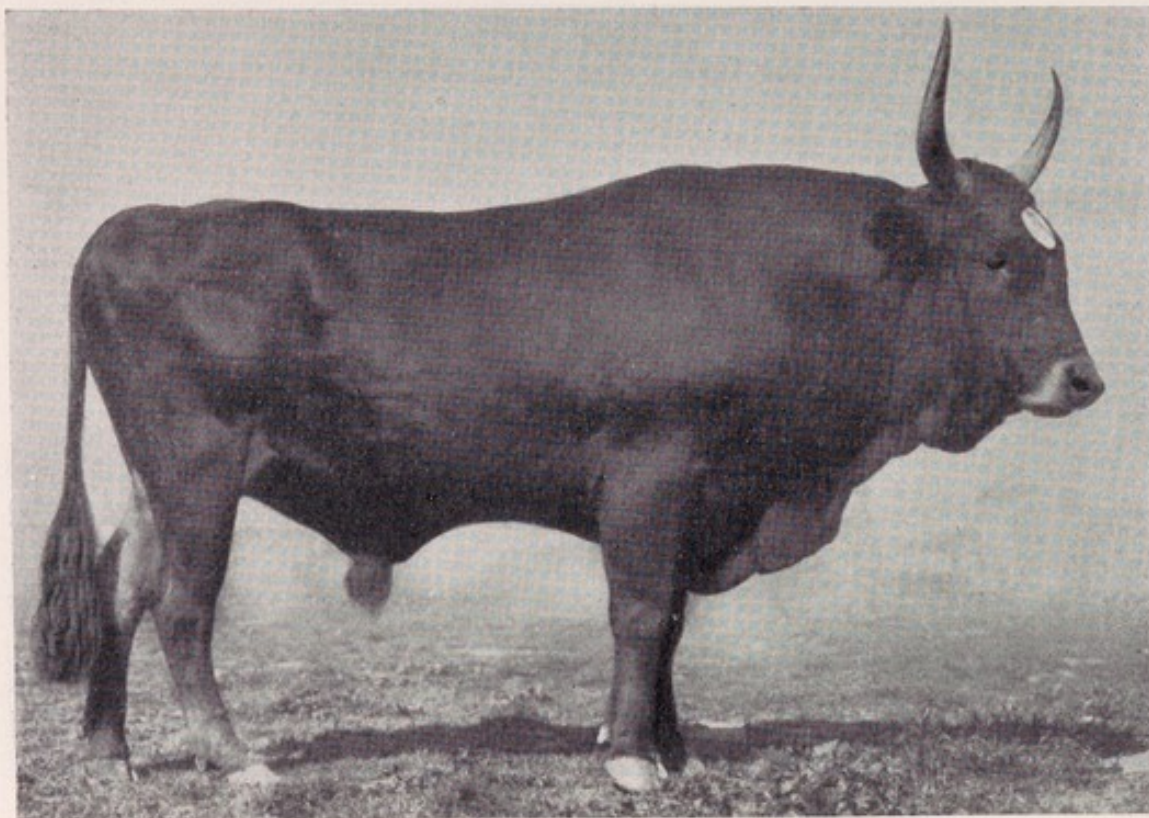


FIGURE 137. — Modica-Sardinian bull (Abboniadu), 3 years old. 771 kilograms liveweight.

Courtesy Italian Ministry of Agriculture and Forests



FIGURE 138. — Modica-Sardinian cow (Bouokla).

Courtesy Marras-Sassari

CLIMATE

The climatic conditions under which this breed lives can be represented by data from Cagliari and Iglesias in Table 128.

TABLE 128. - AVERAGE CLIMATIC CONDITIONS FOR MODICA-SARDINIAN CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
CAGLIARI												
Temperature (°C)	10.9	12.0	13.8	14.6	18.7	21.6	25.2	25.2	23.6	19.3	14.6	12.1
Rainfall (mm)	19	60	25	41	36	4	—	4	47	73	119	117
IGLESIAS												
Temperature (°C)	10.8	12.1	13.0	14.2	19.3	22.9	25.7	25.9	24.1	18.8	14.5	12.5
Rainfall (mm)	70	71	94	85	46	5	31	4	20	119	102	171

FEEDING AND MANAGEMENT

Similar to those for Modica and for Sardinian cattle.

PHYSICAL CHARACTERS

The color is wine red with black tints in the head, neck, shoulders, legs and thighs but lighter red to yellowish red are acceptable. The skin is dark red on the muzzle and slate colored on the natural orifices, while the tail brush is of the same color.

The head is relatively small, rectilinear or slightly convex in profile, with a wide forehead and a large muzzle. The horns are yellowish at the base and black at the tips and spread outward and upward but curl back at the ends.

The body is roughly parallelepiped in form, with the backline nearly horizontal. The withers are large and slightly elevated, the chest is deep, the ribs well sprung, while the loins and quarters are long and wide, although the latter slope away from the spine. The legs are strong boned and the udder is of reasonable size, well attached and carries rather large teats. Table 129 gives data on liveweights and body measurements of this breed.

PHYSICAL CHARACTERS

The Modica-Sardinian cattle have been developed primarily for work purposes but in recent years the emphasis has swung to meat and milk productivities. This breed resembles closely the Modica animals of Sicily in their meat and milk propensities (see p. 209).

TABLE 129. — AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF ADULT MODICA-SARDINIAN CATTLE

	Males	Females
Liveweight (kg)	900	550-650
Body length (cm)	—	158
Wither height (cm)	160	145
Chest girth (cm)	—	190
Chest depth (cm)	—	72
Hip width (cm)	—	52

BREED ORGANIZATION

The Ministry of Agriculture and Forests opened a Herdbook for this breed in 1936 when there were about 55,000 Modica-Sardinian cattle on the island.

Sardinian
(Sarda)

ORIGIN

The Sardinian breed has developed from stock of the Iberian type.

LOCATION, TOPOGRAPHY AND SOILS

This breed is found throughout Sardinia but occurs in greatest density in the northern half of the island.



FIGURE 139. — Sardinian bull.

Courtesy Italian Ministry of Agriculture and Forests



FIGURE 140. — Sardinian cow.

Courtesy Italian Ministry of Agriculture and Forests

CLIMATE

Climatic conditions typical for the area of this breed are given for Sassari and Olbia in Table 130.

TABLE 130. - AVERAGE CLIMATIC CONDITIONS FOR SARDINIAN CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
SASSARI												
Temperature (°C)	9.2	11.2	12.0	13.2	17.3	21.4	24.0	24.6	23.5	18.3	13.1	10.9
Rainfall (mm)	47	20	103	57	44	14	1	53	44	104	89	119
OLBIA												
Temperature (°C)	8.8	10.4	11.7	13.0	16.7	20.7	13.9	24.1	21.6	17.0	13.2	10.9
Rainfall (mm)	60	26	90	63	46	22	3	89	41	90	180	118

FEEDING AND MANAGEMENT

Feeding conditions are restrictive and many animals receive little beyond what they can graze. Others, on the lower and better farms, receive straws, hays and other crop by-products. The more fortunate receive purchased concentrates.

PHYSICAL CHARACTERS

The hair is of various colors, single-colored or spotted but, in males, red and black dominate and intermix, while in the females the color is lighter, i.e., red or yellowish brown. The hair is of medium length and rather stiff. The skin is dark and the muzzle and body orifices are black. Around the muzzle is a ring of white hair and the hair on the udders may also be white.

The head is relatively long, dished in the forehead but rectilinear in profile, has a wide muzzle and carries horns which spread outward, forward and upward. They are yellowish at the base and black at the points.

Although the chest is deep and the ribs well sprung, the dorsal line is higher at the withers and in the sacral region than at the loin. The quarters fall away from the spinal column and, too often, are not well muscled. Table 131 gives some physical characteristics.

TABLE 131. - AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF ADULT SARDINIAN CATTLE

	Males	Females
Liveweight (kg)	250	200
Body length (cm)	115-120	110-115
Wither height (cm)	100-110	100-105
Chest girth (cm)	140-150	135-145
Chest depth (cm)	55-58	52-55
Hip width (cm)	35-38	32-36

FUNCTIONAL CHARACTERS

Sardinian cattle have been raised for work purposes with the production of meat as a secondary character. They have great rusticity, are agile, willing workers but are slow in development.

BREED ORGANIZATION

No Breeders' Association has been established but there are about 47,000 animals on the island.

3. THE BALKANS AND TURKEY

HUNGARY

The greater part of Hungary consists of lowlands formed by sedimentation under water during the tertiary and early quaternary periods. From southwest to northeast, a chain of mountains divides the country into the Upper and Lower Hungarian plains. In the central area, the soil is fertile but, in the northeast, the flat plain is typically steppe (puszta) with an alkaline soil and low fertility. West of the Danube the topography is undulating and in the south it is hilly. The highest point of the central mountains is 1,015 meters above sea level at Mátra to the northeast of Budapest.

Some 62.5 percent of the total land surface is arable, while 15.5 percent is under meadows and pastures. The climate is of the continental type but the winters are not very cold. In the middle of the country, the January temperature is only slightly below zero and on the northeastern puszta it is around -2°C .

Animal husbandry has, through the centuries, been an important factor in the economic life in spite of the ravages of repeated wars. During the second world war, when livestock numbers were reduced to one half, Hungary managed to save a reasonable nucleus of better stock for the expansions in the last 18 years. By the 1945 land reform, about 40 percent of the arable land which had been large holdings were divided among smallholders and this has been followed by an increased density of livestock.

Fifty years ago, Hungarian Steppe (Podolic) cattle represented the largest breed but, with the expansion of crop cultivations, the quantities of by-products available for feeding purposes increased and made possible a swing from extensive to more intensive husbandry systems. This, in turn, led to a demand for more productive milk and meat producers and the character of the cattle population has changed significantly in consequence. There is still a demand for working animals in the smallholdings but these functions can satisfactorily be met from the improved breeds.

The Red and White breed, which now represents approximately 85 percent of the cattle population, developed from the systematic upgrading of indigenous stock with imported Simmentals since 1870. The present cattle breeds are distributed as shown in Table 132.

TABLE 132. - DISTRIBUTION OF CATTLE BREEDS IN HUNGARY

Breed	Percentage
Hungarian Red and White	85.0
Simmental	7.0
Hungarian Brown	1.5
Hungarian Steppe (Podolic)	0.5
Others	6.0

BREED ORGANIZATION

The 1945 land reform, although it increased the importance of animal production, probably delayed the improvement of the stock. By 1960, 95 percent of the smallholdings had been converted into co-operative and state farms and so the stock have again become grouped into large herds where breed improvement becomes a more easily attainable objective.

Breeders' Associations were formed in 1920 but breeding activities, Herdbook and milk recording are now co-ordinated on a national level by the Inspectorate of Herdbooks and Progeny Testing operating under the Ministry of Agriculture. Milk recording is carried out according to international standards and progeny testing by the Danish system, although the English contemporary system is used in some districts. Artificial insemination has increased rapidly in recent years and, in 1961, some 71 percent of the cow population were treated by this method.

Hungarian Red and White

ORIGIN

The Hungarian Red and White breed has developed from the primitive Podolic cattle brought in from the Volga by invasions of early times. Many crossings with animals from other European



FIGURE 141. — Hungarian Red and White bull (Lotto 10/7 Gn 232). Dam yielded 6,307 kilograms of milk containing 3.9 percent of butterfat in fourth lactation.

Courtesy Kecskés

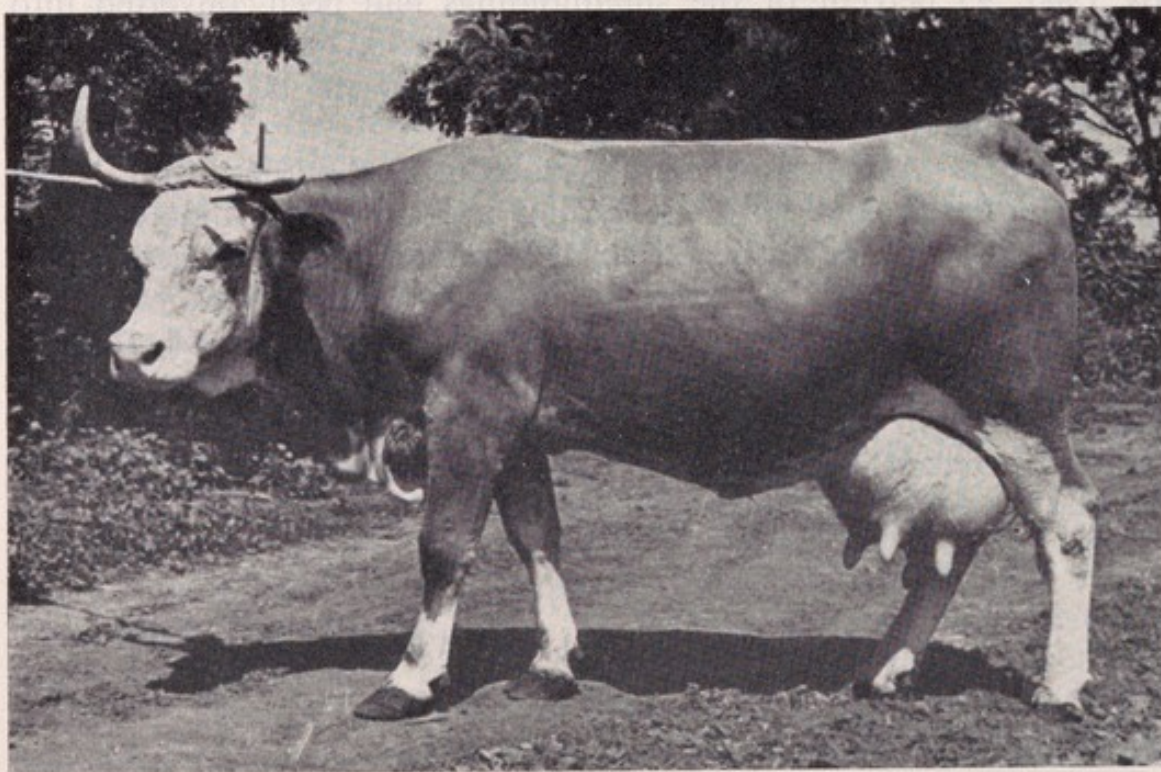


FIGURE 142. — Hungarian Red and White cow (Irmi 48). Yielded 47,821 kilograms of milk containing 4.24 percent of butterfat in ten years.

Courtesy Kecskés

countries took place during the centuries but, since 1870, the Simmental has figured largely in the establishment of the modern breed. Considerable variation used to exist between the conformational characters of different localities (Bonyhádi, Vasi, etc.) but now the breed is fairly uniform.

LOCATION, TOPOGRAPHY AND SOILS

Red and White cattle are now widely distributed, outside the more alkaline steppe regions, in both the plains and in the hills. The soil ranges from clay to peat or sandy gravels and the altitude varies between 100 and 600 meters.

CLIMATE

The climatic conditions are typically continental, as may be seen from the data in Table 133.

TABLE 133. — AVERAGE CLIMATIC CONDITIONS FOR HUNGARIAN RED AND WHITE CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-2.2	0.5	6.7	11.1	16.1	18.9	21.7	20.6	16.7	11.7	6.7	1.7
Rainfall (mm)	38	33	46	58	68	74	54	48	54	58	54	51

FEEDING AND MANAGEMENT

The pastures produce well in the early grazing period, which lasts from May to November, but dry off during July and August and grow again in September. Besides pasture, the better animals receive green maize fodder in summer but all exist largely on stovers and straws during the winter, supplemented in some cases with lucerne or cereal hays, roots, silage, and sugar beet tops. The better stock may live indoors all the year, going out to pasture daily in the summer. All young stock and the less intensively farmed cattle are out on summer grazings but return to the farmstead for the winter.

PHYSICAL CHARACTERS

The color pattern is similar to that of the Simmental, except that the red patches are more irregular. The color of the patches may vary from light yellow to deep red. Also, due to the early ancestors, dark gray or brownish pigmentations occur on the skin, on the muzzle, at the ends of the horns and on the hard hooves.

The other body characters and measurements follow closely those of the Simmental, with mature liveweights for bulls and cows of 800 and 425 kilograms respectively. Cows are about 167 centimeters long, 140 centimeters high at the withers, with a chest girth of 200 centimeters and a depth of 73 centimeters, while the hip width is 53 centimeters.

FUNCTIONAL CHARACTERISTICS

The breeding aim is to develop a dual-purpose animal with the primary emphasis on milk but with beef production as a valuable secondary character. Heifers calve for the first time when between 33 and 36 months of age. Male offspring average 43 kilograms and females 38 kilograms at birth. Bulls are used for service when between 15 and 20 months and remain at stud for 4 years.

The average lactation yield in 1961 for 84,552 recorded cows was 3,445 kilograms of milk containing 3.87 percent of butterfat. To be registered in the Herdbook, a cow must produce 5,000 kilograms of milk containing 3.9 percent of butterfat. Milk yields are higher in the estates than in the communal herd animals.

These cattle have good fattening abilities, are fattened in yards, and many animals weighing from 650 to 850 kilograms are exported annually for slaughter. This breed resembles the Simmental for beef purposes.

Although used for draft and general farm work, the Hungarian Red and White is not being developed for these purposes.

BREED ORGANIZATION

The Herdbook activities are supported by the state and the activities regarding registration, progeny testing, milk recording and analysis and the extension of artificial insemination are being pursued on an expanding scale.

There are 1,125,000 animals of this breed inscribed in the Herdbook (28 percent of the total cattle population) in Hungary and the numbers are increasing.

Simmental

ORIGIN

These animals have descended from purebred imported Swiss stock, but locally bred cattle with 4 topcrossings to purebred bulls may be registered in the Simmental Herdbook of Hungary.

LOCATION, TOPOGRAPHY AND SOILS

Simmental cattle are found chiefly in the east of Hungary.

CLIMATE

Table 134 presents the climatic data for Debrecen, which may be considered to represent the area in which Simmental cattle are distributed.

TABLE 134. - AVERAGE CLIMATIC CONDITIONS FOR SIMMENTAL CATTLE IN HUNGARY

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-3.4	-1.6	4.0	10.5	15.3	18.6	20.9	19.8	15.2	10.4	3.3	-1.8
Rainfall (mm)	30	25	36	44	66	80	76	60	48	65	51	41

FEEDING AND MANAGEMENT

The details described on p. 243 for Hungarian Red and White cattle apply equally to the Simmental breed.

PHYSICAL CHARACTERS

The description of Simmental cattle in Switzerland also refers to the Hungarian animals.

The average body weight of cows is 660 kilograms, while their wither heights and chest girths are 140 and 209 centimeters respectively.

FUNCTIONAL CHARACTERISTICS

These follow very closely those described on p. 244. In 1961, 681 milk recorded cows yielded an average of 3,528 kilograms of milk containing 3.84 percent of butterfat.



FIGURE 143. — Simmental bull (Lotto 10/7 Gn 232). Dam yielded 6,307 kilograms of milk containing 3.9 percent of butterfat in fourth lactation.

Courtesy Kecskés

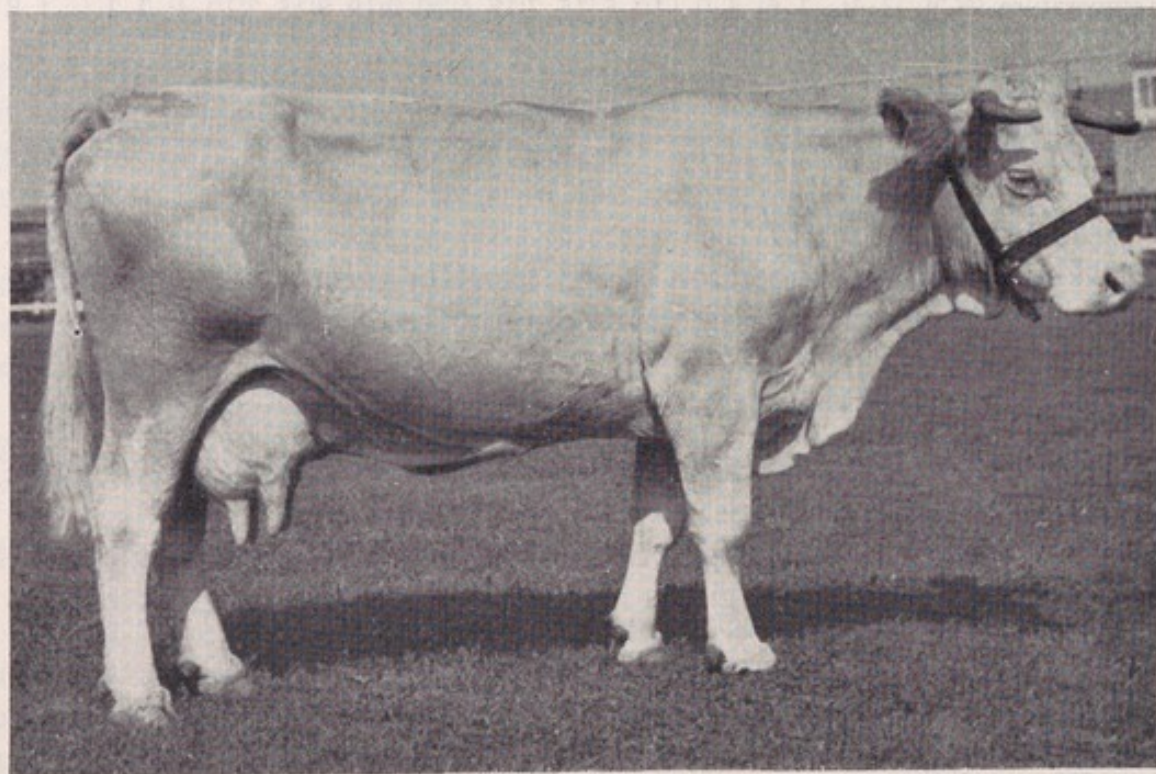


FIGURE 144. — Simmental cow (Cukor 82). Maximum lactation yield: 11,901 kilograms of milk containing 3.9 percent of butterfat.

Courtesy Kecskés

More attention is now being devoted to the improvement of the meat-producing abilities of the Simmental breed in Hungary.

BREED ORGANIZATION

A Breeders' Association has been operating since 1920, and its activities are co-ordinated under the Ministry of Agriculture.

Hungarian Brown

ORIGIN

The Hungarian (or Carpathian) Brown cattle derive from the small Sub-Carpathian stock which have, since the last quarter of the nineteenth century, been improved by crossing and grading with bulls imported from Switzerland, southern Germany and Austria. The descendants of these Alpine stock were distributed on peri-urban lowland estates before the implementation of the land reform policy, introduced after the second world war. These improved cattle, analogous in conformation to the Brown Swiss in its original home, have subsequently been spread to the newly formed smallholdings, where feeding and management permit their exploitation and where conditions are such that they can be kept to supply milk to urban populations.

Unimproved Carpathian Brown cattle are found, for the most part, in the hilly country in the northeast of Hungary, near the Soviet border and also across the border in the Trans-Carpathian Ukraine. These are smaller and of poorer conformation than the above-mentioned Alpine stock but many are sold to the plains before they reach maturity and, in fact, the economy of the cattle industry on the hills depends on these regular sales. These unimproved animals are very hardy, possess considerable vigor and endurance and are surprisingly good producers either for milk or for work purposes.

CLIMATE

Hungarian Brown cattle live in a typical continental climatic area modified by local variations in altitude. Data for Nyíregyháza, near the Soviet frontier, give a general impression of the conditions under which the breed lives.

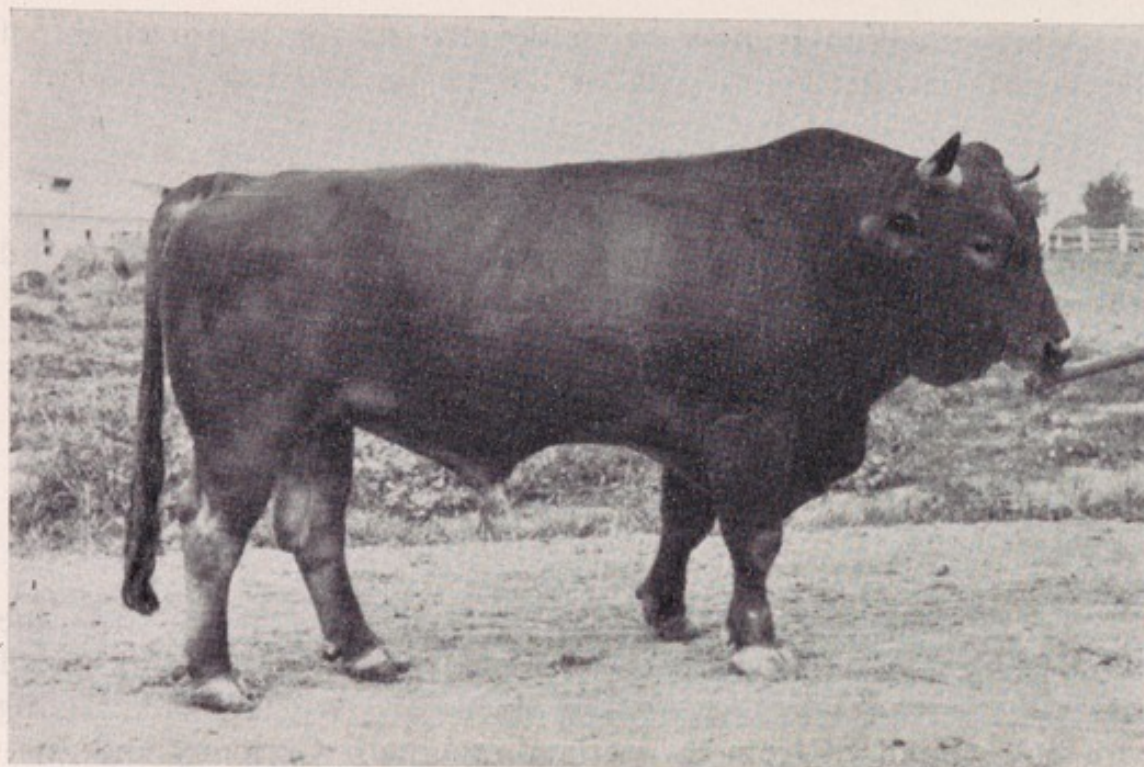


FIGURE 145. — Hungarian Brown bull.

Courtesy J. Becze



FIGURE 146. — Hungarian Brown cow.

Courtesy J. Becze

TABLE 135. - AVERAGE CLIMATIC CONDITIONS FOR HUNGARIAN BROWN CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-0.4	-1.0	4.9	10.1	15.8	18.8	20.4	19.7	15.5	10.1	4.0	0.0
Relative humidity (%)	89	89	80	73	71	70	70	74	74	83	88	91
Rainfall (mm)	28	30	33	45	55	71	68	67	50	49	45	41

SOURCE: Data supplied by Z. Csuka and collected by the Hungarian Meteorological Station.

FEEDING AND MANAGEMENT

Feeding and management practices vary appreciably with locality, the altitude and the degree of intensification. Conditions are relatively poor on the higher ground and there is a shortage of herbage and of concentrates. On the lower slopes, more meadows and pastures are encountered than on the plains and there is a higher rate of alfalfa and clover production than on the flatter arable land. Grazing takes place from May until early October but, for seven months, livestock are dependent on cut and conserved fodders.

PHYSICAL CHARACTERS

The Alpine section of this breed has been developed for milk purposes and the Sub-Carpathian group for both milk and work. The animals have loose, thin skins, which are slightly pigmented and have darker colors around the eyes, vulva, etc. The hair is short and soft and varies from light gray to dark brown, generally being darker colored in the males. The light-colored muzzle ring and a lighter back marking are general characters. The muzzle, the tips of the horns and the hooves must be dark brown or gray-black. Horns should be short and hooves must be sound. Published data are not available to indicate body measurements but Csuka (personal communication) gives the following information for mature females: weight, 280 kilograms; shoulder to pinbone, 138 centimeters; height at withers, 117.8 centimeters; depth of chest, 59.6 centimeters; width of hips, 41.7 centimeters; and chest girth, 161.1 centimeters.

FUNCTIONAL CHARACTERISTICS

The recorded milk productions of this breed for 305-day lactations are as shown in Table 136.

TABLE 136. — AVERAGE LACTATION RECORDS FOR HUNGARIAN BROWN COWS

		No. of cows	Milk yield	Fat	Calving interval
			<i>Kilograms</i>	<i>Percentage</i>	
Pre-1940	Big estates	—	3 769	3.7	at least 14 months
	Smallholdings	—	2 339	3.9	
	Superior individual	1	9 666	3.5	
1961	Average	594	3 462	3.8	—

As with many other dual-purpose breeds, it is clear that, although milk yields can be raised significantly, no high levels will be reached while there is still emphasis on working potential. Both male and female stock of the Sub-Carpathian group are used for draft purposes on smallholdings and they are recognized for their endurance, vigor and quiet disposition.

Heifers calve for the first time when about 3 years old and calvings tend to be concentrated in the spring. Male offspring weigh 30 to 35 kilograms and females 20 to 30 kilograms at birth. Bulls are used for service from about 2 years of age and remain at stud for about 5 years.

The cattle are put to work when 2 to 3 years old, have a working speed of 4 kilometers per hour and can haul 1,500 kilograms per pair of cows, or 2,000 kilograms per pair of oxen. Alpine cattle fatten readily and the Sub-Carpathian types do so very slowly, although the latter are rarely stall-fed like the former and have to fatten on hillside grazings.

BREED ORGANIZATION

With the enactment of land reform legislation in 1945, the large estates were subdivided into numerous smallholdings. In 1960, 95 percent of the latter were amalgamated into co-operative and state farms, so that the effective size of cattle units has increased, and with it the opportunities for genetic improvement. Milk recording systems have been reorganized and extended, artificial

insemination has been reinforced by progeny testing and there has been a genuine attempt to improve the productivity of the 13,000 animals in this breed.

Hungarian Steppe (Grey Hungarian or Podolic)

ORIGIN

These Steppe cattle, which originated from the Podolic group, were brought into the Danube plain with migrating human populations over 2,000 years ago. They are of the same type as those similarly spread over the southern U.S.S.R., the Balkans and parts of Italy. During the last century, due to crossings with Hungarian Red and White cattle, the numbers have been extensively reduced and would probably have been bred out had not special measures been instituted to preserve them on a small number of farms.

LOCATION, TOPOGRAPHY AND SOILS

This hardy breed exists under poor nutritional conditions in the continental climatic area of the great Hungarian plains, near the Tisza river, on alkaline soils, which are not suitable for other more productive types, and on the peaty soils on some large estates in the Danube basin between 100 and 500 meters above sea level.

CLIMATE

The relevant climatic data are summarized in Table 137, and show the typical continental climatic features, with fairly high summer temperatures and with the major proportion of precipitation falling during the summer.

TABLE 137. - AVERAGE CLIMATIC CONDITIONS FOR HUNGARIAN STEPPE CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-1.2	-0.4	5.2	10.5	16.1	19.4	21.3	20.4	15.9	10.4	4.5	0.6
Relative humidity (%)	85	80	74	68	68	68	65	70	73	79	84	86
Rainfall (mm)	32	33	35	49	58	68	57	58	49	50	47	46

SOURCE: Hungarian Meteorological Society.

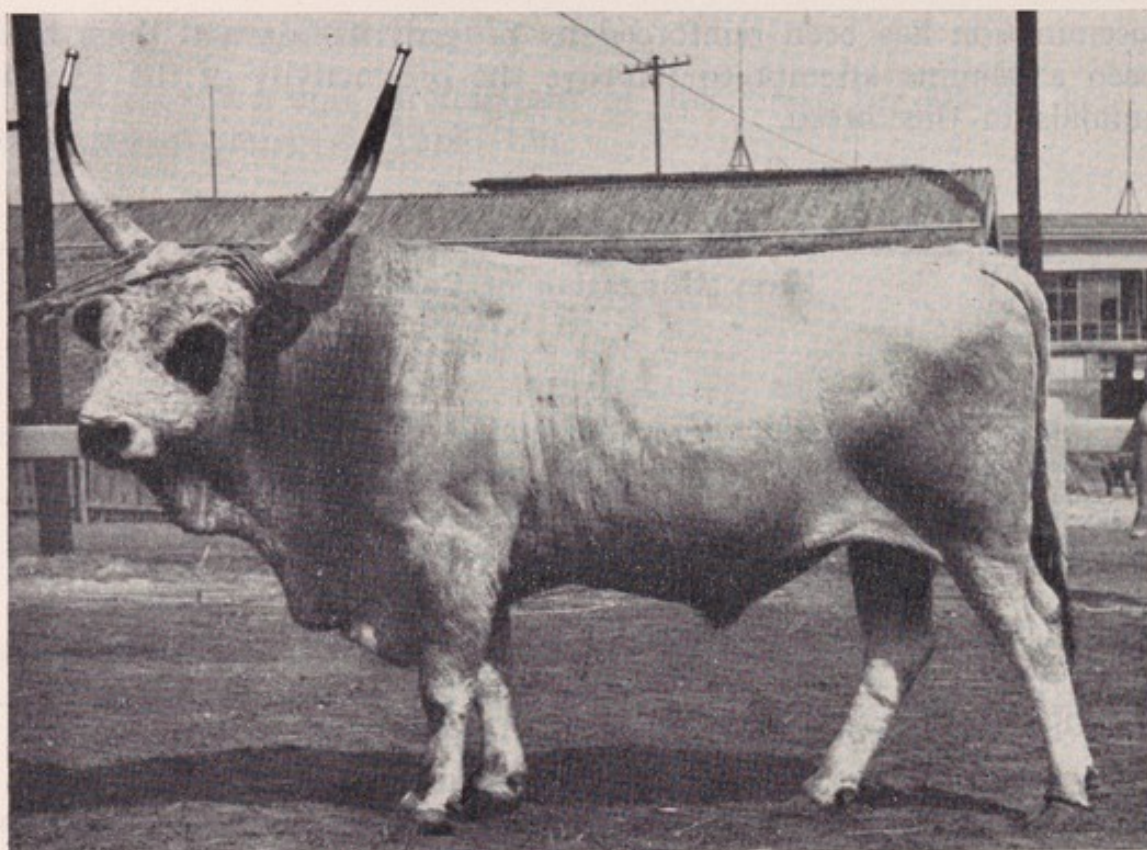


FIGURE 147. — Hungarian Steppe bull.

Courtesy J. Becze

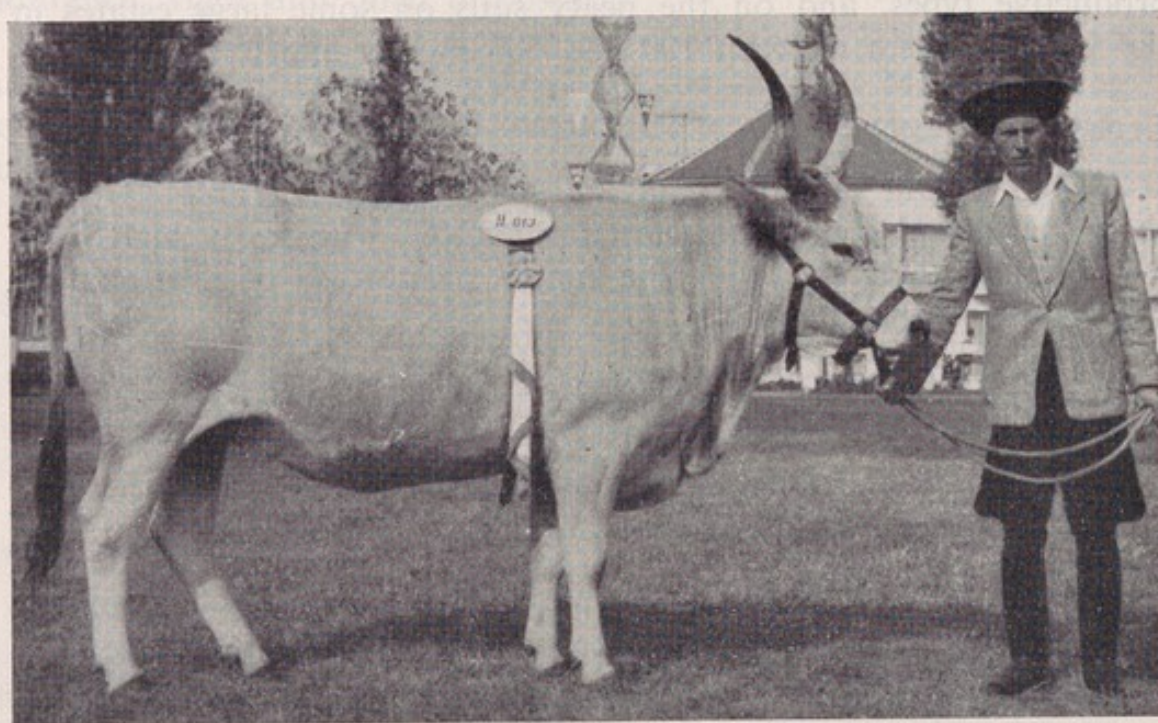


FIGURE 148. — Hungarian Steppe cow (Dugó 24). Yielded 1,237 kilograms of milk containing 4.63 percent of butterfat in fifth lactation.

Courtesy J. Becze

FEEDING AND MANAGEMENT

Over 80 percent of the area is cultivated and this provides maize stover, straws and chaff for winter feeding. Due to the lack of pastures, there is little hay other than small amounts of lucerne. Near the small villages, the animals graze communal pastures and return home for the night. They are milked twice a day and, in the winter, receive fodders from the cultivated areas in yards and byres. The communally managed herds on the alkaline soils receive good grazings during the first six to eight weeks of the grazing season (May-November) but do not return to the homesteads until winter, and so are not milked. These grazings burn out in the windy summers but regrow in autumn.

PHYSICAL CHARACTERS

The color at birth is red but changes at about 6 months of age to a light gray, with varying shades from silver to light gray. Males are normally darker colored than cows but, in all animals, the eyelids and tail switch are black, as are the muzzle and the external orifices, while the hooves are very dark gray to black. The skin carries a dark pigmentation, is thin and tight, while the hair is coarse and long in winter but short in summer.

Hungarian Steppe cattle have more *Primigenius* features than any other European breed. The head is long and carries very long, thick horns which are circular in cross section but vary appreciably in shape and may extend to 75 centimeters in bulls and 67 centimeters in cows. The horns are quite impressive looking as they bend outward and upward.

The animals have heavy necks and forequarters but are comparatively light in the more valuable loin and hindquarter regions. Udder development is poor. Liveweights of bulls vary from 250 kilograms at 2 years up to 600 to 800 kilograms when mature. Female liveweights average 150 kilograms at 2 years of age and around 535 kilograms when the cows are mature. Oxen may weigh from 550 to 650 kilograms when mature. The body measurements of cows average 165 centimeters in length, 138 centimeters in height at the withers, with a chest circumference of 209 centimeters and a depth of 73 centimeters and a hip width of 50 centimeters.

FUNCTIONAL CHARACTERISTICS

The average age at first calving is 3 to 4 years. Male calves average about 38 kilograms and females around 33 kilograms. Milk yields average 2,400 kilograms with 4.1 percent of butterfat

on the big estates and 1,400 kilograms with 5.2 percent of butterfat on smallholdings. Bulls are used for service from 2 to 2½ years of age and may have a breeding life of up to 8 years.

Owing to the shortage of fodder and its generally poor quality, no fattening occurs other than the 100 to 150-kilogram liveweight gain on the early pastures. In the fifteenth to seventeenth centuries, these animals commanded a ready sale for slaughter in Germany.

The cattle are used for light work when between 2 to 2½ years old but are 3 to 4 years of age before they undertake heavy work. A pair of oxen will pull a 1,000-kilogram load at 4 to 5 kilometers per hour. They may be employed for up to 270 days in the year for all kinds of farm work on muddy roads. Hungarian Steppe cattle have a reputation for their speed and long strides, and they exhibit a high level of endurance under unfavorable circumstances, qualities which are often lost by crossing with other breeds.

BREED ORGANIZATION

There are between 60,000 to 70,000 animals of this breed but the numbers are slowly decreasing.

OTHER BREEDS

Friesian cattle have been imported into Hungary but no Breed Society has been established. Since the second world war, Danish Jerseys, Red Danish and Kostroma cattle from the U.S.S.R. have been imported and a number of crossbreeding trials have been conducted, e.g., crosses between the Jersey and the Hungarian Red and White cattle. Some Charolais, Hereford and Aberdeen Angus bulls have also been imported for crossbreeding purposes to improve beef quality and production.

ROMANIA

Romania extends between 40° and 48° north latitude and between 20° and 27° east longitude. The southern and eastern areas are mainly lowlands with fertile soils while in the north and northwest are the Carpathian Mountains, with peaks reaching to 2,000-2,500 meters above sea level.

The climate is generally of the continental type with warm summers and cold winters, but the temperature and precipitation vary with altitude. The annual rainfall is 400 to 600 millimeters in the lowland areas but 1,000 to 1,300 millimeters in the mountain districts. Some 42.5 percent of the land surface is under arable cropping, while 17 percent is in grassland.

The total cattle population is around 4.4 million, of which about 49 percent are females (cows in milk and in-calf heifers). It is composed of Steppe cattle (*Primigenius*); Mountain cattle (*Brachyceros buša*); Simmental (*Rușețu*); Swiss Brown (*Runcu*); and Pinzgau.

The indigenous cattle are the Buša in the north and west and the Steppe cattle in the east.

The varied topography and climate create considerable diversity in agriculture but, until recently, the fragmentation of the land restricted mixed-farming ventures. Under such conditions, work oxen were particularly necessary but these have become redundant with the formation of collective farms. The latter has made possible the economic production of fodder crops and farm residues so necessary for efficient livestock production. At the same time, rational improvements in feeding and management have taken place and permitted a raising of the standards of production, so that the higher-yielding, more rapidly maturing exotic breeds and their crosses with indigenous breeds have become more generally demanded.

Romanian Buša

ORIGIN

This mountain breed in Romania is of the same origin as that of similar breeds in Bulgaria (p. 291) and Yugoslavia (p. 267).

LOCATION, TOPOGRAPHY AND SOILS

The Romanian Buša breed is found chiefly in the north and west of Romania in the mountain valleys on brown soils and also on the poorer mountain ranges.

CLIMATE

The climatic conditions of this mountainous region vary not only with altitude but can be appreciably affected by winds blowing

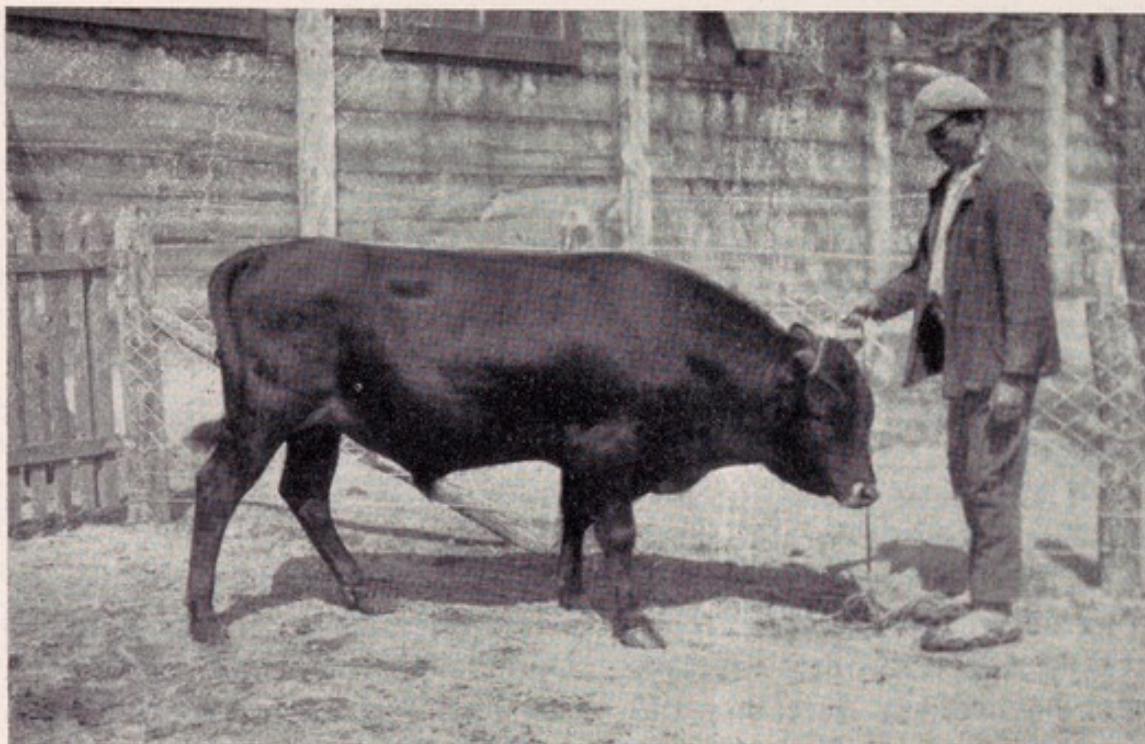


FIGURE 149. — Romanian Buša bull (Obstesc).

Courtesy University Faculty of Zootechnology



FIGURE 150. — Romanian Buša cow (Roșie germană).

Courtesy University Faculty of Zootechnology

up from the valleys and by the orientation of the valleys themselves. Table 138 presents climatic data for Chisineu.

TABLE 138. - AVERAGE CLIMATIC CONDITIONS FOR ROMANIAN BUŠA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-4.0	-2.7	2.1	9.0	15.6	19.4	21.9	21.1	16.2	10.4	3.5	-1.7
Rainfall (mm)	20	25	34	32	51	68	61	40	33	28	30	27

FEEDING AND MANAGEMENT

The feeding and management are similar, although intermediate between the conditions described for the Buša breed in Yugoslavia (p. 267) and the Greek Shorthorn (p. 303).

PHYSICAL CHARACTERS

The medium-thick skin carries medium-length hair, which is light brown to nearly black in color or sometimes gray. Some white or lighter colored hairs are encountered in the inguinal region and on the insides of the legs. The hooves and muzzle are black.

This rather small breed has a broadish forehead and straight profile. From the poll, the short horns grow outward and curl forward and upward. They are white at the base but the tips are black. The topline tends to be level but, in some animals, it dips at the loins or rises at the tail head. The chest is relatively deep, the abdomen is voluminous and the ribs may be flat-sided or rounded. The legs are short, light boned and well muscled.

Liveweights and body measurements are intermediate between those of the Yugoslav Buša (p. 270), the Greek Shorthorn (p. 304) and the Rhodope breed of Bulgaria (p. 293).

FUNCTIONAL CHARACTERISTICS

The animals are typical of the triple-purpose type but, where selection has been practiced, more emphasis has been placed on milk and meat characters and less on working ability. Milk production also varies with the level of feeding.

Romanian Steppe

ORIGIN

Romanian Steppe cattle belong to the same general type as is spread throughout the neighboring territories.

LOCATION, TOPOGRAPHY AND SOILS

The Steppe breed is found in central, eastern and southern Romania in the lowland areas.

CLIMATE

The continental climatic conditions under which this breed is found can be illustrated, as in Table 139, by data from Bucharest.

TABLE 139. - AVERAGE CLIMATIC CONDITIONS FOR ROMANIAN STEPPE CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-2.5	-0.9	6.4	11.3	18.5	20.0	22.9	22.4	18.1	11.8	5.4	-1.9
Rainfall (mm)	40	39	36	33	71	89	51	37	32	40	80	55

FEEDING AND MANAGEMENT

The feeding and management conditions can be judged from the description given on p. 295 for the same breed in Bulgaria and on p. 253 for Hungary.

PHYSICAL CHARACTERS

These Steppe cattle have the typical silver to dark gray hair color, with medium-thick skins and medium hair length.

The head is rather long, with a tendency to narrowness, and the profile is straight or slightly dished. The muzzle is black, as are the body orifices and hooves. The long horns spread outward, upward and then either outward or backward. Their color is whitish but the ends are black.

The forequarters are heavy in comparison with the hindquarters. The topline tends to be straight but often the loins dip and the tail head is set high. The chest is deep but the ribs are sometimes flat-sided and in other animals are well rounded. A marked dewlap is characteristic. The abdominal volume is capacious but the

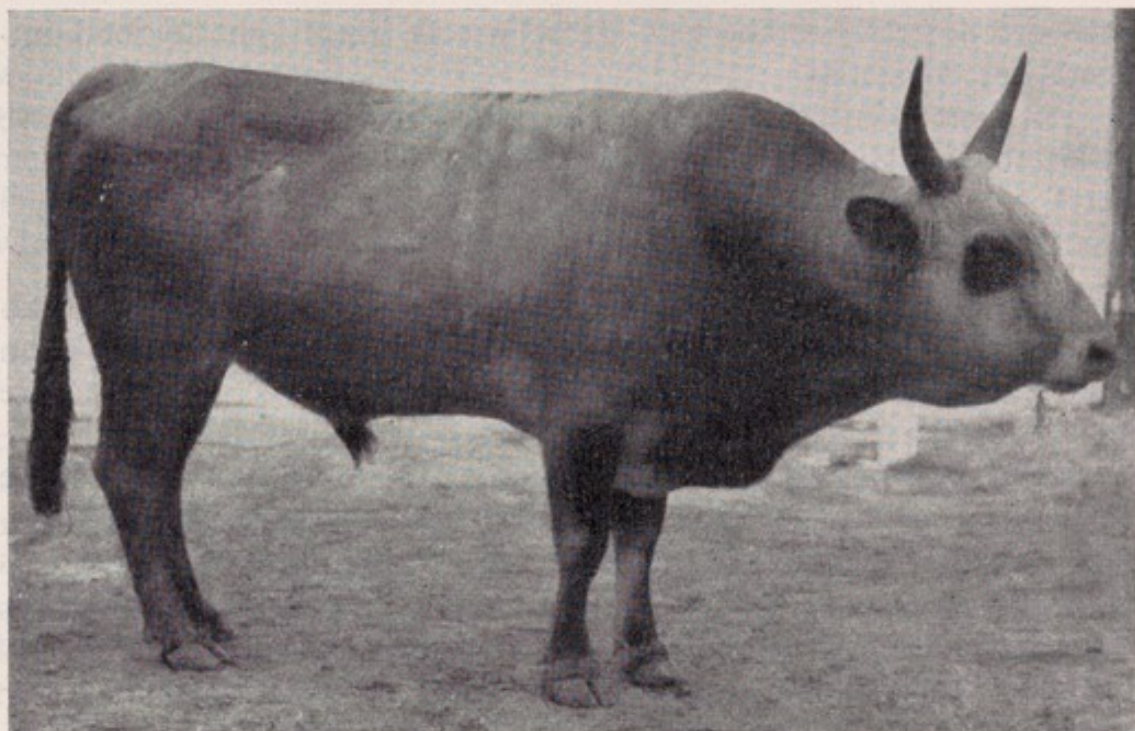


FIGURE 151. — Romanian Steppe bull.

Courtesy Fronius

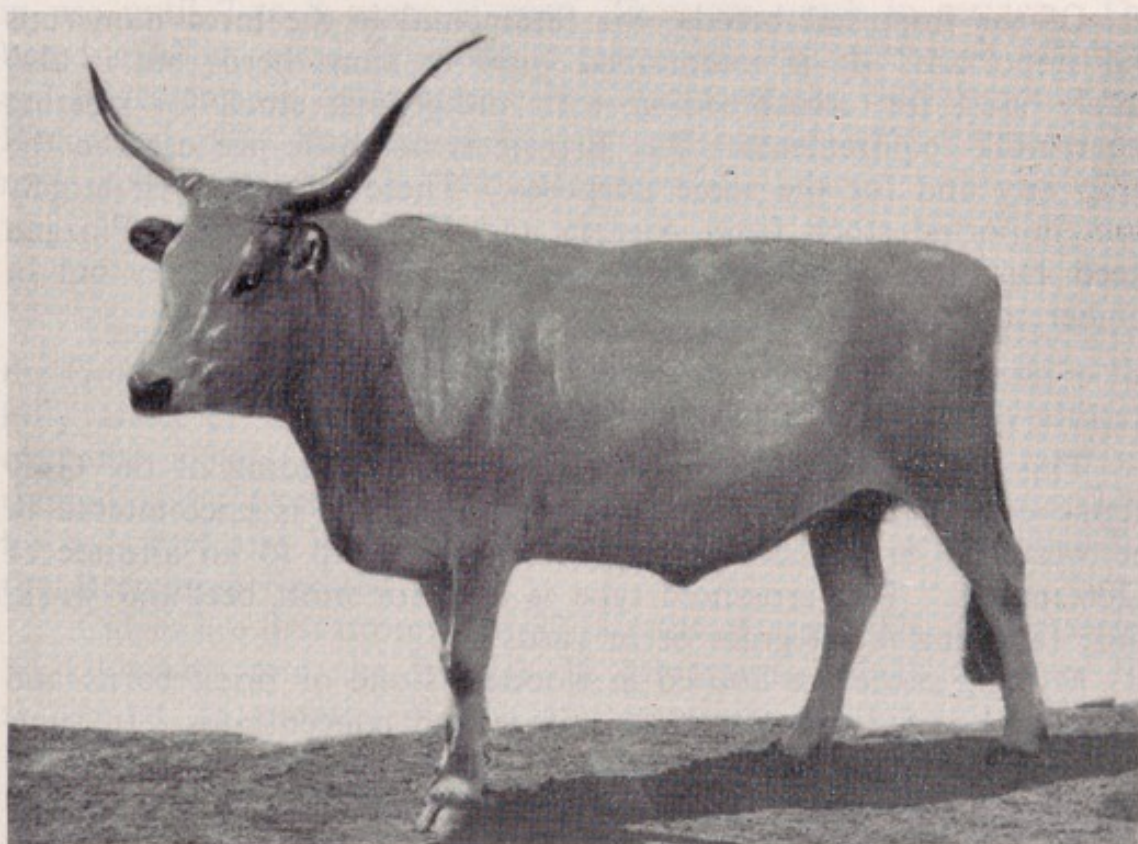


FIGURE 152. — Romanian Steppe heifer.

Courtesy Fronius

flanks are not deep. The legs are relatively long, light to medium-boned but muscular.

The size of these animals and their body measurements are similar to the Hungarian Steppe cattle (p. 253).

FUNCTIONAL CHARACTERISTICS

These animals are employed chiefly for meat and draft purposes and closely resemble the Steppe cattle in the neighboring Balkan countries. Normally, they are fattened off grass but some are finished in yards.

Heifers calve for the first time at 35 months of age. Male calves weigh 26 to 28 kilograms and females average 24 to 26 kilograms at birth. In 1962, the average yield of purebred animals was 2,879 kilograms of milk containing 4.37 percent of butterfat, although the modern tendency is to cross these cows with more productive breeds. Consequently, the numbers are steadily decreasing, although some 21.3 percent of all cattle belong to this breed.

IMPORTED BREEDS AND THEIR CROSSES

Of the imported breeds, the Simmental is the most numerous and important. It is maintained pure in some herds but is also widely used for crossbreeding with indigenous stock for meeting urban milk requirements. The Brown Swiss cattle are used in the same way and for the same purposes. These have derived largely from imported stock from Austria and Switzerland. The Pinzgau breed has also been imported and used in the same way but in smaller numbers.

Romanian Spotted

This breed has originated from the upgrading of the Grey Steppe cattle with imported Simmental sires. It is encountered in the western Carpathian valley and hill areas, up to an altitude of 1,200 meters. This crossbred type is used for milk, beef and work, while fattening is off grass or in yards.

Milking cattle are housed in wooden, stone or brick barns and in winter are fed forages, roots, silage and concentrates. In summer, the animals graze the mountain slopes. The concentrates employed include maize, oats, barley, brans, sunflower cake, molasses, industrial by-products, etc.

The head is always white, but yellow to reddish patches occur on the white body. The feet, legs and tail switch are white.

Heifers calf for the first time at 30 months of age. The birth weights of the males average 41 kilograms and 39 kilograms for the females. Bulls are first used for service at 18 months of age and may remain in service for 8 years, although they are shy breeders. The animals fatten well. There are 3,446,000 cows in the breed, which represents 43.7 percent of the total cattle population.

Maramures Brown

This breed has been derived from the upgrading of local Steppe cattle with imported Brown Swiss, Montafon and Allgäu. The animals are raised in the northern part of the country but occur also in the east and south on varying soil types.

Although originally a triple-purpose breed, with the decreasing need for its employment for draft purposes it is developing as a milk/beef type. Feeding conditions are similar to those described for the Romanian Spotted cattle (p. 260).

The color and conformation resemble that of the Brown Swiss (p. 14). First calves are dropped at about 30 months of age. The liveweight of males averages 38 kilograms and of females 36 kilograms. Males are 18 months old at first service and remain in use until 7 to 8 years of age. They are quick in service. The breed exhibits good fattening propensities and, although numbers are increasing, it represents 17.4 percent of the cattle population. Registered cows, in 1962, yielded an average of 3,758 kilograms of milk containing 3.76 percent of butterfat.

Transylvanian Pinzgau

The Transylvanian Pinzgau has resulted from the crossing of the Grey Steppe breed with the Austrian Pinzgau. It is found in the hilly areas of the west and north of Romania, up to an altitude of 1,000 meters. It is now used mainly as a milk/beef type, although some oxen are still employed as beasts of burden. This horned, Red and White breed is fed and managed as described for the Romanian Spotted cattle.

Calves are first dropped at 32 months of age. The males weigh 34 kilograms and the females 32 kilograms. Males are used for service at 18 months of age and continue at stud until they are 8 years old. The breed has a good fattening ability and can be finished off grass. In 1962, registered cows averaged 3,615 kilograms of milk containing 3.87 percent of butterfat. Numbers are, however, decreasing and the Transylvanian Pinzgau now forms only 10 percent of the total cattle herd.

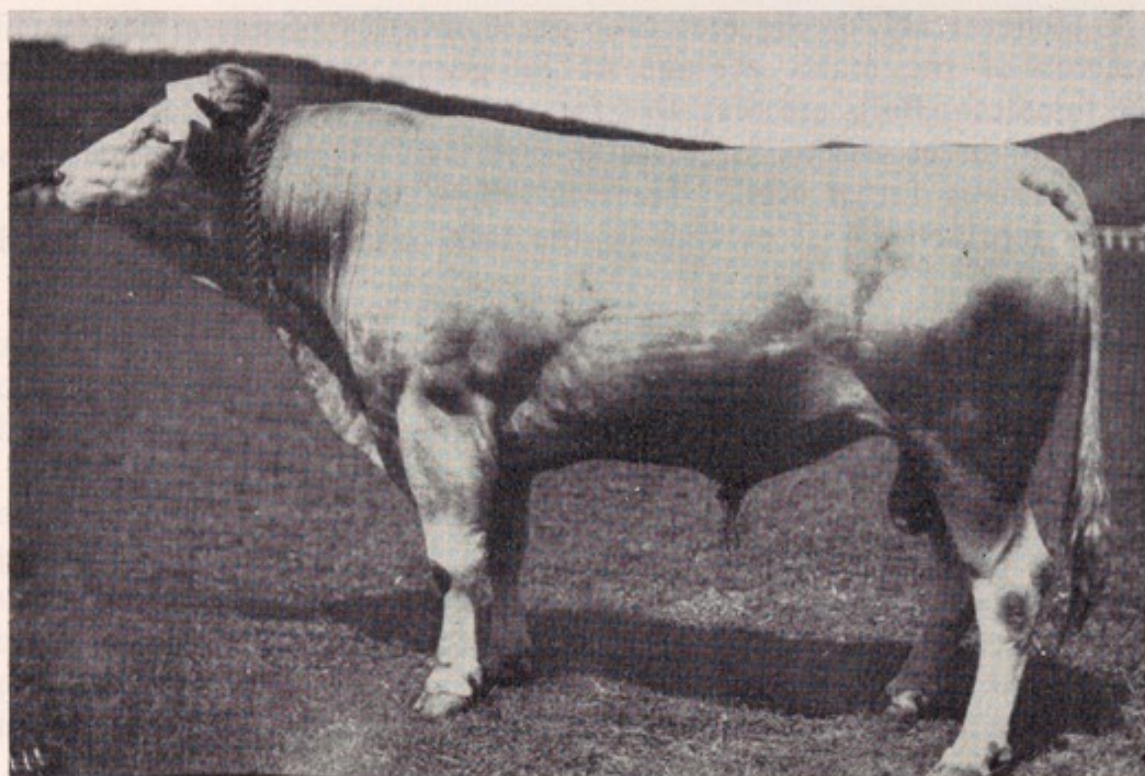


FIGURE 153. — Simmental bull.

Courtesy Fronius



FIGURE 154. — Simmental cow.

Courtesy Fronius



FIGURE 155. — Brown Swiss bull.

Courtesy Fronius

FIGURE 156. — Brown Swiss cow.

Courtesy Fronius



FIGURE 157. — Pinzgau bull.

Courtesy Fronius



FIGURE 158. — Pinzgau cow.

Courtesy Fronius

Romanian Red

The Romanian Red breed has evolved from the upgrading of Grey Steppe cattle with the Angeln and Red Danish breeds. It is found in the southeast of the country below 200-meter altitude and is used primarily for milk production. The stock are fed as described on p. 257 and calve for the first time at 28 months of age. Male calves average 30 to 32 kilograms liveweight at birth, while females average 26 to 28 kilograms. Males are put to service at 18 months of age, are quick and remain in use until 6 to 7 years old. These animals have poor fattening abilities but registered cows, in 1962, averaged 3,684 kilograms of milk containing 3.87 percent of butterfat. Although numbers are increasing, the breed forms only 7.3 percent of the cattle population.

Certain physical and productive characteristics of the pure imported breeds and of the corresponding derived Romanian breeds are given in Table 140.

TABLE 140. — AVERAGE PHYSICAL AND PRODUCTIVE CHARACTERISTICS OF IMPORTED BREEDS AND THEIR CROSSES

	Simmental	Romanian Spotted	Brown Swiss	Maramures Brown
Liveweight (kg)	430-600	560-650	380-550	475-550
Body length (cm)	—	155-158	—	145-148
Wither height (cm)	126-138	136-138	118-128	126-128
Chest depth (cm)	146-160	70-73	138-150	63-65
Heart girth (cm)	—	173-188	—	170-176
Milk yield (kg)	1 500-4 500	3 172	1 400-2 800	3 073
Butterfat content (%)	3.5-4.0	3.72	3.6	3.72
	P n zgau	Transylvanian Pinzgau	Romanian Red	Grey Steppe
Liveweight (kg)	320-600	400-510	450-480	350-480
Body length (cm)	—	142-151	144	134-154
Wither height (cm)	116-130	122-126	125	620-133
Chest depth (cm)	134-151	63-67	65	61-69
Heart girth (cm)	—	166-174	—	162-181
Milk yield (kg)	1 600-5 000	3 114	2 851	2 222
Butterfat content (%)	3.5-4.0	3.80	3.84	4.40

YUGOSLAVIA

Yugoslavia is situated in the northwestern portion of the Balkan peninsula and lies approximately between 37.8° and 46.8° north latitude and between 13.5° and 23° east longitude. The Dinaric Alps occupy a large proportion of the country and run from the northwest to the southeast before continuing into Albania and Greece. The northwestern "limestone Alps" form the border with Austria and attain a height of 2,865 meters above sea level. To the west of the rivers Vrbas and Neretva is found a vast limestone plateau in which are some rather barren regions. In the southeast, the mountain ranges are intersected by numerous river valleys with fertile soils and toward the Hungarian border in the north there is a rich rolling lowland area.

Along the Adriatic coast, the climate is Mediterranean in type with warm summers and mild winters and, on the western slopes of the mountains, the precipitation amounts to 1,500 to 3,000 millimeters per year. The climate is of the continental type in the central and eastern parts of the country and there the winter temperatures are much lower and the summer heat is tempered.

Some 32 percent of the land surface (255,400 km²) is used for arable purposes and 26 percent is in grasslands and meadows. The livestock of Yugoslavia suffered considerable losses during both world wars and, during the second, about half the total cattle population was destroyed and practically all purebred animals were lost, so that a new start had to be made with the latter after hostilities ceased. Rehabilitation projects have progressed steadily and, in 1962, the cattle population amounted to 5.9 million. The national herd was then composed of approximately 40 percent each of the Buša breed and of Simmentals and their Red and White crossbreds. The remaining 20 percent were composed of Brown and Grey indigenous mountain breeds, and of imported Pinzgau, Friesian, Red and White Lowland, Red Danish and Jersey cattle.

BREED ORGANIZATION

About 10 percent of the total cattle population are on state farms where they are closely supervised insofar as concerns their breeding, milk recording and artificial insemination. In the fertile regions, in particular, are co-operative farms in which breeding policies, directed by experts, and insemination centers are established. Between the co-operative farms and those of private breeders a

considerable degree of collaboration has already developed and will, it is hoped, encourage further developments in cattle breeding.

The maintenance of Herdbooks in the provinces and the registration of purebred animals therein is organized with the assistance of experts. These Herdbook activities and the selection of breeding stock are carried out under the guidance of a central institute which services the whole country.

Artificial insemination commenced in 1946 and, in 1961, about 30 percent of all cows in the country were inseminated. The bulls used in this service are progeny tested by means of the British "contemporary comparison" method. Milk recording is conducted mainly on the state and co-operative farms.

Yugoslav Buša

ORIGIN

The Yugoslav Buša breed has descended from the old Illyrian cattle which have existed since ancient times in the southwest of Yugoslavia, in Bosnia, Herzegovina and Montenegro, and in the south in Macedonia.

LOCATION, TOPOGRAPHY AND SOILS

These animals are found in the valleys and up the slopes of the mountainous areas in the southwest of Yugoslavia. The valley soils are fertile but the fertility decreases with altitude. This breed is distributed in Herzegovina, Bosnia, Montenegro, Dalmatia and Macedonia.

CLIMATE

To illustrate the climatic conditions under which this breed is found, Table 141 gives relevant information for Skoplje and Sarajevo.

FEEDING AND MANAGEMENT

During the summer the majority of cattle graze the mountain slopes, while the more productive milk cows remain near the farms at the lower altitudes and in the valleys. The latter graze whenever the opportunity occurs and are also fed in yards and houses with cut fodders supplemented with grain by-products and oilcakes. In

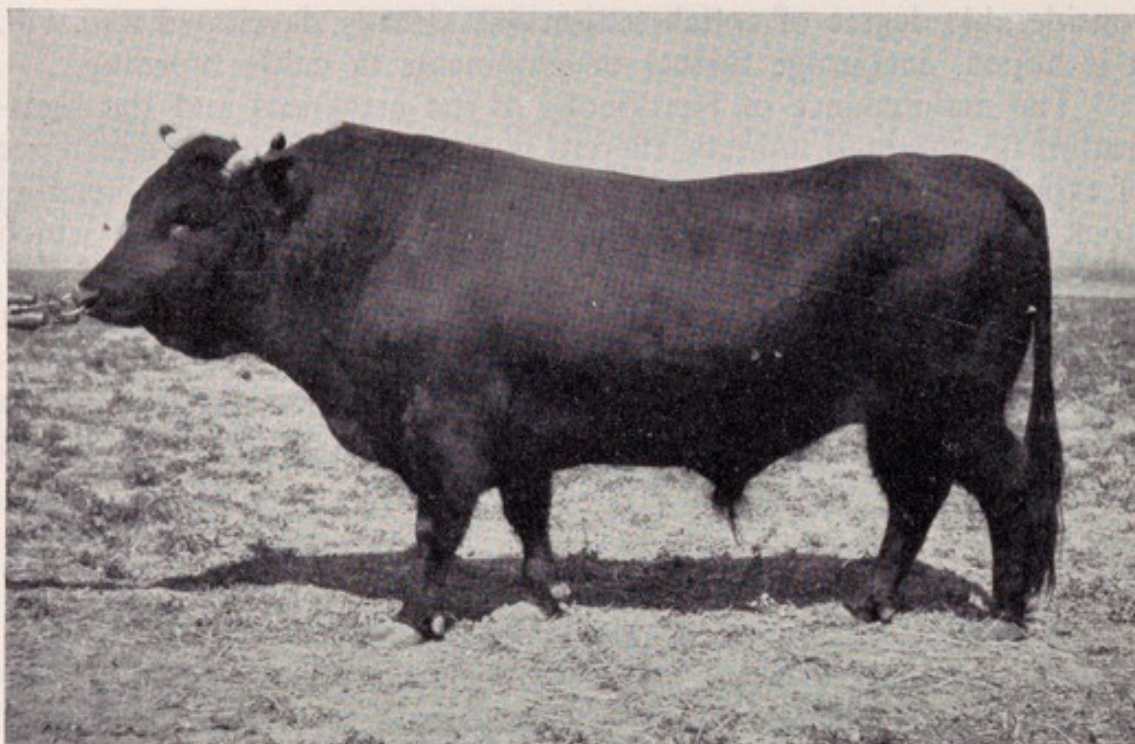


FIGURE 159. — Yugoslav Buša bull.

Courtesy F. Belić



FIGURE 160. — Yugoslav Buša cow.

Courtesy F. Belić

TABLE 141. - AVERAGE CLIMATIC CONDITIONS FOR THE YUGOSLAV BUŠA BREED

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec
SKOPLJE												
Temperature (°C)	-1.4	1.2	7.3	11.8	16.7	20.4	23.2	22.3	19.1	13.9	6.1	1.1
Rainfall (mm)	35	30	19	43	56	57	36	36	30	51	38	48
SARAJEVO												
Temperature (°C)	-0.7	0.2	5.7	9.5	13.5	16.5	18.8	18.5	15.0	10.1	5.6	1.0
Rainfall (mm)	55	51	60	76	83	101	65	60	77	89	85	75

the winter, hays, straws and other crop residues are fed inside to all the animals while, in some localities, the more productive stock are also fed with silage, grain by-products, whole grains and oilcakes.

PHYSICAL CHARACTERS

The pigmented skin is of medium thickness and is normally supple and loose. It carries hair of medium length, which is single-colored, reddish or grayish brown. Some lighter shades are often encountered on the insides of the legs and extend to the inguinal area. The muzzle is black.

The head is wide in the forehead, of medium length and straight or slightly dished in profile. The horns are short, grow outward from the poll and curve forward and usually upward, although in some cases they may curve downward instead. They are whitish in color, with black tips.

The topline is level, the loin relatively wide and the hindquarters level to the tail head, although sloping downward from the spine to the sides. The chest is deep and the ribs are well sprung but body height is small. The legs are strong boned and short, while the hooves are hard wearing and black. The body size and proportional development vary with the level of nutrition and management but body height and weight are low. As would be expected, therefore, several subtypes of this breed have evolved and Table 142 gives the average liveweights and body measurements for two of these: the Metohija and the Neretva cattle.

TABLE 142. - SOME LIVeweIGHTS AND BODY MEASUREMENTS OF MATURE YUGOSLAV BUŠA CATTLE

	Metohija		Neretva	
	Bulls	Cows	Bulls	Cows
Liveweight (kg)	340-430	230-270	—	—
Wither height (cm)	115-125	102-105	106	103
Chest girth (cm)	160-175	143-146	145	139

From the figures given on p. 304, Buša cattle in Yugoslavia are somewhat larger than their Greek counterparts.

FUNCTIONAL CHARACTERISTICS

These cattle are normally regarded as triple-purpose animals but the emphasis on their working ability is relaxing in certain areas in favor of a better milk/meat-producing type. The average production of milk is in general low, while in the better herds it has risen to 1,500 to 2,000 kilograms per lactation and, in superior herds, it can exceed 2,500 kilograms of milk containing 4.5 percent of butterfat.

Being small animals, their working capacity is limited and their low beef yields are associated with a low efficiency and rather poor quality meat.

BREED ORGANIZATION

Herdbook and registration activities are organized under the supervision of a central institute and milk recording is largely undertaken on the state and co-operative farms.

Yugoslav Red and White

ORIGIN

The Yugoslav Red and White breed is derived from crossing and upgrading of the indigenous cattle with Simmentals from Austria, Germany and Switzerland. Purebred herds of these introduced animals and their descendants are now kept in the state and represent some 7 to 12 percent of the total Red and White cattle population.



FIGURE 161. — Yugoslav Red and White bull.

Courtesy D. Stosić

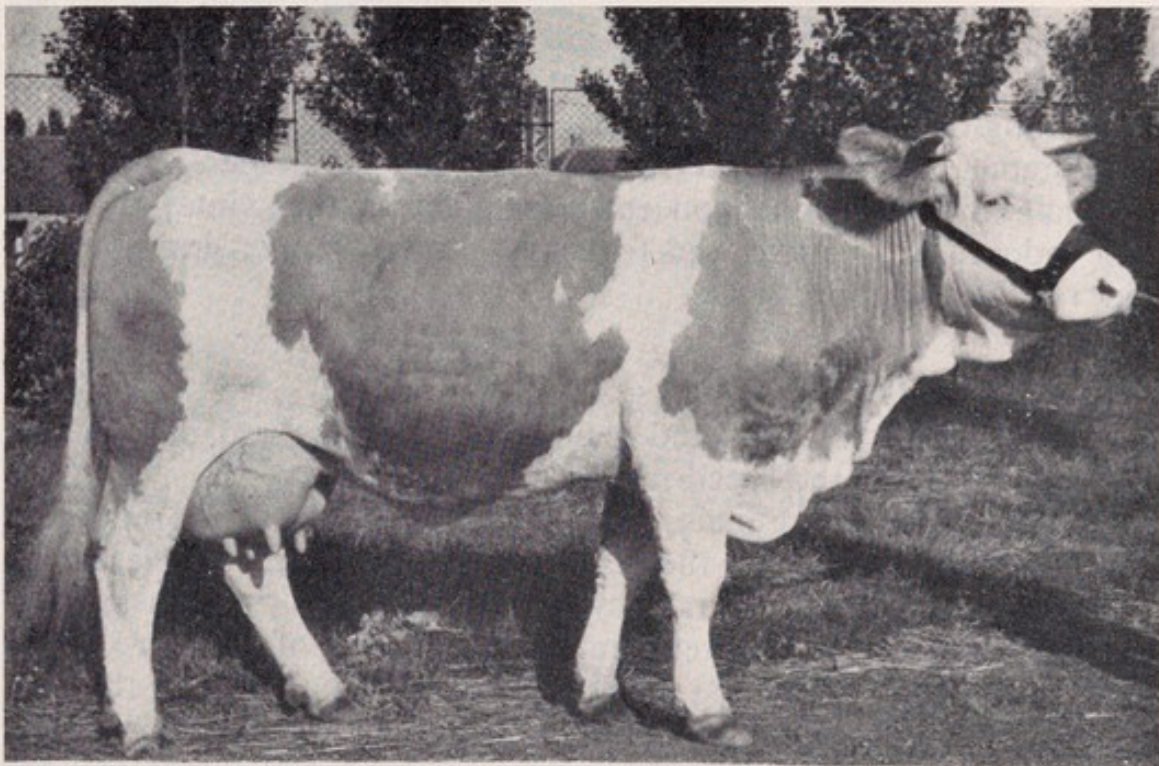


FIGURE 162. — Yugoslav Red and White cow (Kaja 106/15). First lactation: 4,043 kilograms of milk containing 3.96 percent butterfat; second lactation: 5,495 kilograms of milk containing 4.00 percent of butterfat.

Courtesy S.L. Damjanović

LOCATION, TOPOGRAPHY AND SOILS

The breed is located principally in northern Yugoslavia, in eastern Slovenia, northern Croatia and northern Serbia, while the purebred nuclei are maintained chiefly on the state and co-operative farms.

CLIMATE

The average climatic conditions for the area where this breed is encountered are shown in Table 143.

TABLE 143. — AVERAGE CLIMATIC CONDITIONS FOR THE RED AND WHITE YUGOSLAV CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-0.1	2.1	6.7	11.5	16.3	19.3	21.6	20.7	16.9	11.7	5.7	1.6
Rainfall (mm)	46	47	57	72	79	100	81	81	86	98	79	61

FEEDING AND MANAGEMENT

The more productive animals are maintained chiefly at the lower altitudes and their potential output justifies a more intensive level of feeding and management. They are allowed to graze during the summer and may receive, in addition, cut fodders, grain by-products and purchased concentrates. During the winter they are kept indoors or in yards and fed hays, straws, silage, grains, brans and purchased concentrates.

PHYSICAL CHARACTERS

The imported animals and their immediate purebred descendants naturally resemble the breed in its original home (p. 7). With the upgraded indigenous animals, the higher the grading to the imported stock, the more closely do they conform to the purebred characters.

With the increasing tendency to breed for milk and meat characteristics and the decreasing demand for the use of this breed for work purposes, a somewhat smaller type of animal than in the past is becoming more common. For example, in the Posravian area, the average liveweight of mature cows is about 520 kilograms, the wither height is 134 centimeters, and the chest girth is 186 centimeters. Table 144 gives details of the average liveweights and body measurements of the purebred and grade populations.

TABLE 144. - AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF ADULT YUGOSLAV RED AND WHITE CATTLE

	Purebred	Grade
Liveweight (kg)	550-700	450-700
Body length (cm)	162	148-156
Wither height (cm)	135-140	125-135
Chest depth (cm)	73	72

Purebred bulls and heifers at 18 months of age average respectively about 475 and 390 kilograms, while at the age of 4 the corresponding average weights are 1,000 and 600 kilograms.

FUNCTIONAL CHARACTERISTICS

The Red and White breed is maintained as a dual-purpose milk/meat animal but, in some herds, there tends to be more emphasis on the dairy character.

The average milk yield of this breed is probably around 2,500 to 3,000 kilograms but some recorded herds achieve an average of 4,000 to 4,500 kilograms of milk containing 3.5 percent of butterfat.

This breed produces carcasses with a well-developed musculature and surplus males can be fattened for early slaughter while, when required, these animals are good workers.

BREED ORGANIZATION

On the state and co-operative farms, the better producers are recorded and selected for economical production by experts. Herd-book and registration activities are under the supervision of a central institute.

Pinzgau

ORIGIN

The Austrian Pinzgau has been used in recent years to develop this breed in Yugoslavia, and the Kärnten Landrace in particular has been imported.



FIGURE 163. — Pinzgau bull (Zoran).

Courtesy J. Belić



FIGURE 164. — Pinzgau cow (Cika, R 129). Yielded 2,843 kilograms of milk containing 4.07 percent of butterfat in third lactation.

Courtesy Archives Slovenian Institute of Agriculture

LOCATION, TOPOGRAPHY AND SOILS

The Pinzgau is found chiefly in western Slovenia, Croatia and middle Bosnia, but it is spreading slowly over the northwestern sector of the country at the lower altitudes and in the mountain valleys.

CLIMATE

Table 145 illustrates the climatic conditions in the area where this breed is expanding.

TABLE 145. - AVERAGE CLIMATIC CONDITIONS FOR PINZGAU CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-1.9	1.2	7.6	12.7	18.9	22.5	24.8	23.8	18.6	13.7	6.5	1.9
Rainfall (mm)	49	58	74	91	126	120	83	76	85	119	60	61

FEEDING AND MANAGEMENT

Similar to that described on p. 272 for Red and White cattle.

PHYSICAL CHARACTERS

As would be expected from their origin, these purebred animals closely resemble the breed in its original home (see p. 39), while the Pinzgau graded up from Yugoslavian stock are slightly smaller and lighter, as is seen from the data in Table 146.

TABLE 146. - AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF ADULT PINZGAU CATTLE

Liveweight (kg)	450-650
Body length (cm)	152
Wither height (cm)	125-132
Chest depth (cm)	68

FUNCTIONAL CHARACTERISTICS

The functional characteristics of Austrian Pinzgau cattle (p. 40) largely apply to the Yugoslav Pinzgau. Average milk production is from 2,500 to 3,000 kilograms containing 4 percent of butterfat.

The demand for working animals is limited and attention is focusing on the milk/meat characteristics of this breed.

BREED ORGANIZATION

As for the Red and White breed on p. 273.

Istrian

ORIGIN

This breed is related to, and descends from, the same Podolic origins as the Italian Maremma cattle (see p. 182).

LOCATION, TOPOGRAPHY AND SOILS

The Istrian is found mainly on the islands in the north of the Adriatic.

CLIMATE

The climatic conditions can be judged from those of Udine on p. 201.

FEEDING AND MANAGEMENT

Similar to that described on p. 267 for the Buša breed.

PHYSICAL CHARACTERS

The general characters can be judged from the description given on p. 184 for Maremma cattle. The average mature weight varies from 500 to 550 kilograms and the wither height is 130 to 135 centimeters.

FUNCTIONAL CHARACTERISTICS

This is a meat and work type of animal, although in cases where attention has been devoted to the milking potential the yield is from 1,500 to 2,500 kilograms containing 3.7 percent of butterfat.



FIGURE 165. — Istrian bull, 5 years old.

Courtesy J. Belić

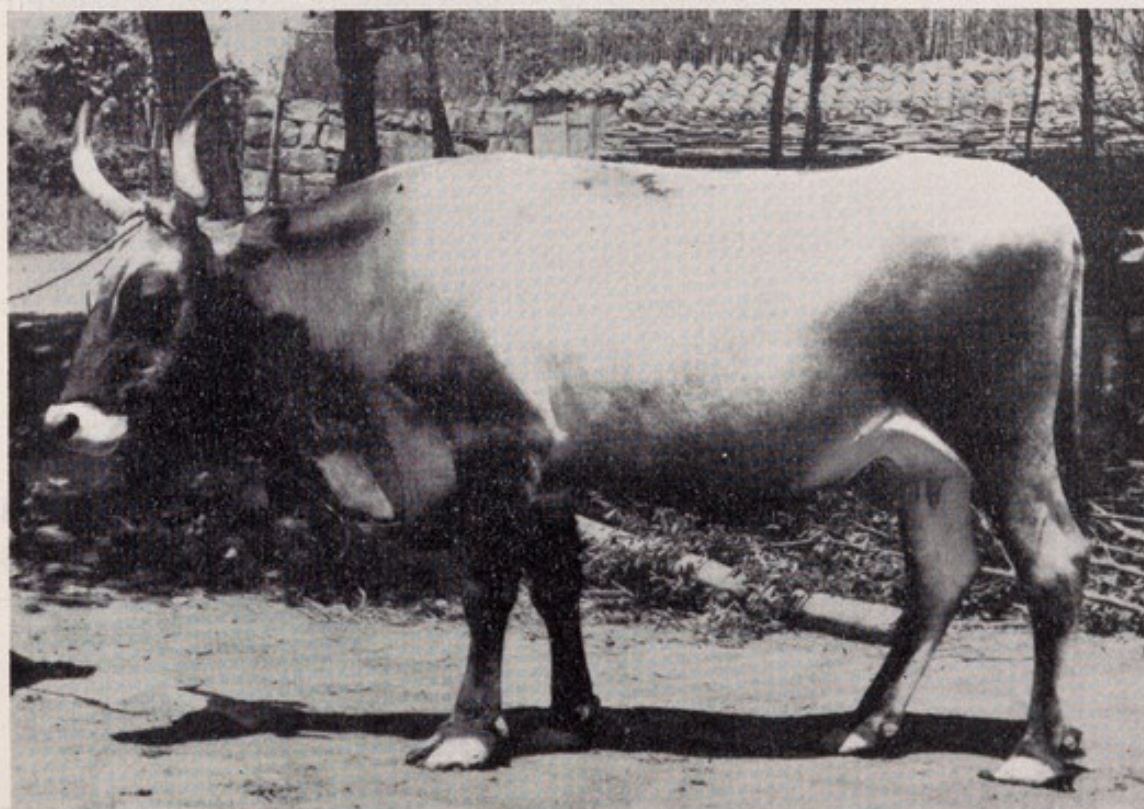


FIGURE 166. — Istrian cow, 6 years old.

Courtesy J. Belić

Brown Slovenian

ORIGIN

The Brown Slovenian is probably an offshoot of the Austrian Brown Mountain breed.

LOCATION, TOPOGRAPHY AND SOILS

This breed occurs in the northwestern province of Slovenia.

CLIMATE

The average climatic conditions may be judged from the data in Table 147.

TABLE 147. - AVERAGE CLIMATIC CONDITIONS FOR BROWN SLOVENIAN CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-0.7	1.2	4.8	10.0	14.5	18.2	29.8	18.9	15.5	10.8	4.9	0.0
Rainfall (mm)	58	50	85	106	125	166	124	126	109	135	93	67

FEEDING AND MANAGEMENT

Similar to that described on p. 272 for the Red and White breed.

PHYSICAL CHARACTERS

These small cattle have characters similar to those described for the Austrian Brown cattle on p. 44. The average weight is 500 to 650 kilograms and the wither height is 123 to 128 centimeters.

FUNCTIONAL CHARACTERISTICS

The functional characteristics can be judged from the description on p. 44 of those of the Austrian Brown cattle. The milking records of this breed in Yugoslavia indicate that cows may



FIGURE 167. — Brown Slovenian bull (Samo R 123). Maximum lactation yield of dam: 4,749 kilograms of milk containing 4.02 percent of butterfat.

Courtesy Archives Slovenian Institute of Agriculture



FIGURE 168. — Brown Slovenian cow (Sobotka R 816 E). Maximum lactation yield: 6,185 kilograms of milk containing 4.18 percent of butterfat; sixth lactation yield: 5,238 kilograms of milk containing 4.03 percent of butterfat.

Courtesy Archives Slovenian Institute of Agriculture



FIGURE 169. — Podolic bull, 4 years old.

Courtesy Prof. T. Bonadonna

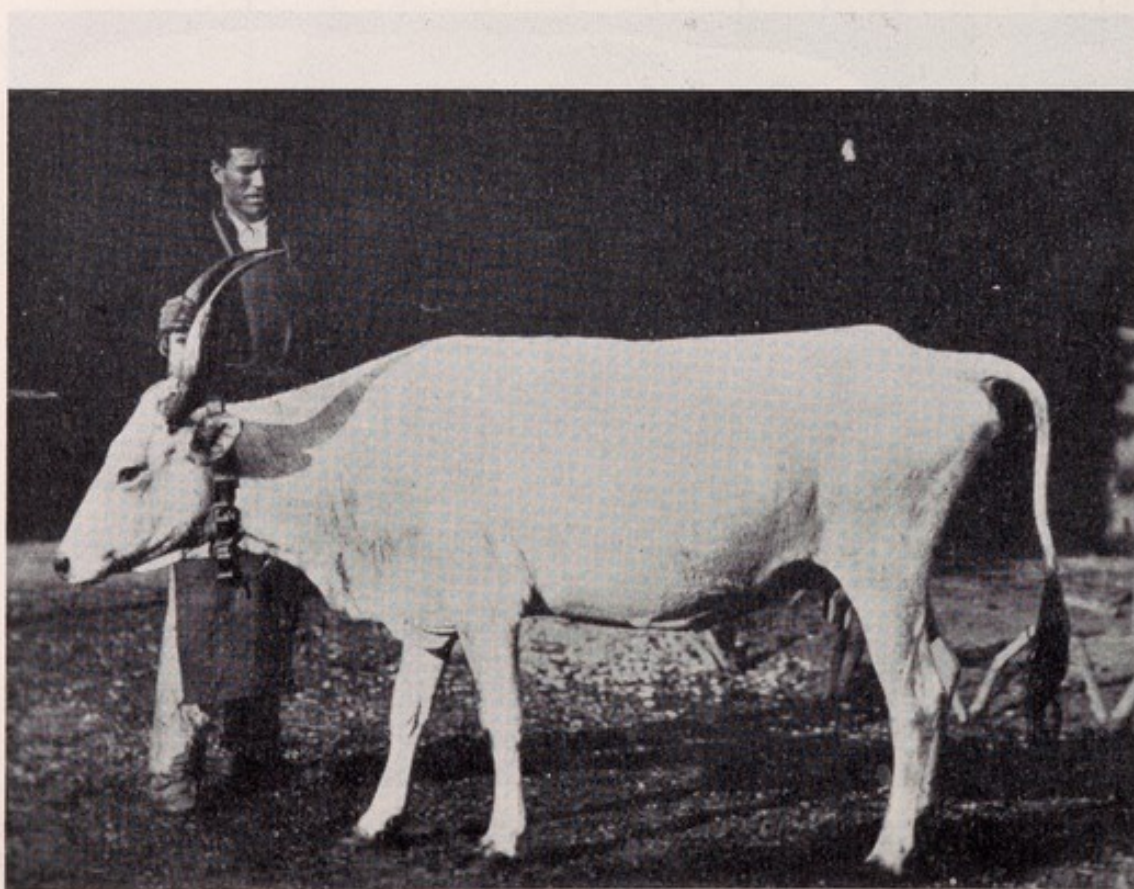


FIGURE 170. — Podolic cow.

yield up to 2,800 to 3,500 kilograms of milk containing 3.8 to 4.1 percent of butterfat per lactation. Up to 1954, the highest recorded yield was 8,000 kilograms of milk containing 3.8 percent of butterfat content.

BREED ORGANIZATION

Similar to that described on p. 270.

OTHER BREEDS

After the second world war, a number of foreign breeds were imported, particularly the Friesian, the Red and White Lowland cattle, the Red Danish and the Jersey. These breeds are kept chiefly around the big cities for milk production. The recorded milk yields of these cows are indicated in Table 148.

TABLE 148. - AVERAGE LACTATION RECORDS OF EXOTIC CATTLE IN YUGOSLAVIA

Breed	Milk	Fat
	<i>Kilograms</i>	<i>Percentage</i>
Black and White Lowland	2 700	3.8
Red and White Lowland	2 900	3.8
Red Danish	3 500	3.9

BULGARIA

Bulgaria lies approximately between 41° and 44° north latitude and 22° and 28° east longitude and is about 110,560 km² in area. Some 75 percent of the land surface consists of plains and hills extending to an altitude of 600 meters above sea level. The remaining 25 percent is semi- or entirely mountainous in topography. The Balkan Mountains run east and west across the country and have their highest point at Botev at an altitude of 2,380 meters. To the north of this central range, the topography falls away to the Danube basin along the northeastern boundary. South of the Massif Central are the Trakai plains, in the southeastern portion of the country, while the southwestern region is occupied by the Rhodope Mountains.

In the northern plains area, the soils are largely of the black earth type but, in the southern plains, light brown forest soils predominate, while the mountain valley soils are dark brown in color. About 39 percent of the total area is under arable crops and 2.3 percent is under pastures and meadows.

The climate is of the moderate continental type. In the north the summers are warm and the winters cold, while in the south the winters are humid and the summers hot and dry, due to the influence of the Mediterranean climatic conditions. The soils and climate in the lower regions favor cattle breeding and management and these activities are being developed, particularly on large co-operative and state farms. Of the 1.45 million head of cattle, 45 percent are dairy cows.

Since 1948, there has been an important and rapid change in the numbers and proportional distribution of the different breeds. This has been stimulated by a desire for more productive stock and has been accomplished by crossbreeding to imported cattle such as the Brown Swiss (Montafon) and the Red Danish. The general trend of the changes is shown in Table 149.

TABLE 149. - CHANGES IN THE PROPORTIONAL DISTRIBUTION OF BULGARIAN CATTLE

Breed	Total population	
	1948	1961
 Percentage	
Grey Iskur	82.1	25.0
Sofia Brown and Montafon crosses	6.6	30.6
Kula and Simmental crosses	5.3	19.4
Shorthorned Rhodope	3.8	4.6
Red Sadova and Ukrainian Steppe	1.3	12.6
Others	1.0	7.7

BREED ORGANIZATION

Since 1944, animal breeding has been reorganized on a socialist basis. Several imported breeds have been employed for the improvement of indigenous stock, i.e., Austrian Brown, Simmental, Red Danish, Latvian Red, Black and White Friesian, Red and White, and Jersey cattle.

Breed improvement began on a large scale in 1952 when five state selection stations were established for different breeds. By 1959, the number of such stations had risen to 27, each one in a different district. In 1962, a central inspection panel was established with about 20 animal breeding specialists under the aegis of the Bulgarian Academy of Agricultural Sciences.

Performance testing is conducted by state-employed technicians, while specialists for the different kinds of livestock carry out the examination and selection work for registration purposes in the different regions. Herdbooks are maintained by the same people in co-operation with the recording staffs. The elaboration of fresh types of cattle and the improvement of old breeds are directed by the staff of the research institutions.

Artificial insemination of cattle was started in the late 1940s and has steadily increased until, in 1961, approximately 60 percent of the total cow population were being inseminated artificially.

Grey Iskur

ORIGIN

The Grey Iskur breed is still rather primitive and has developed from crossings between the *Brachyceros* Buša and the *Primigenius* Steppe cattle. In the mountain areas, animals more akin to the former type predominate but, in the valleys and more fertile areas, the cattle contain a higher proportion of Steppe blood.

LOCATION, TOPOGRAPHY AND SOILS

The best and most highly developed strains of this breed are encountered in the river valleys such as the Iskur, Vit, Rositsa and Osam in northern Bulgaria on the black earth soils.

CLIMATE

The climatic conditions under which this breed exists are given in Table 150.

FEEDING AND MANAGEMENT

Animals graze during the summer on natural grasslands and on the mountain slopes, although the better dairy stock remain near the valley homesteads. In the latter case, some soiling with green



FIGURE 171. — Grey Iskur bull.

Courtesy Brand



FIGURE 172. — Grey Iskur cow, 8 years old.

Courtesy Brand

TABLE 150. - AVERAGE CLIMATIC CONDITIONS FOR GREY ISKUR CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-1.2	0.5	6.1	11.7	17.0	20.6	22.8	22.0	17.4	11.6	4.9	0.7
Rainfall (mm)	29	31	39	49	71	86	80	45	44	51	55	29

crops occurs and supplements are fed to the higher milk producers. In winter, all stock are housed or yarded and fed on hays, straws and other crop residues.

PHYSICAL CHARACTERS

A considerable range exists in the physical characters of this breed according to the percentage of Steppe or Buša blood in its composition and depending on the locality and level of nutrition under which the stock are reared and maintained.

The hair color is a gray of varying shades and, in general, mountain cattle are darker colored than in the plains and valleys. The head is of medium length and width and has a straight profile. The muzzle, body orifices and hooves are black. The medium length, lyre-shaped horns are yellowish in color, with black tips.

The topline is fairly level, the chest is deep, the ribs are fairly well sprung but the fore-end outweighs the hindquarters. The legs are strong boned and of medium length in proportion to the body size. The udder varies in size and development.

The wither height of cows is 115 centimeters on the average, while their liveweight is from 300 to 350 kilograms in the poorer areas, and 400 to 450 kilograms when better fed.

FUNCTIONAL CHARACTERISTICS

In the past, Iskur cattle were bred as triple-purpose animals and this is still true of the stock reared under poorer nutritive conditions on the higher land. In the lower, more productive regions, the tendency is now to breed for a milk/meat dual-purpose type as the demand for working cattle diminishes before the advent of the tractor.

The average lactation yield for recorded cows is about 2,000 kilograms of milk containing 4.5 percent of butterfat. Yields from 2,500 to 2,800 kilograms with a similar high butterfat content are obtained on state farms.

Owing to their small size, the meat-producing capacity of these cattle is restricted. They also grow slowly and their muscles are dark colored and rather coarse.

For work purposes, the Iskur breed is noted for its endurance, willingness to work, docility and for stamina, which allows it to work hard for relatively long hours.

BREED ORGANIZATION

Performance testing is undertaken by state-employed experts and technicians and selection work is carried out by them or with their advice. The Herdbook is also maintained by them. The numbers of this breed have been seriously reduced in the last 15 years by crossbreeding activities and, from being by far the most common animals in 1948, they were outnumbered by the Sofia Brown cattle in 1961.

Sofia Brown and Montafon crosses

ORIGIN

Sofia Brown cattle originated from crossings between the native Grey cattle and imported Austrian Brown or Brown Swiss cattle.

LOCATION, TOPOGRAPHY AND SOILS

These animals are found chiefly in western Bulgaria, in the Sofia region, and are expanding in the south of the country on the light brown soil types.

CLIMATE

The climate is of the continental type, modified by altitude, and Table 151 gives average data for Sofia.

TABLE 151. — AVERAGE CLIMATIC CONDITIONS FOR SOFIA BROWN CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-1.7	0.4	5.3	10.2	15.1	18.2	20.4	20.1	16.1	10.8	4.4	0.3
Rainfall (mm)	27	32	41	54	83	82	68	53	55	55	51	29



FIGURE 173. — Sofia Brown bull (Hepy 1040). Dam yielded 5,462 kilograms of milk containing 4.24 percent of butterfat in eighth lactation.

Courtesy Prof. Ivanoff

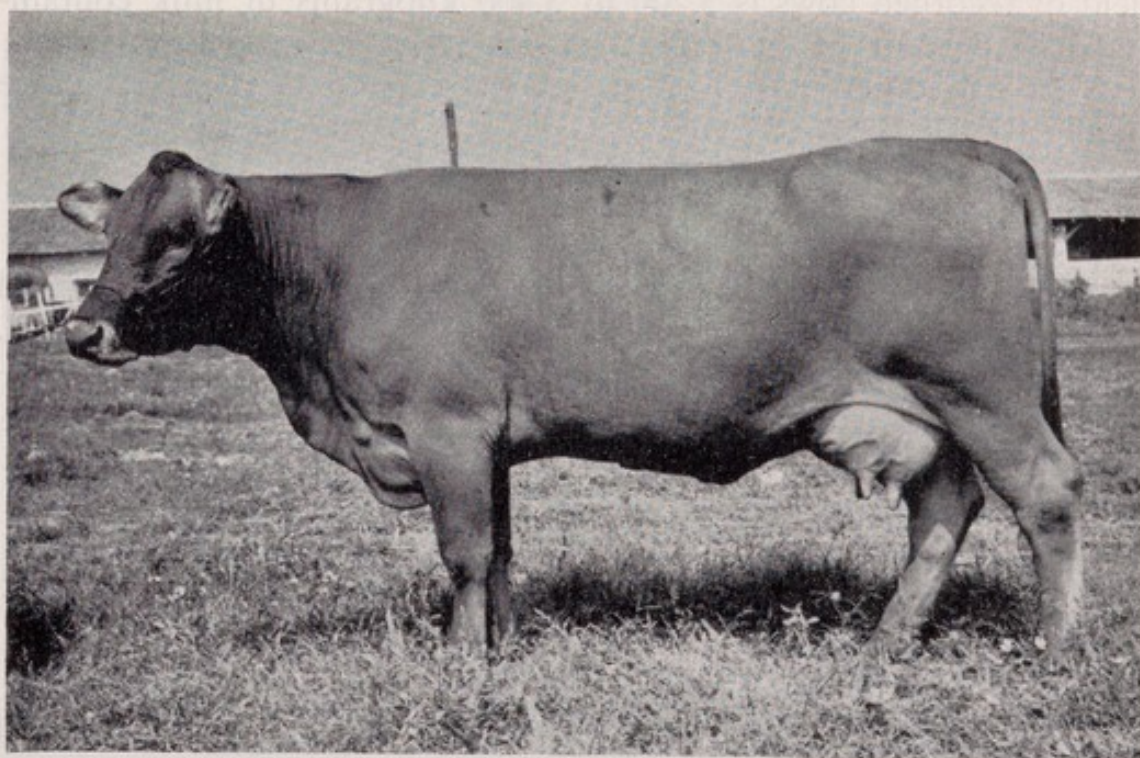


FIGURE 174. — Sofia Brown cow (Cahoa 969). Yielded 7,635 kilograms of milk containing 4.15 percent of butterfat in third lactation.

Courtesy Prof. Ivanoff

FEEDING AND MANAGEMENT

Feeding and management vary appreciably with location and intensity of farming. Some animals depend for their livelihood on what they can eat on summer mountain grazings and spend their winter in yards on hays, straws and other crop residues. The better cared for dairy herds may spend their summers on valley pastures, supplemented with cut forage and concentrates. In winter, they also depend on hays, straws, crop residues, brans and purchased concentrates.

PHYSICAL CHARACTERS

The color and conformation are very similar to that of Brown Swiss cattle (see p. 14), although the average liveweight, 500 to 530 kilograms for mature cows, is below that of the breed in its native home.

FUNCTIONAL CHARACTERISTICS

These Sofia Brown or Montafon cattle resemble in many respects their ancestors from Switzerland and Germany. The average yield of recorded cows is 3,200 to 3,400 kilograms of milk containing 3.75 percent of butterfat.

Their fleshing ability is good and the carcasses are of reasonable quality.

BREED ORGANIZATION

This milk/meat dual-purpose breed is registered and recorded in the same way as is mentioned for the Grey Iskur cattle on p. 286. The breed numbers are slowly increasing, largely as a result of upgrading policies to the Simmental.

Kula and Simmental crosses

ORIGIN

The Kula breed has evolved from crosses between the original Bulgarian Grey cattle and purebred Simmentals imported from Hungary, Austria, Yugoslavia and Switzerland before the outbreak of the second world war.

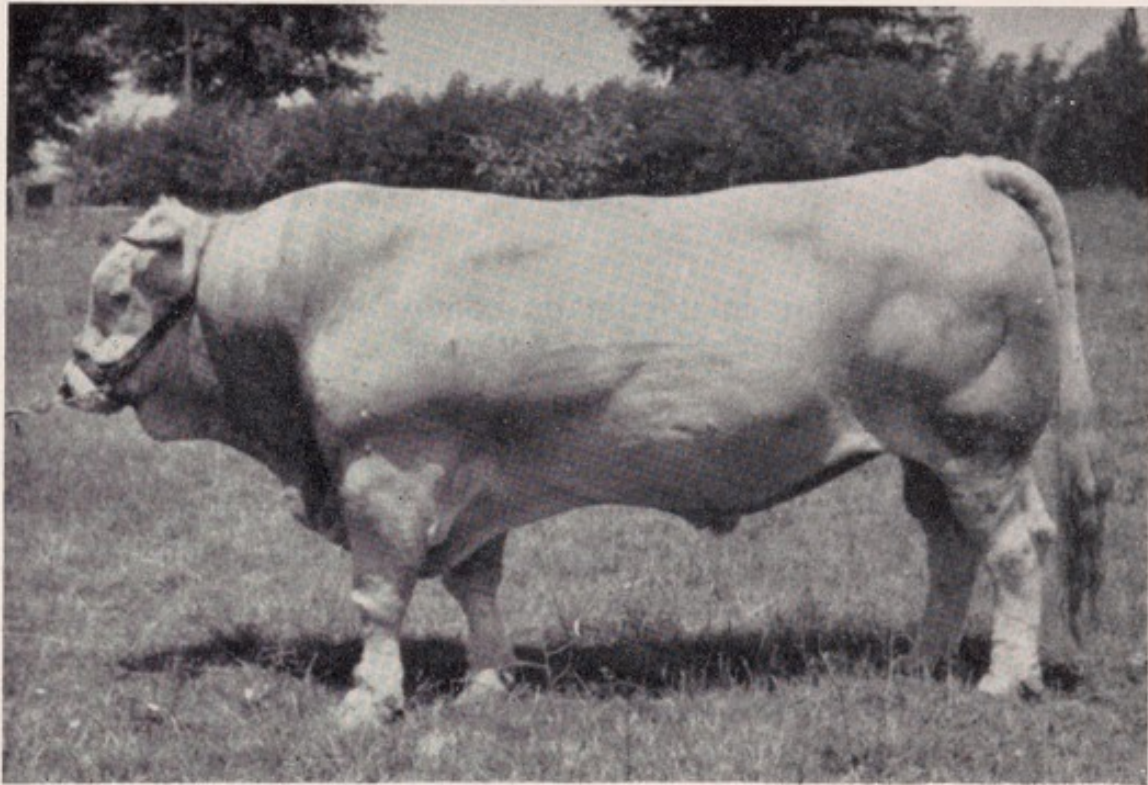


FIGURE 175. — Kula bull.

Courtesy Prof. Ivanoff

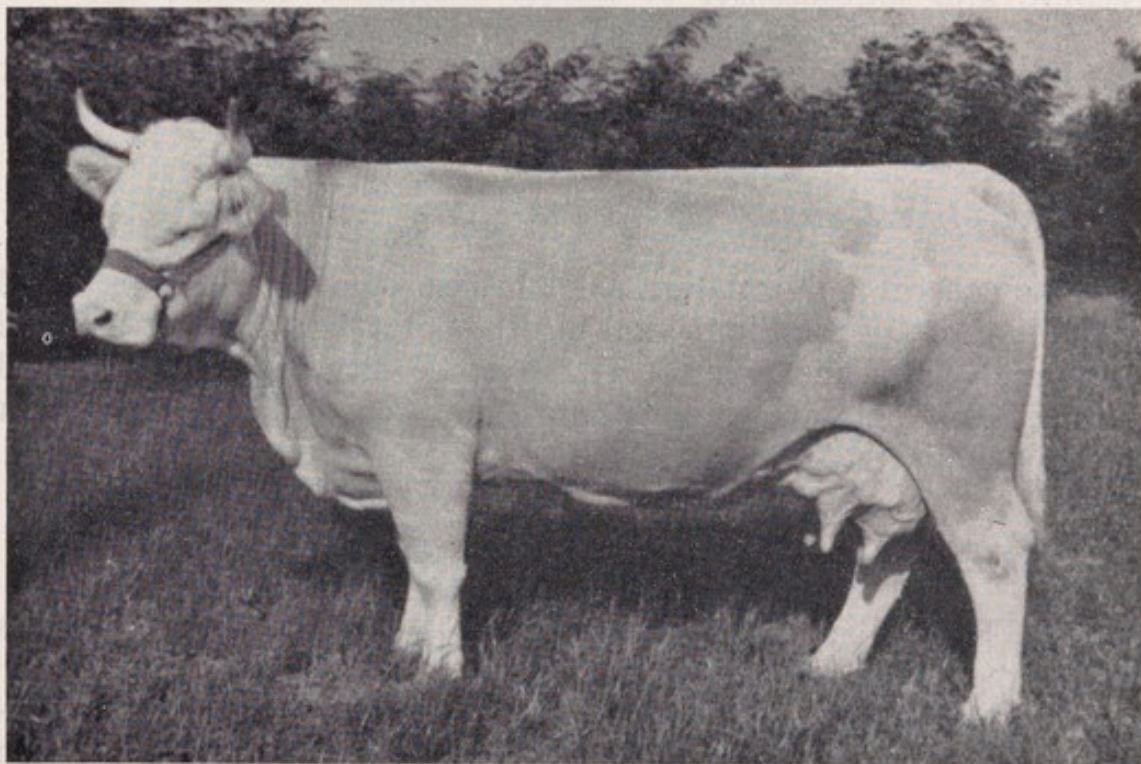


FIGURE 176. — Kula cow.

Courtesy Prof. Ivanoff

LOCATION, TOPOGRAPHY AND SOILS

The Kula is to be found chiefly in the northwest of Bulgaria and in the Danube basin on the black earth soils.

CLIMATE

The typical continental climatic conditions for this breed are shown by the data in Table 152.

TABLE 152. - AVERAGE CLIMATIC CONDITIONS FOR KULA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	2.0	3.3	6.7	11.0	15.7	20.2	22.8	22.6	19.1	14.3	8.3	5.1
Rainfall (mm)	39	47	37	44	50	81	47	29	29	44	57	49

FEEDING AND MANAGEMENT

These animals are fed and managed in a very similar manner to that described on p. 288 for the Sofia Brown breed.

PHYSICAL CHARACTERS

The general conformation and physical characters of this breed resemble those of the Simmental but the color is a light cream and only rarely red and white. The average liveweight of recorded cows is 520 kilograms, which is only some two thirds of the weight of Simmentals in Switzerland.

FUNCTIONAL CHARACTERISTICS

The Kula is a dual-purpose milk/meat breed which resembles the Simmental in its native home (see p. 8).

The milk yields of recorded cows average 2,800 to 3,000 kilograms containing 4 percent of butterfat. Their carcasses are also very suitable for the meat trade. When required, the male stock are used for work, but to a steadily decreasing extent.

BREED ORGANIZATION

As with other Bulgarian breeds, registration and Herdbook activities, as well as the selection of breeding males are conducted and supervised by state-employed technicians and by the nominated specialists.

Shorthorned Rhodope**ORIGIN**

This breed belongs to the small Buša cattle type which is so widely spread over the southeast of Europe.

LOCATION, TOPOGRAPHY AND SOILS

The Shorthorned Rhodope is concentrated chiefly in the Rhodope region in the southwest of the country on the dark brown soils of the mountain valleys.

CLIMATE

The climatic conditions typical of the continental type in the area of this breed are shown in Table 153.

TABLE 153. — AVERAGE CLIMATIC CONDITIONS FOR SHORTHORNED RHODOPE CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	0.9	3.0	7.4	12.2	17.3	21.0	23.4	22.8	18.7	13.2	6.7	2.8
Rainfall (mm)	35	33	38	40	57	62	49	40	38	38	50	33

FEEDING AND MANAGEMENT

The average feeding conditions in this area are similar to those described for the Grey Iskur breed on p. 283, although with the greater dependence on mountain grazings for the summer, the lower rates of growth and smaller mature size, there is less incentive to feed these animals well.

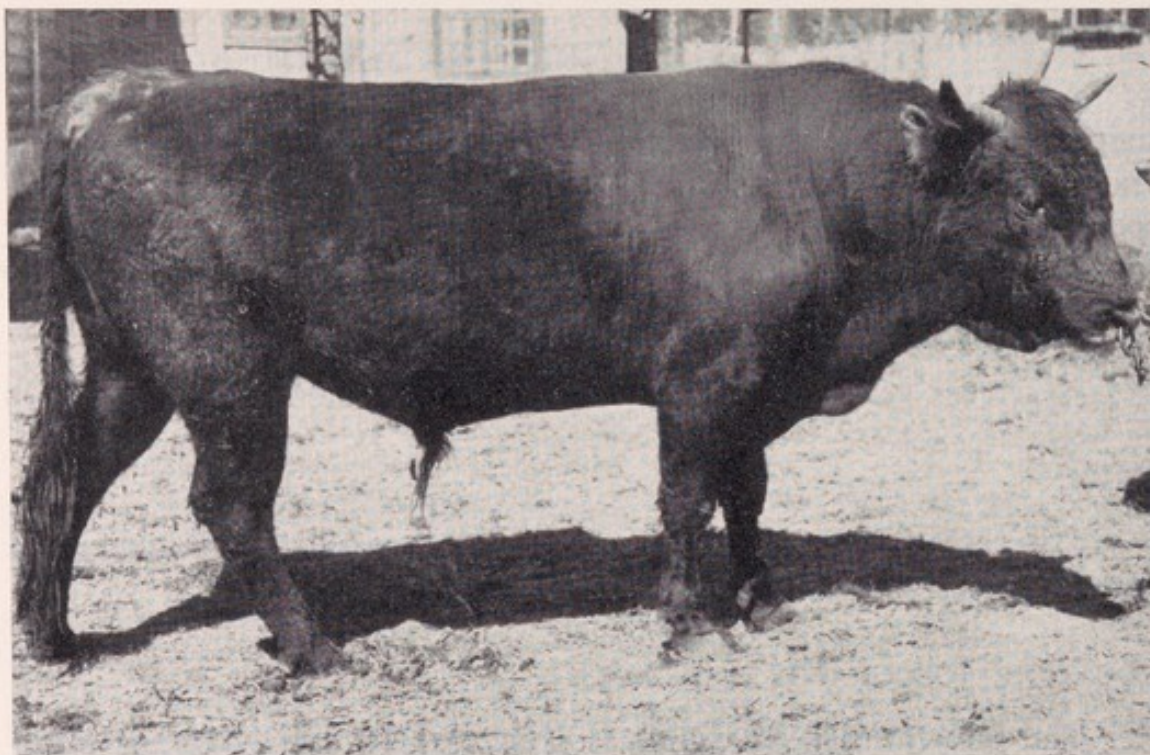


FIGURE 177. — Shorthorned Rhodope bull, 9 years old.

Courtesy Prof. Ivanoff



FIGURE 178. — Shorthorned Rhodope cow.

Courtesy Prof. Ivanoff

PHYSICAL CHARACTERS

In morphological characters, the Shorthorned Rhodope are intermediate between the Buša cattle of Yugoslavia (p. 269) and the Greek Shorthorn (p. 303). Their coat color is dark brown, almost black in some cases, with a lighter band along the back.

The animals are small and cows weigh only from 150 to 250 kilograms when mature. Their wither height varies from 95 to 115 centimeters and their chest circumference is about 140 centimeters on average.

FUNCTIONAL CHARACTERISTICS

These again are intermediate between the Yugoslav and Greek Buša cattle (see p. 270 and 304). Milk yields average 600 to 1,300 kilograms with a butterfat content of 4.5 to 5.5 percent.

BREED ORGANIZATION

This is similar to that described on p. 286 but considerable cross-breeding to Jersey animals is now taking place.

Red Sadova and Ukrainian Steppe

ORIGIN

The Red Sadova breed has originated from crossings between various indigenous types and imported Angeln cattle. More recently, Red Danish blood has been introduced and further crosses with Ukrainian Red Steppe cattle have been made.

LOCATION, TOPOGRAPHY AND SOILS

The Red Sadova breed is mainly distributed in the northeast and in the south of Bulgaria, both on the black earth and light brown soils.

CLIMATE

The climate is typically continental in type, as is indicated by the data in Table 154.

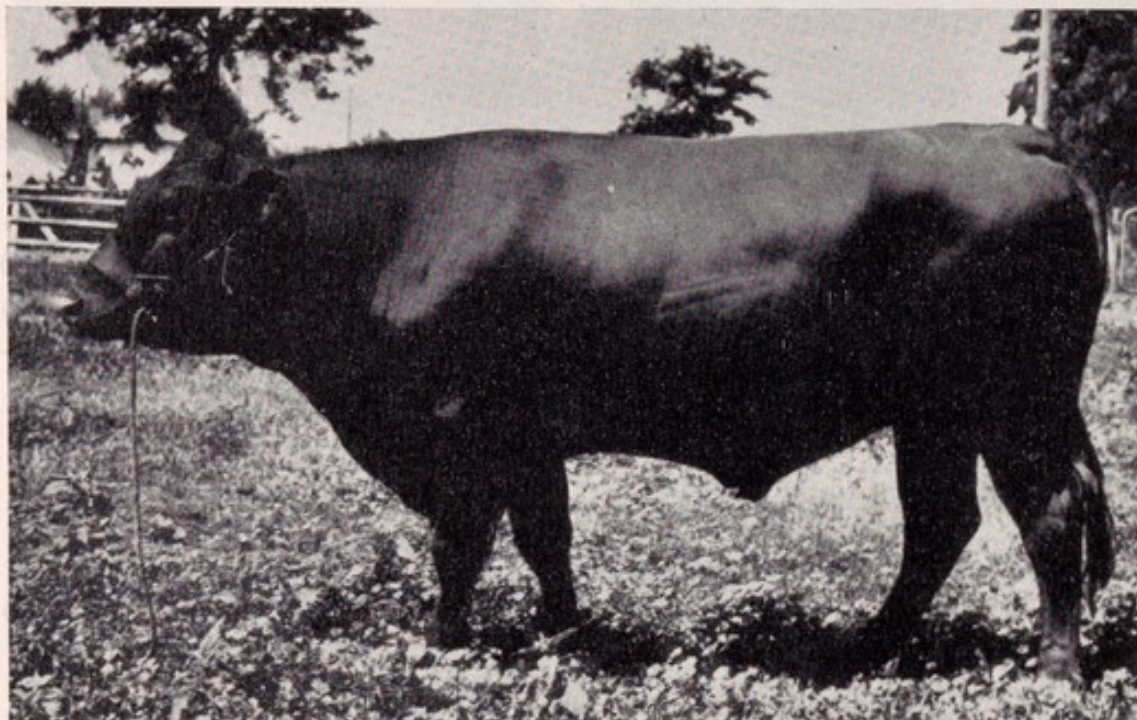


FIGURE 179. — Red Sadova and Ukrainian Steppe bull.

Courtesy Prof. Ivanoff

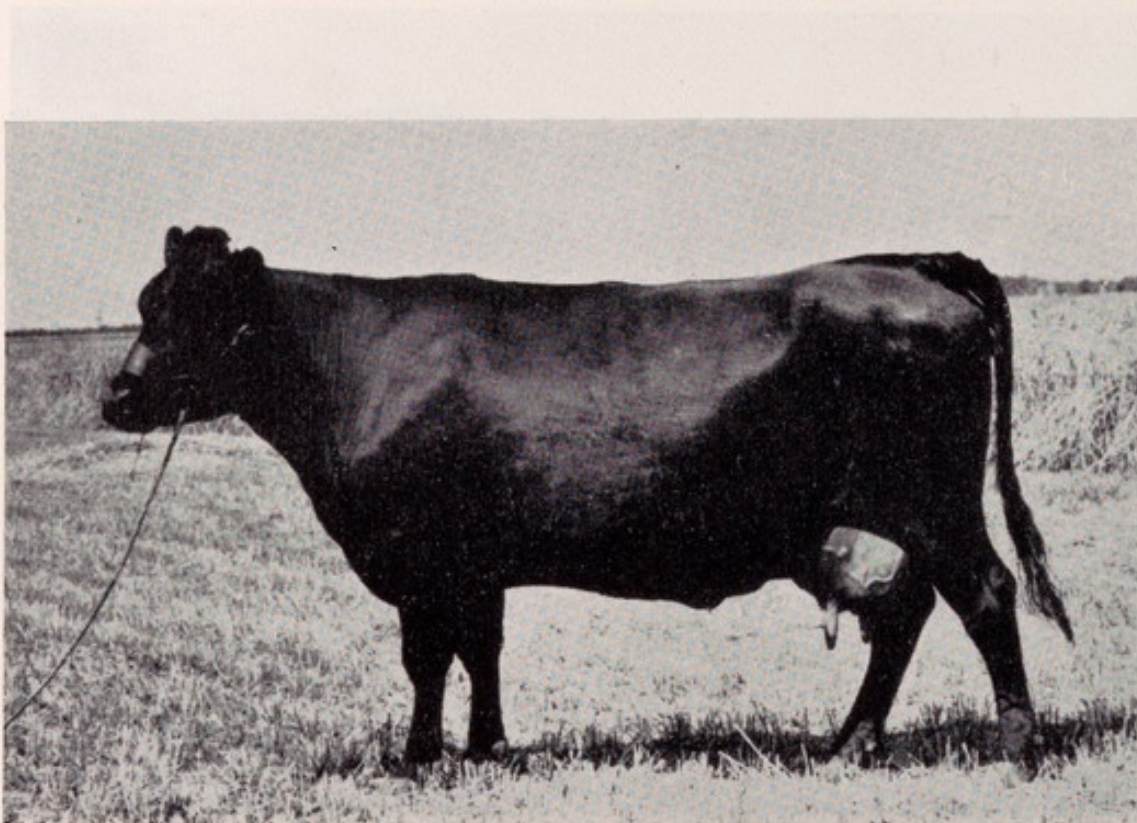


FIGURE 180. — Red Sadova and Ukrainian Steppe cow.

Courtesy Prof. Ivanoff

TABLE 154. - AVERAGE CLIMATIC CONDITIONS FOR RED SADOVA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	0.9	3.0	7.4	12.2	17.3	21.0	23.4	22.8	18.2	13.2	6.7	2.8
Rainfall (mm)	55	33	38	40	57	62	49	40	38	38	50	33

FEEDING AND MANAGEMENT

The general pattern of management is summer grazing and stall-feeding in the winter. The grazing on these plain areas is of much higher nutritive value and there are more and better crop residues for winter feeding. Soiling is also carried out in summer. Grains and oilcake supplements are used and silage is fed in some cases.

PHYSICAL CHARACTERS

As would be anticipated from its genetic make-up, this is a fairly large animal and cows average 500 to 530 kilograms. Considerable variation exists between individual herds, depending on the proportions of the different exotic bloods which have been utilized for developing the individual animals. Reference to the Angeln cattle (Vol. I, p. 232), the Ukrainian Red (Steppe) animals (p. 337) and the Red Danish breed (Vol. I, p. 28) indicates the type of variation which can be anticipated and the general morphological characters exhibited.

FUNCTIONAL CHARACTERISTICS

With better nutritive conditions, these animals approximate more closely to the characteristics of the parent breeds in their original homes. The average milk yield of cows is about 3,600 kilograms containing 3.7 percent of butterfat. The carcasses are better proportioned and contain meat of more culinary properties than is found in the indigenous types. Although some animals are definitely more dairy in type, the average is a good dual-purpose milk/meat beast.

BREED ORGANIZATION

This follows the same pattern as described for other Bulgarian breeds but the numbers of the stock are steadily increasing.

ALBANIA

Albania, which lies between 40° and 43° north latitude and 19° and 21° east longitude, is a small country roughly on the same latitude as northern Greece or the southern parts of Yugoslavia. The Adriatic coast is sandy and at a low altitude while, in the northeast, there are swampy lowland areas adjoining the rivers. Elsewhere, the country is undulating between mountain areas and the valleys cut into them.

The summers are dry and typically Mediterranean in type, while the winters are mild and wet. Only some 13 percent of the land surface is under arable cultivation and 31 percent is grassland.

The 450,000 cattle belong to the same breeds as the Greek animals, i.e., Illyrian Shorthorn *Brachyceros* or Buša breed and the Grey Steppe cattle. The same descriptions as given for the Greek breeds on p. 301 and p. 305 would apply equally to the Albanian stock. Even less has been done in Albania to improve these breeds, while the same problem of feed shortage applies. Consequently, the Albanian animals are no larger nor more productive than the corresponding Greek breeds.

GREECE

Most of the Greek mainland, which lies roughly between 20° and 26.5° east longitude and 36.4° to 42° north latitude, as well as the islands in the Aegean archipelago, consist mainly of mountainous areas with but comparatively small regions lying at the lower altitudes. The highest point is Olympus (2,920 meters) near the Gulf of Salonica. The plains of Thessaly and Macedonia in the northeast, which are the most extensive lowlands in the country, provide reasonably good conditions for animal production.

Generally, the Greek climate is of the Mediterranean type, with hot, dry summers and mild winters, although altitude mitigates the dominant climatic pattern, lowering temperatures, increasing diurnal and seasonal variations and bringing an increased precipitation. On the west coast, rainfall may reach 1,400 millimeters per year but, in the area around Athens, it may be only 350 millimeters.

Some 27 percent of the total land area is arable and 40 percent is used for grazing in localities where the soils and topography are unsuitable for agricultural cropping. In fact, parts of the grazing areas should be put to forestry purposes, while many of the outly-



FIGURE 181. — Scutari bull (Albania).



FIGURE 182. — Scutari cow (Albania).



FIGURE 183. — Guernsey × Scutari bull (Albania).

Courtesy Prof. T. Bonadonna



FIGURE 184. — Guernsey × Scutari cow (Albania).

Courtesy Prof. T. Bonadonna

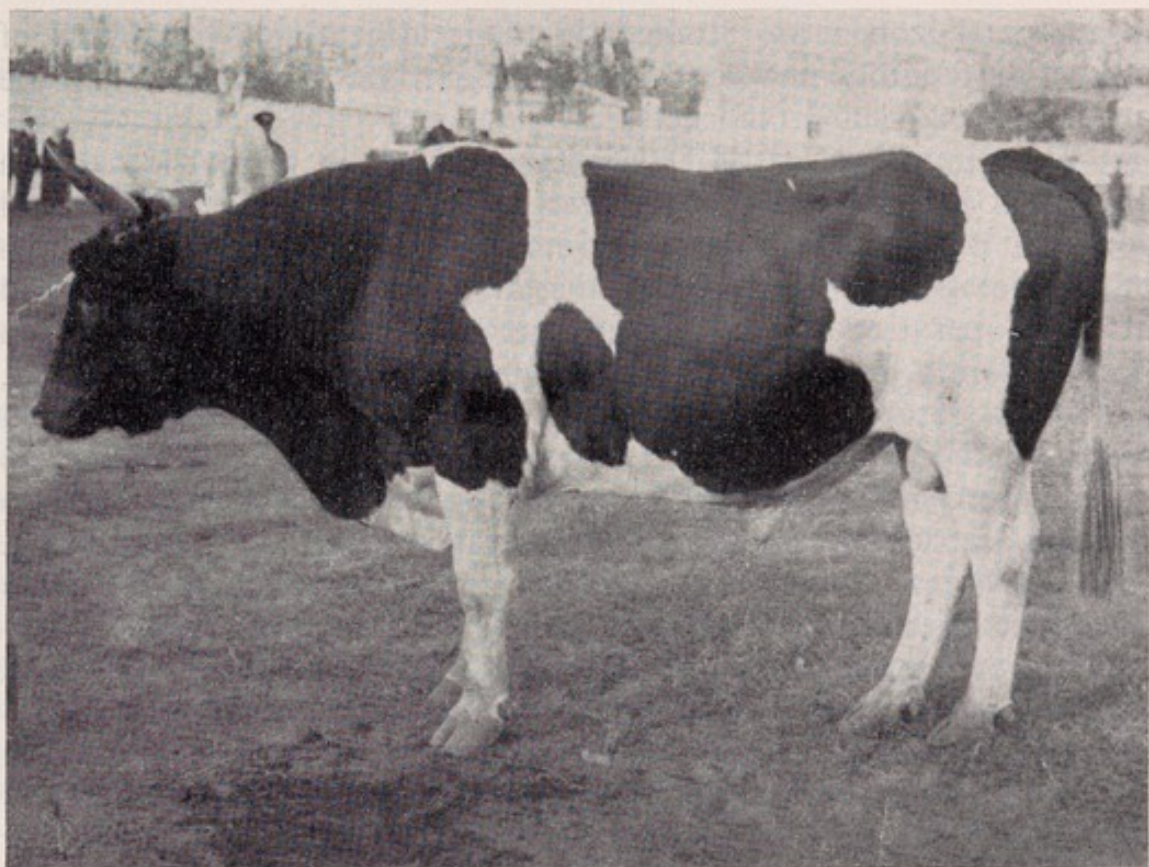


FIGURE 185. — Friesian bull, 5 years old (Albania).

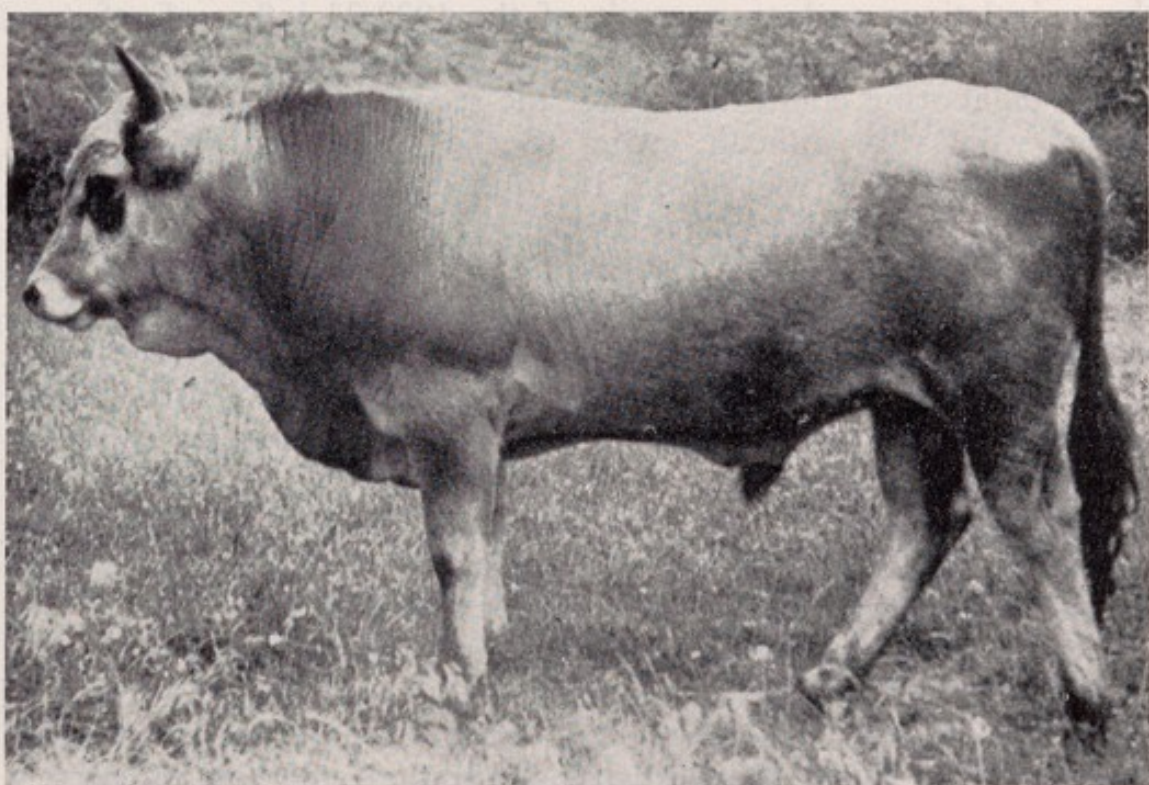


FIGURE 186. — Albanian Steppe bull.

ing grazing zones are limited in their utilization by the lack of marketing facilities and road transportation systems to evacuate the produce to consumer markets.

The number of cattle (1,135,000) is small in proportion to the human population and to the area of land available. Sheep and goats are of greater economic and household importance than cattle but approximately 30 percent of the latter are male animals utilized in farm operations and for draft purposes. The cattle population is significantly influenced by the ubiquitous low planes of nutrition, and body stature is reduced, as are the outputs of meat, milk and work by individual animals. Grazing control is badly needed to secure more herbage and fodder of higher nutritive value and to prevent destruction of the existing sparse grazings by overstocking. In some areas, a restricted form of nomadism is practiced and in others the village units graze the higher altitudes in summer. Because of the limitations of nutrition, the widespread use of imported high-producing exotic cattle is often impractical, owing to the breakdown of such cattle in the local environment. The lack of grazing also eliminates the keeping of herds for beef production and such stock as are maintained are required to produce milk or work.

During both world wars and the subsequent civil war, cattle numbers were seriously depleted. There has been a need, following these depletions and as a result of the 1922/23 influx of refugees, quickly to augment output and many animals have been imported from neighboring countries. After the second world war, such purchases were very difficult owing to the small numbers available. Outside assistance was given by introducing Friesians from the United States, Denmark and north Germany, Brown Swiss from Switzerland, Germany, Austria, Slovenia and the United States, Jerseys from the United States, and Red Danish from Denmark. Simmentals from Yugoslavia were introduced to Thrace and Pinzgau cattle were brought to Macedonia. Between the world wars, certain attempts to improve beef or dual-purpose productions were undertaken, in spite of the adverse environmental conditions, and Brittany cattle were taken to Macedonia, Angeln and Limousin breeds to Salonica, and Tarntaise animals to Seres. Efforts with the Aberdeen Angus were not very successful.

A few years ago, the imported cattle and their progeny amounted to 8 percent of the total cattle population. About 63 percent of all Greek animals belong to the two indigenous breeds of Greek Shorthorn and Greek Steppe cattle, while the remaining 29 percent represent various crossbreds.

A number of attempts have been made unsuccessfully to establish Breed Societies and Herdbooks, so that no geneological data exist and much of what was available up to 1940 has been destroyed. Improvements are now being stimulated by artificial insemination campaigns and the government pays up to 30 percent of the costs of Friesian and Brown Swiss insemination services. Artificial insemination units are now operating in all regions and over 200,000 inseminations were performed in 1963.

Many cattle are in peasant-owned units of one or two cows, and only near the cities or in dairies producing for the towns do the larger owners have 10 to 50 cows in their byres. Owners with improved animals are organized into co-operative societies which, among other activities, are interested in milk recording and productivity. These co-operatives, sponsored by the state and financially assisted by the Agricultural Bank of Greece, are establishing co-operative milk and cheese plants. The state grants loans for the encouragement of better stock and byres and provides producers with 30 percent of the value of the milk plant. The remaining 70 percent is loaned on favorable terms by the bank.

Greek Shorthorn (Illyrian Shorthorn)

ORIGIN

The Greek Shorthorn (*Bos taurus brachyceros*) has descended from the Illyrian cattle which have inhabited the southeast of Europe from very ancient times. A number of different strains developed but, as the animals have been improved by crossings with introduced stock, these different subtypes have largely lost their identity, although three types are still recognizable. In recent years, Brown Swiss animals have been widely employed for a grading-up program designed to improve the output of meat and milk.

LOCATION, TOPOGRAPHY AND SOILS

Except in Thrace, Macedonia and eastern Thessaly, the Greek Shorthorn is found throughout the rest of the country. It is, as a result of centuries of adaptation, now in harmony with a wide range of soil conditions, topography and altitudes.

CLIMATE

To illustrate the climatic conditions under which this breed is encountered, Table 155 summarizes the data for Athens.

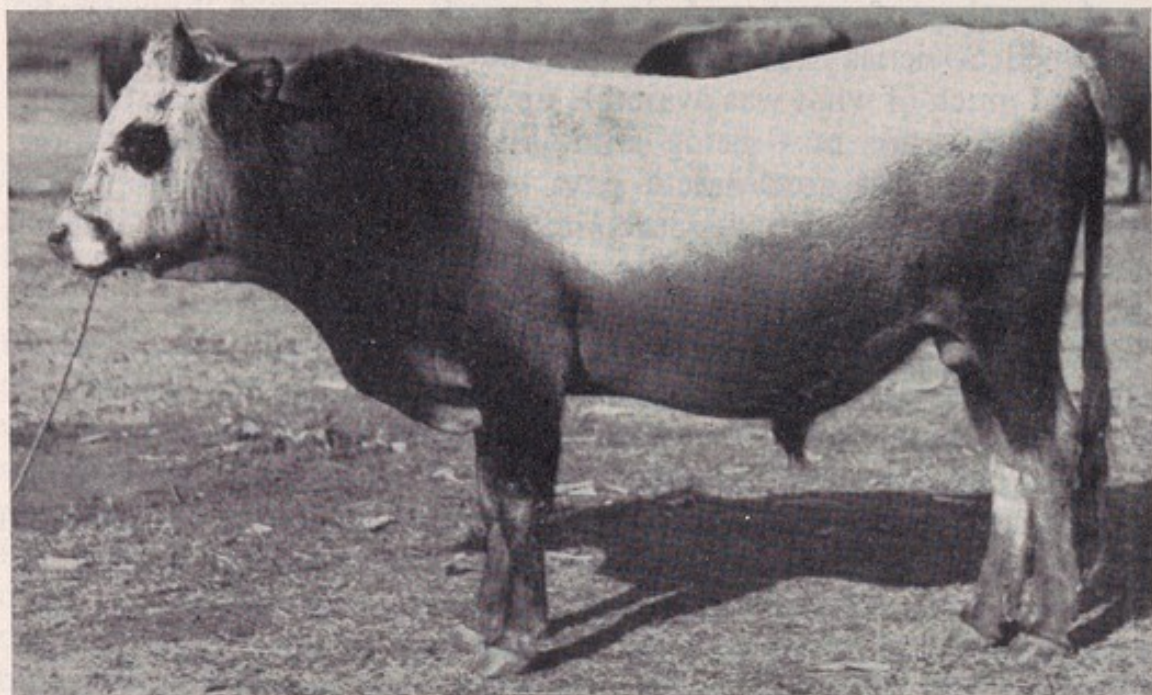


FIGURE 187. — Greek Shorthorn bull.

Courtesy A. Papaioannou



FIGURE 188. — Greek Shorthorn cow.

Courtesy A. Papaioannou

TABLE 155. - AVERAGE CLIMATIC CONDITIONS FOR GREEK SHORTHORN CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	8.6	9.8	11.7	15.1	18.0	23.3	27.3	27.5	24.2	19.1	14.6	10.8
Rainfall (mm)	46	46	35	11	36	26	0	3	20	39	79	44

FEEDING AND MANAGEMENT

The conditions under which imported dairy cattle are kept differ significantly from those under which the Greek Shorthorn is maintained by average farmers. In summer, the latter graze the denuded pastures and the herbage on the deteriorated hill and mountain slopes. The grasses near the homesteads are largely made into hay at a too advanced stage of maturity in order to increase the bulk but at the expense of its quality.

Little knowledge is applied in animal nutrition and reliance is placed on the feeding of poor quality hays, straws, crop residues and small amounts of cereal by-products and carob beans. On the better managed units, lucerne and vetch hays, barley, oats, beans, horsebeans, brans and oilseed cakes are used additionally. As stated earlier, inadequate attention to nutrition and the lack of good pastures are the common hindrances to better cattle productivity.

PHYSICAL CHARACTERS

The pigmented skin is of medium thickness and is supple or tight depending on the animal's condition. The hair is medium to long, and of a brownish color varying from light brown to gray and black. Some white or lighter colored hair is found around the inguinal region and the insides of the legs. There are also three other typical subtypes with silver gray mixed with blond hairs, light brown colorations varying from brown to chestnut and a black-brown coat color.

The cattle are rather small in size so that they appear to have proportionally large heads, straight profiles and widish foreheads. The horns grow out from the poll and curve forward and either downward or upward. They are either black throughout or whitish at the base with black ends.

The topline is relatively straight, although it is often high at the tail and may dip at the loins. The chest is deep but the ribs are often flat-sided, instead of rounded, and the abdomen is capacious. The legs are short, the bones are light and slender, while the muscular development can be very variable. The hooves are black and hard wearing, while the muzzle is always black, except in another subtype with light cream to flame red hairs which has a flesh-colored muzzle. The average liveweight of cows is only 180 kilograms. Table 156 gives details of their liveweights and body measurements.

TABLE 156. — AVERAGE LIVEWEIGHTS AND BODY MEASUREMENTS OF GREEK SHORTHORN CATTLE

Liveweight (kg)	180-200
Body length (cm)	113
Wither height (cm)	101-114
Chest girth (cm)	135
Chest depth (cm)	53

The udder is small and hairy and because of the poor feeding conditions the animals appear stunted and rather primitive in type. With better nutrition, their appearance can be appreciably improved.

FUNCTIONAL CHARACTERISTICS

The Greek Shorthorn is frequently described as being of a dairy type but, under the normal environmental conditions and the low plane of management and nutrition, the output of milk is low. Calves are allowed to suckle their dams for at least two months and it is estimated that the milk available to the owner in the short lactation of six to eight months averages some 530 kilograms, when the cows are dependent on what they can graze or when they are supplemented by the produce of poor farms. If the animals are kept in barns and supplemented with better feeds, the average milk yield will be around 1,200 kilograms containing 4.5 percent of butterfat.

For meat-production purposes, the Greek Shorthorn is not an efficient animal because of its poor muscular development, and

work is the secondary demand made on these cows. Bulls and oxen are normally worked but they are not very strong and their output is reduced in proportion to their size and muscular development.

BREED ORGANIZATION

Although still the most numerous breed in Greece, the Shorthorn is slowly decreasing in numbers because of the attempt to improve its productivity by crossing it with imported breeds, particularly the Brown Swiss. The Greek Shorthorn, although smaller in size, has affinities with the Buša cattle types which are spread throughout the Balkan states.

There is neither a Breeders' Association nor a Herdbook in operation.

Greek Steppe

ORIGIN

The Podolic Greek Steppe breed (*Bos taurus primigenius*) is not indigenous in the same way as the Greek Shorthorn but has derived from cattle brought from neighboring northern countries. The indigenous Shorthorn was too small for requirements in many areas and was bred to the imported *Protogenius* cattle from the north to increase its size and strength. The larger progeny were interbred and slowly from the mixture the Greek Steppe breed emerged.

LOCATION, TOPOGRAPHY AND SOILS

The Steppe breed is to be found in Thrace, in the Macedonian plains, in the eastern area of Thessaly (Larissa, Farsala, Almyros and Dhomokos) and in eastern Fthiotis (the mountains of Orthrys and Kalidromon). Before the second world war, the most representative specimens were to be seen in Chalkidiki, in Sykia, in Kate-rini and Anavra in Almyros.

CLIMATE

The figures in Table 157 show the average climatic data for Larissa.



FIGURE 189. — Greek Steppe bull.

Courtesy A. Papaioannou

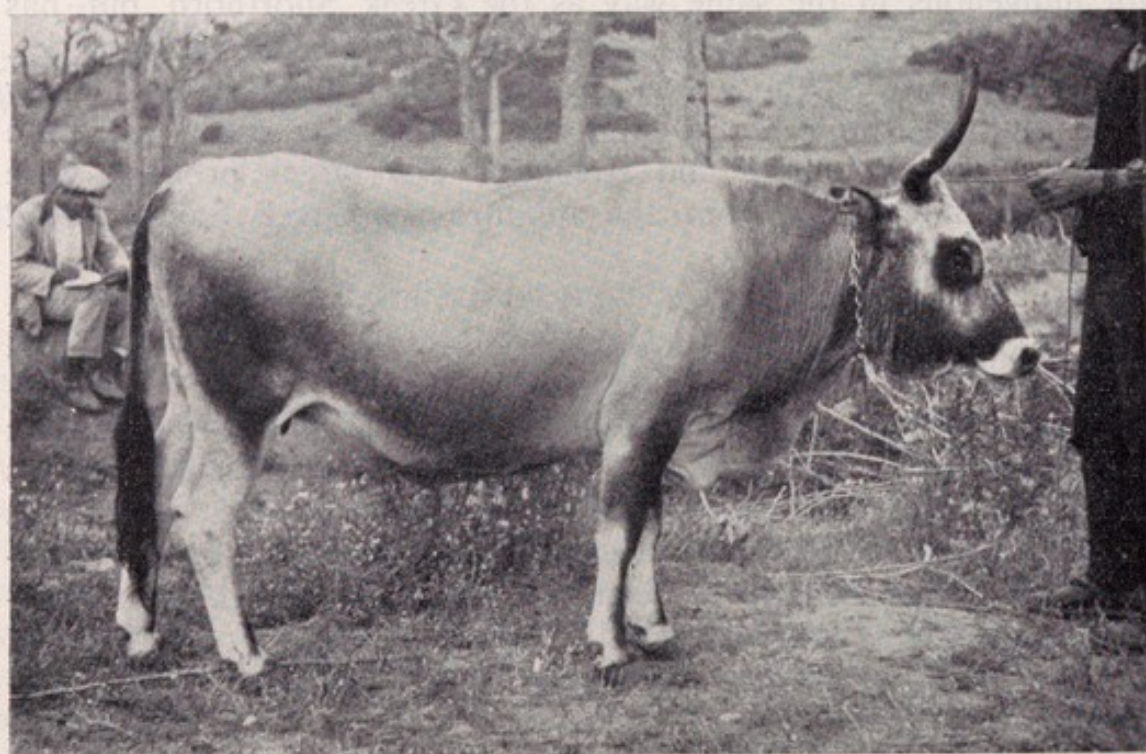


FIGURE 190. — Greek Steppe cow.

Courtesy Director of Animal Husbandry

TABLE 157. — AVERAGE CLIMATIC CONDITIONS FOR GREEK STEPPE CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	5.1	7.4	10.7	14.8	20.2	24.8	27.7	27.4	22.7	17.4	11.1	7.7
Rainfall (mm)	45	47	36	38	45	38	34	23	26	47	67	48

FEEDING AND MANAGEMENT

These are similar to those described on p. 303 for the Greek Shorthorn, although because the better grazings in the plains are of a higher nutritive value than in the hills the size and strength of this breed are greater. Steppe cattle in the Isle of Tinos are the largest type of this breed in Greece, averaging from 120 to 125 centimeters at the withers and weighing up to 325 to 340 kilograms. The Sykia cattle represent the smallest type of this breed, being only 109 centimeters at the shoulder. Katerini cattle are intermediate in size, at around 110 centimeters at the withers and weighing about 300 kilograms.

PHYSICAL CHARACTERS

Greek Steppe cattle have medium-thick skins which carry gray hairs varying in shade from silver to black gray, and sometimes with an admixture of brown but with the lighter colors predominating.

The head is long, straight or slightly dished in profile, of medium width in the forehead and has dark hairs around the eyes and in the ears. The muzzle is black and wide. The horns are long and spread outward from the poll before turning upward and then backward or outward. They are whitish in color but the terminal portions are black.

Heavy forequarters characterize the body shape, the withers are high and the body is long but the upper line is rather variable, with a tendency to be straight but sometimes with low loins or high tail heads. The chest is very deep, there is often a marked dewlap in front of the sternum, but the ribs may be well sprung or rather flat. The abdominal volume is large but the depth at the flanks is often rather shallow. The legs are long but are lightly boned, terminating in black hooves. Although these animals are larger than the Shorthorn types from which they were developed, they are smaller than their Hungarian counterparts.

Table 158 shows the average liveweights and body measurements of mature stock from Thessaly and Sykia.

TABLE 158. — AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF GREEK STEPPE CATTLE

	Thessaly	Sykia
Liveweight (kg)	285	245
Body length (cm)	132	125
Wither height (cm)	115	110
Chest girth (cm)	157	151
Chest width (cm)	35	34

FUNCTIONAL CHARACTERISTICS

This breed, although larger, has no better milk or meat-producing abilities than the Greek Shorthorn but it is better for draft purposes because of its larger size and greater strength. Reference to p. 304 will give an idea of the milking ability under poor and somewhat better conditions.

BREED ORGANIZATION

The Greek Steppe is slowly being bred out by crossings with other imported cattle types. No Breeders' Association nor Herdbook exist.

EXOTIC BREEDS IN GREECE

As has been indicated on p. 300, a number of exotic breeds have been introduced. For beef-production purposes, these have not been really satisfactory owing to the lack of opportunities to express their hereditary characters economically because of dietary restrictions. For milk production, in peri-urban areas, the Friesians have been used successfully wherever feeding could be undertaken in accordance with their demands or, at least, at a level which permitted them to milk without drawing too much upon their body reserves.

Probably the Brown Swiss has been used to the maximum extent, because of its dual-purpose characteristics, and stock from Bessarabia and the Crimea, in addition to the sources mentioned on p. 300, have also been utilized.

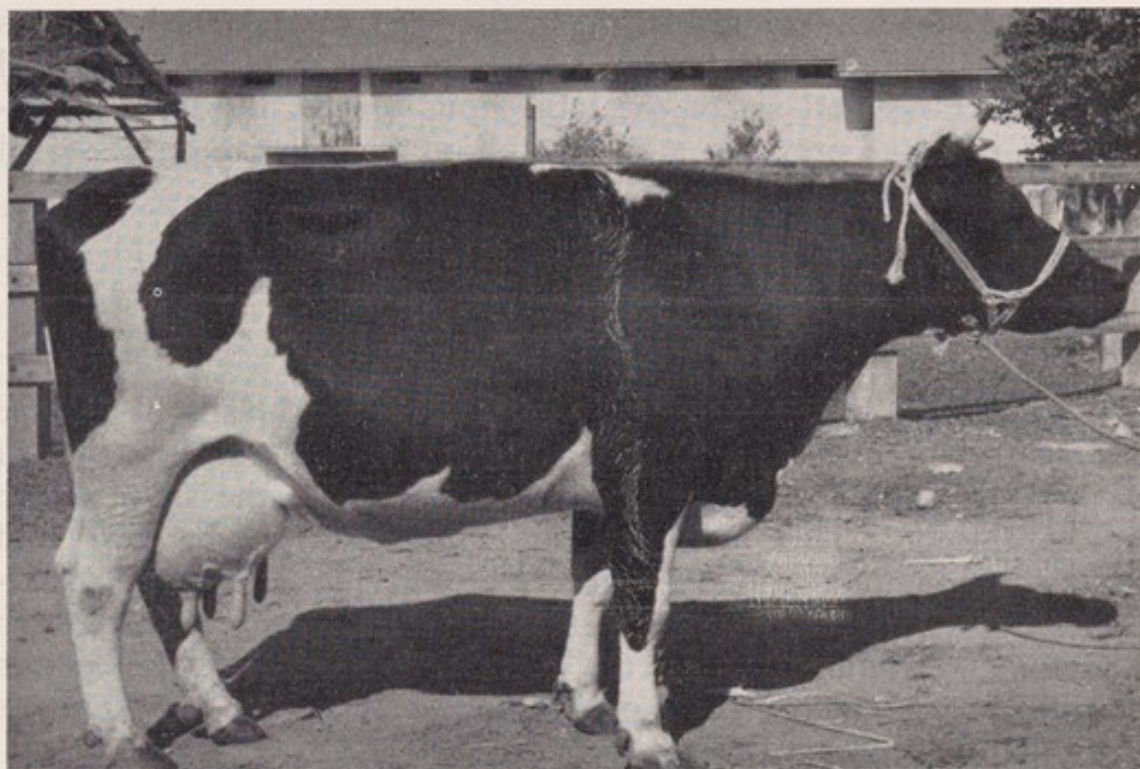


FIGURE 191. — Friesian cow bred in Greece.

Courtesy Director of Animal Husbandry

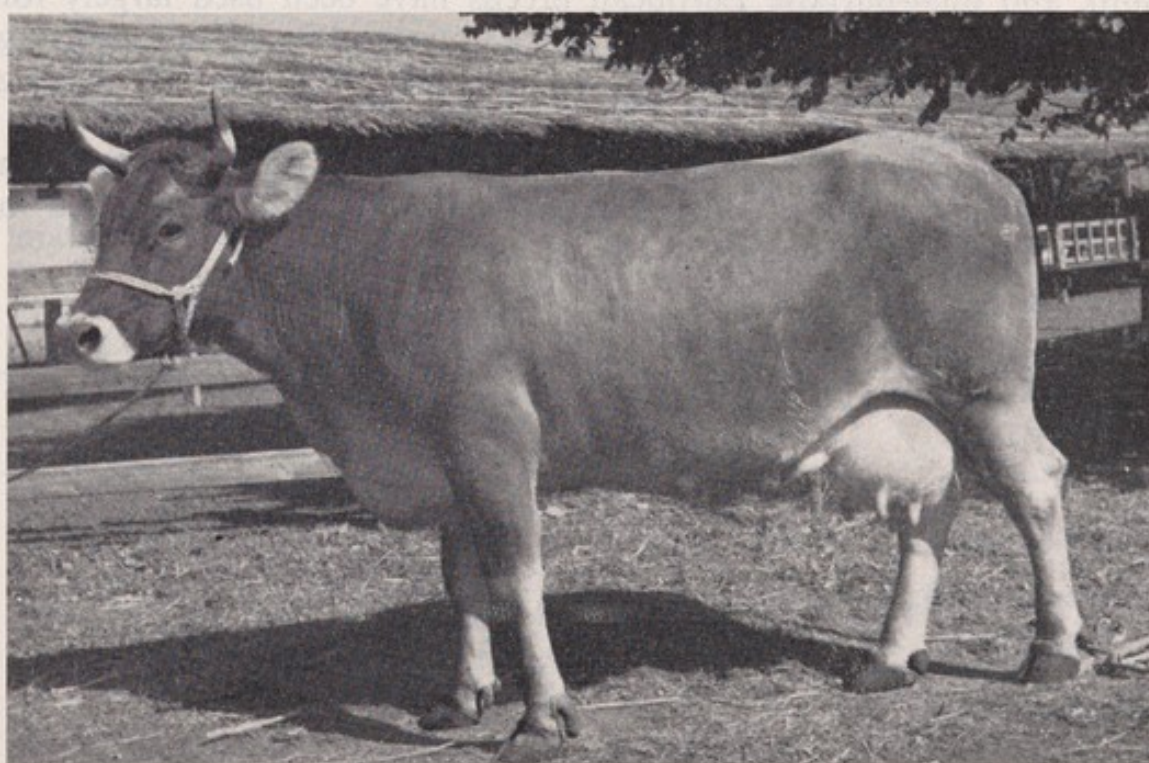


FIGURE 192. — Brown Swiss cow bred in Greece.

Courtesy Director of Animal Husbandry

The Friesians managed in sheds can yield over 4,000 kilograms of milk, while the other foreign breeds produce between 3,000 and 3,500 kilograms but, as for the indigenous breeds, the lack of precise information prevents a discussion of the relative successes of these various exotic breeds.

TURKEY

This study is concerned only with the cattle breeds of Europe and so the discussion on Turkey is limited to the small portion of the country (about 3 percent of the total area) in the southeastern tip of Europe. This area lies approximately between 26.1° and 29.2° east longitude and 40.2° and 42.1° north latitude. The topography and soils are continuations of the eastern Greek and southern Bulgarian conditions, while the climate is typical of the eastern Mediterranean environment, e.g., hot and relatively dry summers with humid and mild winters.

The cattle breeds are now rather mixed and include the Grey Steppe cattle of Podolic origin, the Buša, Greek Shorthorn, Ukrainian Red, as well as the Brown Swiss (or Montafon), Jerseys, Friesians and Simmental breeds and their crossbred descendants. The milk and dual-purpose European breeds have been used largely for improving milk supplies to the larger towns while, in the outlying districts, the more primitive meat and work types are still meeting peasant demands.

For Turkey as a whole, and not just the European portion of the country, there are about 12.5 million cattle, distributed in the proportions between breeds as shown in Table 159.

TABLE 159. - DISTRIBUTION OF CATTLE BREEDS IN TURKEY

Breed	Percentage
Anatolian Black	42.0
Eastern Red and White	29.0
Grey Steppe	20.0
Southern Yellow	6.0
Kilis	1.0
Crossbred and imported	2.0

The Anatolian Black breed is indigenous to Anatolia and the Eastern Red and White cattle are encountered in the east of Turkey. The Southern Yellow and the Kilis breeds are found in the south of the Asiatic part of the country, while the Grey Steppe cattle live in the western parts of Asiatic Turkey and are the main indigenous breed in the small European part of the country.

Grey Steppe

ORIGIN

The Grey Steppe cattle are of very ancient origin and are derived from the same stock as similar breeds in the Ukraine, Bulgaria, Romania, Czechoslovakia, Yugoslavia and Greece. These animals are of the Podolic Steppe group with *Primigenius* characteristics.

LOCATION, TOPOGRAPHY AND SOILS

Grey Steppe cattle are the most numerous indigenous breed in European Turkey and are the main breed in Thrace on the lower altitude regions with light brown soils.

CLIMATE

The climatic conditions are typically Mediterranean in type but the summer temperatures are less intense than in Greece and the total precipitation is lower. Table 160 gives the average climatic data for this breed.

TABLE 160. — AVERAGE CLIMATIC CONDITIONS FOR GREY STEPPE CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	5.4	7.1	10.1	14.0	19.4	23.5	26.6	25.8	22.0	17.5	11.3	7.8
Rainfall (mm)	46	46	35	11	36	26	0	3	20	39	79	44

FEEDING AND MANAGEMENT

Feeding and management conditions are very similar to those described for Greek Steppe cattle (p. 307).



FIGURE 193. — Grey Steppe bull.

Courtesy Turkish Veterinary Department

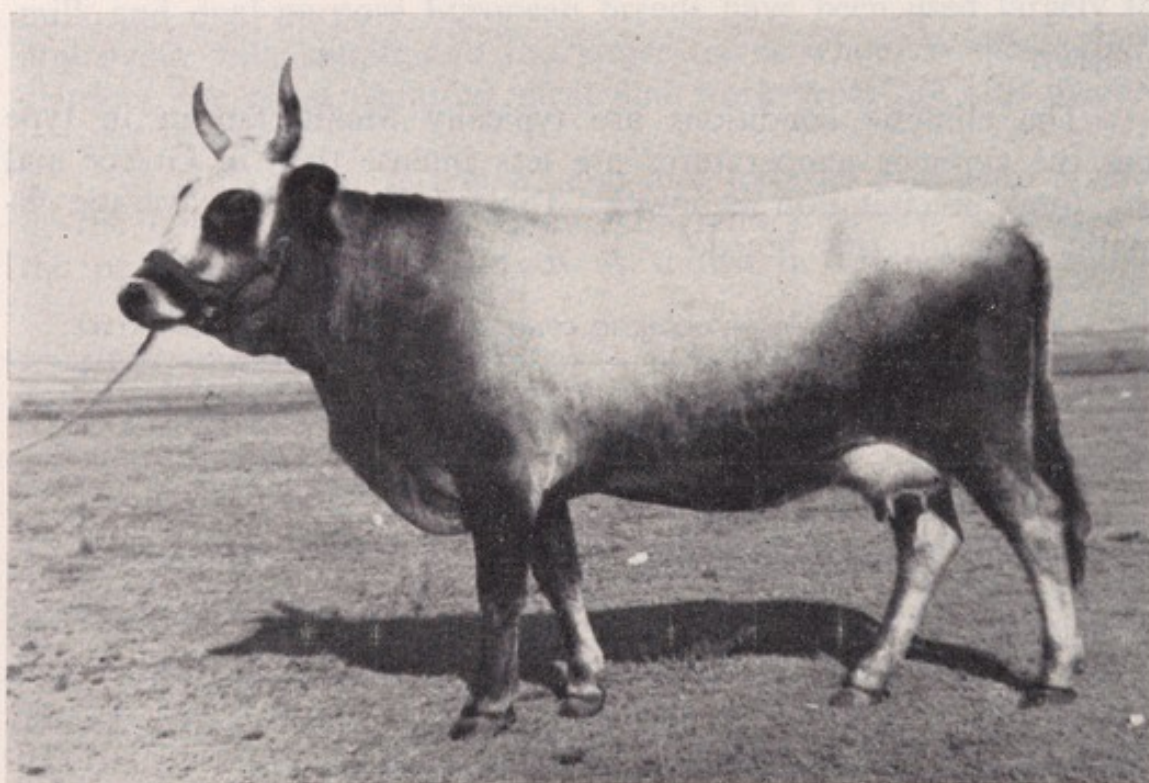


FIGURE 194. — Grey Steppe cow.

Courtesy Turkish Veterinary Department



FIGURE 195. — Montafon bull.

Courtesy Turkish Veterinary Department



FIGURE 196. — Montafon cow.

Courtesy Turkish Veterinary Department

PHYSICAL CHARACTERS

The short hair is gray in color but varies from very light to dark gray and is usually darker in the males than in the females. The skin is pigmented and almost black on the muzzle and body orifices.

The head is long, narrow and straight in profile. The horns are large and grow out from the poll before turning forward and upward. They are yellowish in color with black tips. The hard, durable hooves are also black.

The neck and legs are darker than the body, while the legs are rather long in proportion to the trunk measurements. The topline shows high withers and a low loin region before rising again to a moderately high tail head. The chest is deep and the forequarters are heavier than the hindquarters. The ribs may be nicely sprung or may be somewhat flat depending on the nutritional plane during growth. Although the animals are strong, the muscles of the hindquarter tissues are not so well developed as in improved beef breeds and the mammary tissues are not outstanding. The legs are well boned and strong. Average liveweights and body measurements are given in Table 161.

TABLE 161. - AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF TURKISH GREY STEPPE CATTLE

	Village herds		Agricultural College herd	
	Mean	Range	Mean	Range
Liveweight (kg)	340	250-410	410	330-500
Wither height (cm)	118	114-124	125	118-130
Chest girth (cm)	165	156-174	177	165-187
Chest depth (cm)	63	58-67	67	62-71
Hip width (cm)	45	40-48	50	46-53

The better mature bulls will weigh 800 to 900 kilograms but the majority do not reach this size.

FUNCTIONAL CHARACTERISTICS

This is a work and meat breed and the animals have an excellent ability to perform hard work for long hours under unfavorable conditions. For field work they are superior to other Turkish breeds.

They grow slowly and their meat is of a rather low quality due to the coarse and dark muscle fibers. They are better milk producers than beef animals and the average lactation yield is around 900 kilograms of milk containing 4 percent of butterfat. In the better managed herds, the average output rises to 1,450 kilograms of milk containing 4.25 percent of butterfat.

The present tendency is to concentrate more on milk and meat productivities, although for some time to come animals in more remote areas or on smallholdings will be required for draft purposes.

BREED ORGANIZATION

Animal improvement activities in Turkey are under the supervision of the General Directorate of Veterinary Affairs in the Ministry of Agriculture. Milk recording is carried out only in state herds from which breeding bulls are distributed because artificial insemination services are not used to any great extent.

IMPORTED BREEDS

Whereas the Brown Swiss and its Montafon subtype were the main breeds imported prior to 1956, a number of other breeds have since been tried. Among these are the Jersey and Friesian for milk and the Aberdeen Angus and Hereford for beef. In addition, Simmental herds are also found in urban environs as well as Ukrainian Red stock from the U.S.S.R.

4. U.S.S.R.

That part of the U.S.S.R. which is in Europe extends between 40° to 70° north latitude and between 21° to 67° east longitude. The total area of this sector is about 5 million km², or rather more than the rest of Europe. In general terms, it is a vast lowland area with mountains only in the south (the Crimean and Caucasian Mountains) and the east, where the Ural mountain chain lies along the border with the Asian part of the U.S.S.R.

As would be expected in such a vast region, the agricultural potential varies enormously from north to south, but large parts of the central and southern portions of the European sector possess very fertile soils. The climate is markedly continental in type and in the central region the hot summers are relatively short, while the winters are long and cold, particularly toward the Urals in the east. Whereas at Archangel near the White Sea in the north the temperature range is from -13° to 14° C, it is -14° to 20°C in the east and from 2° to 24°C in the Crimean peninsula in the south.

The average rainfall decreases from west to the east and south, from 615 millimeters in Moscow to 170 millimeters at Astrakhan in the south on the Caspian. Precipitation is greatest during the summer months and much of the southeast is steppe land because of the low annual rainfall and its distribution. In spite of the lack of rain, the soil and climatic conditions favor agricultural and animal production enterprises in the central and southern zones, and in many places they are excellent. From 60° north latitude to the Polar Circle there is a wide forest belt stretching from east to west. Further north, the tundras reach to the shores of the Arctic Ocean.

Indigenous cattle, which still exist in the European U.S.S.R., may be divided into three main groups: the Northern Polled and Horned cattle, the Grey Steppe or Podolic stock in the south, and the Caucasian cattle in the southeast. The Steppe cattle, which once played an important role as draft animals, have become less in demand since the advent of the tractor, and there is an increasing tendency to concentrate on milk or dual-purpose milk/meat types of cattle. Certain specialized beef animals have been imported.

Western European breeds were first imported about 250 years ago. They were brought first from the Netherlands, then Germany, Switzerland and the United Kingdom. Prior to the 1917 revolution, improvement activities were conducted by private land-

owners but, since the state became responsible for supplying milk and meat to the population, a considerable amount has been done to improve the animals as well as their feeding and management. Many local indigenous breeds have been improved by crossbreeding and upgrading with European breeds and several new breeds have evolved thereby. Of the foreign breeds which have been widely used, the three most important are the Friesian, Simmental and Brown Swiss. According to Mason (1951), the European U.S.S.R. cattle breeds can be classified as shown in Table 162.

TABLE 162. - CLASSIFICATION OF EUROPEAN U.S.S.R. CATTLE BREEDS

Indigenous breeds	Northern Polled, Grey Steppe and Caucasian
Imported breeds	Friesian, Simmental, Brown Swiss, Red Danish, Polish Red, Angeln, Ayrshire and Jersey (for dairy and dual-purpose production)
	Shorthorn, Hereford, Aberdeen Angus and Santa Gertrudis (beef breeds)
Improved local breeds and new breeds developed from crossings with imported cattle	Black and White breed (mainly Friesian crosses): Kholmogor, Istoben, Tagil, Yaroslavl and Oldenburg
	Red breeds: Estonian, Latvian, Lithuanian, Suksun, Ukrainian Red and Ukrainian Whitehead
	Red or Red and White dual-purpose breeds: Bestuzhev, Gorbатов, Kostroma, Tambov Red and Yurino

BREED ORGANIZATION

Prior to the 1917 revolution, improvement activities had been undertaken by the big landowners but no Herdbooks had been published. The measures taken by official bodies were also on a small scale. Little attention was devoted to the improvement of indigenous breeds and the influence of imported purebreds on these local types was haphazard and often unplanned.

After the revolution, government-established breeding units were developed in the different districts for the planned importation of exotics, the development of crossbreds and the distribution of improved types. State inspectorates were set up to organize breed improvements, the registration of animals in the State Herdbooks and the breeding of superior types. Kolkhozes and sovkhoses, or collective farms, were developed. The kolkhoz farms are owned by the farmers and the personnel employed therein, while the sovkhos is state-owned and worked by hired labor. Hence the sovkhos is more flexible and has a greater investment power than the kolkhoz.

By 1950 there were 72 state pedigree breeding units in possession of nearly 1 million cattle and many thousand head of stock are issued annually. The state breeding units work on the kolkhoz farms in their neighborhood but their main function is to organize breeding farms, rationalize their feeding methods, draw up and execute mating plans, inaugurate recording systems and to register animals in the Herdbooks.

The State Herdbooks register animals on the basis of their productivity and not on the purity of their blood. Consequently, purebred animals of low productivity cannot be registered. The Breed Regionalization Plan of 1938 prescribed the breeds which could be used for improvement purposes in each district. Twenty-four breeds were chosen and each had to be used exclusively in the area to which it was allotted.

The extent of milk recording activities is not known and, although artificial insemination is being increasingly employed, no official figures were available to the authors.

Research on animal breeding was conducted at 10 large institutes and at more than 50 experimental stations in 1950. These activities were directed by the Lenin All-Union Academy of Agricultural Sciences and the All-Union Institute of Animal Breeding.

Kholmogor

ORIGIN

Although one of the best dairy breeds, the Kholmogor is one of the oldest breeds in the U.S.S.R. and has been used for the improvement of other local types, while exports have also been made to Poland, Finland and other Baltic countries. The early development of Kholmogor cattle was assisted by the favorable conditions in the Archangel province and was stimulated by the economic outlet for milk. Ancient documents refer to the value of this breed and its sale to Moscow milk producers. During the eighteenth century, and also at intervals during the nineteenth century, cattle were imported from the Netherlands, so that Dutch blood probably had some influence on the early improvement of the Kholmogor breed, but the numbers imported were insignificant compared with the numbers of local stock.

LOCATION, TOPOGRAPHY AND SOILS

The Kholmogor breed evolved on the lower reaches of the north Dvina river (Pinega to Archangel), but it is also now widely distributed in the Archangel, Moscow, Vologda, Leningrad and Kirov

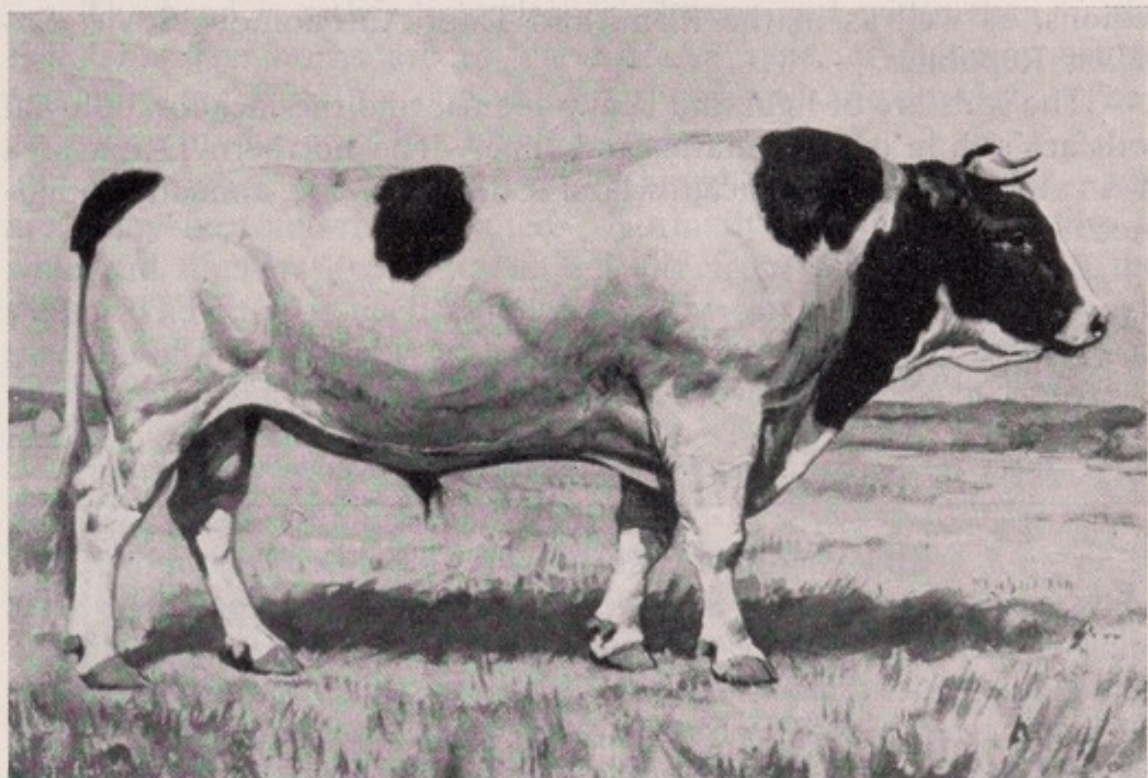


FIGURE 197. — Kholmogor bull.

Courtesy Ministry of Agriculture, Moscow

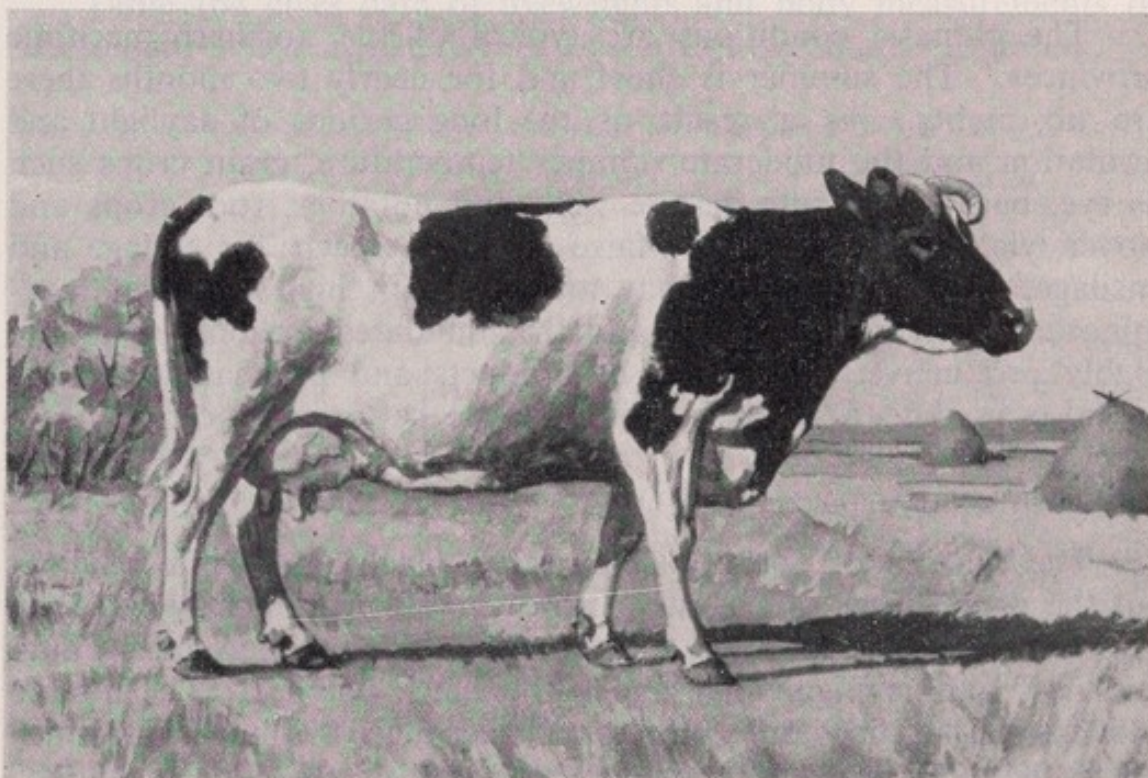


FIGURE 198. — Kholmogor cow.

Courtesy Ministry of Agriculture, Moscow

regions, as well as in the Komi and Tatar Autonomous Soviet Socialist Republics.

The soils are of light and heavy loams, and the meadow alluvial soils are rich in organic matter and lime. The northern Dvina area is a catchment of rich meadowlands and many are annually inundated.

CLIMATE

Table 163 presents the average climatic data for Archangel.

TABLE 163. - AVERAGE CLIMATIC CONDITIONS FOR Kholmogor Cattle

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-13.3	-12.4	-8.1	-1.1	5.2	11.5	15.3	12.9	7.6	1.0	-5.9	-11.0
Rainfall (mm)	21	22	22	21	33	48	71	64	58	49	33	24

FEEDING AND MANAGEMENT

The climatic conditions are typical of the northern maritime provinces. The summer is short and for nearly two months there are no nights. As a result of the long periods of daylight and insolation and the moderate summer temperature, grain crops such as rye, barley and oats mature well, and potatoes, root crops and clover yield satisfactorily. Maize is also grown for silage and ensilage. The grazing and hay areas contain high levels of leguminosae in the grass herbage and the inundated meadow areas are highly productive. Grain, its by-products and purchased oilcakes are also used to a limited extent for the better producers.

PHYSICAL CHARACTERS

The hair is of sharply demarcated black and white patches, but the proportions of the two colors vary from almost white with a little black to black with a little white. The skin is of medium thickness and is pigmented under the black patches. The muzzle and external orifices are colored in accordance with the surrounding skin.

In some animals, the color is red and white, while there are fewer numbers with brown and white or gray and white coats.

The head is rather light, leaner, shorter and wider than in the Friesian. The horns are of the Friesian type, of medium length, and grow out from the poll, then curl forward and upward. They are white at the base but black at the tips.

The topline is relatively level, although the tail head and rump area may be somewhat elevated. Normally, however, the rump is wide and slightly sloping to the tail and from the backbone to the sides. The chest is deep but the ribs are often flat-sided, although the abdominal capacity is large. Long legs, that are properly set, are normal but both bow legs and close-set hocks may arise if feeding is not correctly balanced.

The udder is of good size, but again a number of cows have sagging udders and bunched teats.

Kholmogor cattle are typically dairy animals, with a long body and well-developed digestive system and skeletal structure. The muscles are normally not highly developed and the meat is lean. On the other hand, as a result of selective action, there are herds with a more muscular body and better beef characters and other strains which are definitely bred for milk production irrespective of their beef propensities. The breed has a strong constitution and the more modern trend is to evolve a milk-producing breed which still yields a valuable carcass to the butcher.

Table 164 gives data of liveweights and body measurements of Kholmogor cattle registered in the Archangel State Herdbook.

TABLE 164. - AVERAGE LIVEWEIGHTS AND BODY MEASUREMENTS OF Kholmogor CATTLE

	Males			Females		
	1 year	2 years	Mature	1 year	2 years	Mature
Liveweight (kg)	300	600	925	230	480	600
Body length (cm)	135	157	182	121	156	162
Wither height (cm)	118	134	146	112	131	132
Chest girth (cm)	152	182	213	139	176	182
Chest depth (cm)	57	66	79	53	65	68
Hip width (cm)	38	46	56	35	51	51

The liveweights and body measurements are reduced by poor feeding conditions during growth and the majority of cows are between 450 to 500 kilograms when mature. The birth weights average 38 kilograms for males and 36 kilograms for female calves.

FUNCTIONAL CHARACTERISTICS

This breed is often regarded as an average to late-maturing dairy type. The variability in milk production can be gathered from the data in Table 165, which are taken from various State Herdbooks.

TABLE 165. — AVERAGE LACTATION RECORDS OF Kholmogor Cows

	Leningrad (1940)			Archangel (1949)			High producers (1947)		
	No. of cows	Milk	Fat	No. of cows	Milk	Fat	No. of cows	Milk	Fat
		<i>Kilo-grams</i>	<i>Percent-age</i>		<i>Kilo-grams</i>	<i>Percent-age</i>		<i>Kilo-grams</i>	<i>Percent-age</i>
1st lactation	412	3 476	3.45	396	3 038	—	50	5 164	3.62
2nd lactation	313	3 820	3.57	369	3 556	—	28	6 392	3.50
Subsequent lactations	475	4 280	3.56	389	3 942	3.57	121	7 024	3.56

The productivity responds appreciably to better feeding and, when the latter is adequate, Kholmogor cows may attain levels of milk output equal to those of the Friesian in the U.S.S.R.

Although the beef characters are generally weak, mature steers fatten well and yield carcasses of 52 to 55 percent of their live-weights.

BREED ORGANIZATION

Herdbooks and Registers of Kholmogor cattle are maintained in connection with the state breeding grounds. Bulls are selected on the basis of their dairy productivity and replacements for the cow herd are selected on the basis of milk yield and butterfat content. The state breeding units decide where bulls shall be used, introduce artificial insemination systems and carry out progeny tests.

Friesian

ORIGIN

The Friesian in the U.S.S.R. descends directly from importations from the Netherlands supplemented by introductions from other European countries. These introductions began in the eighteenth century and have continued up to the present.

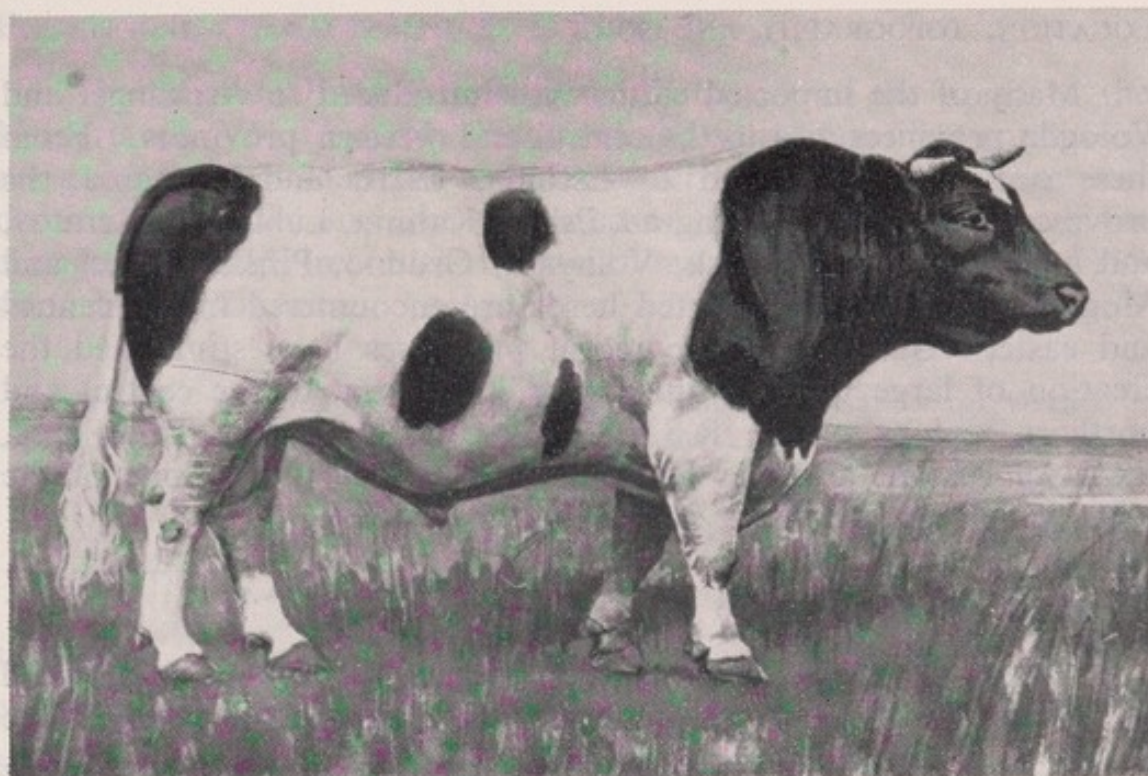


FIGURE 199. — Friesian bull.

Courtesy Ministry of Agriculture, Moscow



FIGURE 200. — Friesian cow.

Courtesy Ministry of Agriculture, Moscow

LOCATION, TOPOGRAPHY AND SOILS

Many of the imported cattle were introduced to Archangel and Vologda provinces and to the central and western provinces. From these centers, they spread to Estonia, Latvia and Lithuania, the provinces of Moscow, Leningrad, Pskov, Kalinin, Lublin and Saratov, and around Minsk, Vitebsk, Volhynia, Grodno, Pinsk, Gomel and Mogilyev. Individual isolated herds are encountered in the central and eastern U.S.S.R. More recent purchases have stimulated the creation of large units of this breed in Siberia, in the central and northern regions of the R.S.F.S.R., in the Urals, the Volga area, the Byelorussian and the Ukrainian S.S.R. It is now one of the most widely spread dairy breeds in the U.S.S.R.

CLIMATE

Many of the areas in which the Friesian has become established have had climatic data given under other breed descriptions. The details in Table 166 refer to Minsk.

TABLE 166. - AVERAGE CLIMATIC CONDITIONS FOR FRIESIAN CATTLE IN THE U.S.S.R.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-8.3	-6.7	-2.2	4.4	12.2	15.6	16.7	15.6	11.1	5.6	-0.6	-8.3
Rainfall (mm)	36	38	33	38	51	71	76	79	41	38	38	43

FEEDING AND MANAGEMENT

Although the winters in the U.S.S.R. are cold, the Friesians are housed for most of the year and fed on conserved supplements, such as grass and leguminous hays, straws, grains and their by-products, silage, sunflower or cottonseed cakes, beet and beet pulp products and molasses. In the more rural areas, summer grazing is practiced, supplemented with silage crops and concentrates.

PHYSICAL CHARACTERS

Physical characters approximate to those of the Dutch Friesian (Vol. I, p. 201) and the Black and White Lowland breed in the Federal Republic of Germany (Vol. I, p. 223).

FUNCTIONAL CHARACTERISTICS

The functional characteristics parallel those of the breed in the Netherlands (Vol. I, p. 204) when feeding and management conditions are good but, where either are of a lower standard the average production of milk and meat decreases. Table 167 illustrates the changes of yields recorded by lactations for pure and grade Friesians in the Ukraine.

TABLE 167. - AVERAGE LACTATION RECORDS OF FRIESIAN CATTLE IN THE U.S.S.R.

	Purebreds		Crosses	
	Milk	Fat	Milk	Fat
	<i>Kilograms</i>	<i>Percentage</i>	<i>Kilograms</i>	<i>Percentage</i>
1st lactation	2 458	3.3	3 094	3.30
2nd lactation	4 053	3.4	3 457	3.38
Subsequent lactations	5 076	3.3	4 087	3.60

The yields vary appreciably between sovkhos and kolkhos, so that average values are very limiting. Where management and feeding are good, herd averages reach 6,500 to 7,000 kilograms of milk per lactation and the best individual lactation yields may be from 10,000 to 12,000 kilograms of milk. Similarly, where feeding and management are good, the Friesian has a long productive life and selected superior strains are being evolved.

Efforts are also concentrating on the development of the musculature of the Friesian in parts of the U.S.S.R. where the level of feeding justifies this, and the breed has been developed for its carcase properties, as in other parts of Europe.

BREED ORGANIZATION

The Friesian is widely used in the U.S.S.R., and particularly in peri-urban areas, as purebreds and also as a means of raising milk production by crossings with other breeds. They are crossed with indigenous animals in the Moscow, Vologda, Kalinin, Bryansk and other regions.

There were 2,167,000 Friesians in the U.S.S.R. at the beginning of 1956 but in 1949 only 5,000 animals were registered in the Herd-book.

Oldenburg

ORIGIN

Oldenburg cattle (a German Friesian developed from grading up local stock along the Weser river to Dutch bulls) were imported into Podolsk province at the end of the last century (Telezhnitsa and Khomintsa in 1878), and later into Golozubentsy and Ruda Gorchaninskaya.

The Ukrainian Oldenburg cattle have derived from grading up the local Podolsk cattle with Oldenburg bulls.

LOCATION, TOPOGRAPHY AND SOILS

The present breeding centers of Oldenburg cattle are the Dunaevetsky and Chemerovetsky districts, the Kamenets-Podolsk region and the Ukraine.

CLIMATE

The climatic conditions in Kamenets-Podolsk are quoted in Table 168.

TABLE 168. — AVERAGE CLIMATIC CONDITIONS FOR OLDENBURG CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-5.4	-3.4	1.2	7.7	14.0	17.4	19.4	18.9	14.4	8.7	1.6	-2.4
Rainfall (mm)	23	20	27	42	65	86	82	55	57	41	38	30

FEEDING AND MANAGEMENT

In the region where this breed is found there are often restricted areas of grassland due to the high proportion of the districts sown to cereals. In summer, the animals graze the natural grasslands or may be kept indoors or around the farm and fed silage crops. Where more extensive pastures occur, hays are conserved together with silage for winter feeding. During the cold season, the stock are housed and yarded and are fed straws, to eke out the hay, and any other farm by-products. For productive purposes, in both

summer and winter, concentrate mixtures are made up of grains, brans, oilcakes, etc., while in some districts potatoes may be fed or sugar beet by-products.

PHYSICAL CHARACTERS

These animals are of rather large size, with the typical black and white hair pattern of German Black and White cattle (see Vol. I, p. 223), and are good dairy/beef dual-purpose types. The mature weights of bulls are 850 kilograms for animals registered in the Herdbook but around 700 kilograms for stock in the kolkhozes of the Kamenets-Podolsk region. The comparable weights of adult cows are 480 and 420 kilograms, respectively. The best animals, properly fed, attain weights of 900 to 950 kilograms for bulls and 575 to 600 kilograms for cows. It is thus seen that these animals are lighter than their ancestors in the Federal Republic of Germany, although, when well fed from birth, they attain approximately the same size and weight.

FUNCTIONAL CHARACTERISTICS

The average milk productions of Oldenburg cattle, in 1939/40, were as shown in Table 169.

TABLE 169. — AVERAGE LACTATION RECORDS OF OLDENBURG COWS 1939/40

	Kamenets-Podolsk area		State Herdbook (Vol. I)	
	Milk	Fat	Milk	Fat
	<i>Kilograms</i>	<i>Percentage</i>	<i>Kilograms</i>	<i>Percentage</i>
1st lactation	2 072	—	1 761	—
2nd lactation	2 371	3.64	2 332	3.67
3rd lactation and over	2 479	—	2 677	—

At the All-Union Agricultural Exhibitions in 1939-41, the milk yields of cows shown varied from 5,500 to 8,125 kilograms.

The quality of their beef and carcass yields is typical of Friesian types.

BREED ORGANIZATION

There is only a small percentage of purebred animals in the mainly crossbred population, but a Herdbook is maintained and animals of sufficient merit can be registered.

Tagil

ORIGIN

The Tagil breed was created in the second half of the eighteenth century from crossings between Kholmogor, Brown Swiss, Shorthorn, Tirolese, Yaroslavl, Simmental, Holstein, Ukrainian Grey, Kalmyk (Red Astrakhan) and Kirgis (Kazakh). From this group of interbred stock, there has evolved during the last 200 years a useful type of animal and its productivity has been stimulated at intervals by further gradings with bulls from the Netherlands.

LOCATION, TOPOGRAPHY AND SOILS

The breed developed in the Tagil district of the Urals, and has been stimulated by the demands for milk, butter and meat by the growing industrial population. It is spread from the Urals eastward, between the Tundra and Omsk, to the Ob river.

CLIMATE

Table 170 summarizes the climatic conditions at Tagil.

TABLE 170. - AVERAGE CLIMATIC CONDITIONS FOR TAGIL CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-19.7	-20.0	-13.8	-2.8	1.6	5.0	10.1	10.5	6.2	-0.3	-8.0	-18.3
Rainfall (mm)	16	13	8	18	20	36	78	87	103	40	29	17

FEEDING AND MANAGEMENT

In the lower Tagil area there is an abundance of good pastures and the special attention paid to feeding over many years has had an appreciable influence on the development of this breed. Calves are given a good start with milk in the better managed units but, with the peasant-owned less improved types, the calf allowance may be considerably restricted.

In addition to summer pastures and leguminous crops, the animals may also receive cut maize, locally produced, and purchased

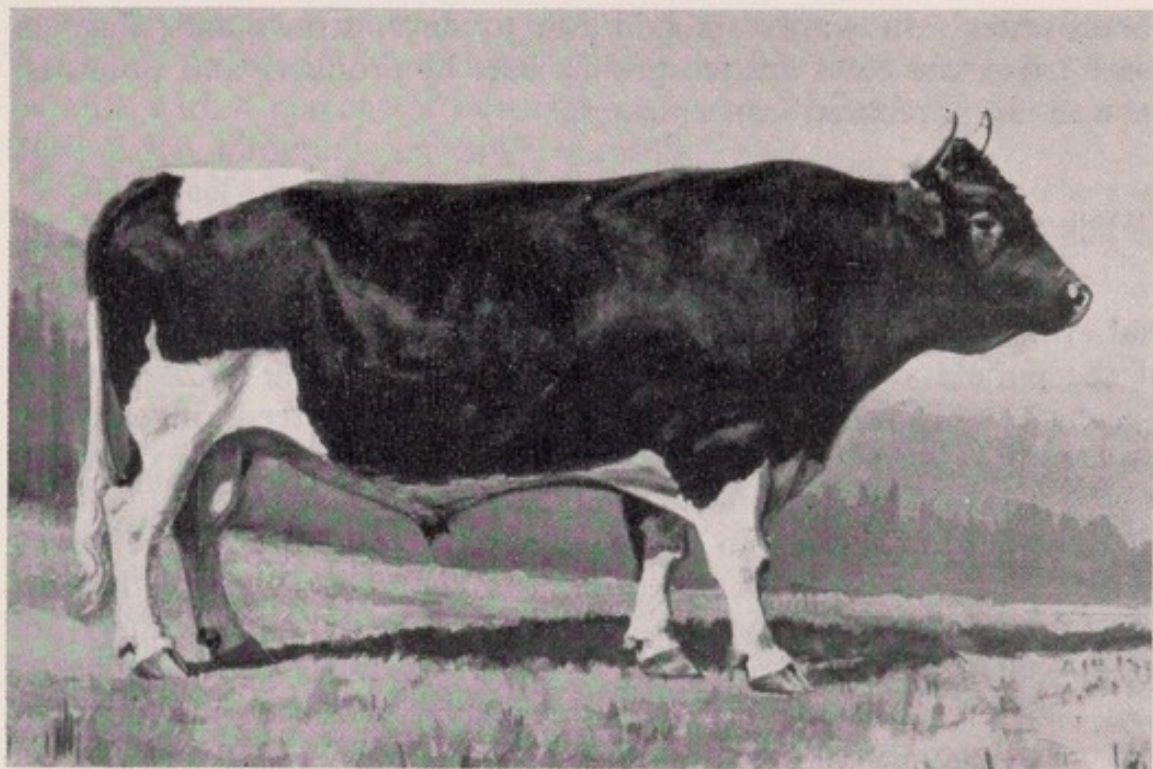


FIGURE 201. — Tagil bull.

Courtesy Ministry of Agriculture, Moscow



FIGURE 202. — Tagil cow.

Courtesy Ministry of Agriculture, Moscow

concentrates. In winter, in addition to hays, straws and silage in some parts, the cows are fed grains, beet by-products and potatoes, as well as purchased concentrates.

PHYSICAL CHARACTERS

The hair color varies from black to black and white, or red and white, and to almost white. Black cattle comprise 65 percent of the population, while the red and whites amount to 22 percent. The hair color variation derives from the many breeds involved in the creation of the Tagil cattle, and the same diversity is encountered in the skull shape, the horns and parts of the body.

The head is of medium length, straight in profile, and the horns spread outward, forward and upward. The chest is deep, the ribs are often rather flat, but the abdomen is large. The withers are slightly high and the long body may have a fairly even topline or may sag in the loins or at the hindquarters. The hindquarters and legs may often be poorly shaped. Table 171 gives data on average liveweights and body measurements.

TABLE 171. — AVERAGE LIVEWEIGHTS AND BODY MEASUREMENTS OF TAGIL CATTLE

	Males			Females
	1 year	2 years	Mature	Mature
Liveweight (kg)	370	545	850	480
Body length (cm)	—	—	—	153
Wither height (cm)	—	—	—	123
Chest girth (cm)	—	—	—	177
Chest depth (cm)	—	—	—	67

FUNCTIONAL CHARACTERISTICS

Tagil cattle have strong stamina and long productive lives but there is still considerable variation between individuals. Female calves weigh 28 to 30 kilograms at birth and 260 kilograms at one year of age.

Milk yields for 1,189 recorded registered cows in 1949 averaged 3,568 kilograms containing 4.13 percent of butterfat, although unimproved cows attain an average yield of 2,210 kilograms contain-

ing 4.30 percent of butterfat. The high butterfat content is characteristic of the breed. Individual cows may yield over 4,050 kilograms of milk with 4 percent of butterfat and cows in Istok Sovkhoz averaged 2,350 kilograms of milk in 1940.

The beef-producing propensities were little studied until the last quarter of a century, but the old cows have carcass yields of 42 to 50 percent. Females are distinctly smaller than males.

BREED ORGANIZATION

Although efforts for the improvement of Tagil cattle have been continuing for a long time, it was not until 1923 that this stimulation became permanent and organized as a result of the formation of the Lower Tagil Breeding Association. The state breeding unit was established in 1930 and a number of breeding sovkhozes and kolkhozes were started. As a result, the numbers of Tagil cattle have increased and, during the six-year period 1939-45, the cattle population again increased by about 60 percent.

Yaroslavl

ORIGIN

Rubovich mentions these cattle in an article written in 1853 and, although it has developed from indigenous types, many other breeds were incorporated in its make-up between 1870 and 1900; i.e., Kholmogor, Algäu, Tirolese, Friesian, Brown Swiss, Simmental, Jersey and Angeln. Obviously, not all had any significant influence but the modern Yaroslavl breed was evolved in response to the demand for milk in the St. Petersburg (Leningrad) and Moscow markets, to which areas large numbers of cattle were sold.

LOCATION, TOPOGRAPHY AND SOILS

The main breeding center is the Yaroslavl region, but the districts of Davidov, Tutayev, Nekrasovo, Burmakino and Rybinsk are also important.

CLIMATE

Climatic conditions typical of those for the Yaroslavl breed are shown in Table 172.

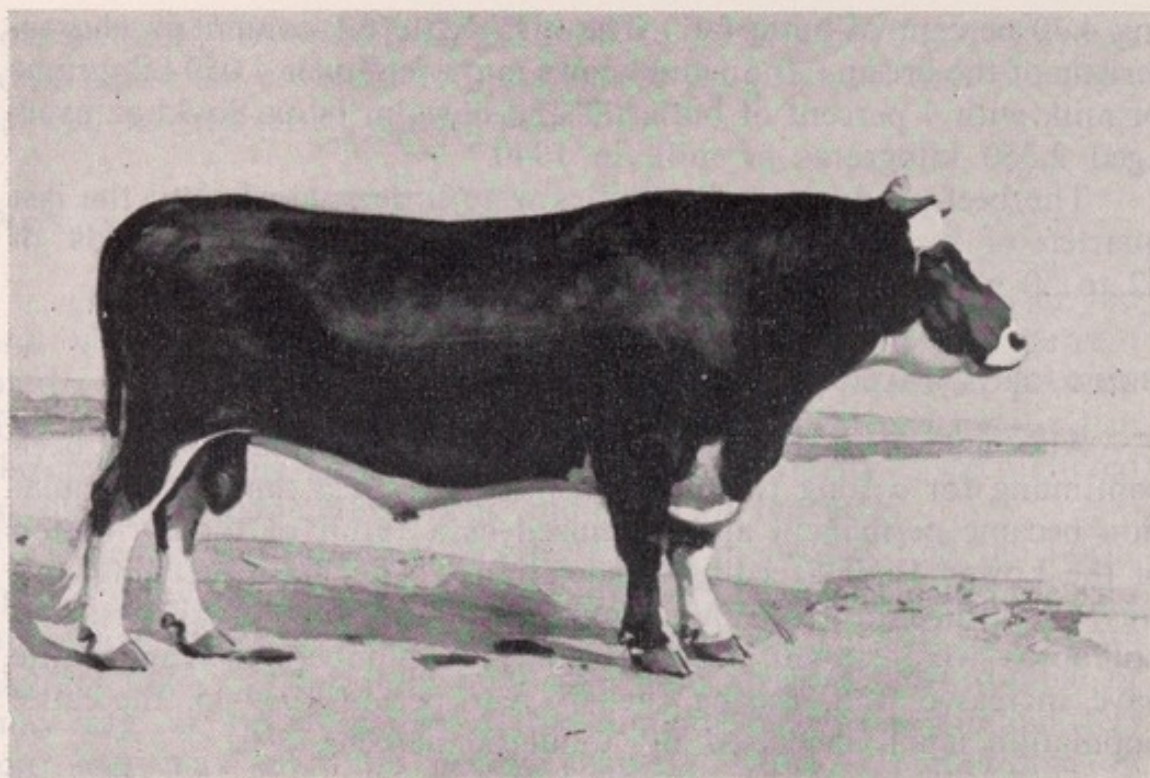


FIGURE 203. — Yaroslavl bull.

Courtesy Ministry of Agriculture, Moscow

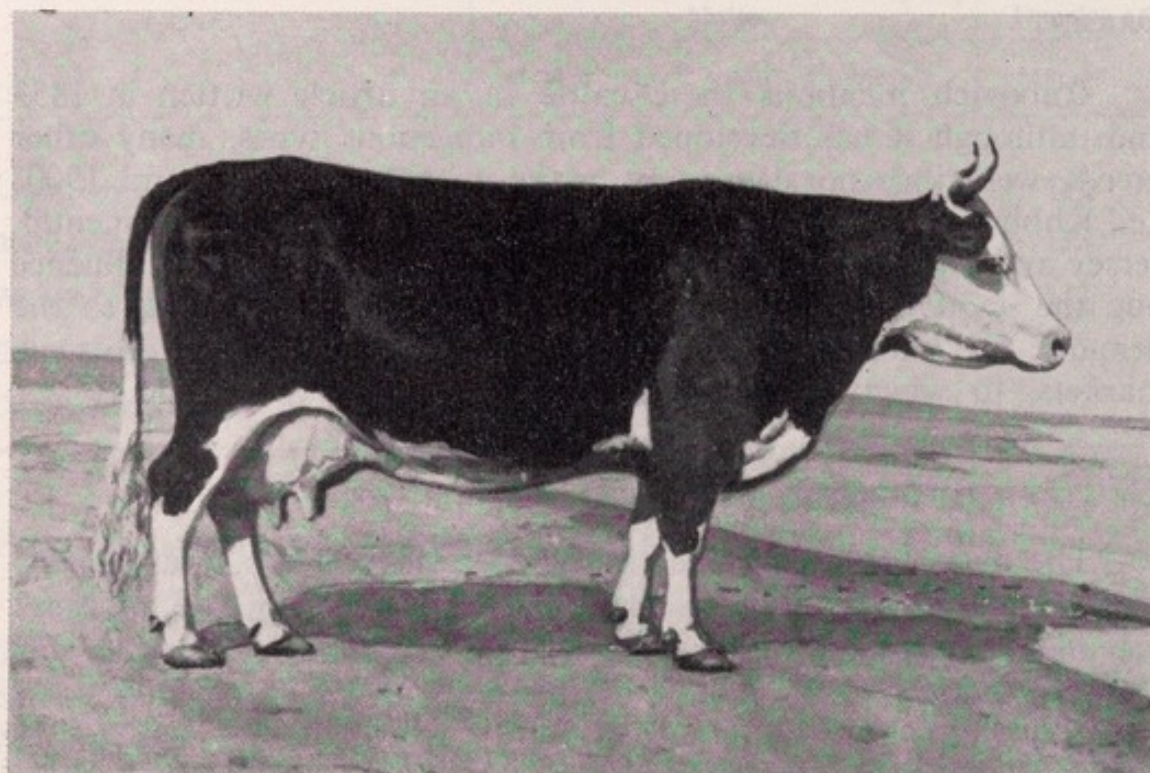


FIGURE 204. — Yaroslavl cow.

Courtesy Ministry of Agriculture, Moscow

TABLE 172. - AVERAGE CLIMATIC CONDITIONS FOR YAROSLAVL CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-12.0	-9.9	-5.0	3.4	11.9	15.8	18.8	16.0	9.9	3.3	-3.6	-9.1
Rainfall (mm)	31	31	28	39	47	61	66	68	64	56	47	35

FEEDING AND MANAGEMENT

Animals are pastured in summer but the better producers receive cut fodders and concentrates. In the cold period of the year, the stock are housed or yarded, and receive hays (grass and leguminous), straws, cereals (oats, rye and maize), cereal brans, oilcakes and often silage.

PHYSICAL CHARACTERS

The skin is of medium thickness and pigmented, while the medium-length, soft hair is mainly black. A small percentage (about 10 percent) of the animals have red, instead of black hair, but white hair is to be found on the head, belly and legs. The muzzle and body orifices are black, as are the hooves in the majority of cases.

The head is light, the face is long and the forehead and profile are flat. The horns are yellowish at the base but are black at the tips. They spread outward from the poll and then forward and sometimes curl upward.

The topline is straight and the loins are wide, as are the hips. Some sagging may occur in the hindquarters. Although the chest is deep, the ribs are generally flat-sided, but the abdominal organs are large. The legs can be strong but usually are not well boned. A well-developed glandular udder carries four large and correctly spaced teats.

The skeletal weakness often encourages a knocking together of the legs, a narrowness of the chest and sagging hindquarters. Many of these external effects can be countered by better feeding. Table 173 illustrates the liveweights and body measurements of Yaroslavl cattle.

TABLE 173. — AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF YAROSLAVL CATTLE

	Males			Females		
	1 year	2 years	Mature	1 year	2 years	Mature
Liveweight (kg)	270	450	600	180	280	450
Body length (cm)	—	—	180	—	—	164
Wither height (cm)	—	—	128	—	—	124
Chest girth (cm)	—	—	188	—	—	170
Chest depth (cm)	—	—	70	—	—	66
Hip width (cm)	—	—	52	—	—	48

FUNCTIONAL CHARACTERISTICS

The functional characteristics of the Yaroslavl breed have evolved in response to the demand for city milk and are based on the productivities of this breed for yielding large quantities of milk. This dairy breed is a direct consequence of social and economic conditions influencing the trends of development and evolution. The long-established cheese and butter industries were forerunners of the present liquid milk trade.

The average liveweight at birth is 26.5 kilograms but productive output is considerably influenced by the size of the animals and consequently by the plane of nutrition imposed during growth and lactation.

As long ago as 1867, yields of 4,000 kilograms of milk per lactation were recorded, but the intensive development of the Yaroslavl breed commenced with the formation of sovkhozes, kolkhozes and state breeding units. In 1948, the Gorshikha Kolkhoz had an average of 4,263 kilograms of milk but the general trends of the last 40 years may be judged from Table 174.

The beef qualities of Yaroslavl cattle still leave much to be desired and the average carcass yield is below 50 percent unless the animals have been fattened on pastures or in yards.

BREED ORGANIZATION

In 1935, there were about 1 million Yaroslavl cattle and their crosses. A Herdbook was opened in 1925 and the first State Breed-

TABLE 174. — AVERAGE LACTATION RECORDS OF YAROSLAVL COWS

	Year	Milk	Fat
		<i>Kilograms</i>	<i>Percentage</i>
Control Associations	1925/26	2 380	4.13
Agricultural Exhibition	1923	2 245	4.16
Breeding Unit	1935/36	2 634	4.06
Agricultural Exhibition	1939	5 130	3.93
Herdbooks	1955	3 546	—
Herdbooks	1957	3 557	—

ing Center was established in 1932. Improvement activities are directed and controlled by state-employed officials and improved livestock are distributed in large numbers annually from the state breeding units.

Ukrainian Red (Red Steppe)

ORIGIN

These cattle developed from the crossing of Ukrainian Grey cattle (a draft/milk type) with Red-Brown East Friesland, Angeln, Wilstermarsch, Shorthorn, Fünen and Kholmogor breeds. By the second half of the nineteenth century various local types had emerged and these were again crossed with Angeln, Wilstermarsch and other bulls, so that the different districts of the Ukraine possessed stocks of varying conformation and productivity. This variation was accentuated by the use of Kuban Black Sea cattle instead of Ukrainian Greys as basic stock in the eastern districts of the Ukraine and Rostov, and by employing Kalmyk Red (Astrakhan) cattle in other areas. The various local types were, however, amalgamated into one breed after the October Revolution.

LOCATION, TOPOGRAPHY AND SOILS

The Ukrainian Red breed is now one of the most numerous in the U.S.S.R. and is exceeded only by the Simmental. About 45 percent are found in the Dnepropetrovsk, Zaporozhye, Odessa,



FIGURE 205. — Ukrainian Red bull.

Courtesy Ministry of Agriculture, Moscow

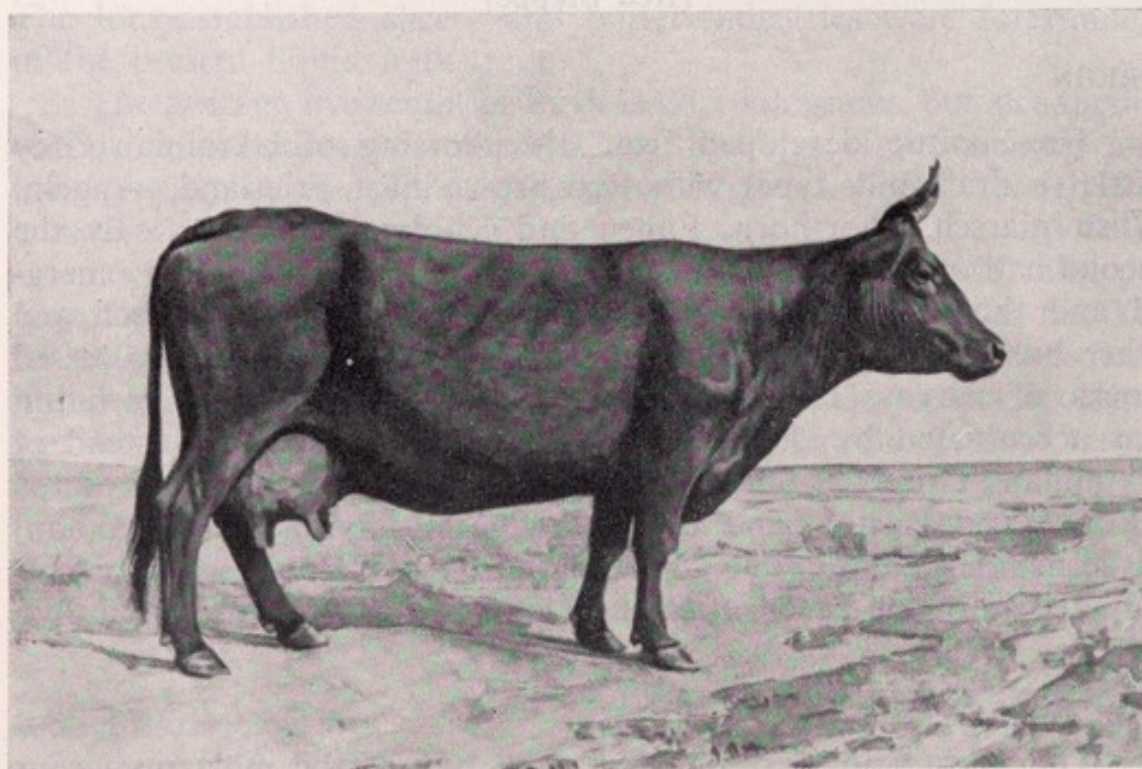


FIGURE 206. — Ukrainian Red cow.

Courtesy Ministry of Agriculture, Moscow

Donets and Kherson regions, some 30 percent are encountered in the Krasnodar and Stavropol Territories, the Rostov, Volgograd, Crimea and Orenburg regions and in the Transcaucasian S.F.S.R. These cattle are also bred in Uzbekistan and Turkmenia and in a number of republics in Siberia and Kazakhstan.

CLIMATE

The data in Table 175 refer to the Dnepropetrovsk area.

TABLE 175. - AVERAGE CLIMATIC CONDITIONS FOR UKRAINIAN RED CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-6.1	-4.0	0.6	7.8	15.5	19.5	21.7	21.1	15.5	9.0	1.1	-4.0
Rainfall (mm)	35	28	30	36	46	76	48	41	25	46	41	41

FEEDING AND MANAGEMENT

These cattle have strong constitutions and are well able to withstand summer heat and winter cold. They make excellent use of available roughage and pastures and graze in the summer, where this is possible, or are stall-fed with cut legumes, grasses, maize and other green cereals. They are stalled during the winter and, although both grass and leguminous hays are rather limited in amount, the roughage portion is met from straws, roots, silage, sugar beet residues and potatoes. For the higher producers, both in summer and winter, brans, cereal grains, beans and purchased oilcakes are employed for supplementary purposes.

PHYSICAL CHARACTERS

The hair is red in color and of medium length. The muzzle and body orifices are dark to black, as are the hooves, and the skin is pigmented.

The head is fairly long, wide between the eyes, and straight in profile. The medium-length yellowish white horns spread outward from the poll and then curve forward, upward and inward but, as with the body conformation, there is considerable individual dif-

ference due to the ancestry of the various subgroups which constitute the breed and the differences in feed and management in the various geographical zones in which the breed is encountered.

The body is long and the topline fairly straight, with slightly protruding withers and with the tail head higher than the loins. The body conformation tends to the dairy type wedge, although the chest is deep and the ribs are fairly well sprung. The abdomen is large. The hindquarters are long and wide but slope away from the spinal column. The musculature is adequately developed in well-fed stock but animals which are not so well fed are rather lean. The skeleton is strong but thin and the udder is rather small.

A number of body defects, such as sagging hindquarters, narrow withers, flat ribs, asymmetrical udders and cow hocks are found in many farm stock but have been eliminated from the herds on the government breeding grounds. Table 176 gives data on the average liveweights and body measurements of adult Ukrainian Red cattle.

TABLE 176. — AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS
OF ADULT UKRAINIAN RED CATTLE

	From the Odessa Herdbook		From the Zaporozhe region		At the 1939 All-Union Agricultural Exhibition	
	Bulls	Cows	Bulls	Cows	Bulls	Cows
Liveweight (kg)	—	—	900-1 000	500-520	860	540
Body length (cm)	171	144	179	154	179	158
Wither height (cm)	136	126	142	125	141	132
Chest girth (cm)	194	175	221	173	218	190
Chest depth (cm)	72	65	78	65	79	72
Hip width (cm)	45	40	50	43	48	46

FUNCTIONAL CHARACTERISTICS

The birth weight of male calves is 32 kilograms and 30 kilograms for females. With normal feeding, weights of 250 to 270 kilograms are reached by male stock, while females weigh 200 to 210 kilograms. The breed is of a dairy type and Table 177 indi-

cates the level of milk production achieved in various years and in different regions. It can be confidently expected that higher records will have been attained in more recent years.

TABLE 177. — AVERAGE LACTATION RECORDS OF UKRAINIAN RED COWS
(300-day lactations)

	Year	Milk	Fat
		<i>Kilograms</i>	<i>Percentage</i>
Dnepropetrovsk	1939	3 052	3.69
Odessa	1940	3 160	3.82
Kharkov	1940	3 126	3.62
Krasnodar	1941	2 530	3.78
Omsk	1937	2 780	3.83

On the better farms, yields of 3,000 to nearly 5,000 kilograms of milk are secured, and the Ukrainian Red cow can be placed in the same class as the best breeds reared in the U.S.S.R. (5,500 to 6,000 kilograms). A high percentage of these cows in the State Herdbook have very long productive lives and, in the Donets region, cows 10 years of age gave a yield of 3,080 kilograms of milk, compared with the 2,693-kilogram average for cows of all ages. Cows producing more than 10,000 kilograms of milk are now being recorded.

In the past, this breed has not been a good producer of beef but, with feeding and management improvements, a better carcass yield is now being obtained and, under good feeding conditions, the rate of liveweight increase can be quite satisfactory. The carcass return reaches 58 percent.

BREED ORGANIZATION

The number of cattle satisfying the standards for registration in the Herdbook was 10,000 in 1929 and 50,000 in 1939. The war years had serious repercussions on this breed and, when the Herdbook was restarted in 1942, only 2,905 animals were registered but, by 1948, the number had risen further and, more important, the average milk yield had exceeded the prewar levels. Artificial insemination is being used on a large scale.

Angeln

ORIGIN

Angeln cattle were imported into the U.S.S.R. from about 1830 and became very popular in certain localities.

LOCATION, TOPOGRAPHY AND SOILS

Small numbers of this breed are concentrated in the collective farms of the Pskov, Velikie Luki, Novgorod and Ryazan regions, the Udmurt Autonomous Republic and in some districts of the west Ukraine, in the Leningrad and Moscow regions and in Byelorussia.

CLIMATE

The data in Table 178 refer to the conditions in Pskov.

TABLE 178. - AVERAGE CLIMATIC CONDITIONS FOR ANGELN CATTLE
IN THE U.S.S.R.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-7.1	-6.8	-3.4	4.0	11.2	15.4	17.5	15.5	10.7	4.9	-0.7	-4.0
Rainfall (mm)	33	30	25	30	40	62	78	78	48	42	40	38

FEEDING AND MANAGEMENT

Depending on the locality, these animals either graze during the summer or are fed cut green fodders, such as cereals, maize, lucerne and clovers. In the winter, they are stall-fed or yarded and receive hays, straws, roots, sugar beet residues, potatoes, silage and molasses. The basic rations are supplemented with brans, cereal grains, minerals and oilcake residues.

PHYSICAL CHARACTERS

These dairy type, lean-muscled animals with a good mammary development closely resemble their German ancestors (see Vol. I, p. 232), although body size and development vary with the nutritional

and management levels in the different districts. Table 179 gives some data on the liveweights and body measurements of Angeln cattle in the U.S.S.R.

TABLE 179. - AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF ADULT ANGELN CATTLE IN THE U.S.S.R.

Liveweight (kg)	400	—
Body length (cm)	—	—
Wither height (cm)	126	141
Chest girth (cm)	—	—
Chest depth (cm)	68	80
Hip width (cm)	44	52

FUNCTIONAL CHARACTERISTICS

Angeln cattle can yield up to 7,000 kilograms of milk per lactation but the average available records in the U.S.S.R. are summarized in Table 180.

TABLE 180. - AVERAGE LACTATION RECORDS OF ANGELN COWS IN THE U.S.S.R.

	1st lactation		2nd lactation		3rd lactation and over	
	<i>Kilo-grams</i>	<i>Percent-age</i>	<i>Kilo-grams</i>	<i>Percent-age</i>	<i>Kilo-grams</i>	<i>Percent-age</i>
Moscow region	2 285	3.73	2 779	3.66	3 586	3.73
Byelorussian region	2 255	3.40	2 780	3.60	3 396	3.77

The yields in the best herds are also higher than these average figures. At the Lesnye Polyany Sovkhoz, it was 5,460 kilograms in 1938 for fully mature cows and in the Gomontovo Sovkhoz it was 4,650 kilograms.

The beef characters of these cattle are relatively poorly developed, the joints are lean, as the animals do not fatten readily, and the carcass yield is low.

BREED ORGANIZATION

A Herdbook for registered cows is maintained but many Angeln cattle have been used for upgrading with the local stock and the numbers of purebred stock are limited.

Red Danish (Fünen)

ORIGIN

Red Danish cattle have been introduced into the U.S.S.R. since the end of the last century but the majority were acquired in 1934.

LOCATION, TOPOGRAPHY AND SOILS

They are to be found in the Pskov, Novgorod and Leningrad regions, in the Ukraine, in the Kamenets-Podolsk region, and on certain farms in the Vologda and Kalinin regions, as well as in Byelorussia.

CLIMATE

Table 181 shows the climatic conditions for Leningrad.

TABLE 181. - AVERAGE CLIMATIC CONDITIONS FOR RED DANISH CATTLE IN THE U.S.S.R.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-7.6	-7.7	-4.1	2.8	9.5	14.6	17.5	15.5	10.6	4.7	-0.9	-5.5
Rainfall (mm)	28	26	24	33	39	56	57	83	59	47	38	32

FEEDING AND MANAGEMENT

With the wide area of distribution, feeding levels vary appreciably but, in summer, the cattle are either on pastures or are yarded and fed cut grasses, legumes and cereals. In the winter, the stock are housed and fed hays, straws, roots, potatoes, silage from maize and other cereals, sugar beet residues, wherever these are available, molasses, beans and cereal grains. Supplementary purchased sunflower and cottonseed cakes are also employed.

PHYSICAL CHARACTERS

These Soviet stock resemble in physical characters the Red Danish in their original home (see Vol. I, p. 29). The liveweight of bulls is 800 to 900 kilograms and for cows the average is 450 kilograms.

FUNCTIONAL CHARACTERISTICS

The milk yields recorded for registered Red Danish cattle in the U.S.S.R. are illustrated by the data in Table 182.

TABLE 182. — AVERAGE LACTATION RECORDS OF RED DANISH COWS

	Leningrad	Byelorussia S.S.R.	Moscow
	<i>Kilograms</i>		
1st lactation	3 274	2 908	4 300
2nd "	3 128	2 900	3 620
3rd "	3 567	3 843	5 225
4th "	3 540	3 681	—
5th "	3 892	3 891	—
	<i>Percentage</i>		
Average milk fat	3.8	3.9	3.9

As a further example of the improvements which have been achieved in milk productivity over the last 65 years, the data in Table 183 are interesting.

TABLE 183. — IMPROVEMENT IN THE AVERAGE MILK YIELDS OF RED DANISH COWS IN THE U.S.S.R.

Year	Milk	Fat
	<i>Kilograms</i>	<i>Percentage</i>
1896-1905	3 847	3.44
1925-26	4 426	4.15
1951	5 547	4.46
1954	5 489	4.56

These cattle proved so successful in relation to the local conditions and to the quantity and quality of their milk that they were successfully employed for grading up native cattle. They also played a role in the elaboration of the Polish Red breed in the U.S.S.R. but exerted an even greater influence on the development of the Latvian Red, Estonian Red and the Suksun breeds from indigenous stock.

In addition to their milking propensities, Red Danish cattle have proved valuable producers of good quality meat.

BREED ORGANIZATION

The numbers of Red Danish cattle in the U.S.S.R. are not large but they are exerting an appreciable influence on other breeds through crossbreeding. A Herdbook is maintained and animals are registered if of an approved quality.

Estonian Red

ORIGIN

The Estonian Red breed was developed from local cattle stocks by crossing them with imported Angeln prior to the middle of the nineteenth century. Later, North Schleswig and Red Danish blood was introduced to improve milk production. Estonian Red cattle make up 73 percent of the herds in the Estonian S.S.R.

LOCATION, TOPOGRAPHY AND SOILS

This breed is spread throughout the eastern and southern parts of Estonia. The most important communal farms are in the Sovkhozes of Ideva, Triigi and Uusna.

CLIMATE

The climatic conditions for this breed can be represented by the data for Tallin in Table 184.

FEEDING AND MANAGEMENT

This follows closely the system and methods employed for Latvian Red cattle on p. 349.



FIGURE 207. — Estonian Red bull.

Courtesy Ministry of Agriculture, Moscow

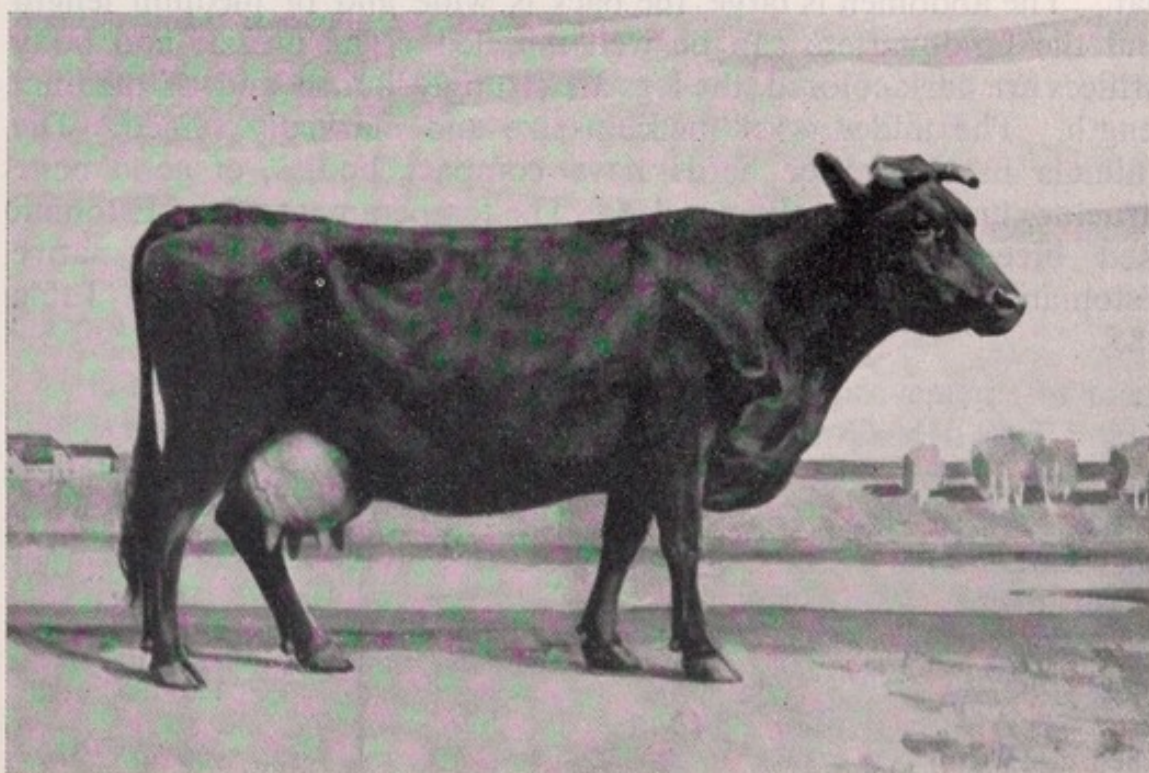


FIGURE 208. — Estonian Red cow.

Courtesy Ministry of Agriculture, Moscow

TABLE 184. - AVERAGE CLIMATIC CONDITIONS FOR ESTONIAN RED CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-4.4	-5.2	-2.7	3.0	8.8	13.4	16.3	15.3	11.4	6.3	1.2	-2.8
Rainfall (mm)	29	28	24	28	38	48	50	69	51	47	41	33

PHYSICAL CHARACTERS

Estonian Red cattle have pale to dark red hair on a slightly pigmented skin. The hair is short to medium in length, soft and shiny, while in the bulls the color is darker than in cows.

The head is of medium size with a narrow forehead, wide muzzle and straight profile. The yellowish white horns grow outward from the poll and then curve forward, often downward, and may have the dark tips turned inward.

The topline is rather variable, in some it is straight, but in others the loins dip while the withers and tail head may be light. The chest is deep but the ribs may be nicely sprung but are usually flat. The abdomen is large, the back is wide and of medium length and the hindquarters can be well muscled. The muzzle and body orifices are dark colored, the legs are strongly boned and of medium length. The udder is of medium size and markedly veined. The animals in the better herds have compact bodies, of good bone structure and adequately muscled. The temperament of the Estonian Red breed is more lively than that of the mixed black native Estonian cattle. Details of body measurements are given in Table 185.

TABLE 185. - AVERAGE BODY MEASUREMENTS OF ESTONIAN RED COWS

Body length (cm)	152-158
Wither height (cm)	124-127
Chest girth (cm)	175-196
Chest depth (cm)	66-70
Hip width (cm)	50-53

The average liveweight of such animals is between 440 and 580 kilograms. The weight of well-fed mature cows is up to 780 kilograms, while the better bulls scale from 800 to 1,000 kilograms.

FUNCTIONAL CHARACTERISTICS

Considerable improvements in milking potential have been achieved during this century. Whereas the 1920-30 average was between 2,000 to 3,000 kilograms, the average production of registered cows in 1940/41 was 3,656 kilograms. Yields of up to 5,000-6,000 kilograms have been averaged in the better fed and managed sovkhos herds. The fat content varies from 3.6 to 4.0 percent.

The birth weight of females is 32 to 33 kilograms on the average and, under good feeding conditions, the liveweights at 1 and 2 years of age are 285 and 470 kilograms, respectively. Under more normal levels of feeding, the corresponding liveweights would be 245 and 355 kilograms.

The animals are economical converters of feed and yield a reasonably good carcass with an output of 50 percent, but it is only in more recent years that greater emphasis has been placed on beef characters in combination with milking potentials.

BREED ORGANIZATION

Herdbook registration commenced in 1885 and the conditions of entry are similar to those elsewhere in the U.S.S.R.

Latvian Red

ORIGIN

Latvian Red cattle have been derived by improvements of local Latvian stock through crossings with Angeln, Red Danish and Polish Red breeds.

LOCATION, TOPOGRAPHY AND SOILS

These cattle are found in the Latvian S.S.R., in some districts of Byelorussia and the Moscow region.

CLIMATE

The climatic conditions of Riga are shown in Table 186 as representative of this breed.

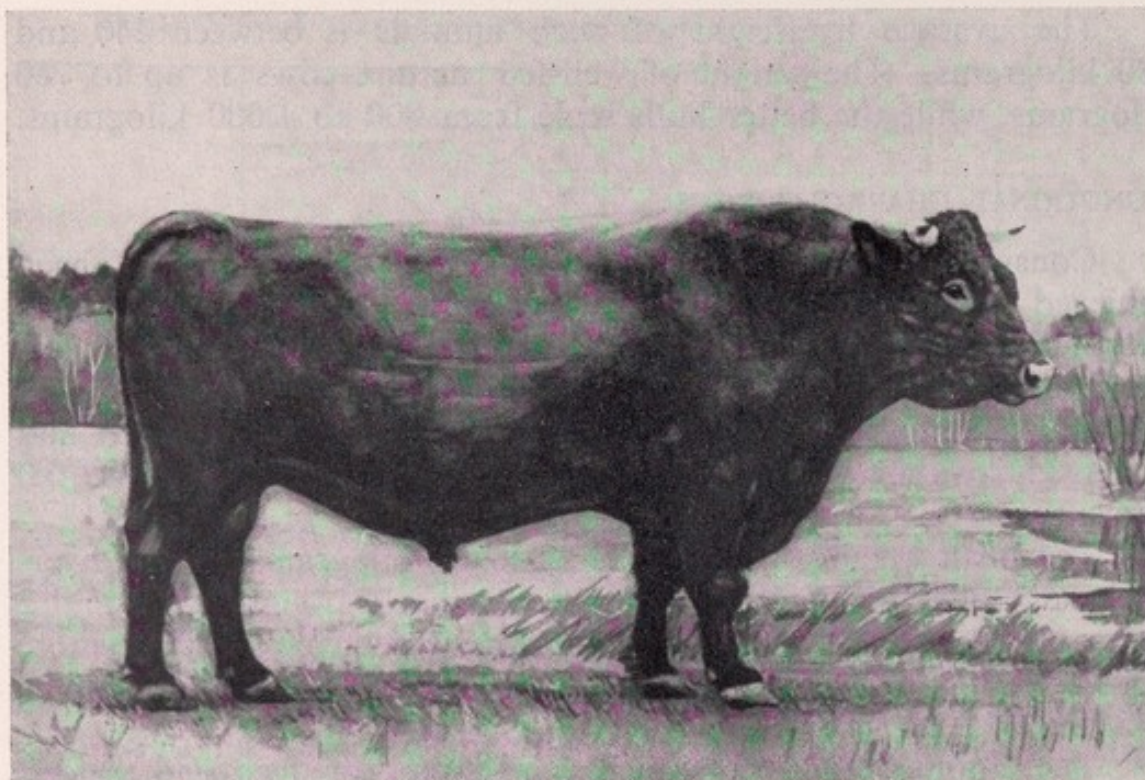


FIGURE 209. — Latvian Red bull.

Courtesy Ministry of Agriculture, Moscow



FIGURE 210. — Latvian Red cow.

Courtesy Ministry of Agriculture, Moscow

TABLE 186. - AVERAGE CLIMATIC CONDITIONS FOR LATVIAN RED CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-4.7	-4.4	-1.5	4.5	10.7	16.0	17.9	16.5	12.2	6.5	0.8	-3.1
Rainfall (mm)	33	34	29	37	40	64	88	84	52	47	50	40

FEEDING AND MANAGEMENT

The cattle graze on permanent pastures and leys during the summer and may receive some cut green forage when natural grazings are limited. In the winter, they are housed and fed grass and legume hays, straws, silage, cow cabbage, sugar beet by-products and roots. In both summer and winter the productive part of the ration may contain grains, brans and oilcakes.

PHYSICAL CHARACTERS

The pigmented skin is of medium thickness and carries a coat of medium to long brown or dark red hair. Some white patches may occur on the udder and underline. The muzzle, body orifices and hooves are dark colored.

The head is long, narrow in the forehead and straight or slightly concave in profile. The short horns are yellowish white with dark tips and spread out from the poll and then curl forward and slightly inward.

The topline can be fairly straight or, in less well-fed animals, may dip at the loins. The hindquarters are long but slope from the spine to the sides. The chest is deep and the ribs may be well sprung or flat-sided. The body is long and the abdominal volume is capacious. The legs are rather fine boned, the sack-like udder is medium to large in size and the teats tend to be bunched.

The average liveweight of bulls is about 750 kilograms, while cows average 460 kilograms.

FUNCTIONAL CHARACTERISTICS

The Latvian Red breed is a dairy type animal and milk production in the Moscow area is very similar to that obtained in Latvia. The emphasis has always been on productivity and, by

1926, the average milk yield of 48,000 cows was 2,200 kilograms containing 3.85 percent of butterfat. The output has increased further and, by the 1940s, the registered cows in the Herdbook averaged 3,200 kilograms of milk containing 4.13 percent of butterfat and 11.5 percent yielded over 4,000 kilograms per year. In the Moscow region, the cow herds in sovkhoses averaged from 2,300 to 5,500 kilograms, while in kolkhozes the range was from 3,000 to 4,150 kilograms.

BREED ORGANIZATION

The Society Herdbook was opened in 1911, when all Latvian cattle, irrespective of origin, were registered provided they were of high productivity. Angeln and Red Danish bulls were used together with the best indigenous animals. Breeding work in the next 30 years evolved a uniform type, and the size increased together with milk output. Of the cows in Volume XIX of the Herdbook, only 3 percent yielded less than 2,500 kilograms of milk. During recent years the standards for registered bulls has been considerably tightened.

Suksun

ORIGIN

The Suksun breed has derived from the improvement of local Perm cattle through crossings with Red Danish and Latvian Red stock in the Suksun district.

LOCATION, TOPOGRAPHY AND SOILS

These cattle are bred in certain parts of the Perm region in the Urals.

CLIMATE

Table 187 gives the climatic data for the Perm area of development of the Suksun breed.

FEEDING AND MANAGEMENT

The summer is spent grazing, with supplements fed for milk production. In winter, the animals are fed inside on hays, straws, cereals, brans, potatoes, sugar beet by-products, oilcakes, etc.

TABLE 187. — AVERAGE CLIMATIC CONDITIONS FOR SUKSUN CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-15.1	-13.3	-7.2	2.2	10.1	15.8	16.8	15.8	9.3	1.7	-6.5	-13.0
Rainfall (mm)	14	13	16	27	45	86	72	57	61	37	18	17

PHYSICAL CHARACTERS

These cattle are similar to the Latvian Red animals (p. 349), but the Suksun are smaller and less uniform in type. The average live-weight of cows is 370 to 380 kilograms. Table 188 gives data on the average size of the cows.

TABLE 188. — AVERAGE BODY MEASUREMENTS OF SUKSUN COWS

Body length (cm)	149
Wither height (cm)	119
Chest depth (cm)	65
Hip width (cm)	41

Bulls weigh up to 550 kilograms and naturally are of larger body dimensions than the cows.

FUNCTIONAL CHARACTERISTICS

The lactation yield of Suksun cows, in comparison with that of other breeds, is not high but is nevertheless twice as great as that of the unimproved local breed from which it was developed. While individual cows may yield up to 6,000 kilograms of milk containing over 4 percent of butterfat, 8,000 kilograms was the maximum yield in 1955. In 1946, the best yields were around 3,000 kilograms, while the average yield was then around 2,000 kilograms. In 1960, the average yield had reached 3,500 kilograms of milk containing 4.1 percent of butterfat. These figures represent the success which has attended selection work in the last 20 years.

BREED ORGANIZATION

This is a relatively new breed and the first state breeding unit was established in 1944 to control the work of five kolkhozes in the Suksun district. Breeding and the improvement of this breed has really developed since that time, and the objective is to improve liveweight and body conformation as a basis for raising milk production. The data above illustrate the success achieved. The State Herdbook contained only 98 head of registered animals in 1946 but the numbers are steadily rising. The total cattle population in 1946 was about 600 head.

Polish Red

ORIGIN

Polish Red cattle were brought to the U.S.S.R. from their country of origin.

LOCATION, TOPOGRAPHY AND SOILS

They are bred on the peasant farms in the western regions of the Ukraine, chiefly in the Lvov and Tarnopol regions but also in the Stanislav and Dorogobuzh regions.

CLIMATE

The climatic conditions for this breed can be represented by the data for Lvov in Table 189.

TABLE 189. - AVERAGE CLIMATIC CONDITIONS FOR POLISH RED CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-4.9	-2.9	0.9	8.9	14.5	17.4	19.1	19.3	15.8	8.0	2.6	-0.6
Rainfall (mm)	26	33	22	45	49	84	74	56	41	33	49	18

FEEDING AND MANAGEMENT

The conditions are similar to those recorded in Vol. I, p. 278 for the breed in Poland.

PHYSICAL CHARACTERS

These are very similar to those of the Red cattle in Poland (see Vol. I, p. 279).

FUNCTIONAL CHARACTERISTICS

Again, the functional characteristics are very similar to those of the Polish Red breed in its native home. The effects of the better feeding and management provided today compared with the conditions existing 50 years ago can be judged from the data in Table 190.

The maximum yield in 1946 was 2,994 kilograms of milk.

TABLE 190. - AVERAGE LACTATION RECORDS OF POLISH RED COWS
IN THE U.S.S.R.

Year	Milk	Fat
	<i>Kilograms</i>	<i>Percentage</i>
1908	2 050	4.0
1946	2 600	3.9

The beef qualities are similar to those described in Vol. I, p. 281.

BREED ORGANIZATION

The number of animals of this breed in the U.S.S.R. is relatively small but efforts are being made to develop their productivity and expand their numbers.

Ukrainian Whitehead

ORIGIN

The indigenous Grey cattle were typical milk/meat/work animals unable to supply the increasing demand for milk and, consequently, they were bred to other and better breeds early in the nineteenth century. Angeln, Shorthorn, Wilstermarsch and Simmental were used in various districts, but one of the reasons for the early segregation of the Whitehead breed was the good feeding conditions.

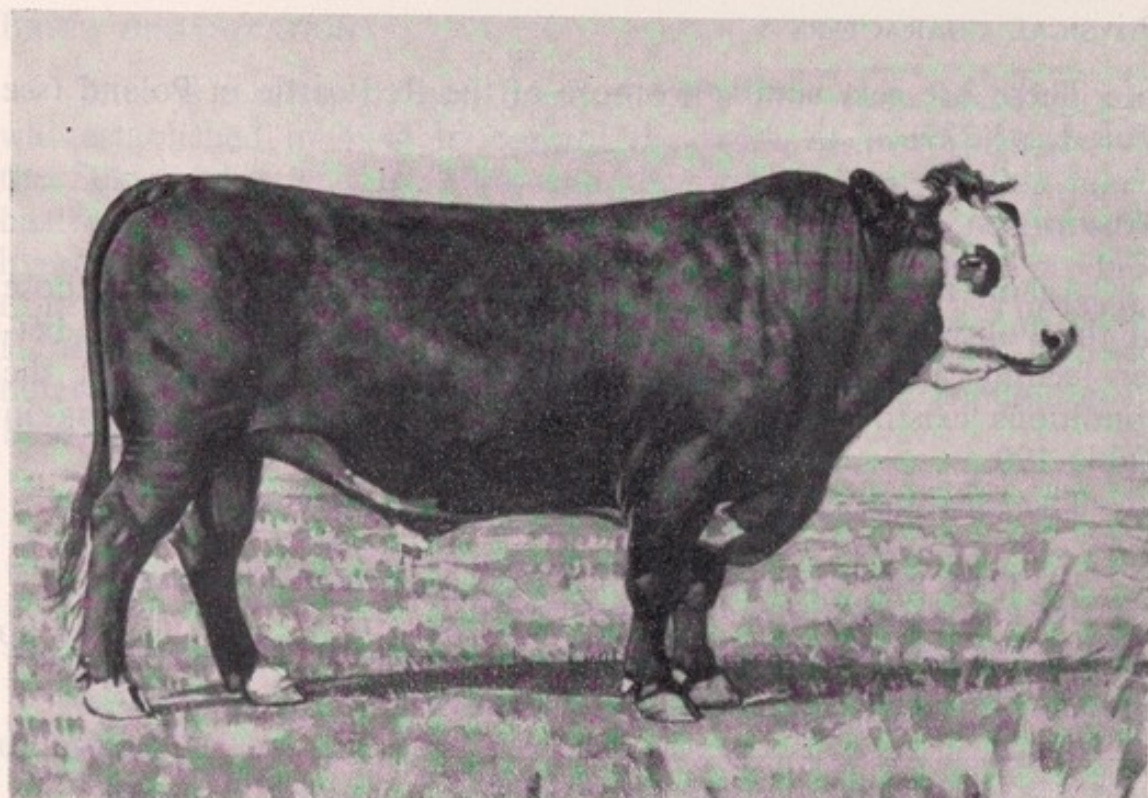


FIGURE 211. — Ukrainian Whitehead bull.

Courtesy Ministry of Agriculture, Moscow

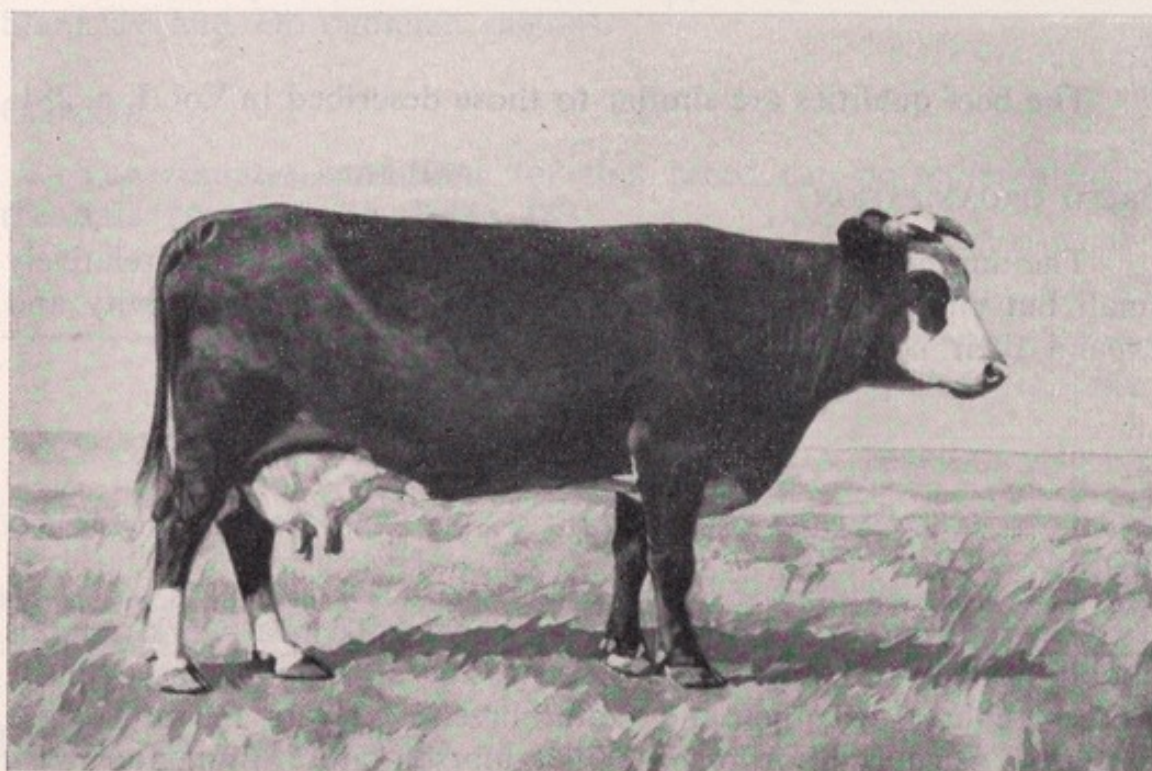


FIGURE 212. — Ukrainian Whitehead cow.

Courtesy Ministry of Agriculture, Moscow

LOCATION, TOPOGRAPHY AND SOILS

These cattle are to be found in the southern part of Polesya, on the right bank of the Dnieper, in Kiev, Zhitomir, Vinnitsa and neighboring areas.

CLIMATE

Climatological data for Kiev are presented in Table 191 to illustrate the conditions to which this breed is adapted.

TABLE 191. - AVERAGE CLIMATIC CONDITIONS FOR UKRAINIAN WHITEHEAD CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-6.0	-4.7	-0.5	6.8	14.6	17.4	19.3	18.2	13.4	7.3	0.7	-3.5
Rainfall (mm)	34	32	43	45	50	75	80	55	47	48	40	38

FEEDING AND MANAGEMENT

Even when the breed was in its formative stage, the feeding conditions were good, with reasonable pastures supplemented with grass and leguminous hays, straws and roots. Considerable reliance is placed on annual grains for silage and grazing in the summer months and indigenous and introduced grasses are also used, together with lucerne, vetch, clovers and green maize in the summer. Today the quantity of grass hay that can be made is limited, straws are conserved for feed and for bedding, silage is prepared, potatoes, root crops and sugar beet residues also figure in the winter dietary under stall conditions. For the better producers, the basic ration is supplemented with grains, brans and purchased concentrates, such as linseed, sunflower or cottonseed cakes.

PHYSICAL CHARACTERS

The hair is short and fine and either red and white or black and white. The head is largely white, although some animals have colored patches or "spectacles" around the eyes. The body is either black or red, with white markings on the belly, flanks, udder, chest and the lower parts of the neck, tail and legs.

The head is rather long, wide between the eyes and at the muzzle, and the profile is straight. The horns pass outward from the poll, curl forward and upward and the tips are turned backward. The horns are white in color with dark tips. The skin is pigmented, while the muzzle and body orifices are black or dark colored.

The body is long, particularly toward the rear, the conformation is typical of a dairy type: wedge shaped and not heavily fleshed. The withers and rump are narrow and somewhat higher than the loins, the chest is deep, the ribs only medium well sprung and the abdomen is voluminous. The legs are strongly boned in some animals but in other cows the hind legs knock together at the hocks. The udder is large, although its shape could be improved, and the teats are long and well placed. Table 192 gives average liveweights and body measurements of cows.

TABLE 192. — AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF UKRAINIAN WHITEHEAD COWS

Liveweight (kg)	450
Body length (cm)	150
Wither height (cm)	127
Chest girth (cm)	179
Chest depth (cm)	67
Hip width (cm)	45

Table 193 gives the average liveweights of typical animals.

TABLE 193. — AVERAGE LIVeweIGHTS OF UKRAINIAN WHITEHEAD CATTLE

	Males	Females
 Kilograms	
Birth	32	29
One year	260	245
Two years	450	360
Mature	600	410

FUNCTIONAL CHARACTERISTICS

Under good conditions of feeding and management, the milk yield of these cows is fairly high and Table 194 gives some data for this breed.

TABLE 194. — AVERAGE LACTATION RECORDS OF UKRAINIAN WHITEHEAD COWS

	No. of cows	Milk	Fat
		<i>Kilograms</i>	<i>Percentage</i>
Vol. II (Herdbook)	—	2 573	3.60
Vol. I: Vinnitsa	379	2 684	3.60
Vol. II: Kiev	240	2 482	3.81
1939 Exhibition	65	5 173	3.69
Elite cattle (1937)	4	4 585	3.60

Yields of up to 12,000 kilograms of milk have been recorded for individual cows.

The beef characters of this breed have been insufficiently developed and, without special feeding, carcase yields fluctuate from 50 to 52 percent.

BREED ORGANIZATION

The registration of cattle and a Herdbook were started in 1926, while a State Breeding Center was opened in 1935, at which there were 4,756 animals in 1947.

Gorbatov Red

ORIGIN

This breed developed from the crossing of local cattle with Red Tirolese animals. The first consignments of the latter arrived early in the nineteenth century but importations ceased soon after 1870.

LOCATION, TOPOGRAPHY AND SOILS

This is the basic dairy breed of the Gorki, Vladimir and Ivanov regions and of the Chuvash A.S.S.R. They are also common in the Bryansk region and in the Marii A.S.S.R. and occur in many districts of the Kaluga, Kalinin, Moscow, Smolensk and Orel regions. The best herds are in the Bogorodsk district of the Gorki region.

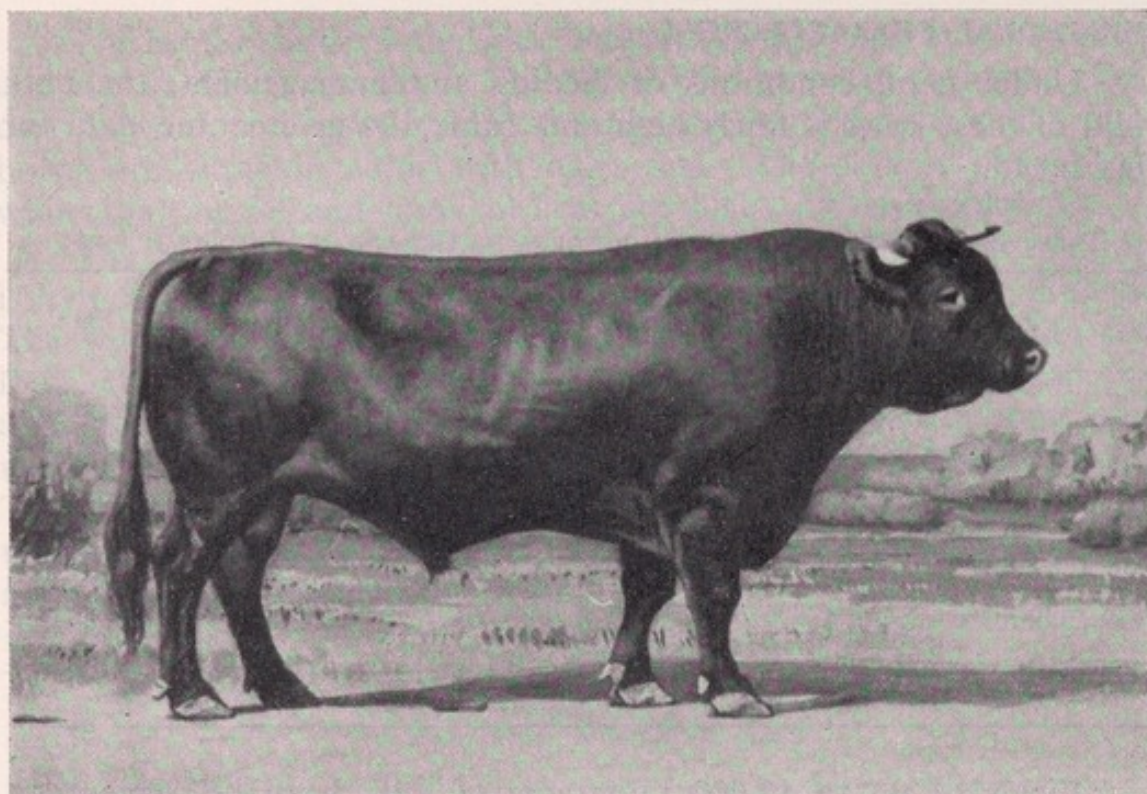


FIGURE 213. — Gorbатов Red bull.

Courtesy Ministry of Agriculture, Moscow



FIGURE 214. — Gorbатов Red cow.

Courtesy Ministry of Agriculture, Moscow

CLIMATE

The climatic data for Gorki are presented in Table 195 as typical of this breed.

TABLE 195. - AVERAGE CLIMATIC CONDITIONS FOR GORBATOV CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-8.3	-7.1	-3.2	4.3	12.4	15.0	17.7	16.0	10.9	4.8	-1.2	-5.6
Rainfall (mm)	29	28	27	31	42	71	85	64	45	40	34	27

FEEDING AND MANAGEMENT

The nutritional level employed by these animals, which tend to be on the small side, has an important influence on body development. Grazings are not good and considerable reliance is placed in summer on the use of cut green cereals, clovers and maize. Little hay is made and winter rations, when the stock are housed or yarded, rely on straws for roughage, supplemented with grains, silage, oilcakes and, where available, sugar beet residues, potatoes and root crops.

PHYSICAL CHARACTERS

These compact, rather small animals have a pigmented skin covered with red hair of medium length.

The head is quite short but wide in the forehead and straight in profile. The muzzle is dark colored, as are the body orifices and hooves. The horns are short to medium in length, and spread outward and then curl forward and downward.

The backline is relatively straight but usually sags at the loins in cows. The tail head is rather high and the quarters often slope rather sharply from the spine to the sides. The trunk is wide, deep in the chest and has well-sprung ribs, so that the abdominal organs are voluminous. The musculature is well developed, the legs are fairly short and the bone is strong. The udder tends to be rather badly set and the teats are frequently bunched or uneven. Table 196 gives data on the average liveweights and body measurements of registered cows.

TABLE 196. — AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF GORBATOV RED COWS

Liveweight (kg)	350-400
Body length (cm)	149-160
Wither height (cm)	120-127
Chest girth (cm)	160-180
Chest depth (cm)	61-68
Hip width (cm)	41-44

Bulls weigh up to 950 kilograms if well fed but usually scale between 500 to 700 kilograms, and cows which are well developed may weigh up to 525 kilograms.

FUNCTIONAL CHARACTERISTICS

When originally developed, the Gorbatov Red cattle were beef and milk types, but recent improvement activities have converted them into dairy types which still yield useful carcasses. Growth rates and final size can be appreciably augmented by better feeding. The cows have long lives and their milk yields, as measured in the State Herdbook of the Gorki region, are given in Table 197.

TABLE 197. — AVERAGE LACTATION RECORDS OF GORBATOV RED COWS

	Volume I		Volume II		Volume III	
	No. of cows	Milk	No. of cows	Milk	No. of cows	Milk
		<i>Kilo-grams</i>		<i>Kilo-grams</i>		<i>Kilo-grams</i>
1st lactation	70	1 680	11	2 000	23	1 887
2nd „	78	2 176	17	2 405	20	2 305
3rd „	85	2 321	7	2 914	19	2 646
4th „	89	2 675	7	2 700	20	2 731
5th „	80	2 712	22	2 800	20	2 820
6th „	77	2 796	28	3 403	12	2 700

The average butterfat content is over 4.0 percent, while individual milk yields have been recorded of over 7,000 kilograms per lactation.

Gorbatov Red cattle fatten readily in feedlots and yield meat of a good and satisfactory quality. Carcase percentages vary from 52 to 55 percent but can reach 67 percent depending on condition.

BREED ORGANIZATION

Improvement of this breed was stimulated by the opening of the Nizhegorod Semstvo Breeding Unit in Bogorodsk in 1912. It started by purchasing young bulls from peasant owners and selecting therefrom, but more intensive activities were launched in 1926 when the State Herdbook was founded.

Yurino

ORIGIN

This breed has developed from crossing the local cattle of Gorki province with imported Simmental bulls. These were moved, in 1812, to the Yurin estate from Bogorodsk and, about 1860, further cattle of this breed were introduced for crossing with the peasant-owned grades. From about 1880 to 1908, Brown Swiss were used and from the mixture the Yurino breed was selected.

LOCATION, TOPOGRAPHY AND SOILS

These Yurino cattle have developed in the Yurin area and surrounding country. Their development was favored by the rich pastures along the Volga, Sura, Vetmera and other rivers.

CLIMATE

The climatic conditions for this breed may be represented by the data in Table 198.

TABLE 198. - AVERAGE CLIMATIC CONDITIONS FOR YURINO CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-11.7	-9.3	-4.5	4.3	13.3	17.4	19.6	17.6	11.7	4.7	-2.1	-7.4
Rainfall (mm)	26	24	24	30	38	72	60	53	37	38	36	32

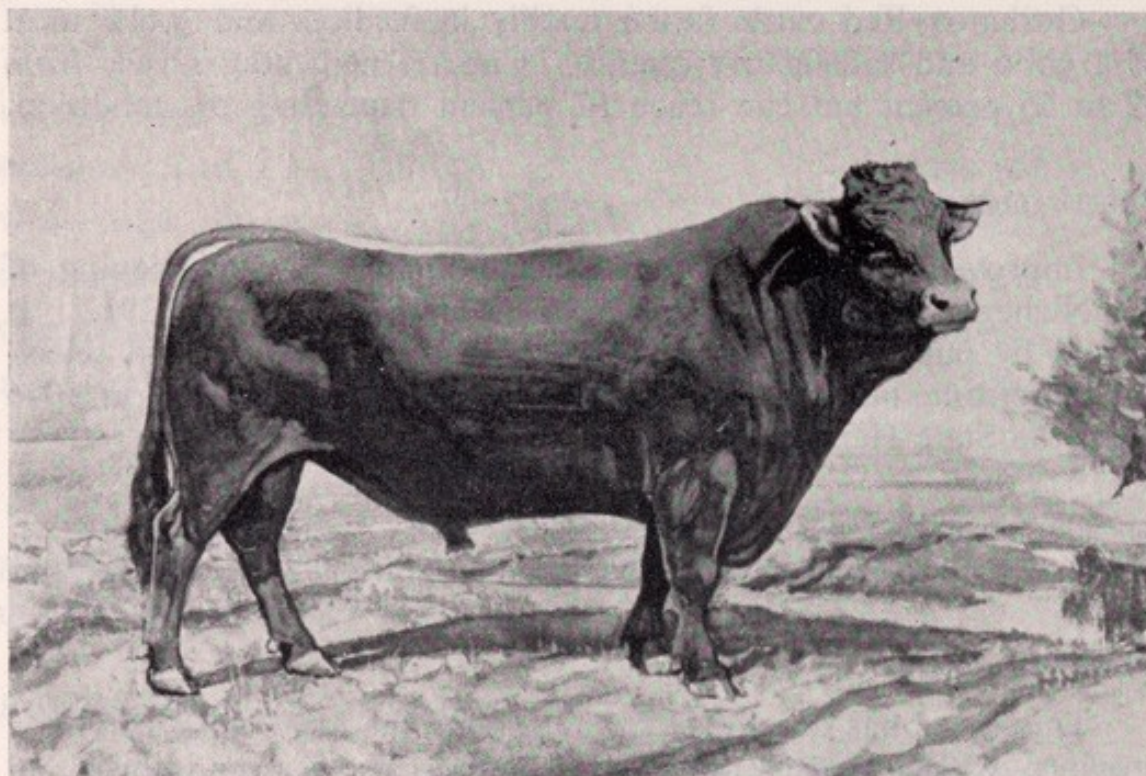


FIGURE 215. — Yurino bull.

Courtesy Ministry of Agriculture, Moscow

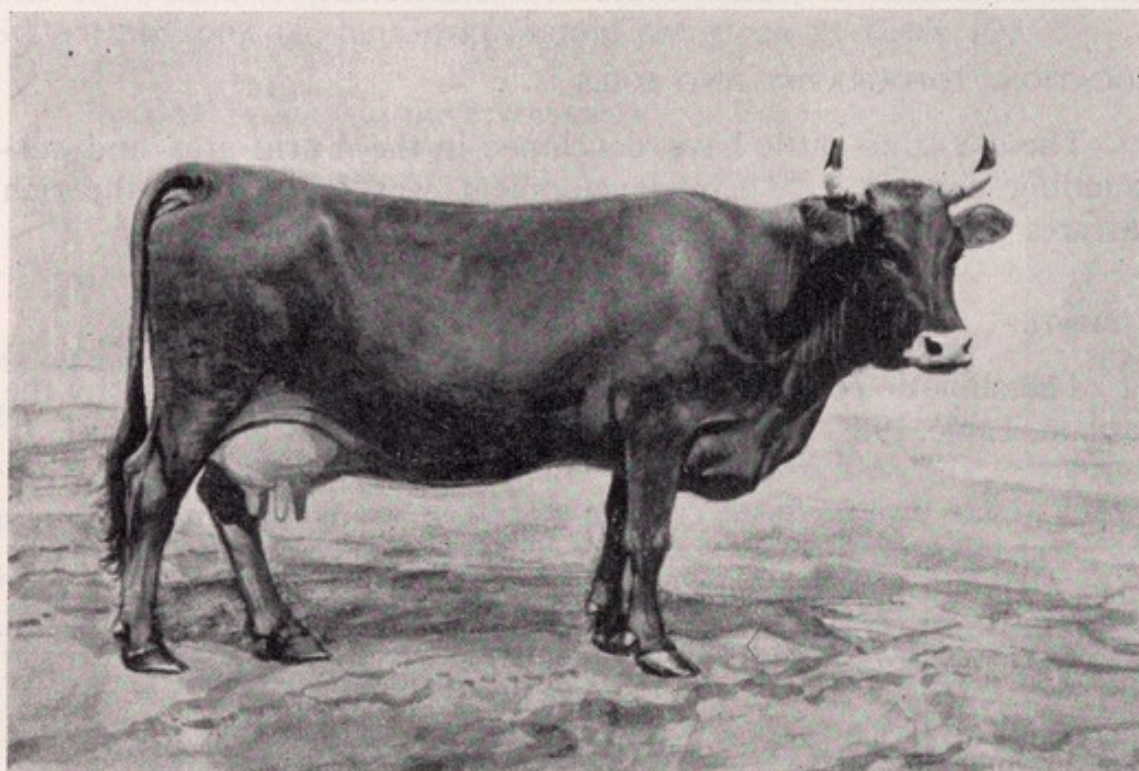


FIGURE 216. — Yurino cow.

Courtesy Ministry of Agriculture, Moscow

FEEDING AND MANAGEMENT

The rich pastures in the area of this breed provide excellent grazings and hays and have contributed much to the early development of this breed from its crossbred origins. Thus, the summer feeding conditions are satisfactorily catered for by the addition of balancing concentrates. In the winter yard and stall-feeding period, hays bulk largely in the ration with cereal straws. Concentrate mixtures composed of brans, cereals, oilcakes, silage and sugar beet residues are fed according to productivity.

PHYSICAL CHARACTERS

These well-built animals are shorter in the body and legs than other breeds of Russian origin, rather like a beef and dairy animal in conformation. The elastic skin is of medium thickness, pigmented and covered with soft medium-length hair. The hair color is brown and black of various shades in a variegated pattern which reflects the mixed origin and nonselection for the unimportant hair color. White patches on the belly and legs are common. The head is short, wide in the forehead and straight in profile. The muzzle, body orifices and hooves may be black to flesh colored. The horns grow out from the poll to curve forward and downward. They are yellowish in color.

The topline tends to be horizontal, is fairly wide, but the long quarters slope from the backbone to the sides and the tail head is often set high. The chest is deep and wide, the ribs well sprung and the abdominal organs are capacious. The legs are strong and well set but the skeletal framework of these animals is somewhat coarse. The glandular udders are of medium size and the teats are properly placed.

The liveweight of these cows is 370 to 470 kilograms, while the bulls may weigh up to 800 kilograms. Average body measurements are given in Table 199.

TABLE 199. — AVERAGE BODY MEASUREMENTS OF YURINO COWS

Body length (cm)	144
Wither height (cm)	120
Chest girth (cm)	167
Chest depth (cm)	65

At the beginning of this century, Yurino cattle were powerfully built animals, but with selection for milk their liveweights decreased. At birth, male calves average 35 kilograms and females 30 kilograms.

FUNCTIONAL CHARACTERISTICS

The milk yield of this breed varies appreciably with the level of nutrition and management. In 1940, the Marii State Herdbook registered 179 cows with an average milk yield of 2,860 kilograms containing 4.15 percent of butterfat but the range was from 1,600 to 5,100 kilograms. In the Gorki State Herdbook, the average yield was 3,097 kilograms and the best cow produced 6,900 kilograms of milk containing 4.77 percent of butterfat. A high fat content is a characteristic of the milk of this breed.

The beef of Yurino cattle carcasses is of medium quality. The carcass yield is from 45 to 50 percent.

BREED ORGANIZATION

In 1945, there were 31,804 cattle in this breed.

Istoben

ORIGIN

Istoben cattle have developed from the local stock in Vyatka province and were already fairly good dairy animals when Kholmogor (1900-06) and subsequently Yaroslavl and Brown Swiss breeds (1914) were used. The influence of these breeds is, however, small on present-day stocks which were considerably altered by crossings with Friesian cattle after 1930.

LOCATION, TOPOGRAPHY AND SOILS

The Istoben cattle are bred in Vyatka province, along the Vyatka, Kholunitsa and Istobenets rivers, and in the Orichev and Khalturin districts.

CLIMATE

Table 200 indicates the average climatic conditions at Kazan.

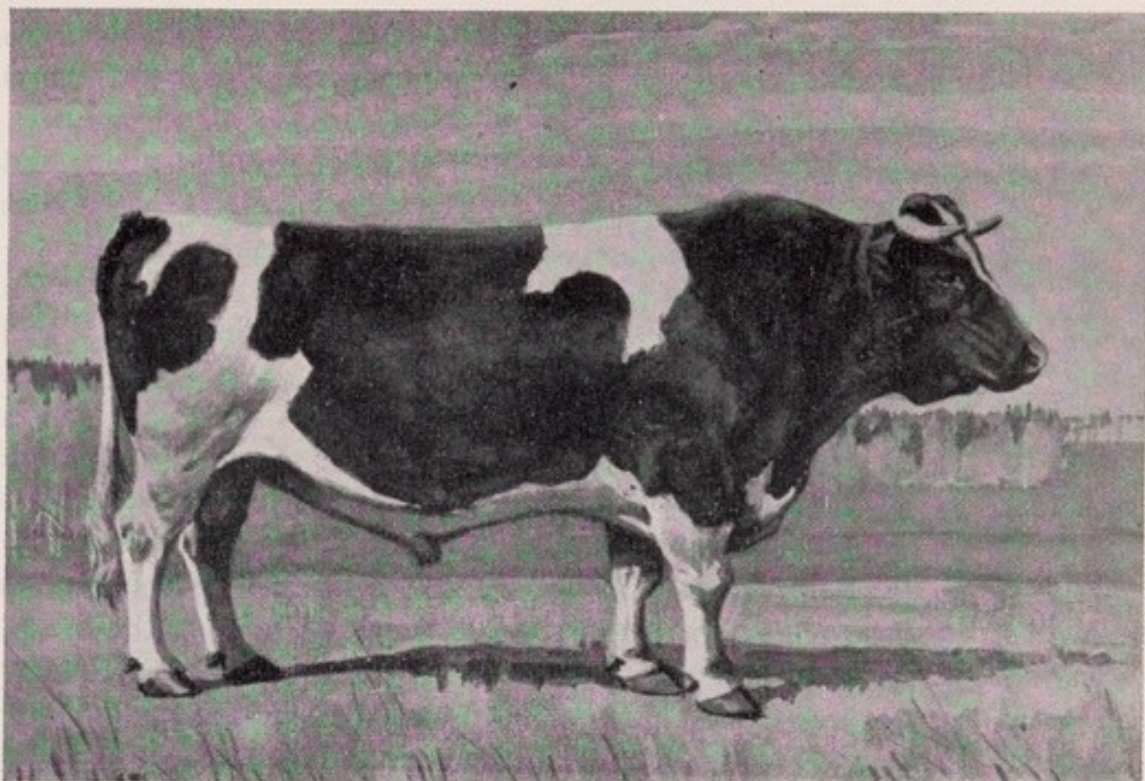


FIGURE 217. — Istoben bull.

Courtesy Ministry of Agriculture, Moscow



FIGURE 218. — Istoben cow.

Courtesy Ministry of Agriculture, Moscow

TABLE 200. - AVERAGE CLIMATIC CONDITIONS FOR ISTOBEN CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-12.9	-11.6	-6.0	3.7	12.7	18.0	18.9	17.6	11.8	3.7	-4.0	-9.8
Rainfall (mm)	19	16	22	26	43	45	72	79	41	38	25	28

FEEDING AND MANAGEMENT

In Vyatka province, good grazings exist and this, coupled with the need to extend the seasonal use of the labor force beyond the needs of ordinary farm cropping and vegetable gardening, favored attention on dairy farming. Butter and cheese manufacturing was developed and this, in turn, stimulated the improvement of the local cattle.

Summer grazings rely largely, and sometimes entirely, on local pastures and cultivated legumes. Surplus herbage is converted into hay, and vegetable gardening by-products are fed together with brans, grains and purchased concentrates. For the winter period, hays and straws form the basis of the diet, supplemented with roots, vegetable surpluses, potatoes, brans, grains and concentrate mixtures.

PHYSICAL CHARACTERS

As would be expected from the use of the Friesian in the development of this breed, the skin is of medium thickness and the hair color is black and white, in distinct patches. A red and white coloring is sometimes but rather infrequently encountered. The skin is pigmented under the areas of colored hair. The black-colored hair normally covers considerably more of the body surface than the white, which frequently appears as a stripe along the back, in variable proportions along the belly and lower parts of the abdomen and on the legs. In some cases, however, the black may be restricted to only a few patches on the head and neck. In fact, considerable color variation occurs, as is natural where breeding has been conducted on a productivity basis and without emphasis on the irrelevant hair color which bulks so largely in west European breed standards.

The skin color of the muzzle and body orifices depends on the color of the surrounding skin and hair and, therefore, may be black

or flesh colored or even a mixture of the two. Similarly, the hoof color, although normally waxen, may be black or dark colored.

The head is narrow and similar to that of *Bos taurus primigenius* but is straight in profile. The horns spread outward from the poll and then forward but may curl upward or downward.

The topline is mainly straight but the back is normally rather narrow. Sometimes the loin area sags and usually the longish quarters slope downward from the spine to the sides. The body is long, the chest is deep, the ribs are often flat and the barrel is voluminous. The legs may be well boned but often their skeletal development has been so interfered with that knocking hocks or bow legs develop. The udder is of a small size, glandular and often globular, with bunched teats. Average liveweights and body measurements are shown in Table 201.

TABLE 201. - AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF ADULT ISTOBEN CATTLE

Liveweight (kg)	350-400
Body length (cm)	160
Wither height (cm)	123
Chest girth (cm)	178
Chest depth (cm)	66
Hip width (cm)	45

Liveweight and body development vary appreciably with feeding and breeding. Liveweights at birth are 30 kilograms for males and 29 kilograms for females while, when one year old, the respective average weights become 240 and 220 kilograms. At 2 years of age, the better managed bulls average 400 kilograms and the females 300 kilograms.

FUNCTIONAL CHARACTERISTICS

Productivity varies between districts but is significantly affected by feeding and management. Table 202 summarizes data on milk yields and illustrates the general improvement being effected.

Individual cows can yield from 6,000 to 9,000 kilograms of milk with over 4.0 percent of butterfat.

The meat qualities of this breed are not high, although attention is being given to its improvement.

TABLE 202. — AVERAGE LACTATION RECORDS OF ISTOBEN COWS

	Year	No. of cows	Milk	Fat
			<i>Kilograms</i>	<i>Percentage</i>
Control Associations	1925/26	867	2 303	3.71
Registered in Herdbook	1925/26	168	2 737	4.03
Kirov region, all records	1939	—	2 071	—
Agricultural Exhibition	1939	—	5 650	4.00
Leninskaya Iskra Kolkhoz	1948	63	2 813	—
Registered in Herdbook	1947	—	3 382	4.12
Registered in Herdbook	1955	—	3 219	4.19

BREED ORGANIZATION

There were 36,943 Istoben cattle in 1939, of which 15,345 were registered, while the corresponding data for 1945 were 39,293 and 20,346. Various improved lines have been developed on the state farms and in the kolkhozes and sovkhoses, and these are being distributed to improve breed standards.

A Control Union was organized in 1914 for this breed but this was replaced in 1926 when collective units centralized breeding activities. The primary aim is to raise the liveweight of cows to 400 to 450 kilograms and to attain a lactation average of 3,500 to 4,000 kilograms of milk containing not less than 4 percent of butterfat.

Ayrshire

ORIGIN

Importations of Ayrshire cattle were first made between 1870 and 1880 from Scotland by landowners. After the 1917 revolution, these were renewed and, in the 1930s, small consignments were obtained from Finland and further animals were secured from Sweden in 1947.

LOCATION, TOPOGRAPHY AND SOILS

Ayrshire cattle are bred pure on several farms in the Leningrad and Moscow regions and in the Estonian S.S.R.

CLIMATE

Climatic conditions in the Moscow region are summarized in Table 203.

TABLE 203. - AVERAGE CLIMATIC CONDITIONS FOR AYRSHIRE CATTLE IN THE U.S.S.R.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-10.8	-9.1	-4.8	3.4	11.8	15.6	18.0	15.8	10.1	3.7	-2.8	-8.0
Rainfall (mm)	36	37	34	42	49	67	79	72	56	59	45	37

FEEDING AND MANAGEMENT

Where grazing land is available, the cattle graze outside in the summer months and elsewhere they are fed inside with cut grasses, legumes, cereals and maize. In the winter period, they receive only a little hay but are fed various straws, silage, roots, potatoes and sugar beet residues. These basic rations may be supplemented during both summer and winter with oats, maize or barley, molasses, sunflower and cottonseed cakes, brans and other by-products.

PHYSICAL CHARACTERS

These closely resemble the characters of Ayrshires in their native home (Vol. I, p. 108). Some data on liveweights and body measurements are given in Table 204.

TABLE 204. - AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF AYRSHIRE COWS IN THE U.S.S.R.

Liveweight (kg)	400-540
Body length (cm)	158-159
Wither height (cm)	120-123
Chest girth (cm)	172-184
Chest depth (cm)	64-65
Hip width (cm)	37-42

Bulls weigh up to 670 kilograms when mature.

FUNCTIONAL CHARACTERISTICS

The Ayrshire in the U.S.S.R. exhibits the same functional characteristics as the breed in Scotland (Vol. I, p. 109) provided its level of feeding and management is equivalent.

Table 205 illustrates the variations in milk yield and the progress made over the years.

TABLE 205. — AVERAGE LACTATION RECORDS OF AYRSHIRE COWS IN THE U.S.S.R.

	Year	No. of cows	Milk	Fat
			<i>Kilograms</i>	<i>Percentage</i>
Pskov	1881	206	1 950–3 000	—
Tula	1900	23	1 520–2 560	—
Smolensk	1891	43	1 600–1 750	—
Smolensk	1893	42	2 050–3 000	—
Leningrad				
1st lactation	—	264	2 618	3.99
2nd lactation	—	264	3 250	4.08
3rd lactation and over	—	280	3 524	4.04

Milk yields of from 6,000 to 8,000 kilograms have been recorded for the best cows.

BREED ORGANIZATION

In 1941, 540 cows and 30 bulls were registered in the Herd-books of the Leningrad region. Bulls of this breed are also being used to raise the butterfat content of milk from Friesian herds.

East Finnish

ORIGIN

East Finnish cattle of the same type as encountered in Finland (see Vol. I, p. 40) are found in the U.S.S.R. Further stocks were imported in 1924-34.

LOCATION, TOPOGRAPHY AND SOILS

The East Finnish cattle are found in the Karelo-Finnish A.S.S.R. and in the Murmansk and Leningrad regions.

CLIMATE

The harsh climatic conditions under which this breed lives are summarized for Kola in Table 206.

TABLE 206. — AVERAGE CLIMATIC CONDITIONS FOR EAST FINNISH CATTLE IN THE U.S.S.R.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-11.5	-11.6	-8.1	-1.6	3.4	8.7	12.5	10.7	5.9	-0.3	-6.4	-10.4
Rainfall (mm)	14	20	13	17	27	37	55	48	43	30	30	21

FEEDING AND MANAGEMENT

The cattle can graze in summer but for a large part of the year (nine to ten months) they are yarded or kept inside. The pastures are relatively poor, stony and scant. The feeds consist of hays, straws, roots, silage, cereals, brans, oilcakes and other products of the farm.

PHYSICAL CHARACTERS

The general characters resemble those of the breed described in Vol. I, p. 42. Table 207 gives data on the liveweights and body measurements of this breed in the U.S.S.R., which are very similar to the statistics for animals registered in the Herdbook in Finland.

FUNCTIONAL CHARACTERISTICS

The average yield of East Finnish cows in the U.S.S.R. is between 2,000 and 2,200 kilograms of milk in a 300-day lactation. Individual cows can yield up to 5,500 kilograms. A characteristic of the milk is its high butterfat content.

The birth weight of male calves averages 20 kilograms and that of females 18 to 19 kilograms, but female birth weights may vary from 11 to 32 kilograms depending on the mother and her state of

TABLE 207. — AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF EAST FINNISH CATTLE IN THE U.S.S.R.

	Karelo-Finnish and Murmansk sovkhozes	State Herdbook	Finnish Herdbook
Liveweights (kg)	330	—	—
Body length (cm)	139	—	140
Wither height (cm)	111	114	111
Chest girth (cm)	162	156	162
Chest depth (cm)	63	60	62
Hip width (cm)	46	44	44

nutrition. The State Herdbook shows that bulls weigh up to 450 kilograms liveweight, while slaughter tests indicate that carcass yields of 40 to 45 percent of the liveweight are obtained. The meat is of average quality, but the taste, texture and cooking characters are superior when the meat derives from a younger and more adequately fed animal.

BREED ORGANIZATION

A State Herdbook is maintained, and animals are registered upon compliance with the minimum prescribed standards.

Pechora

ORIGIN

Pechora cattle are descendants of the native cattle which occurred in the north of the European U.S.S.R. They are similar in type to the cattle of northern Karelia and Murmansk and to northern breeds of dairy cattle in Finland, Sweden and Norway.

LOCATION, TOPOGRAPHY AND SOILS

Pechora cattle derive their name from the district, in the catchment area of the Pechora river, where they are raised.

CLIMATE

The average conditions under which this breed lives at Pechora are presented in Table 208.

TABLE 208. - AVERAGE CLIMATIC CONDITIONS FOR PECHORA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-18.4	-17.5	-14.3	-7.2	-0.6	5.7	12.2	10.0	4.8	-2.3	-10.4	-15.1
Rainfall (mm)	19	18	18	19	27	34	42	48	53	34	27	20

FEEDING AND MANAGEMENT

Only during four months in the summer period can these animals graze, but for the rest of the year they are stalled and fed chiefly on hays and straws. The unsatisfactory feeding system, including a shortage of feed during the winter, leads to periods of subsistence during which the animals become emaciated.

PHYSICAL CHARACTERS

The medium-thick skin carries hair which in 55 percent of the animals is black and white, while a red and white coat occurs on 35 percent of the remainder. The skin is pigmented under the colored hairs but the muzzle, body orifices and hooves may be black, whitish or flesh colored.

The head is rather long, narrow in the forehead and straight in profile. Some 65 percent of the animals are polled, while in the remaining 35 percent short horns pass out from the poll and curve forward and upward.

The topline is very variable and often low at the loins. The chest is deep but the ribs are often flat-sided, although the body capacity is large. The leg bones are sometimes weak and knocking hocks are common. The exterior conformation often exhibits a number of defects. Average liveweights of cows are 270 kilograms under poor conditions and 350 to 370 kilograms for the better-fed animals registered in the Herdbook.

FUNCTIONAL CHARACTERISTICS

Under poor feeding conditions on hays and straws in the winter period average lactation yields are from 700 to 1,500 kilograms of milk. When feeding conditions are better the yield increases significantly. For cows registered in the Herdbook, some 1,700 to 2,100 kilograms of milk per year are recorded, while the best cows produce 2,500 to 3,500 kilograms.

BREED ORGANIZATION

Pechora cattle improvements commenced between 1880 and 1890, when Kholmogor cattle from Archangel were introduced. The numbers were small and erratic and it was not until 1931 that Kholmogor cattle exerted an important influence on the Pechora breed.

Caucasian

ORIGIN

The origin of the Caucasian breed has not yet been determined. There are two types, the larger being found on the Lesser Caucasus and the smaller type on the Higher Caucasus Mountains.

LOCATION, TOPOGRAPHY AND SOILS

Within both basic groups, the animals divide into varieties named after the area in which they have developed. The Greater Caucasian types are the Daghestan, Khevsur, Ossetian, etc., while in the Lesser Caucasus group are found the Kazakh, Karabakh and others. The varieties within each of the two basic groups are not widely dissimilar. For this discussion, the emphasis naturally falls on the animals in the European sector of the U.S.S.R.

CLIMATE

In Table 209 are given the climatic data at two stations, Lenkoran on the Caspian at an altitude of -20 meters, and Stavropol, at 575 meters.

TABLE 209. - AVERAGE CLIMATIC CONDITIONS FOR CAUCASIAN CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
LENKORAN												
Temperature (°C)	3.2	5.0	7.9	12.0	18.4	23.1	25.8	25.6	21.8	16.7	10.7	6.3
Rainfall (mm)	120	84	95	65	39	24	27	46	219	213	195	127
STAVROPOL												
Temperature (°C)	-4.6	-3.0	1.3	6.9	13.5	17.6	20.6	20.0	14.6	9.1	2.6	-1.2
Rainfall (mm)	27	32	31	53	70	107	81	36	60	34	57	44

FEEDING AND MANAGEMENT

The feeding and management of cattle, together with a long tradition of cheese making, include the ranging of cattle from valleys to mountains and back, in accordance with the seasonal conditions and the possibilities, or lack thereof, for grazing. Except for certain mountain districts, where adverse climatic conditions restrict the possibilities, cattle graze for nine to ten months of the year on pastures, both natural and cultivated. Supplementary feeds are given according to production but are normally supplied from barley, maize, brans, oilcakes and silage (maize, sunflower and grass). In winter, the basic ration fed in yards or houses is composed of hays and straws, and the concentrates are adjusted to the productivity of the herds.

PHYSICAL CHARACTERS

Caucasian cattle have strong constitutions and lively dispositions. The skin is thin and supple, while the hair color covers a wide range. In the Greater Caucasus, the hair is predominantly black but, in the Lesser Caucasus, various red shades, ranging from light to dark, as well as a similar range of browns and grays, are the normal colors.

The head is small, wide between the eyes, with large orbits and a slightly dished or straight profile. The horns are yellowish white and spread outward to curl upward and usually slightly forward.

The body is often very variable in conformation. Usually, a dewlap is present on the lower part of the neck. The topline is roughly level, although the loins may be low and the withers high. The chest depth also varies with the nutritional plane, as do the

circumference and the spring of ribs. The back is often narrow and the body shows a number of defects. Knocking hocks is another frequent fault of this breed, and both the skeleton and musculature may be poorly developed. The udders, which are generally glandular, are small, as are the teats. The latter are often bunched together.

At birth, calves average 18 to 20 kilograms and 130 to 150 kilograms at 12 months of age. Table 210 presents data on the average body measurements of this small breed.

TABLE 210. — AVERAGE BODY MEASUREMENTS OF CAUCASIAN CATTLE

	Lesser Caucasus	Greater Caucasus
Body length (cm)	135	126
Wither height (cm)	112	108
Chest girth (cm)	154	142
Chest depth (cm)	59	50

Mature liveweights on the sovkhoses and experimental farms vary from 200 to 400 kilograms but the majority of mature cows average 280 to 290 kilograms, while the best are between 400 to 500 kilograms.

FUNCTIONAL CHARACTERISTICS

Milk yields of these small cattle are not high but they respond to better feeding and management. Table 211 shows the changes in milk production over the years.

TABLE 211. — AVERAGE LACTATION RECORDS OF CAUCASIAN COWS

Year	Milk	Fat
	<i>Kilograms</i>	<i>Percentage</i>
1885/86	400-450	4.8
1909/10	500-550	5.0
1926/27	600-650	—
1937/38	1 000-1 500	4.46

Individual yields have reached 5,000 kilograms of milk containing 4.2 percent of butterfat. The fat content is normally high in milk from this breed.

The beef-producing capacity is relatively low for animals under average conditions, with carcass returns of 43 to 45 percent. Better fed stock may have a carcass out-turn of 50 percent, and fattened animals may yield 55 percent.

Caucasian cattle still play an important role as draft animals, particularly in the mountain regions.

BREED ORGANIZATION

No State Herdbook had been established by 1950.

Kostroma

ORIGIN

The Great Russian or Forest cattle which were indigenous in the northern and central provinces of the U.S.S.R. were uneven, small and of low productivity, except in the river valley areas, where the animals were larger and noted for their greater milk productivities. After the 1861 reform, Allgäu (Brown cattle of Austria) cattle were imported and began to spread by crossbreeding. With better management and feeding, these crosses were of greater productivity than the local animals. Consequently, further Allgäu and Brown Swiss bulls were introduced, particularly the latter, and large numbers of crossbreds of Allgäu-Brown Swiss local breeds were established.

The Kostroma State Breeding Unit, established in 1934, concentrated on the improvement of this mixture and, from this work, there emerged in 1944 the new Kostroma breed, noted for its dairy propensities.

LOCATION, TOPOGRAPHY AND SOILS

Developed originally in the catchment basins of the northern Dvina, Vychegda, Kostroma, Volga, Oka and Kliazma rivers, and stimulated by the activities on the Karavaevo Sovkhoz and the Kostroma State Breeding Farm, the Kostroma breed has since been spreading over the northern and central provinces of the U.S.S.R.

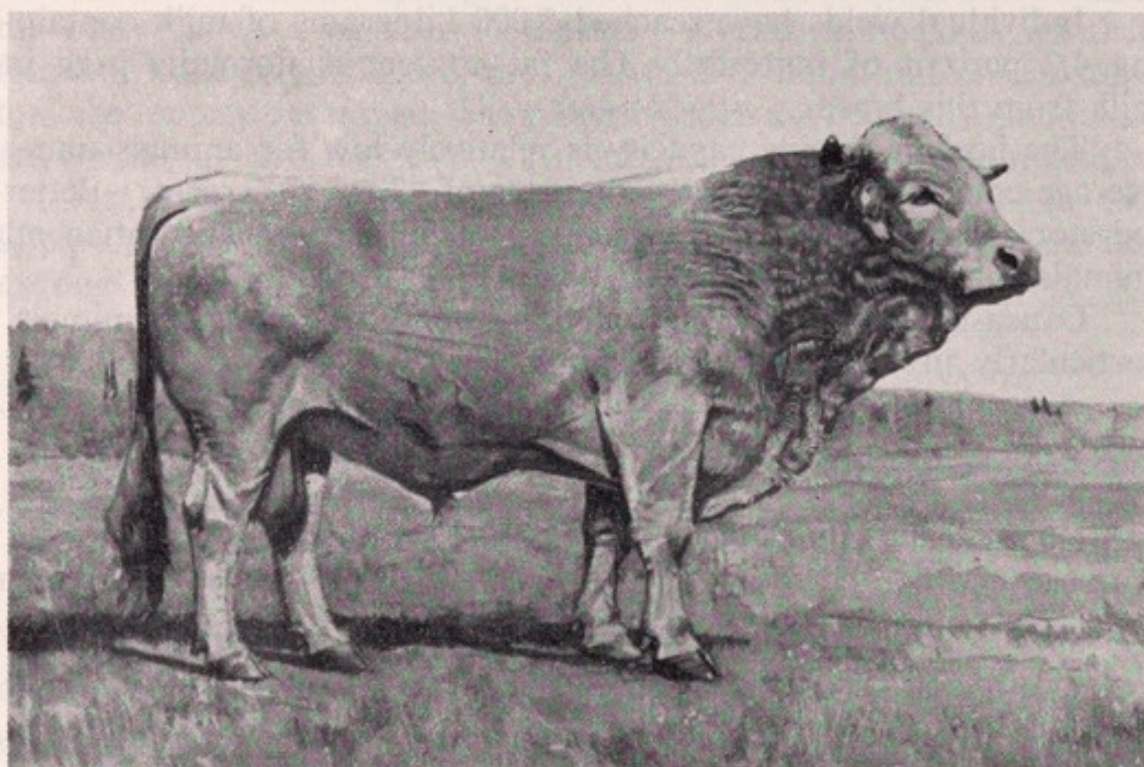


FIGURE 219. — Kostroma bull.

Courtesy Ministry of Agriculture, Moscow



FIGURE 220. — Kostroma cow.

Courtesy Ministry of Agriculture, Moscow

CLIMATE

The climatic conditions under which this breed has been developed may be indicated by the data for Vologda in Table 212.

TABLE 212. - AVERAGE CLIMATIC CONDITIONS FOR KOSTROMA CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-12.0	-10.3	-5.9	2.1	10.3	14.8	17.6	14.7	9.1	2.5	-4.2	-9.5
Rainfall (mm)	25	22	22	28	51	68	68	71	57	41	29	27

FEEDING AND MANAGEMENT

During the summer, cattle normally graze outdoors, although some of the better milking herds may spend part of their time in yards feeding on such soilage crops as green cereals, maize and lucerne. During the winter, the animals are fed hays, straws, cabbage, silage and vegetable by-products. Concentrate mixtures include brans, grains and oilcakes, while sugar beet by-products are also fed when available.

PHYSICAL CHARACTERS

With the mixed origin, the relatively early stage of development and the considerable variation in feeding levels, body conformation and size differ appreciably. Naturally, the general similarity to the Brown Swiss is accentuated by the more recent breedings to these ancestors, but the animals are somewhat coarser and the body parts are less well balanced. This is to be expected, because the emphasis has been on milk potential irrespective of appearance. A characteristic of the breed is its healthiness, constitutional vigor and longevity. The Karavaevo herd, which has been more intensively improved, can be used to illustrate the 1940 conformational potential, and details are presented in Table 213.

The birth weight of calves averages 40 kilograms for males and 37 kilograms for females in the better animals. To illustrate the physical differences, data from the Kostroma State Breeding Unit, incorporating some 55 kolkhozes, are given in Table 214.

TABLE 213. — LIVeweIGHTS AND BODY MEASUREMENTS OF SUPERIOR KOSTROMA CATTLE

	Males	Females	
	1 year	1 year	Mature
Liveweight (kg)	377	329	650-850
Body length (cm)	131	127	165-195
Wither height (cm)	121	118	128
Chest girth (cm)	158	153	195-220
Chest depth (cm)	58	55	70-80
Hip width (cm)	40	39	50-60

Comparison with the figures in Table 213 clearly demonstrates the effects of the nutritional plane and selection in changing body weights and proportions.

TABLE 214. — AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF REGISTERED KOSTROMA ADULT CATTLE

	Males	Females
Liveweight (kg)	720	470
Body length (cm)	167	152
Wither height (cm)	135	127
Chest girth (cm)	205	179
Chest depth (cm)	73	66
Hip width (cm)	51	49

FUNCTIONAL CHARACTERISTICS

This breed has been, and still is being, selected for its dairy potential, and the 300-day milk yields of cows registered in the Herd-book, separated according to lactation, are shown in Table 215.

The best cows in these registered animals from the kolkhozes in the Kostroma Breeding Unit yield up to 8,000 kilograms of milk containing 3.8 to 4.0 percent of butterfat. The best pasture-fed cows achieve 4,000 kilograms, whereas the daughters of outstanding

TABLE 215. - AVERAGE LACTATION RECORDS OF REGISTERED KOSTROMA COWS

	Milk	Fat
	<i>Kilograms</i>	<i>Percentage</i>
1st lactation	2 664	3.91
2nd „	2 923	3.98
3rd „	3 394	3.93
4th „	3 245	3.94
5th „	3 589	3.89
6th „	3 704	3.85

sires and dams, up to 1940, had produced from 8,000 to 14,000 kilograms of milk, while 52 daughters of the bull "Artist," over three or more lactations, had produced an average yield of 8,382 kilograms in 300-day lactations.

Although little is said about the meat potentials of this breed, the animals can grow rapidly, and it has been shown (by 1957) that male stock can be finished for slaughter at a relatively early age to give carcass yields of up to 64 percent from 1½ to 2-year-old animals weighing 450 to 500 kilograms. Veal calves 30 to 40 days old can dress out at 60 percent.

BREED ORGANIZATION

A Herdbook is maintained for registered animals but registration is permitted only to those which achieve certain minimum standards. Sires are now being evaluated by the productivity of their progeny and artificial insemination is gaining momentum. Prior to the second world war, there were over 17,000 purebred cattle, but the numbers have since been augmented to over 23,000 (1957), when the total population was 276,100.

Brown Swiss

ORIGIN

Brown Swiss cattle were first brought to the U.S.S.R. from Switzerland at the beginning of the nineteenth century. At first they were on landowners' estates but later penetrated into peasant holdings and became widespread by the beginning of the present century.



FIGURE 221. — Brown Swiss bull.

Courtesy Ministry of Agriculture, Moscow

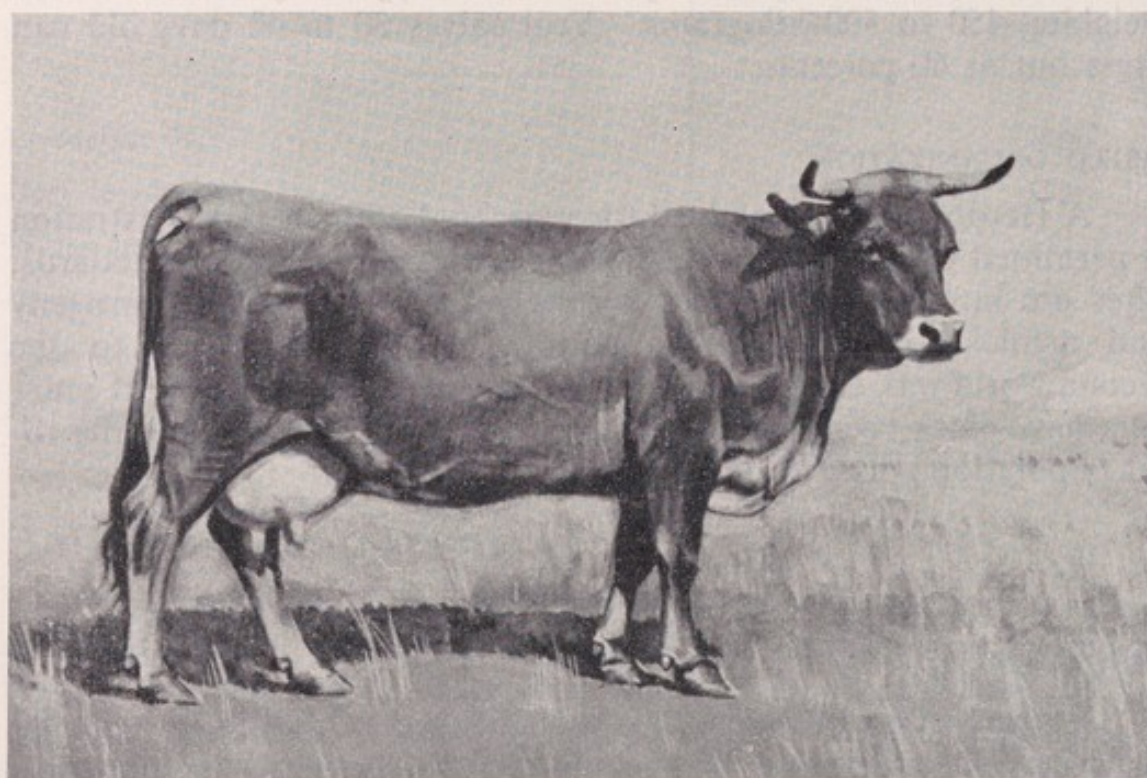


FIGURE 222. — Brown Swiss cow.

Courtesy Ministry of Agriculture, Moscow

The most rapid spread took place, however, after the 1917 revolution and the organization of collective farms. Between 1917 and 1929, the peasants of many districts in the Ukraine, Byelorussia, Smolensk, Tula, Kostroma and other regions began the upgrading of their cattle to the Brown Swiss, so that when the collective farms were set up, many of the animals were high-grade Brown Swiss.

LOCATION, TOPOGRAPHY AND SOILS

Breeding units are established in the Smolensk, Tula, Kostroma, Suma regions, and in Kazakhstan, Armenia and Kirghizia. After the second world war, there was a steady displacement of this breed from the west to the southeast of European U.S.S.R., partly stimulated by the stock losses in war-ravaged areas.

CLIMATE

The climatic conditions in the areas where the Brown Swiss cattle are kept vary considerably but the data in Table 216 for Saratov may be taken as average.

TABLE 216. - AVERAGE CLIMATIC CONDITIONS FOR BROWN SWISS CATTLE IN THE U.S.S.R.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-10.2	-7.1	-3.2	4.3	12.4	15.0	17.7	16.0	10.9	4.8	-1.2	-5.6
Rainfall (mm)	29	28	27	31	42	71	85	64	45	40	34	27

FEEDING AND MANAGEMENT

The major reliance for fodder is on annual grains for summer feeding (barley, oats, rye, maize, grass, clover, vetches and sudan grass). Many of the cattle have little or no grazing and are fed in houses and yards on cut fodder. During the winter, the animals are yarded or housed and get limited hays but large amounts of straws, together with silage. To supplement the productive part of the ration, grains, brans, potatoes and oilcakes are fed. In areas where sugar beet is grown, the tops and pulp (wet and dry) are given to cows.

PHYSICAL CHARACTERS

The purebred stock in the U.S.S.R., which represent but a small percentage of the total Brown Swiss population, physically resemble the same breed in its Swiss home (p. 14). The grade stock also resemble them, depending on the level of upgrading, but exhibit considerable variations between individuals.

The birth weights of male calves vary from 37 to 46 kilograms and males weigh from 280 to 310 kilograms at one year of age. Corresponding weights for female stock range from 35 to 42 and 245 to 310 kilograms. The data in Table 217 show the average body dimensions of upgraded stock at various places in the U.S.S.R.

TABLE 217. — AVERAGE BODY MEASUREMENTS OF BROWN SWISS CATTLE IN THE U.S.S.R.

	Lenin Kolkhoz	Udarnik Kolkhoz	Krynki Kolkhoz	Shulgino Kolkhoz
Body length (cm)	150	158	156	169
Wither height (cm)	128	131	129	133
Chest girth (cm)	180	189	180	193
Chest depth (cm)	67	71	67	71
Hip width (cm)	51	55	50	53

Mature cows weigh from 350 to 680 kilograms, while bulls average from 590 to 810 kilograms.

FUNCTIONAL CHARACTERISTICS

The Brown Swiss breed and its crosses have proved very productive in the U.S.S.R. and are correspondingly popular. The best Brown Swiss cows have recorded from 10,000 to 12,750 kilograms of milk containing 3.6 to 4.2 percent of butterfat. The best kolkhoz averages in the postwar years (1948) were from 2,550 to 3,530 kilograms of milk, while the best sovkhos records were from 3,863 to 5,308 kilograms.

Table 218 presents data to illustrate the comparative yields of purebred and grade Brown Swiss cows, together with the comparable data for local unimproved cows during the years following the second world war.

TABLE 218. — AVERAGE LACTATION RECORDS OF BROWN SWISS COWS IN THE U.S.S.R.

	Purebred	Local cattle	$\frac{1}{2}$ grades	$\frac{3}{4}$ grades	$\frac{7}{8}$ grades
ALAMEDIN SOVKHOZ					
Liveweight (kg)	566	339	454	562	565
300-day lactation yield (kg)	5 248	1 135	2 754	4 106	5 079
Fat (%)	3.71	4.18	4.11	3.77	3.72
TULA STATE BREEDING UNIT					
Liveweight (kg)	554	—	517	505	515
300-day lactation yield (kg)	4 971	—	4 812	4 263	4 504
Fat (%)	3.71	—	3.70	3.70	3.60

The meat-producing abilities of purebred Soviet cattle resemble those for Swiss cattle in their native home (p. 16). The yields and quality of the meat from grade stock depend on the level of upgrading to Brown Swiss.

BREED ORGANIZATION

The Smolensk Breeding Unit was established in 1931 and large numbers of cattle have been sold from this center. As more units were established, sires of this breed spread into many districts and regions for the improvement of local cattle and the numbers of cattle of this breed and its grades have been considerably augmented. According to the 1945 census, the number of purebred cattle was only 1.25 percent of the Brown Swiss population.

Simmental

ORIGIN

Simmental cattle were imported into the U.S.S.R. from the beginning of the nineteenth century and were bred pure and used for upgrading local cattle. They were first exhibited in shows in the U.S.S.R. in 1869 and began to spread among the landowners and peasants. Whereas they constituted only 3 percent of the cattle



FIGURE 223. — Simmental bull.

Courtesy Ministry of Agriculture, Moscow

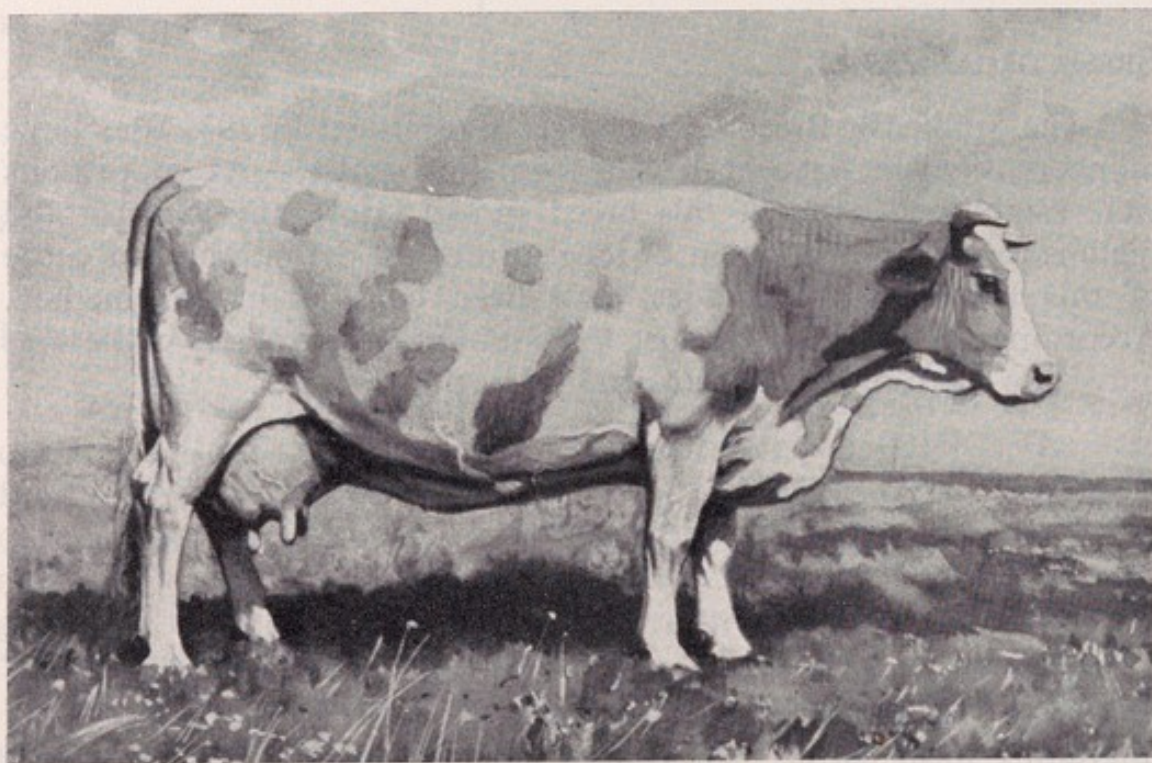


FIGURE 224. — Simmental cow.

Courtesy Ministry of Agriculture, Moscow

shown in 1877-79, their numbers represented 47 percent in 1907-09. With the setting up of state farms after the revolution, they became very widely distributed.

LOCATION, TOPOGRAPHY AND SOILS

Although widespread, the main concentrations of Simmentals are to be found in the Smolensk, Orel, Voronezh, Tambov, Penza, Saratov, Kharkov and Poltava provinces.

CLIMATE

Owing to its wide distribution it is difficult to describe average climatic conditions for Simmentals in the U.S.S.R. Because of the great importance of the Smolensk region as one of the main centers of this breed, Table 219 gives the average climatic data for Smolensk.

TABLE 219. — AVERAGE CLIMATIC CONDITIONS FOR SIMMENTAL CATTLE IN THE U.S.S.R.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-9.4	-7.8	-3.3	4.0	12.2	15.5	17.2	15.5	10.0	5.0	-2.2	-7.8
Rainfall (mm)	46	41	41	35	53	73	96	76	51	51	51	48

FEEDING AND MANAGEMENT

Where grazing conditions are suitable, Simmental cattle graze during the summer, but elsewhere they may be fed in yards or stalls on cut fodder. In winter, all animals are yarded or inside and receive hays and straws, with roots, silage, sugar beet by-products, cereals, brans and oilcakes.

PHYSICAL CHARACTERS

The physical development of Simmentals and their crossbred progeny is significantly affected by the feeding conditions and the average climatic environment. Due to its wide area of dispersion, these factors can vary considerably and, consequently, so do the body development and liveweights. The well-fed and properly managed animals resemble the breed in its Swiss home (see p. 7) and the degree of departure from this is an interaction between feeding levels and genetic composition.

FUNCTIONAL CHARACTERISTICS

The Simmental and its crosses have adapted well to the various environmental conditions in the U.S.S.R. and many local types have become stabilized. Under good feeding conditions, purebred cows yielded 31 percent more milk than the first generation of crossbreds with local stock (4,720 *versus* 3,594 kilograms). The difference in yield between good and poor feeding conditions in first-generation crossbreds was 211 percent (3,594 *versus* 1,700 kilograms) and in purebred cows 251 percent (4,720 *versus* 1,878 kilograms). More than 13 percent of cows in the best breeding sovkhoses gave over 5,000 kilograms of milk in 300-day lactations.

In the last prewar years, 2,224 cows of all ages which were registered in the State Herdbook averaged 3,789 kilograms of milk containing 3.98 percent of butterfat. Individual lactations in 1955-57 reached levels of 6,000 to 7,000 kilograms of milk containing over 3.9 percent of butterfat, while the record-holding cows have yielded up to 11,000 kilograms of milk.

BREED ORGANIZATION

In 1945, Simmentals and their crosses accounted for 61.1 percent of all cattle breeds in the U.S.S.R., compared with 21.8 percent in 1939. As a consequence of the devastation during the second world war, a shift in the Simmental population occurred; the greatest number of animals in 1939 was in the Kiev region but by 1945 the center had shifted to Voronezh.

In the central regions of European U.S.S.R. (Smolensk, Ryazan and Kalinin), the dairy type Simmental crosses were derived from central U.S.S.R. cattle types. The feeding conditions are characterized by a low proportion of grain crops in the rotation, cultivated pastures and improved meadowlands.

In the central Chernozem belt (Voronezh, Kursh, Orlov and Tambov) sown grasses are used for hays and grazings and natural hay meadows represent an appreciable amount of the land, but much straw is fed in the winter. The Simmental crosses are here milk and meat animals and have arisen from crossbreeding to local and Kalmyk breeds.

In the Ukraine (Kiev, Kharkov, Chernigov, Poltava) there is little pasture and hay land but there are large grain areas. Again the dairy and beef types have developed from crossings with Ukrainian breeds.

In the pasture area of the Volga (Volgograd, Saratov, Kuibyshev and Orenburg), extensive grass fattening and milk production occur.

The crossbred beef and milk animals were obtained from the Red Astrakhan (Kalmyk) and Kirgiz (Kazakh) breeds.

Purebred animals provide large numbers of crossbreds for distribution and the improvement of outside herds.

Tambov Red

ORIGIN

At the beginning of the last century, Red Tirolese and Devon cattle were imported into Voronezh province. From the latter, Pashkov cattle were developed from local stock and used for crossbreeding purposes, as were also the progeny of the Red Tirolese cattle. At the end of the nineteenth century, Simmentals slowly displaced the above breeds on the bigger estates. The Pashkov and Tirolese improved animals remained in peasant hands. From these, there was eventually (1936) recognized the Tambov Red breed.

LOCATION, TOPOGRAPHY AND SOILS

The breed originated, and still exists, in the Tambov province and considerable extension work has been carried out in the Degtyan, Kirsanov, Umet and Michurin districts.

CLIMATE

Table 220 summarizes the average climatic conditions for Tambov Red cattle.

TABLE 220. - AVERAGE CLIMATIC CONDITIONS FOR TAMBOV RED CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-11.1	-9.5	-4.6	4.9	14.0	17.8	20.2	18.0	11.7	5.0	-2.3	-7.7
Rainfall (mm)	37	38	27	33	52	58	48	50	43	44	40	39

FEEDING AND MANAGEMENT

The zone occupied by this breed is one of intensive agriculture and a large proportion of the fields is sown to grains. Some sown pastures and other crops are also grown, together with natural herb-



FIGURE 225. — Tambov Red bull.

Courtesy Ministry of Agriculture, Moscow



FIGURE 226. — Tambov Red cow.

Courtesy Ministry of Agriculture, Moscow

age. The nature of the summer and winter diets closely follows that described for Brown Swiss cattle on p. 13.

PHYSICAL CHARACTERS

Tambov Red cattle are large in size and of a variable, although harmonious body conformation and have excellent constitutions. The skin is of medium thickness and pigmented. The medium-length hair is red in varying shades but white patches often occur on the belly, udder and the lower parts of the chest and legs.

The head is relatively short, with a wide forehead and straight profile. From the poll, medium-thick horns pass outward, forward and then upward at the tips. The horns are whitish in color but the tips are black. The muzzle, body orifices and hooves are black or dark in color.

The topline is comparatively level, although the back often rises toward the tail head, so that the loins may appear sunken. The back and loins are fairly wide, and the hindquarters slope from the backbone to the sides and from the hip to the pinbones. The chest is deep and the ribs are usually well sprung, while the abdomen is capacious. The skeletal development is of average proportions and hock weaknesses sometimes appear. The udder is variable in shape and size and the teats are long. Average body proportions are given in Table 221.

TABLE 221. — AVERAGE BODY MEASUREMENTS OF MATURE TAMBOV RED COWS

	Kirsanov	Degtyan	Lenin Kolkhoz
Body length (cm)	172	166	182
Wither height (cm)	129	126	134
Chest girth (cm)	183	179	163
Chest depth (cm)	67	65	71

Mature Tambov Red cows vary from 370 to 580 kilograms, depending on their genetic make-up and level of feeding. At birth, the average weight of male calves is 38 kilograms and 36 kilograms for females.

FUNCTIONAL CHARACTERISTICS

The average milk yield varies with the district and size of the cows, as can be seen from the data in Table 222.

TABLE 222. - AVERAGE LACTATION RECORDS OF TAMBOV RED COWS

	1st lactation			2nd lactation			3rd lactation		
	Weight	Milk	Fat	Weight	Milk	Fat	Weight	Milk	Fat
	Kilograms	Percent- age		Kilograms	Percent- age		Kilograms	Percent- age	
Kirsanov	391	1 787	3.81	437	2 062	3.67	473	2 371	3.8
Degtyan	369	1 644	3.89	414	2 116	4.01	462	2 504	4.2
Lenin Kolkhoz	522	3 368	3.9	546	4 114	3.9	578	4 611	3.9

Superior producers have yielded up to 7,000 kilograms of milk.

Apart from their good milking propensities, the Tambov Red cattle have above-average beef qualities.

BREED ORGANIZATION

The number of animals in this breed were over 4,000 in 1945. The Breed Herdbook and registration qualifications are controlled by the state, as is true of other Soviet breeds.

Bestuzhev

ORIGIN

This breed is considered to have been created by a complex system of crossings, starting with local native animals. Initially, Shorthorn, Friesian and Simmental cattle were used, later Wilstermarsch bulls were employed, and somewhere in this mixture the Kholmogor cattle were included. The objective started in 1810, when Bestuzhev decided to produce a single breed which would incorporate high milk yield, good beef qualities, a nice conformation and hardiness.

LOCATION, TOPOGRAPHY AND SOILS

In the European U.S.S.R., the Bestuzhev breed is found in the Ulyanov region. It is also widely spread in the Asiatic U.S.S.R.



FIGURE 227. — Bestuzhev bull.

Courtesy Ministry of Agriculture, Moscow



FIGURE 228. — Bestuzhev cow.

Courtesy Ministry of Agriculture, Moscow

CLIMATE

The climatic data typical of the Syzran area, where this breed developed, are given in Table 223.

TABLE 223. - AVERAGE CLIMATIC CONDITIONS FOR BESTUZHEV CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-13.1	-11.5	-5.8	4.4	14.3	18.9	20.4	19.1	12.5	4.7	-3.0	-9.2
Rainfall (mm)	23	20	16	17	27	51	35	31	34	35	28	27

FEEDING AND MANAGEMENT

The animals graze the extensive pastures in the summer months and in the winter are yarded or housed and fed hays, straws, grains, brans and oilcakes.

PHYSICAL CHARACTERS

The medium-thick hide is only lightly pigmented and carries a hair coat which may be red or red and white. The red varies from light red to cherry. The external mucous membranes are flesh colored and the hooves are yellowish white.

Although not large, the head is long, wide between the eyes and straight or slightly dished in profile. The horns are white in color, spread out from the poll and then curl forward. The angle may be upward or downward, and the tips often curl inward.

The topline is fairly level, the withers wide and the chest is deep. In some animals the ribs are well sprung but in others they are flat-sided. The hindquarters are generally not well muscled, and are often sagging or sloping steeply from the backbone line to the sides. The legs are short but strong, although knocking hocks are fairly frequent.

The Bestuzhev cattle are fairly large and the average weight of 1,171 cows in the Syzran State Breeding Unit was 465 kilograms, while the 1947 mature average on the farms of the Ministry of Sovkhoz was 457 kilograms. Average body dimensions are summarized in Table 224.

TABLE 224. - AVERAGE BODY MEASUREMENTS OF BESTUZHEV CATTLE

	Males	Females		
		Kuibyshev region	Tatar A.S.S.R.	Breed average
Body length (cm)	179	156	157	154
Wither height (cm)	138	131	124	127
Chest girth (cm)	209	181	166	177
Chest depth (cm)	79	70	63	67
Hip width (cm)	54	51	46	49

FUNCTIONAL CHARACTERISTICS

Bestuzhev cattle yield fairly large quantities of milk but there are rather wide variations between herds, depending on the nutritional- and management levels. In 1933/34, the herd of the Syzran State Breeding Unit averaged 2,699 kilograms of milk containing 3.98 percent of butterfat, while the 1959 data for all registered herds varied from 1,040 to 4,100 kilograms. Individual yields up to 10,386 kilograms have been recorded.

BREED ORGANIZATION

In the middle of this century the State Herdbook contained over 1,000 cattle and the District Herdbook over 40,000.

Ukrainian Grey (Grey Steppe)

ORIGIN

The Grey Steppe cattle in the Ukraine are of the same ancient origin as was mentioned for the same breeds of animals in the Balkan countries.

LOCATION, TOPOGRAPHY AND SOILS

These Grey Steppe animals are found in the Ukraine, in the northern Caucasus, as well as in the Volgograd and Rostov regions. In the Ukraine they are also called Cherkass cattle and in the northern Caucasus they are known as Kuban or Black Sea cattle. They are associated with the southern steppes of the U.S.S.R.

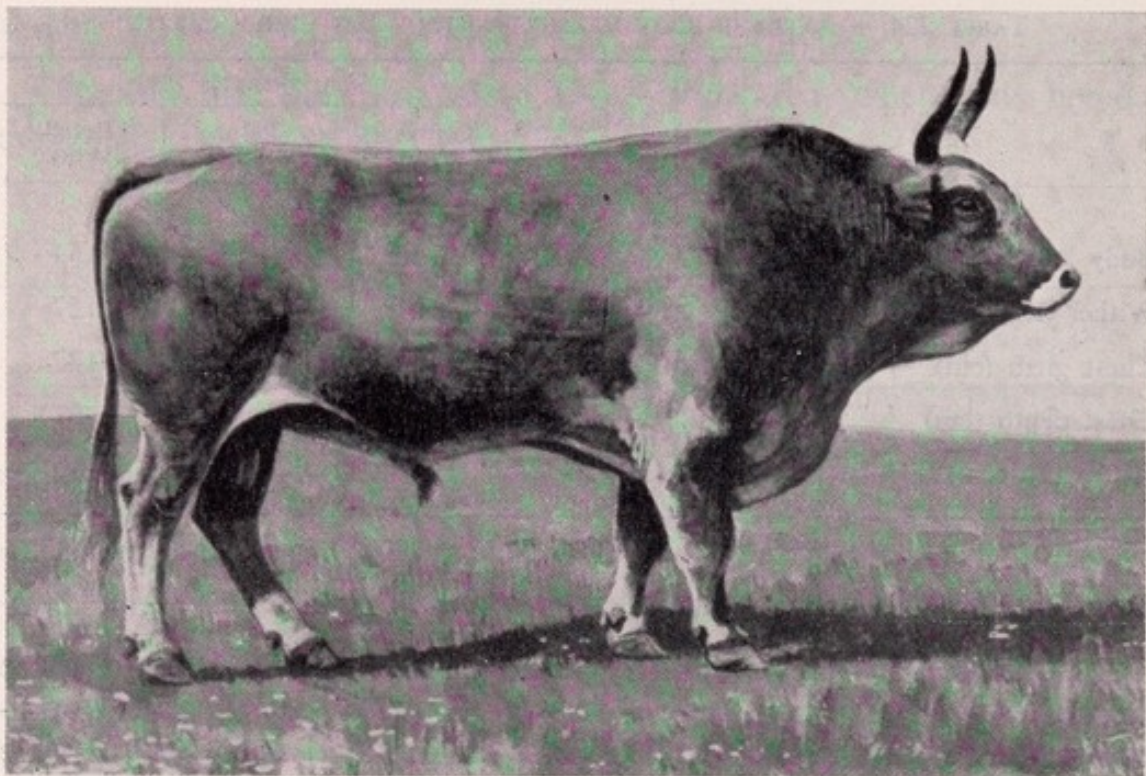


FIGURE 229. — Ukrainian Grey bull.

Courtesy Ministry of Agriculture, Moscow

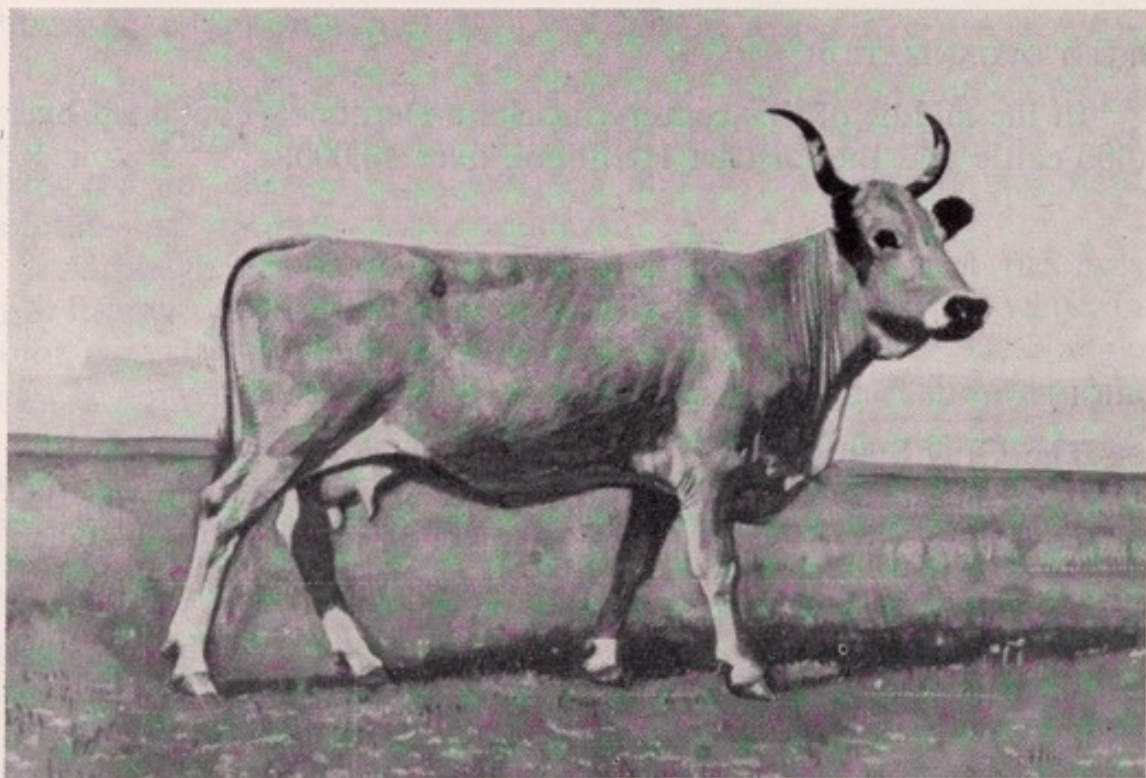


FIGURE 230. — Ukrainian Grey cow.

Courtesy Ministry of Agriculture, Moscow

CLIMATE

The average climatic conditions may be illustrated by data from Rostov, as shown in Table 225.

TABLE 225. — AVERAGE CLIMATIC CONDITIONS FOR UKRAINIAN GREY (GREY STEPPE) CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-6.1	-4.0	1.0	9.0	16.8	20.7	23.7	22.8	16.5	9.8	2.3	-2.5
Rainfall (mm)	32	41	30	38	41	61	52	24	26	34	42	36

FEEDING AND MANAGEMENT

These animals are normally late-maturing but their rate of development and their size are largely determined by the levels of nutrition and management to which they are subjected. They are naturally at pasture from early spring through the summer to late in the autumn. During the winter they may be yarded or housed and fed on hays and straws. Some supplementary feeds must be provided to obtain rapid rates of growth or for milk production.

PHYSICAL CHARACTERS

The medium-thick skin, which is pigmented, is covered with gray hairs of varying shades from silver to black, gray and brown, but generally the lighter shades are most common. The muzzle, body orifices, hooves and tail switch are black.

The head is long and narrow, the profile is straight and the horns are large. The horns are whitish in color but black at the ends and spread outward from the poll, curve forward and sometimes upward.

Heavy forequarters are the natural tendency and still persist in the unimproved triple-purpose animals, although as improvement and selection for milk and meat beasts is progressing, the relative size of the forequarters is being reduced. The withers are narrow and high, the chest is deep and the ribs can be well sprung, or the animal may be flat-sided. The body is long but the upper line can be very variable and low loins or high tail heads are common. The depth at the

flank is good, as is the size of the abdominal organs. The skeleton is large, the legs are long and strong, but the principal defect of many animals is the very poor development of the hindquarters. This automatically reduces the meat-producing potential. The mammary system in the majority of cows is also relatively underdeveloped.

Liveweights and body measurements of Ukrainian Steppe cattle are given in Table 226, from which it is seen that these animals are much larger and nearly double the weight of their Greek counterparts.

TABLE 226. - LIVeweIGHTS AND BODY MEASUREMENTS OF ADULT UKRAINIAN GREY (GREY STEPPE) COWS

Liveweight (kg)	400-500
Body length (cm)	166
Wither height (cm)	131
Chest girth (cm)	185
Chest depth (cm)	69

Bulls under better feeding conditions may weigh over 800 kilograms and specially fed and fattened animals may reach 1,400 to 1,500 kilograms.

FUNCTIONAL CHARACTERISTICS

Ukrainian Grey cattle are normally slow growing and maturing, but much depends on the plane of nutrition. They have justifiably earned a good reputation for hardiness, constitutional vigor and stamina.

For centuries this breed had a milk/meat/work general-purpose objective and often the emphasis was on working ability. Before the introduction of rail and motor transport, they served as the principal transport oxen in the southern U.S.S.R. They are willing, docile, strong, and their stamina allowed them to be worked for long hours. On small peasant holdings they are still used for draft purposes, but with the development of industry, the growth of urban surroundings and the mechanization of agriculture, the demand for working animals has decreased and the emphasis has swung to the need for milk/meat dual-purpose types.

Whereas in 1910 the mature weight of bulls was 400 to 500 kilograms and the milk yield of the best herds was 1,100 to 1,500 kilograms, the average milk yield in 1940 was 2,249 kilograms containing 4.25 percent of butterfat for cows registered in the State Herdbook. This yield, lower than that of Ukrainian Red cattle, is probably due to the lateness of the emphasis placed on dairy propensities. The best cows yield up to 5,000 kilograms with a butterfat content of over 4 percent.

The meat of the Cherkass cattle from the Ukraine was at one time highly appreciated and more recent trends have proven that the Ukrainian Grey cattle surpass the Ukrainian Red and Whitehead breeds as meat producers. When properly fed, they fatten rapidly and carcass yields may then exceed 65 percent. Steers of 615-kilogram liveweight yield carcass weights of 54 percent.

The animals have thick hides which are used for the production of heavy leathers.

BREED ORGANIZATION

The State Herdbook for this breed was opened in 1928 and the state breeding unit in 1935. In 1908, there were 7.5 million of these animals, but due to the changed circumstances only 2.5 million remained in 1912 and the numbers were down to 1.6 million in 1928. Now only small concentrations, 5 to 6 percent, remain in the Ukraine and in these the main emphasis is on milk and beef production.

Hereford

ORIGIN

The Herefords were imported from the United Kingdom between 1928 and 1939, approximately 1,507 being introduced between 1928 and 1932.

LOCATION, TOPOGRAPHY AND SOILS

Hereford cattle have been selected for the Volgograd, Rostov, Saratov and Orenburg regions and for Kazakhstan, where they have been used for improving the beef qualities and rates of maturation of local cattle.

CLIMATE

To indicate the climatic conditions of the Herefords in the U.S.S.R., data from Saratov have been presented in Table 227.

TABLE 227. — AVERAGE CLIMATIC CONDITIONS FOR HEREFORD CATTLE IN THE U.S.S.R.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-11.5	-11.6	-8.1	-1.6	3.4	8.7	12.5	10.7	5.9	-0.3	-6.4	-10.4
Rainfall (mm)	14	20	13	17	27	37	55	48	43	30	30	21

FEEDING AND MANAGEMENT

The animals remain at pasture for the greater part of the year but have to be yarded or housed in the winter months and fed on hays and straws. To get higher rates of growth, concentrate feeding is necessary, both on pasture and in yards. In the Orenburg region, pasture-fattening on sown, improved pastures allowed the use of concentrates to be eliminated, provided melons and pumpkins were supplied when the pastures were dried up in the summer and in the autumn.

PHYSICAL CHARACTERS

Reference to p. 141 of Vol. I will give the description of Hereford cattle.

Table 228 gives data on liveweights and body measurements.

TABLE 228. — AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF ADULT HEREFORD CATTLE IN THE U.S.S.R.

	Males			Females		
	1 year	2 years	Mature	1 year	2 years	Mature
Liveweight (kg)	328	484	766	283	469	615
Body length (cm)	—	163	179	—	—	—
Wither height (cm)	—	122	131	—	123	126
Chest girth (cm)	—	182	209	—	186	200
Chest depth (cm)	—	65	76	—	66	72
Hip width (cm)	—	44	50	—	45	49

FUNCTIONAL CHARACTERISTICS

Herefords are used largely for crossing with Kalmyk and Kirgiz local breeds.

These crossbred animals have growth rates similar to those of the purebreds, although the latter are superior in carcass quality and the amount of fat in the carcass. Carcass yields of up to 60 percent are obtained from the crossbreds and the tenderness of the meat is considerably better than that of the indigenous breeds.

Shorthorn

ORIGIN

Beef Shorthorns were first brought to the U.S.S.R. from the United Kingdom in the second half of the nineteenth century, but the most significant importations took place between 1928 and 1933 when 1,000 head were introduced.

LOCATION, TOPOGRAPHY AND SOILS

The imported animals were placed on sovkhozes in the southeastern regions, mainly in Rostov, Volgograd and neighboring regions, but also in the Chelyabinsk region. The imported sires and their progeny from the Kurgan Breeding Sovkhoz were widely used for crossbreeding purposes with the local cattle. During the second world war, many of these animals were destroyed and, at the 1945 census, the main centers of distribution were in the Rostov, Orenburg, Kurgan and Tyumen regions.

CLIMATE

The climatic conditions in which these crosses have developed may be typified by the data presented in Table 229.

TABLE 229. - AVERAGE CLIMATIC CONDITIONS FOR SHORTHORN CATTLE IN THE U.S.S.R.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-8.2	-7.4	-1.1	8.4	15.9	20.1	22.3	21.6	15.8	8.3	1.6	-4.5
Rainfall (mm)	21	17	21	25	43	55	48	36	25	27	31	24

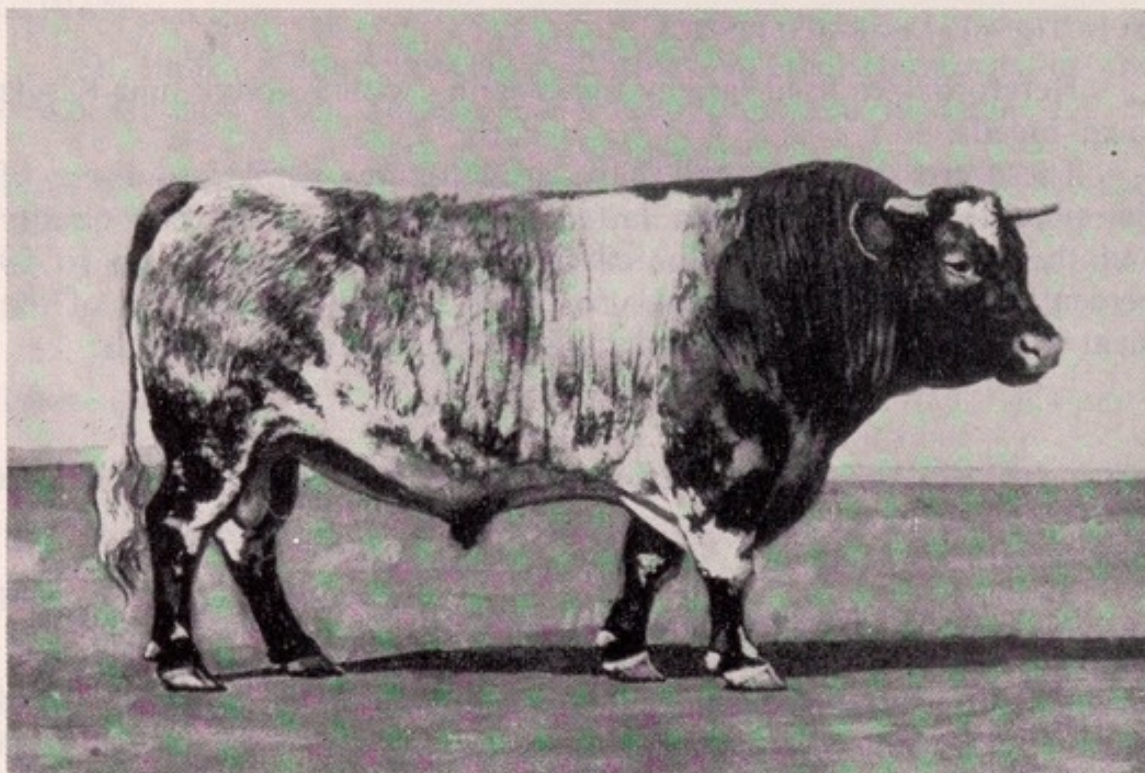


FIGURE 231. — Shorthorn bull.

Courtesy Ministry of Agriculture, Moscow

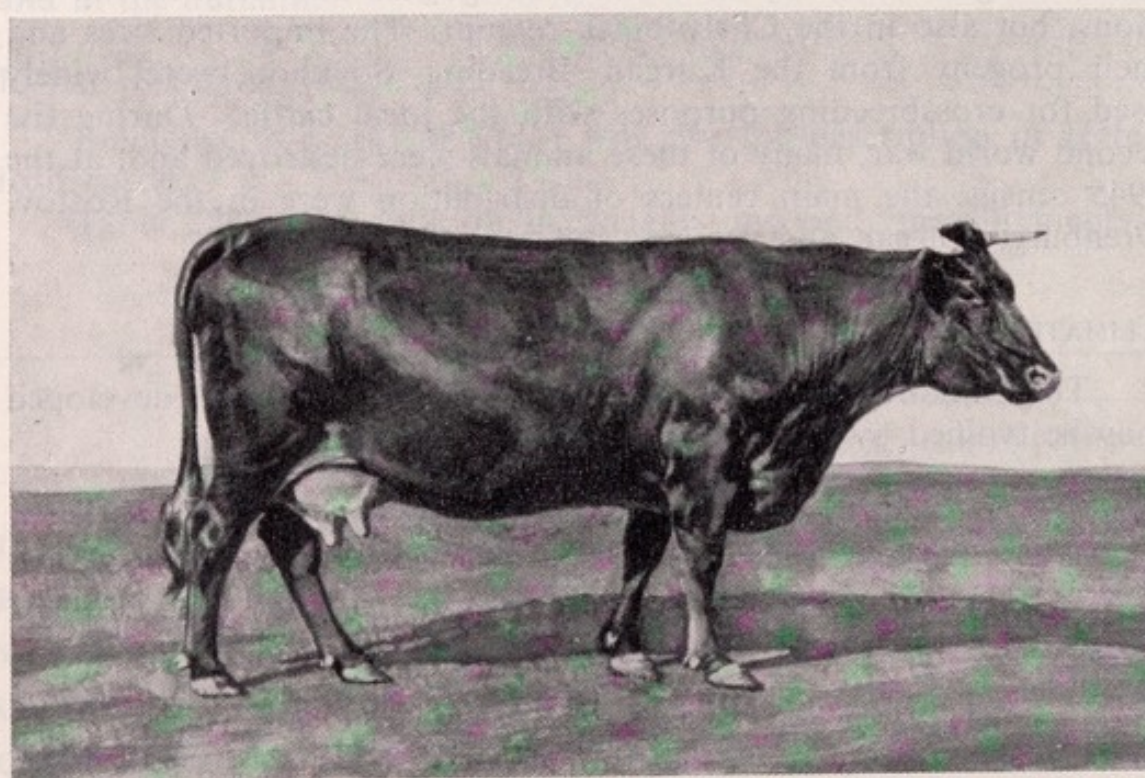


FIGURE 232. — Shorthorn cow.

Courtesy Ministry of Agriculture, Moscow

FEEDING AND MANAGEMENT

The conditions described on p. 140 of Vol. I for the Hereford breed also apply to the Shorthorn.

PHYSICAL CHARACTERS

The main physical characters described on p. 141 of Vol. I apply equally to the purebred Shorthorns in the U.S.S.R. The rates of growth in the Salsk Breeding Sovkhoz are very similar to those recorded in the United Kingdom. Many crosses were made with Kalmyk cattle, while crosses with Siberian cattle have developed into the new Kurgan breed. Table 230 gives data of the weights of Kalmyk, Shorthorn and grade cattle.

TABLE 230. - AVERAGE LIVeweIGHTS OF SHORTHORN, KALMYK AND CROSSBRED CATTLE

Age	Pure Shorthorn	Pure Kalmyk	Shorthorn × Kalmyk
Birth	30	23	24
6 months	160	139	142
12 "	255	216	228
24 "	436	337	366
36 "	—	396	450
48 "	—	421	472

FUNCTIONAL CHARACTERISTICS

The growth rate naturally depends on the level of nutrition and the data in Table 231 illustrate this.

TABLE 231. - AVERAGE LIVeweIGHTS OF KALMYK AND KALMYK × SHORTHORN CROSSBRED BULLS

	1 year		2 years	
	Kalmyk	Crossbreds	Kalmyk	Crossbreds
 Kilograms			
Fed without concentrates	158	212	339	395
Average feeding	228	283	370	456
Intensive feeding	236	309	—	—

Slaughter yields of fattened Shorthorn \times Kalmyk steers taken from pastures gave the out-turns as shown in Table 232.

TABLE 232. - SLAUGHTER YIELDS OF SHORTHORN \times KALMYK STEERS

Age	Liveweight	Carcase
	<i>Kilograms</i>	<i>Percentage</i>
12-18 months	360	60.5
21-30 months	397	65.8

Attention in the European U.S.S.R. is concentrated on the use of Beef Shorthorns. Table 233 gives data on the 300-day milk yields recorded at the Salsk Breeding Sovkhoz.

TABLE 233. - AVERAGE LACTATION RECORDS OF SHORTHORN \times KALMYK COWS

	Milk		Fat
	Normal conditions	Intensive conditions	
	<i>Kilograms</i>		<i>Percentage</i>
1st lactation	2 165	2 481	—
2nd lactation	2 478	3 056	3.96
3rd lactation and over	2 787	3 618	—

The maximum yields of these crossbred cattle are approximately 6,000 kilograms.

Aberdeen Angus

ORIGIN

Aberdeen Angus imported before the 1917 revolution left no trace behind them and further small trials began in 1932.

LOCATION, TOPOGRAPHY AND SOILS

The animals were introduced into the Volgograd and Rostov regions.

CLIMATE

The climatic conditions of Volgograd, given in Table 234, indicate the environment into which the Aberdeen Angus and their crossbreds have developed.

TABLE 234. — AVERAGE CLIMATIC CONDITIONS FOR ABERDEEN ANGUS CATTLE IN THE U.S.S.R.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept	Oct.	Nov.	Dec.
Temperature (°C)	-9.9	-7.8	-2.4	7.8	17.0	21.7	24.7	22.9	16.0	8.0	0.0	-5.8
Rainfall (mm)	32	31	21	21	31	45	31	22	30	27	38	41

FEEDING AND MANAGEMENT

The conditions mentioned on p. 104 of Vol. I apply.

PHYSICAL CHARACTERS

The purebred animals conform to the description given on p. 104 of Vol. I.

FUNCTIONAL CHARACTERISTICS

In the comparatively dry conditions of the Salsk Steppes, the Aberdeen Angus cattle reached somewhat lower weights than in their homeland. A milk yield of 2,500 kilograms was obtained for cows in the Salsk Experiment Station.

Kalmyk
(Red Astrakhan)

ORIGIN

The origin of these cattle has not been fully determined. According to Sivchik, they represent an ancient Asiatic breed, whose center of development may have been Dzhungaria in Mongolia.

LOCATION, TOPOGRAPHY AND SOILS

The Kalmyk nomads brought these cattle to southern Siberia, the Urals, the lower reaches of the Volga, the Caspian plain and to

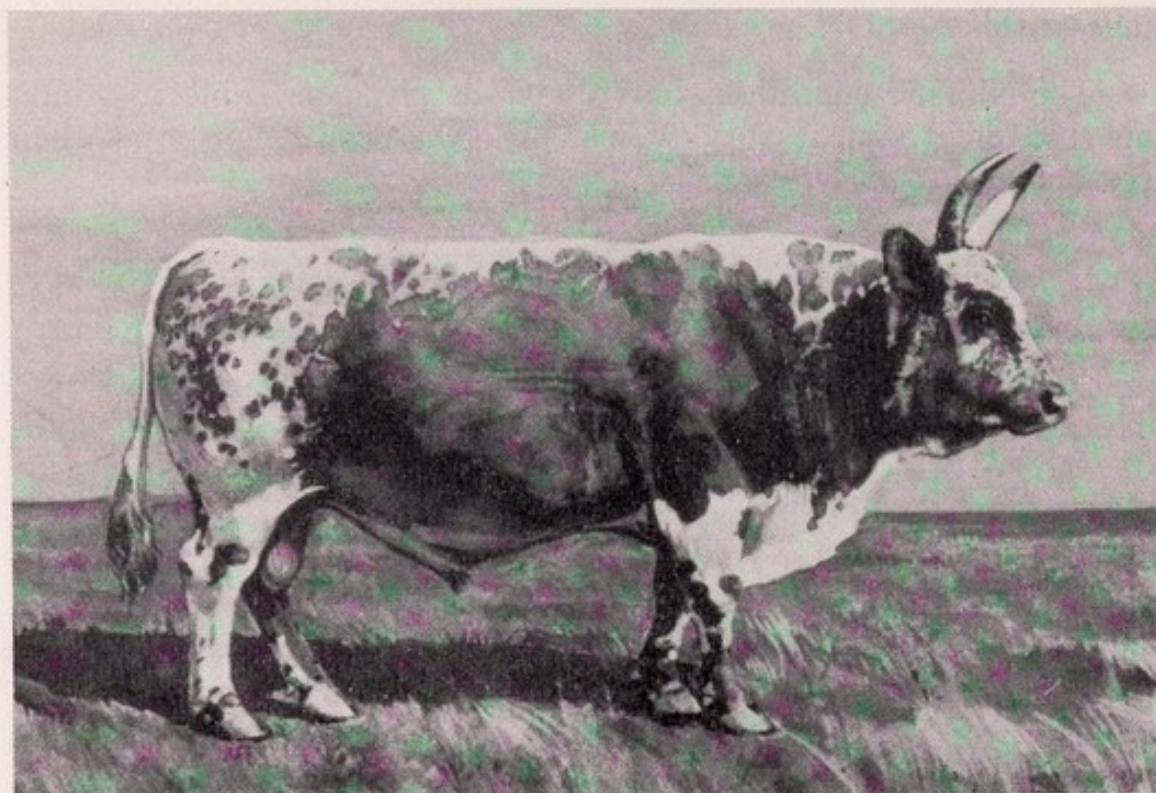


FIGURE 233. — Kalmyk bull.

Courtesy Ministry of Agriculture, Moscow

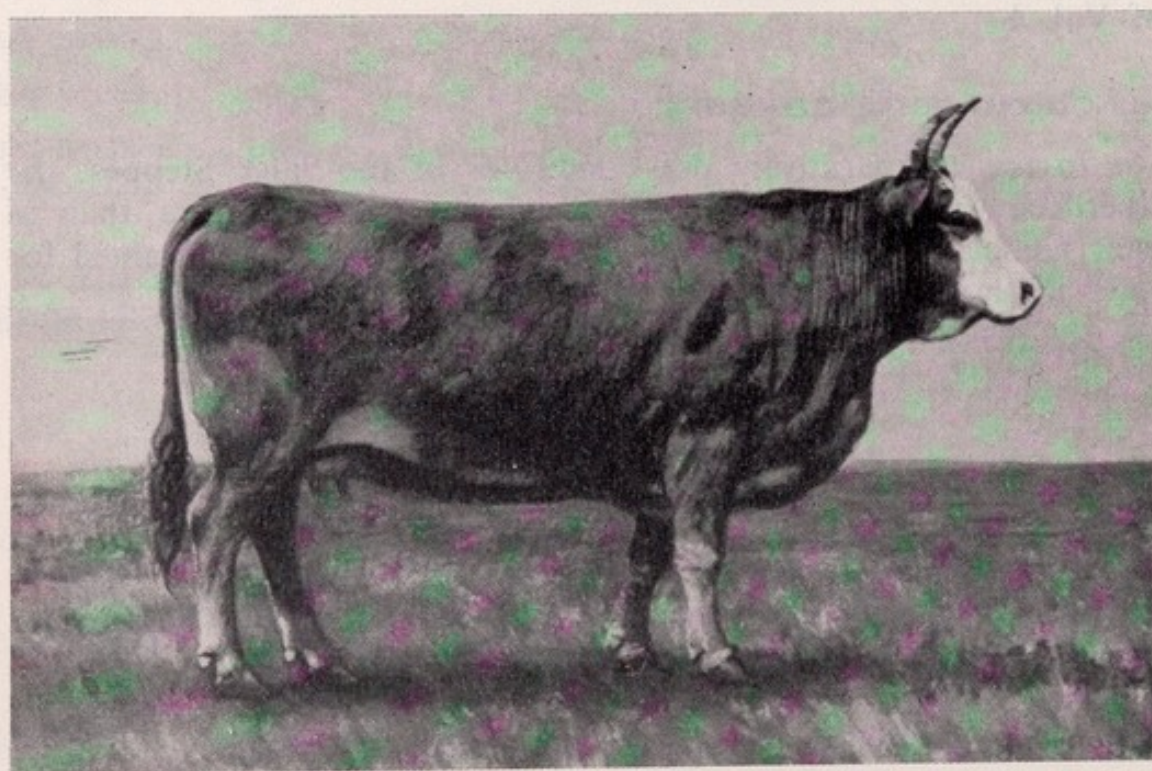


FIGURE 234. — Kalmyk cow.

Courtesy Ministry of Agriculture, Moscow

the shores of the Don. They are found in the Voronezh, Rostov, Volgograd, Astrakhan and Grozny regions and in the Stavropol and Krasnodar Territories.

CLIMATE

The climatic conditions in Table 235 refer to Voronezh, which may be taken as representative of the area of these animals in the European U.S.S.R.

TABLE 235. - AVERAGE CLIMATIC CONDITIONS FOR KALMYK CATTLE

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Temperature (°C)	-9.8	-8.3	-3.6	5.8	14.6	18.4	20.6	18.7	12.6	5.7	-1.3	-6.6
Rainfall (mm)	34	27	31	36	46	59	57	50	29	37	38	34

FEEDING AND MANAGEMENT

The normal method is for these animals to be on pasture the year round, and they are often forced to search for feed beneath the snow. This leads to a sharply alternating stage of rapid growth and fattening, followed by subsistence during the winter. It certainly eliminated the weaker and less adaptable animals over the centuries to leave a breed capable of living in harmony with the environment. Although higher feeding standards are applied in the state breeding units, there is no attempt to raise the levels so high that the stock produced would not be able to adapt to the conditions in the sovkhoses and the normal range environment.

PHYSICAL CHARACTERS

The loose skin is of medium thickness and is covered with soft, long red hair of various shades from red to red-brown and to ginger. White spots may occur on the head, belly, tail brush, udder and legs, while often the head is completely white. The external mucous membranes are flesh colored.

The head is comparatively short, wide in the forehead and straight in profile. There is no crested poll, and the horns pass outward and upward in a gentle curve. Some also curve forward at the ends, while others may curve backward. They are yellowish white in color.

The topline is fairly level but may dip at the loins. Some of the larger animals have deep and wide bodies with a good degree of muscular development but normally the flesh covering is not highly developed. The abdominal capacity is large, and the ribs may be well sprung. A high percentage of the carcass weight is concentrated in the fore-end, although good feeding permits the hindquarters to become well fleshed. Table 236 gives data on liveweights and body measurements of the Kalmyk breed.

TABLE 236. — AVERAGE LIVeweIGHTS AND BODY MEASUREMENTS OF KALMYK CATTLE

	Shephov Sovkhoz (155 cows)	"Revoliut- sionnyi put" Sovkhoz (186 cows)	1939 Exhibition	
			Males	Females
Liveweight (kg)	450	—	860	445-635
Body length (cm)	146	138	177	159
Wither height (cm)	122	122	147	133
Chest girth (cm)	175	177	227	193
Chest depth (cm)	66	64	80	72
Hip width (cm)	47	47	64	55

Calves weigh 28 kilograms at birth.

FUNCTIONAL CHARACTERISTICS

Kalmyk cattle are the best indigenous beef breed in the U.S.S.R. and they also produce a good medium-weight hide. With liberal feeding, males will weigh 525 kilograms and heifers 440 kilograms at 27 to 28 months of age. Carcass yields are around 50 to 60 percent depending on their condition at slaughter. In more recent years, attention has been devoted to fattening for slaughter and the intensification of beef production.

Milk productivity is around 1,500 to 2,000 kilograms but selected show animals yield from 2,300 to 3,400 kilograms of milk containing slightly more than 4 percent of butterfat.

BREED ORGANIZATION

Breeding work for the Kalmyk is not highly organized but attention is now being devoted to the selection of improved beef strains and their propagation.

5. ADAPTABILITY OF EUROPEAN CATTLE BREEDS TO FOREIGN ENVIRONMENTS

General observations

Certain breeds of European cattle have for long established reputations for the level and the efficiency of their milk and/or meat productivities. As a consequence of this early recognition of these characteristics, there developed an increasing demand for such superior stock to supply other areas of the world, where these high levels of productivity did not exist but were required. Their world wide distribution was further expedited by the fact that, in recent centuries, many Europeans traveled overseas and settled in new countries. The latter were often so disappointed in the productive performances of local cattle that automatically they sought to improve them by introducing breeds with which they were familiar and which were noted for their economic productivities in the regions from which the settlers had emigrated. As a result, European breeds of cattle have been introduced into many parts of the world, either for pure breeding or for improving indigenous animals by a grading-up policy.

When the environmental and feeding conditions in these new areas resembled those in the homeland of the breed, such introductions were very successful as, for example, the introduction of European cattle to North America or New Zealand. In other areas, particularly in the tropics and subtropics, much more variable results have been encountered and sometimes complete failures have been recorded. These experiences have led to the realization that there is an important adaptability character involved. In many cases, certain individuals were capable of adaptation while the great majority of the introduced stock were incapable of doing so under the conditions to which they were exposed. In this context, the term "adaptability" refers to the ability of individual animals, or a group of animals, to adjust themselves with a minimum change in character and productivity to an environment which is different from that in which they were evolved. The term "environment" refers to the whole

complex of factors affecting growth and productivity and includes climatic stresses, nutritional planes, housing, methods of handling and management, as well as resistance to new types of diseases and parasites. Climate is frequently considered the dominating environmental characteristic affecting adaptability because, apart from its direct influence on the animal, it exerts an indirect control through its interactions with the growth of fodder and grain crops, the availability of drinking water, the prevalence of diseases and parasites, the seasonality of varying nutritional levels, the concentration of large numbers of animals around permanent water supplies and the necessity for nomadism.

It is generally inferred that a given "breed" of cattle is adapted to the particular environment in which it has developed because, over many generations, natural selection would have eliminated the unadapted and concentrated those genotypes which could exist in harmony with the local conditions. Such a generalization has but a limited application, due to the fact that man is continuously interfering with and changing the environmental complexes. Sometimes this results in more favorable conditions and the better producers are thereby encouraged but, probably more frequently, overgrazing, mismanagement and agricultural cupidities cause degenerative changes in the nutritional field and then the more adapted stock are those with lower productive potentials. The advent of the tractor has also caused serious reductions in the emphasis placed on working potentials, while the growth of urban populations, their greater purchasing powers, and a rising standard of living have swung the demand away from work types toward milk or milk- and beef-producing animals. These variations in requirements and the extent to which they have been met illustrate the wide gene combinations in certain cattle breeds and the possibilities of selecting, from the main population, those individuals and strains which more nearly meet the current demands of their owners. In other cases, the opportunities for doing this are more restricted and there have been many examples quoted, in the earlier descriptions of the European breeds, indicating decreases in numbers and popularity of certain breeds. In other instances, a breed which cannot quickly be changed to meet the new economic requirements has been graded up to more productive types such as the Friesian, Brown Swiss or other breeds.

Although these changes and limitations have been mentioned in the earlier chapters for Europe, they are still occurring with even greater frequency when European animals are crossed with indigenous populations in other continents. Because certain European breeds have retained a good measure of inherent variability in the home

environment, they have retained an ability to adjust to very different environments and this has permitted their wide distribution throughout the world.

Despite the fact that all breeds retain some ability to adapt to changed environments, certain morphological and physiological traits are recognized as affecting adaptability. A breed with an ample body size and the ability to produce large volumes of milk is not suited to an environment where the essential nutrients are limited. In such areas, a smaller-sized breed with a lower milk output would be expected to adapt more readily. Recent research in animal climatology and environmental physiology has tended to improve the understanding of the physiological mechanisms of adaptation and the possibilities for providing varying combinations of conditions, housing and management which will permit certain breeds to function economically, and without the degenerative breakdowns which so frequently disrupted earlier attempts to introduce such animals into less favorable and new environments.

Until fairly recently, it was generally assumed that European cattle were unable to adapt themselves to tropical conditions and that they would almost inevitably degenerate in a few generations, if they survived at all. This "tropical degeneration" is now recognized as due to a combination of poor nutrition, poor housing and management, and to the debilitating effects of diseases and parasites, acting in combination with the adverse effects of climate. Proper attention to these factors has enabled European cattle to be introduced into areas where their effective use had previously been thought to be impossible. In effect, unfavorable environments can be modified so that European animals or their crosses can be introduced successfully. The costs of such modifications may be economically prohibitive and, in certain cases, it has been found to be more economical to introduce animals of tropically adapted breeds and to improve the environment to the level necessary for such lower productive cattle to achieve optimal rates. In such cases, it may cost less to produce a liter of milk from locally adapted animals, with a ceiling of 2,000 liters per year, than to introduce European stock, with a capacity of 4,000 liters per year, and install the costly measures necessary to protect them from the environment.

In general, cattle originating in northern Europe adapt most readily to cold environments and this is well illustrated by the successful introduction of cattle from these areas into North America and Oceania, where climatic conditions are similar to those in their homelands. Often, however, such cattle are introduced into the much hotter regions of the world or to areas where the heat is consider-

ably higher than that to which they are accustomed for at least part of the year. For these hotter regions, indigenous types of stock, such as the zebu, are adapted but often produce at low rates. The physiological and morphological differences between tropically adapted zebras and certain European evolved breeds are still incompletely understood. It is, however, clear that a major part of the observed differences in "heat tolerance" can be attributed to differences in the internal heat accumulations of the animals. This does not exclude the assimilation and dissipation of the tremendous solar energy uptakes. Because European cattle are fast-growing and produce large amounts of milk, they normally tend to consume greater quantities of feed and to exhibit higher basal metabolic rates than zebu cattle. Such traits are physiologically interrelated and contribute to the production of greater quantities of body heat. In hot environments, the elimination of the additional heat load becomes a problem and consequently those animals which produce the greater quantities of internal heat are at a disadvantage. Unfortunately, high levels of internal heat production are inevitably associated with the greater quantities of milk production and the natural reaction of the cow to this resulting distress is to consume less, so that her productive output is diminished. For this reason, there are many examples of lower milk yields being recorded in the tropics than would be anticipated from the same cows in temperate areas.

There is also considerable individual variation in cattle in their ability to maintain heat balance and in their powers of heat tolerance. Characters such as the insulating qualities and the reflectivity of their coats, sweating ability, and surface area per unit of body weight vary appreciably, but it is not possible here to discuss all the factors involved in climatic adaptability, and interested readers should refer for additional information to treatises specifically dealing with this subject.

The important point for the purposes of this publication is to draw attention to the differences within and between European breeds in their adaptability to both hot and cold climates. The reasons for these differences are not completely understood, but included in these are factors such as body size and conformational features, levels of milk production, the variations in skin and coat characteristics and in metabolism.

Modern methods of transportation make it possible to move cattle easily and quickly from one part of the world to another. This rapidity of movement subjects the animals to significant changes in environmental factors, particularly climate, without allowing the animals any opportunity for a gradual physiological adjustment.

Experimental data have indicated that it takes about two months to achieve a physiological adaptation to a change from a cool to a hot environment, and that during this interval the animals may be under severe physiological stress. If to such stresses are added, simultaneously, fundamental changes in the nature of the diet and management, additional strains due to lactation and/or gestation, and the animals have to combat new diseases and parasites for which their resistance is not always sufficiently developed, the net result may be disastrous. Consequently, when animals are moved from temperate to tropical climates, certain precautions must be taken to minimize the stresses to which they are exposed. Some of these are mentioned below.

1. Transfer the animals at the time of the year when the climatic differences are minimal.
2. Immunize the stock against as many as possible of the diseases which they will encounter in their new homes and in time to allow the animals to recover from any untoward effects of the immunizations.
3. Avoid movements of young calves (which have less ability to adapt), lactating cows or females in the later stages of pregnancy.
4. Provide proper feed, water, sanitation, ventilation, etc., during transportation.
5. Segregate the stock, as far as is possible, during the first few months in their new environment, from contacts with other animals or sources of infection.

These are not all the factors involved but they serve to indicate some of the more critical ones, as well as the wide range of safeguards that must be taken.

Distribution of European breeds outside their countries of origin

The European breeds, which have successfully been distributed over large areas of the world, originate from a relatively narrow zone between 46° to 58° north of the equator. They have been transported to regions both north, south, east and west within Europe, to North and Latin America, to Africa, Australasia and Asiatic countries. The northern limits of distribution are naturally determined by the conditions for crop and herbage production rather than by the direct effects of low temperatures (which can be countered by appropriate housing). In the Scandinavian countries, Finland and the U.S.S.R., cattle are maintained north of the Arctic Circle. They

have spread to the western seaboard of Europe, eastward to the U.S.S.R. and southward to the Mediterranean littoral. The Friesians, Brown Swiss and Jersey cattle, for example, have become widely dispersed in the Scandinavian countries, the British Isles, and throughout Europe. These and other milk breeds such as the Guernsey, Ayrshire and Dairy Shorthorn have been widely spread in other continents, and beef breeds such as the Aberdeen Angus, Hereford and Galloway have also achieved a very wide distribution both north and south of the equator. Many authorities consider the best example of the adaptation to, and further improvement within, a foreign environment is provided by the Friesian in Israel.

The main centers in Europe from which extensive shipments of breeding animals have occurred during and since the nineteenth century are the United Kingdom, the Netherlands, the northwest of the Federal Republic of Germany, Switzerland and the eastern Alpine areas. More recently, the French Normandy and Charolais and the Red Danish breeds have been increasingly disseminated outside and within Europe. A brief survey of the distribution of the more important breeds is presented later, together with some comments on their adaptability to foreign environments. Often, however, the dominance of one or other breed in a given overseas area does not indicate genetic or physiological superiority over other breeds, because the preferences and prejudices of the various farming communities have often determined the breeds which were multiplied, or shortages of foreign currency have forced many farmers to purchase stock which were already available locally.

Sometimes the European breed has been bred pure and resembles the same breed in its original home. In other cases, as the consequence of selection within the new environment, strains have been developed with their own particular variations which clearly distinguish them from the cattle of the same breed in their native home. In other cases, the European animals have been crossed with indigenous stock and the latter have been graded up to the purebred but show certain conformational variations which distinguish them from their purebred ancestors. Many attempts have been made to grade up local stock to European breeds but the higher grades have broken down constitutionally and so the objective was changed to the fixation of intermediate levels, say a $\frac{3}{8} \times \frac{5}{8}$ crossbred. The Santa Gertrudis ($\frac{5}{8}$ Shorthorn) is perhaps the most outstanding of such crossbreds. In other cases, the local cows have been bred up successively to a number of western European breeds and a new type of animal has ultimately been evolved from the descendants of these heterogenous crossbreds.

British breeds established overseas**SHORTHORN**

This was the first British breed to be exported in quantity and regularly to Europe as well as to other parts of the world. In Europe they were used mainly for crossbreeding purposes to improve native stock and in the formation of new breeds, although limited numbers of purebreds are still found in Denmark, northwestern Germany and the U.S.S.R. The Shorthorn breed is also well established in the United States, Canada, parts of South America and is the dominant breed in Argentina. Large numbers are also found in Australia, and it has been established in New Zealand, the southern countries of Africa, the United Arab Republic and Japan. The Beef Shorthorn seems to be maintaining its popularity better than the dairy type but this can be readily understood, since the Dairy Shorthorn does not now occupy the pre-eminent position that it held 50 to 100 years ago.

Shorthorns were first introduced to the United States in 1783 and large imports followed during the 1820-50 period. The breed is distributed most extensively in the Corn Belt, but it has also been used for crossbreeding purposes on the western rangelands. In Canada, the Shorthorn is the third most numerous breed insofar as numbers of Herdbook registrations are concerned.

In Australia and New Zealand, the Dairy Shorthorn has become popular, and the beef type is also well represented in Australia and is second in numbers only to the Hereford. A cross between the Dairy Shorthorn and the Ayrshire has been developed in southeastern Australia and is known as the Illawarra Shorthorn. Selection, after the early crossings, has been for milk production and a Dairy Shorthorn conformation. In 1949, about 25 percent of the total dairy stock in Australia belonged to this breed. Milking Shorthorns have been exported from Australia and New Zealand to the Fiji Islands.

HEREFORD

The Hereford breed has not been firmly established as a pure breed in any European area outside the British Isles, but it is now being used in several countries in crossbreeding programs to improve the carcass quality of surplus offspring from dairy cows. In the U.S.S.R., the Herefords have been utilized in the elaboration of new breeds.

In Canada and the United States, Herefords are still the most important beef breed. Imports to the United States started in 1817

and continued until the beginning of this century and a Breeders' Association was formed in 1881. Briggs (1949) says about the Hereford in the United States : "It stands the heat and drought conditions of many semi-arid regions during much of the year, and in the winter seems to be able to take the cold of the more exposed range. Herefords are unexcelled as grazing animals which makes them greatly admired by the range men. They have ability to walk great distances to water and to distribute themselves generally over the area available. Their rustling ability is unsurpassed by the other beef breeds." As with all breeds, the Hereford has certain disadvantages and it is often found that some cows do not give enough milk to support their calves properly and that an entirely white head, which has been favored by some breeders, may be associated with eye cancer in regions with intense sunlight.

As mentioned earlier, selection for a more blocky conformation has resulted in a concentration of a partially recessive gene which has become a complicating issue in certain American herds.

ABERDEEN ANGUS

The Aberdeen Angus, like the Hereford, has been used in recent years in Europe principally for crossbreeding purposes to improve the carcass quality of the offspring of dairy cows. Imports to Canada and the United States started about the middle of the nineteenth century and a Breeders' Association was founded in the United States in 1883. The breed is now well established in both countries and is the second most important beef breed in the United States and the third in Canada. The Aberdeen Angus cannot compete with the Hereford under range conditions but it has a good reputation for early maturity when raised under ordinary farm conditions. It has gained in popularity, during recent years, in the hot-humid Southeastern United States, where it is used for crossbreeding with the Brahman to produce a type of crossbreed known as the Brangus. The Aberdeen Angus is also found in South America, Australia, New Zealand, South Africa and Japan.

Other British beef breeds

The Devon, Galloway and Highland cattle breeds have been established in North and South America, Oceania and in South Africa, but in relatively small numbers. The same is true of some dual-purpose breeds (i.e., the Red Poll).

AYRSHIRE

The Ayrshire is an important breed in Finland, and the Red and White cattle in Sweden and Norway are partly founded on imported Scottish Ayrshires. In the U.S.S.R., imported Ayrshires have played a part in the formation of certain new national breeds.

In Canada and the United States, Ayrshires form some 10 percent of the total number of registered dairy cattle. In the United States, the breed is most numerous in the Northern States, but according to Briggs (1949), it has also done well in the hot and dry sections of the Southwestern States. From Queensland, Australia, it is reported that the breed is moderately well adapted to the temperate climates of the state. In New Zealand, probably about 5 percent of the total dairy stock belong to this breed. It has also been imported into South Africa and Japan.

JERSEY

The Jersey breed has attained a wider distribution than any other British dairy breed. In Denmark, it has enjoyed an increasing measure of popularity and some very high production yields have been recorded. The number of Jersey cattle in Sweden is small but they have shown a good adaptability. In France and Italy, there are small populations of Jersey cattle and, in several Balkan states, Hungary, Germany, Poland and the U.S.S.R., the Jerseys are used in crosses with national breeds.

In Canada, there are approximately as many Jerseys as Ayrshires and, in the United States, the Jersey is the second most important dairy breed, followed closely by the Guernsey. The first Jerseys were brought to the United States in about 1815, and a Breeders' Association was founded in 1868. The Jersey cattle have been particularly appreciated in the Southern States, where they are considered to be more heat-tolerant than any of the other dairy breeds. During recent years, in this area, they have been losing popularity to the Holstein-Friesian, chiefly because of the increasing emphasis being placed on the sale of fluid milk and the lower demand for fat-rich milks.

The Jersey is the most important dairy breed in Australia and, in New Zealand, the purebreds and grades constitute up to 80 to 90 percent of the total dairy herd.

The breed has adapted well both to the favorable environment of New Zealand and to the tropical and subtropical areas of Queensland, where the climatic conditions are more exacting. Research studies on identical twins, reared in New Zealand and Fiji, showed

that the most marked effect of the tropical environment was a reduction in the fat percentage of the milk but that there was also considerable variation in milk yields between animals,¹ suggesting that there were possibilities of genetic differences between individuals in adaptability to tropical conditions. Jerseys have also been crossed with Indian zebu in Jamaica to form a new breed known as the "Hope Jersey," which was reported to have advantages over the pure Jersey under the conditions on that island. Recently this new strain has been bred to Friesian bulls to increase its milk yield.

The Jersey has generally been regarded as the most adaptable of the European dairy breeds to tropical environments. It is unquestionably a hardy animal and its small size has probably given it an advantage in areas where nutrition was a limiting factor but, as in other breeds, there are certain individuals in the northern herds of this breed which still retain the ability to adapt to hot environments (probably not more than 10 percent) and, if these can be identified, they and their progeny have distinct possibilities for extension in tropical regions.

GUERNSEY

Exportation of Guernsey cattle to North America began during the mid-nineteenth century and a Guernsey Cattle Club was inaugurated in the United States in 1877. The early introductions of this breed were relatively few in number and the largest numbers were imported to North America early in the twentieth century. The Guernsey was thus effectively introduced later than the Jersey and Friesian but has grown in importance rapidly and is now one of the major dairy breeds in both Canada and the United States.

The Guernsey has also been established in most countries of Central and South America as well as in Australia and New Zealand. It has shown an ability to adapt well to both warm and cool climates, provided suitable feeding and management are secured.

Lowland cattle from the Netherlands and northwestern Germany

The Friesian cattle in Great Britain and overseas are founded on Dutch stock, whereas the corresponding breeds in the Federal Republic of Germany and also in Eastern Germany and Poland originate mainly from East Friesland in the northwest of the Federal Republic. The Friesians are widely distributed in most other European countries and are founded on both Dutch and

German stock. At the present time, there are greater differences in color and conformation between the Holstein-Friesians in North America and the Friesian cattle in the Netherlands than between the latter and the German Friesians (*Deutsche Schwarzbunte*). With regard to adaptability to foreign environments, the Friesian (or Black and White Lowland) cattle may be considered as one breed, irrespective of the country of origin, and the term Friesian cattle may therefore be used for all local varieties.

In Europe and North America, the Friesian has become the dominating dairy breed of this century. In England and Wales, more than 50 percent of the total number of dairy cows belong to this breed, in Scotland about 20 percent, in Sweden and Denmark 18 percent, in Luxembourg 70 percent, in Eastern Germany and Poland about 85 percent, in France and Italy about 15 percent of the total cattle stock, in Spain 10 percent and in Portugal 22 percent. It is an important dairy breed in the U.S.S.R. and has been used there extensively for the improvement of native breeds. It is also found in Hungary, Austria and some of the Balkan states.

In Canada and the United States, the Holstein-Friesian is the leading dairy breed. The first imports of Dutch cattle to the United States were made by Dutch settlers in the first part of the seventeenth century, but the real beginning of the Holstein-Friesian breed, however, dates back to the middle of the nineteenth century. A Breeders' Association for Holstein cattle was formed in 1871 and another for Dutch Friesian cattle in 1877. The two groups merged in 1885 to form the Holstein-Friesian Association of America. Nobody seems to know why the breed was first called Holstein, because there are no records of importations of breeding stock from that part of Germany. The breed was formerly concentrated primarily in the northern part of the United States but, during the post-second world war period, its popularity in the South and West have increased, so that it is now the predominant breed in almost the whole of the United States.

The Holstein-Friesian cattle of the United States and Canada have been bred for dairy rather than for dual-purpose production, which has characterized developments in the Netherlands and Germany. They are thus more angular and less meaty than the European strains of Friesian cattle.

Friesian cattle are found in many Central and South American states. The breeding of these cattle has been emphasized particularly in Argentina and in Chile and they are assuming increasing importance in Colombia and Venezuela. The breed is also well established in Australia, New Zealand, South Africa and Japan. Small num-

bers have been introduced into Indonesia, India and other South-east Asian states.

The best example of the successful adaptation of Friesian cattle to a warm climate is provided by Israel, where much of the country is characterized by a hot summer climate. The national herd now consists of approximately 68,000 milking cows, mainly of Dutch Friesian or Holstein-Friesian origin and their descendants. They were developed through a series of upgradings of local or Syrian cattle. The average yearly production of cows in milk recorded herds (about 25 percent of the total) in 1959/60 was 5,658 kilograms of milk and 193 kilograms of butterfat. Production levels are continuing to increase steadily. The outstanding success of the Friesian breed under the difficult climatic conditions of Israel must be attributed to the extremely high levels of feeding and management and to the close attention being paid to housing and disease control. Friesian cattle are also being introduced in the United Arab Republic and several other countries of the Near East.

The Red and White Lowland cattle (Meuse-Rhine-Ijssel and Deutsche Rotbunde) are found in several countries of continental Europe but have not been used extensively overseas.

Mountain cattle of Switzerland, Austria and Germany

The Simmental and Brown Swiss cattle (Braunvieh) of the Alpine areas have been imported into the southern parts of Europe, mainly in a belt between 40° and 45° north of the equator. Switzerland has for a long time been the breeding center of these cattle but, in the Federal Republic of Germany, the Simmental type (Fleckvieh) accounts for 39 percent of the total population and for 46 percent in Austria. The corresponding figures for the Brown cattle in Germany and Austria are 5.6 and 14 percent respectively.

SIMMENTAL

The Simmental has exerted a great influence on cattle breeding in several European countries, in addition to those just mentioned. It is established as a breed in France, Italy, most of the Balkan states and Hungary, while in the southern and central parts of the U.S.S.R., the Simmental and its crossbred progeny are very numerous. Breeding stock have been exported to South America and to North and South Africa, mostly for crossbreeding purposes. The permanent influence on overseas cattle breeding is, however, rather modest.

BROWN SWISS CATTLE

Brown Swiss cattle (Braunvieh) also enjoy a rather wide distribution. The breed has offshoots in France, Italy, Spain, the Balkan states and Hungary and has also been successfully employed in crosses with native breeds in these countries. In the U.S.S.R., the Brown Swiss breed has been extensively used in the formation of new breeds, i.e., the Kostroma and Yurino, and also for pure breeding.

Imports of Brown Swiss to the United States started in 1869 and a Breeders' Association was formed in 1880. It is now the fifth in importance of the dairy breeds in the United States. The Brown Swiss breed is also represented in Canada in small numbers.

The breed is established in several Central and South American countries, for example, Argentina, Venezuela and Peru, where it has proved its worth in regions with rather poor pastures and under hard climatic conditions. It is found in Australia and New Zealand and in North and South Africa. The Brown Swiss have also been tested in India and Japan.

From investigations under natural and experimentally controlled atmospheric conditions, it would appear that, compared to certain other dairy breeds, Brown Swiss cattle possess a rather high degree of heat tolerance. The breed has several traits which probably favor adaptability to hot climates and, especially under poor pasture conditions, its stamina and good walking abilities are valuable assets.

Breeds from other areas

Following the second world war, there has been an increasing interest in the French Charolais breed, especially in Great Britain, the Scandinavian countries, the United States and Argentina, mainly for crossbreeding for beef production. The dual-purpose Normandy and Limousin breeds have been established in Uruguay and some other South American countries.

Red Danish cattle have been used for improvement crosses in the U.S.S.R., East Germany, Czechoslovakia, Poland, Hungary and Italy. In the United States, a small population of Red Danish cattle has been established for pure breeding and for crossbreeding experiments. These cattle are now being introduced in a number of Near Eastern countries. The Angeln and the Swedish Red and White cattle have also been used for improvement purposes in eastern European areas.

BIBLIOGRAPHY

- ALT, E. *Klimakunde von Mittel- und Südeuropa*. Berlin, Borntrager. 288 p. 1932
- BIANCA, W. Heat tolerance in cattle, its concept, measurement and dependence on 1961 modifying factors. *Int. J. Biomet.*, 5(1): 5-30.
- BIANCA, W. & BLAXTER, L.K. The influence of the environment on animal produc- 1961 tion and health under housing conditions. *Proc. 8th int. Congr. Anim. Pro- duction*, 3: 113-147.
- BONADONNA, T. *Le razze bovine*. Milano, Progresso Zootecnico. 1037 p. 1959
- BONADONNA, T. *Problemi zootecnici di ventun paesi di cinque continenti*. Milano, 1964 Progresso Zootecnico. 520 p.
- BRIGGS, H.M. *Modern breeds of livestock*. New York, Macmillan. 772 p. 1949
- BULAKOV, N.M. & STORZER, D.I. *Cattle breeding (big horned cattle)*. Vol. 1. 1961 Moscow, State Publishing House for Agricultural Literature.
- CAESAR, J. *De Bello Gallico*. Book 4. Chapter 29. Circa 65 BC
- ENGELER, W. *Das schweizerische Braunvieh*. Frauenfeld, Huber. 336 p. 1947
- ENGELER, W. *Brown Swiss cattle*. Berne, Commission of Swiss Cattle Breeding 1956 Federations. 24 p.
- ENGELER, W. Rinderrassen in den Alpenländern. *Handbuch der Tierzüchtung*, 3 (1): 1961 363-383.
- FAO. *Production yearbook 1962*. Vol. 16. Rome. 493 p. 1963
- GIULIANI, R. Rinderrassen in Italien und Spanien. *Handbuch der Tierzüchtung*, 1961 3: 384-399.
- GRABISCH, W. *Tierzucht und Tierhaltung in Spanien*. Hilstrup bei Munster, Land- 1955 wirtschaft-Angewandte Wissenschaft. 150 p.
- HANCOCK J. & PAYNE, W.J.A. The direct effect of tropical climate on the perfor- 1955 mance of European cattle. I. Growth. *Emp. J. exp. Agric.*, 23: 55-74.
- HERBERSTEIN, S. VON. *Rerum moscoviticarum. Commentarij*. Antwerp. 1557

- HODGSON, R.E. & HEIZER, E.E. Impressions of Russian dairy farming. *J. Dairy Sci.*, 44: 564-574. 1961
- KENDREW, W. *The climates of the continents*. 4th ed. Oxford. Clarendon Press. 1953 608 p.
- KÖPPEN, W. *Klimakunde von Russland*. Berlin, Borntrager. 96 p. 1939
- LÖRTSCHER, H. *The red and white spotted Simmental cattle*. Berne, Commission of Swiss Cattle Breeding Federations. 24 p. 1955
- MIZZI, L. *Allevamenti italiani bovini*. Roma, Federazione Italiana dei Consorzi Agrari. 149 p. 1960
- MÜLLER, W. *Die Rinderzucht in Österreich*. Wien, Gerolds. 432 p. 1958
- NOACK, T. *Über Herberstein und Hirsfogel*. Berlin. 1897
- NOVIKOV, E.A., STARTSEV, D.J. & ARZUMANIAN, E.D. *Breed development in cattle breeding*. Washington, D.C., published for the National Science Foundation and the U.S. Department of Agriculture by the Israel Program for Scientific Translations. 382 p. 1960
- OBÉE. Masse und Gewichte der Schwarzbunten auf den DLG-Schauen. *Der Tierzüchter*, 9(7): 161-162. 1957
- PAYNE, W.J.A. & HANCOCK, J. The direct effect of tropical climate on the performance of European type cattle. II. Production. *Emp. J. exp. Agric.*, 25: 321-335. 1957
- PLINIUS SECONDUS, C. *The natural history of Pliny*. Tr. by J. Bostock and H.T. Riley. London, Bell. 1893
- SALCEDO, L.V.F. *El toro bravo*. Madrid, Sección de Publicaciones, Prensa y Propaganda del Ministerio de Agricultura. 67 p. 1947
- SAWOW, T. & TOTEW, ST. D. *Rassenverteilung der Rinder, Schafe und Schweine in Bulgarien*. Bulgarische Akademie der Wissenschaften, Institut für Tierzucht. 1954
- SCHEIN, M.W. *et al.* Heat tolerance of Jersey and Sindhi-Jersey crossbreds in Louisiana and Beetsville. *J. Dairy Sci.*, 40: 1405-1415. 1957
- SCHMID, A. *Rassenkunde des Rindes*. Bern, Benteli. 2 vols. 1942
- SEATH, D.M. Heritability of heat tolerance in dairy cattle. *J. Dairy Sci.*, 30: 137-144, 959-962. 1947
- SKOTOVODSTVO [Animal husbandry]. Vol. 1. [Cattle]. Moscow, Selkhozgiz. 421 p. 1961. (In Russian)
- SMALCELJ, I. Rinderrassen in Osteuropa, auf der Balkaninsel und in Asien. *Handbuch der Tierzüchtung*, 3(1): 400-421. 1961

- TIROLER GRAUVIEHZUCHTVERBAND. *Das Tiroler Grauvieh*. Innsbruck. 55 p.
1948
- TREHANE, R., HAMMOND, J. & HODGES, J. *Cattle breeding in Hungary*. Thames
1964 Ditton, Surrey, Milk Marketing Board. 23 p.
- TUREK, F. *Rinderassen im Österreich*. Wien, Institut für Tierzucht. 41 p.
1962
- WENGER, H. *Das Simmentaler Fleckvieh der Schweiz*. Bern, Verbands Druckerei A.G.
1947
- WENGER, H. *Glück im Stall*. Bern, Buchverlag Verbandsr. A.G. 256 p.
1954
- WINDELS, F. *The Lascaux cave paintings*. London, Faber. 159 p.
1948
- ZEUNER, F.E. *A history of domesticated animals*. London, Hutchinson. 560 p.
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