Group I

EGYPTIAN CATTLE

Origin

Various authors (Epstein, 1933; Curson and Epstein, 1934; Curson and Thornton, 1936) who have speculated on the origin of the native Egyptian cattle assume that they are derived from an intermixture of Hamitic cattle, humped cattle from Asia, and shorthorned humpless cattle which have been introduced from Asia and Europe. There appears to be a very close similarity between the cattle populations in different parts of Egypt and for the purposes of this description they have been considered as a single type.

Conditions in the native home of the breed

Location, topography and soils

Egypt occupies about 383,000 square miles, of which some 98,000 are desert and 261,000 semi-desert. With the exception of a small number of oases, the only productive land is that which is irrigable from the Nile. The Nile valley south of Cairo is considerably lower than the desert and is bounded by barren cliffs and hills separated from one another by the flat, silt-covered flood plain which is never much more than 12 miles in width and sometimes extends very little beyond the banks of the river.

The eastern desert, which is mountainous and dissected by deep valleys, approaches the river closely down most of the length of the valley, and it is only between Assiut and Luxor that there is any large area of cultivation on the east bank. The western desert is lower, undulating and falls more gently to the valley so that the chief cultivation areas, the larger towns, and the main communications are on the west bank of the river. Water can be found in wells and holes in the valleys of the eastern desert but the western desert is nearly

waterless away from the line of oases which occupy depressions about 100 miles west of the Nile.

At Cairo, the Nile forms two branches which, when they reach the sea 150 miles further north, are 70 miles apart. The alluvial soil of the delta of the Nile between and around these branches provides Egypt with its most fertile land.

The settled and cultivable area covers about 12,000 square miles, or 3 percent of the whole area of the country (Gemmil, 1928; Shantz, 1941; Hurst, 1952).

While the conformation of the indigenous cattle of Egypt appears to be very similar in all parts of the country, those of particular areas are referred to by differing local names. In Lower Egypt there are two local types, the Damietta by the coast, and the Baladi or Baheri inland in the delta; in Upper Egypt in the Nile valley the cattle are of the Saidi type; and the Maryuti or Arabian cattle are in the hands of the nomadic or semi-nomadic tribes outside the irrigated areas (Figure 10) (Curson and Thornton, 1936).

Climate

A narrow strip of the north coast of Egypt has a very arid Mediterranean climate. The winters are mild with a little cloud and rain (mean annual precipitation at Alexandria has been 8 inches, and at Port Said, 3 inches) and the summers are hot and dry.

South of the coastal strip rainfall becomes negligible and, even in the Nile delta, is insufficient for the growth of crops without irrigation. At Cairo the mean annual precipitation is only 1 inch, all of which occurs in winter. This small amount of rain, however, may fall in violent storms, during which hailstones exceeding a pound in weight have fallen.

While winter temperatures at Cairo are lower than on the coast (the January mean has been 54° F.) the summer is considerably hotter. Humidity is low. At Halwan the mean relative humidity, which is 41 percent in May, rises to its maximum of 58 percent in September. When the valley is flooded by the high Nile, however, the weather may be sultry and oppressive.

During the spring, Lower Egypt is subject to an intermittent hot, dry, dust-laden southerly wind, known locally as the *khamsin*, which may continue for two or three days at a time, during which temperatures may rise to 118° F. and the air may be filled with fine dust particles.

Cold northerly winds which occur during the winter lower temperatures until the maximum daily temperature may be little

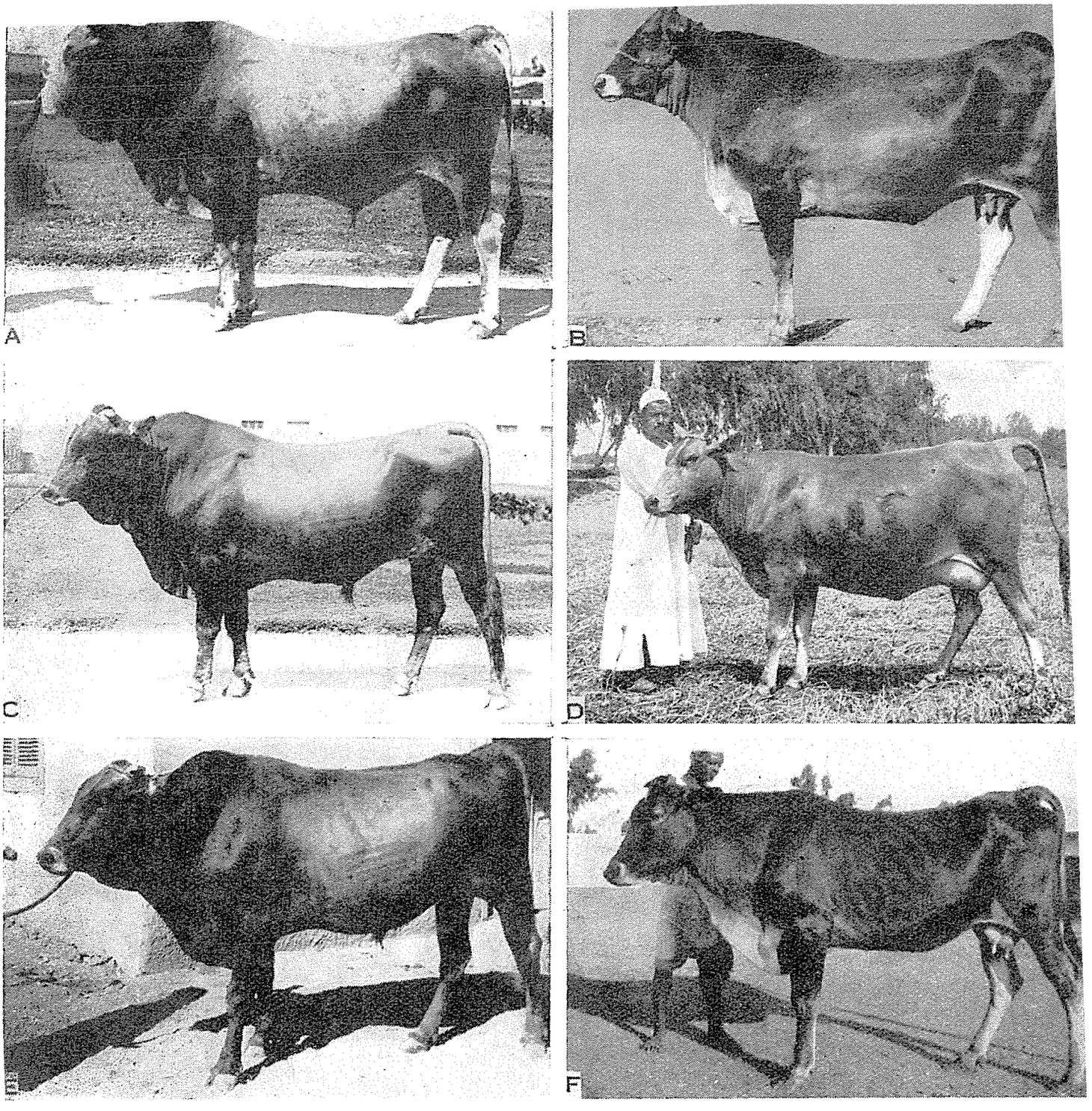


FIGURE 10. *Egyptian cattle.* (A) *Baladi bull;* (B) *Baladi cow;* (C) *Damietta bull;* (D) *Damietta cow;* (E) *Saidi bull;* (F) *Saidi cow.*

Courtesy of Y. Sabet

more than 60° F. The nights are cold and water at ground level may freeze.

Upper Egypt (south of Cairo) has a desert climate. The sky is clear throughout the year. Rain only occurs at very irregular intervals; a violent storm during which 1 or 2 inches of rain may fall in 24 hours following a drought period which may have lasted for as much as 10 or 20 years. Daily and seasonal temperature range is high. Summer maxima in excess of 120° F. have been experienced while, in winter, night frost may occur in the whole area.

Climatological data for three stations in Egypt are presented in Table 1.

TABLE 1. – CLIMATOLOGICAL DATA FOR THREE STATIONS IN EGYPT

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Alexandria													
Mean temperature, °F.	56	57	60	64	69	74	77	79	77	73	67	60	68
Mean rainfall, in.	2.0	0.9	0.4	0.1	—	—	—	—	—	0.2	1.3	2.3	7.4
Cairo													
Mean temperature, °F.	54	56	61	68	75	80	81	81	77	72	65	57	69
Mean rainfall, in.	0.2	0.2	0.1	0.1	—	—	—	—	—	0.1	0.1	0.2	1.1
Assiut													
Mean temperature, °F.	53	56	63	72	80	84	85	84	80	74	65	56	71
Mean rainfall, in.	—	—	—	—	—	—	—	—	—	—	0.1	—	0.2

SOURCE: Kendrew, 1953.

Vegetation

Away from the oases and the Nile there is insufficient soil water for any but ephemeral or xerophytic vegetation. Much of the area is barren desert only producing short-lived plants after the occasional fall of rain. About 261,000 square miles carry desert shrubs which, in some areas, are close enough together to provide browsing for livestock. In the southeast there is an area of *Acacia*-desert grass which occupies about 14,000 square miles and provides the best grazing land in Egypt.

The irrigated land is intensively farmed and over much of the area two and sometimes three crops a year are taken from the land. During the warmer part of the year the principal crops are cotton

(the most important cash crop), maize, sorghum, sugar cane and rice, while in the winter, wheat, barley, beans and Egyptian clover (*Trifolium alexandrinum*) and other coolweather annual crops are grown. Dates, citrus, vines and a variety of subtropical fruits and vegetables are grown extensively (Shantz, 1941).

Management practices

Although larger estates exist, more than half the agricultural holdings in Egypt are of less than half an acre and the average area is about 2 ⅓ acres. While the land is carefully and intensively cultivated, methods and implements are primitive, the fass, or hoe, being used for almost all agricultural operations, from digging to ridging up and weeding. A simple wooden plow shod with iron is drawn by oxen or buffaloes. Threshing is carried out by dragging a sled armed with cutting discs, similar to those of a disc-harrow, over the cut wheat or barley and winnowing the broken heads and straw. The straw and chaff is carefully collected for livestock feed.

Cattle are maintained almost exclusively as draft animals, being employed on tillage operations, threshing, and lifting water by means of the *saqiya* or Persian water wheel.

The buffalo is the milch animal of Egypt, except in the vicinity of some of the larger towns of Lower Egypt where herds of imported European cattle are maintained and the Egyptian cow is not usually regarded as a source of milk.

Beef is supplemented by camel meat and some 25,000 camels, many of which are imported from Libya, the Sudan and Arabia, are slaughtered each year.

The few cattle that are kept by the nomadic tribes away from the Nile valley subsist entirely on natural grazing. In the irrigated areas, however, all the land is cultivated and, in the absence of pasture, livestock are maintained on crop residues and Egyptian clover. The clover grows luxuriantly and, during the few months that it occupies the land, is cut four or five times for feeding green to the animals, or for hay. Alternatively, it may be grazed, each animal being tethered to a peg by a rope long enough to permit it to graze an area of clover sufficient for its daily requirements (Hurst, 1952).

Physical characteristics of the breed

Egyptian cattle are medium-sized, long-bodied animals, lean of musculature and lightly boned. The head is of medium length, the face is lean and the profile is straight or very slightly convex. The

orbital arches are slightly accentuated, giving a small degree of concavity to the forehead. The poll is flat and the horns are short and grow from the poll laterally, curving forward so that their inclination is approximately at right angles to the line of the profile. The ears are of moderate size and are carried more or less horizontally.

The neck is of medium length and tends, in the female, to be lean. The dewlap and umbilical fold are small. The crest is accentuated in the bull but it is only in the Saidi subtype that a small cervico-thoracic hump is apparent in the female. The body is long with only moderate depth and the ribs tend to be flat. The topline dips in its central part between the withers and the prominent hook bones and the bottom line rises from front to rear. The rump is of very moderate slope and the accentuated tail setting is often higher than the withers. The tail is of moderate length. The thighs are flat and the limbs are long, lean and lightly boned. The usual coat coloration varies from fawn to red.

The average birthweight of 140 male calves in the herd of the Faculty of Agriculture, University of Cairo, was 27.77 kg. and that of 130 females was 23.93 kg. (Asker and Ragab, 1952).

Functional characteristics of the breed

Various estimates of the average age of Egyptian heifers at the first calving have been: 33.38 months (Asker and Ragab, 1951), 2.86 years (Asker *et al.*, 1954), and 34.3 months (Ragab *et al.*, 1954).

Bulls in the same herd were very little used for service before they were 3 years of age (Asker and Ragab, 1951). The average calving interval in the herd was 1.15 years and the average productive life of cows covered 3.5 lactations. The average age of cows calving in the herd was 5.73 years (Asker *et al.*, 1954). The average gestation periods in the same herd were 289.8 days (458 calvings) for male calves and 289.2 days (397 calvings) for female calves (Ragab and Asker, 1951).

Asker and Ragab (1951), in an investigation on the generation interval in the University of Cairo herd of Egyptian cattle which embraced the records of 223 male and 238 female cattle, found that the average generation interval was 6.10 years. The intervals between sire-son, sire-daughter, dam-son, and dam-daughter were 6.23, 6.39, 5.74 and 5.85 years respectively.

Asker *et al.* (1955), in a study of the effect of culling in the University of Cairo herd found that the average yield of first lactations was 2,253 lb. (102 records), second lactations, 2,855 lb. (90 records), third lactations 3,150 lb. (71 records), and fourth lactations 3,267 lb. of

milk (49 records). Ragab *et al.* (1953) estimated that the heritability of total milk yield for the first lactations was 0.40.

Asker *et al.* (1952), in an investigation of the effects of exposing Egyptian cattle to sun, found that when tested on three days during which the average air temperature and relative humidity were 99.8° F. and 46 percent respectively, the average heat tolerance coefficient of 9 cattle according to Rhoad's (1944) method was 91.5 percent, the normal body temperature of the animals being 100.53° F. and the average body temperature after being exposed to the sun for two hours, 101.48° F. The average body temperature of the cattle during March when the average air temperature and relative humidity were 61.7° F. and 62 percent, was taken as the normal body temperature for the purpose of the experiment.

Sources of breeding stock and information regarding the breed

A herd of Egyptian cattle is maintained by the Faculty of Agriculture, University of Cairo.

Further information regarding the native Egyptian cattle can be obtained from:

The Director, Animal Breeding Department, Ministry of Agriculture, Cairo, Egypt.

The Dean, Faculty of Agriculture, University of Cairo, Egypt.

LIBYAN CATTLE

Origin

The following account of the cattle type has been compiled from material presented by Faulkner (1956), who refers to the cattle as the Indigenous Libyan Shorthorn.

The Libyan cattle are considered to be derived from shorthorned humpless cattle which are thought to have reached North Africa from Egypt in early historical times.

Conditions in the native home of the breed

Location, topography and soils

With the exception of a few animals at oases in the Fezzan, cattle are only kept in the more settled areas of the coastal zone, the jebel or low mountain area, and in parts of the semi-arid Jefara plain between the coastal belt and the jebel area.

The coastal zone borders the Libyan coast along its full length and varies in width from the negligible to 18 miles. The coastline is low and is characterized by broken lines of sand dunes, salt water lagoons and salt marshes. The soils are, except in northern Cyrenaica where clays predominate, sandy and of low fertility. The rainfall, augmented by irrigation from shallow wells, is sufficient to support a considerable degree of crop and fruit production.

In Tripolitania, the coastal zone merges into the semi-arid Jefara plain, 14,000 square miles in area, which separates it from the jebel area further inland. Although part of the plain is cultivated by means of irrigation from wells, much of its area can only be used as extensive grazing. The plain lying inland of the coastal strip in Cyrenaica is composed of " white-earth " soils which, with a higher humus content than many of the coastal soils, form the major barley-producing area of the country.

Roughly parallel to the coast, but with a break in its central part so that it forms two blocks extending into Libya from the eastern and western frontiers, is an area of low mountains (jebels) which, however, even in its Cyrenaican section which is higher than that in Tripolitania, does not exceed 762 meters in elevation. The topography is typically that of gently rolling hills and isolated grass-covered plateaus. In Cyrenaica the hills have red and black sedentary soils derived from the underlying limestone.

South of the jebel areas the country is true desert and the rainfall is insufficient to provide grazing for cattle.

Climate

In the northern part of Libya the greater part of the annual rainfall occurs in winter with the heaviest falls in the three coldest months of December, January and February. The dry season extends from May to October and in June, July and August precipitation is negligible. The seasonal and annual variation in rainfall, particularly in Tripolitania, is very considerable and periodic droughts occur which cause severe losses both in crops and livestock. At Sidi Mesri, for instance, there were 736.4 mm. of rain in 1938, while in the preceding year there had only been 167.2 mm. Rainfall in Cyrenaica tends to be both higher and less variable than in Tripolitania. In both provinces the coastal faces of the jebel areas receive the highest rainfall in the territory.

While humidity is generally low throughout Libya, the proximity of the Mediterranean results in higher values being obtained in the coastal zone, particularly near Tripoli and in the northern part of Cyrenaica.

Mean temperatures during much of the year, although modified in the coastal zone by the effect of the Mediterranean and in the jebels by altitude, are generally high throughout Libya. There is, however, a considerable seasonal variation between the hot dry season when air temperatures exceeding 43° C. have been recorded, and the winter when frost may occur for a few days each year. Mean monthly temperatures are in excess of 18° C. in most places for six to eight months each year and, during four to six months, are higher than 21° C.

Very dry, dust-laden southerly winds (*ghibli*) from the Sahara may have a severely desiccating effect on growing plants with a consequent reduction of crop and pasture yields. These winds, which blow intermittently throughout the year, are most frequent in spring.

Climatological data for representative stations in both Tripolitania and Cyrenaica in the coastal, semi-arid and low mountain zones are presented in Table 2.

Vegetation

The coastal zone in Tripolitania and the adjacent parts of the Jefara plain into which it merges are covered with herbaceous vegetation and annual grasses during years of good rainfall. On the plain itself the vegetation includes stunted asphodel and jujube (*Ziziphus lotus*) trees or shrubs. The rainfall is sufficient for the cultivation of olives, almonds and barley; where irrigation water is available, dates, citrus, vegetables, barley and groundnuts are grown.

Between the coastal areas and the jebels, in the semi-arid plain, the perennial vegetation consists of scattered herbs and shrubs including *Caroxylon articulatum*, *Daphne gnidium*, *Chenopodium* spp., *Artemisia herba alba*, *A. campestris*, and asphodel. In years of good rains there is an ephemeral grass cover including *Bromus* spp., *Poa* spp. *Lolium* spp., as well as some legumes such as lotus, *Astragalus* spp. and *Medicago* spp.

The natural vegetation of the northern part of the Cyrenaican plateau is low but relatively dense forest (*macchia*) dominated by the juniper (*Juniperus phoenicia*) and the lentisk (*Pistacia lentiscus*). During the rains annual grasses, including *Bromus* spp., *Phalaris* spp., *Poa* spp. and *Lolium* spp. appear in open spaces. The carob tree grows naturally in northern Cyrenaica. Barley, wheat, olives, almonds and grapes are among the crops grown in this area.

In the jebel areas of Tripolitania the vegetation, as a result of the smaller rainfall, is sparser and of a more reduced habit than in Cyrenaica. The plateaus are generally covered with grassland of similar species to those which are represented in Cyrenaica and hilltops tend to be bare of plant cover. Olives are grown extensively, as well as cereals and figs.

TABLE 2. – CLIMATOLOGICAL DATA FOR SIX STATIONS IN LIBYA

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
TRIPOLITANIA COAST (*Misurata*)													
Mean maximum temperature, °C.	17.4	18.7	21.6	24.0	26.2	29.6	31.9	33.0	31.1	28.8	24.0	19.2	25.4
Mean minimum temperature, °C.	6.9	7.3	9.9	12.7	15.3	18.5	20.7	21.8	20.8	17.6	13.8	9.0	14 5
Mean temperature, °C.	12.1	13.0	15.7	18.3	20.7	24.0	26.3	27.4	25.4	20.7	18.9	14.2	19.7
Mean relative humidity, %	67	62	60	56	58	60	59	62	63	61	64	65	61.4
Mean rainfall, mm.	52.6	31.5	13.0	6.6	4.3	1.3	0.0	0.6	11.8	34.0	41.9	49 8	247.4
LOW MOUNTAIN (*Garian*)													
Mean maximum temperature, °C.	12.0	14.1	17.9	22.5	26.9	30.9	32.5	32.8	29.8	25.5	19.4	13.5	23.22
Mean minimum temperature, °C.	4.8	6.2	7.8	11.2	14.7	18.2	20.3	20.8	18.2	15.4	11.4	6.3	12.9
Mean temperature, °C.	8.4	10.1	14.8	16.8	20.8	24.5	26.4	26.8	24.0	20.0	15.4	9.9	18.2
Mean relative humidity, %	57	54	48	40	36	28	30	31	39	43	53	58	43.1
Mean rainfall, mm.	76.4	52.7	45.4	17.0	9.4	2.2	0.7	0.8	12.6	20.4	41.4	54.1	333.1
SEMI-DESERT (*Mizda*)													
Mean maximum temperature, °C.	16.2	18.9	21.9	28.7	31.3	36.5	38.3	37.4	34.0	28.5	23.5	17.9	27.8
Mean minimum temperature, °C.	4.0	5.2	8.0	12.7	15.6	19.9	21.1	20.7	18.3	14.3	10.4	5.0	12 9
Mean temperature, °C.	10.1	12.0	14.9	20.7	23.4	28.1	29.7	29.0	26.1	21.4	16.9	11.9	20.4
Mean relative humidity, %	57	52	45	38	34	32	32	34	41	48	54	57	43.7
Mean rainfall, mm	6.9	4.6	9.6	4.0	3.8	1.9	0.0	1.3	6.3	2.7	11.8	9.7	62.6

TABLE 2. – CLIMATOLOGICAL DATA FOR SIX STATION IN LIBYA (*continued*)

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
CYRENAICA COAST													
(*Derna*)													
Mean maximum temperature, °C.	17.5	18.1	19.7	22.4	23.8	26.5	27.9	28.7	27.9	27.9	23.3	19.5	23.6
Mean minimum temperature, °C	7.7	8.2	9.7	12.3	14.5	18.4	21.4	21.5	20.0	17.1	13.5	8.7	14.4
Mean temperature, °C.	12.6	13.1	14.2	17.3	19.1	22.4	24.6	25.1	23.9	22.5	18.4	14.2	19.0
Mean relative humidity, %	74	70	60	52	45	44	50	53	51	55	63	71	57.3
Mean rainfall. mm.	65.3	43.3	28.0	10.4	6.3	0.8	0.1	0.1	2.5	20.8	43.2	62.4	285.2
LOW MOUNTAIN													
(*Barce*)													
Mean maximum temperature, °C.	15.8	16.6	19.9	24.3	28.3	31.5	31.5	29.9	31.1	28.2	23.4	17.9	24.9
Mean minimum temperature, °C.	5.1	5.5	5.8	7.6	11.7	14.0	15.8	16.0	14.5	12.2	9.8	6.6	10.4
Mean temperature, °C.	10.4	11.0	14.8	15.9	20.0	22.7	23.6	22.4	22.8	20.2	16.1	12.2	17.7
Mean relative humidity, %	74	70	60	52	45	44	50	53	51	55	63	71	57.3
Mean rainfall, mm.	117.3	86.9	42.2	17.0	6.1	1.2	0.3	0.5	1.9	36.2	56.7	118.5	484.8
SEMI-DESERT													
(*Soluch*)													
Mean maximum temperature, °C.	17.6	18.1	21.9	26.4	31.0	33.8	34.1	34.0	32.4	29.7	24.3	19.7	26.9
Mean minimum temperature, °C.	5.9	6.8	8.3	11.1	14.7	17.3	18.3	18.4	17.0	14.6	11.3	7.8	12.6
Mean temperature, °C.	11.7	12.9	15.1	18.7	22.8	25.5	26.2	26.2	24.7	22.1	17.8	13.7	19.8
Mean relative humidity, %	72	69	58	45	43	40	41	45	50	54	59	72	54.0
Mean rainfall, mm.	46.0	36.2	13.4	4.0	2.8	0.4	0.1	0.0	0.6	11.4	23.8	46.8	185.5

SOURCE: Faulkner, 1956.

FIGURE 11. *Libyan heifer about 4 years old (height at withers, 105 cm.) used for plowing on an Arab holding in the irrigated areas of the coastal zone in Tripolitania.*

Courtesy of D. E. Faulkner

Management practices

In the coastal strip and the adjacent parts of the plain the holdings are small, seldom exceeding 7 acres in area. Crops are grown under irrigation, the water for which is drawn from shallow wells, usually from 5.5 to 7.5 meters deep, by animal power partly, and in Tripolitania almost entirely, provided by cattle which are also utilized as draft animals for plowing the land (Figure 11).

While sedentary agriculture is well developed in the coastal areas of Tripolitania, a large proportion of the population in the corresponding parts of Cyrenaica remain nomadic or semi-nomadic, possibly owning a few date palms near the coast, growing their barley on the plains and jebels during the rains, and seasonally moving their livestock in search of grazing and water.

Cattle are not kept in large numbers. A cultivator seldom maintains more than one or two head of cattle and the semi-nomad, except in parts of Cyrenaica, has only comparatively small herds, the greater part of his wealth being in his very considerable flocks of sheep.

While cattle are given precedence over the other classes of livestock for the limited supplies of water, the practice of hobbling the animals to prevent their straying and of leaving them in the charge of small girls near the homestead or tent, tends to result in the intake of grazing being restricted to below that required for the proper development and maintenance of the animals. Faulkner (1956) observes that

phosphate/calcium imbalance, phosphate deficiency and vitamin A deficiency are undoubtedly present as a result both of the soil status and the very low plane of nutrition during most of the year (Figure 12).

Where the cultivated holdings are scattered the cattle are maintained on natural grazing in their vicinity, but where little land remains uncultivated it becomes necessary to devote a proportion of the irrigation water to the production of stock feed.

Although their milk and meat is utilized, draft is the prime purpose for which cattle are kept in the cultivated areas. On the jebel areas in Cyrenaica are found the only large herds of cattle, which are the foundation of an export trade to Malta and elsewhere.

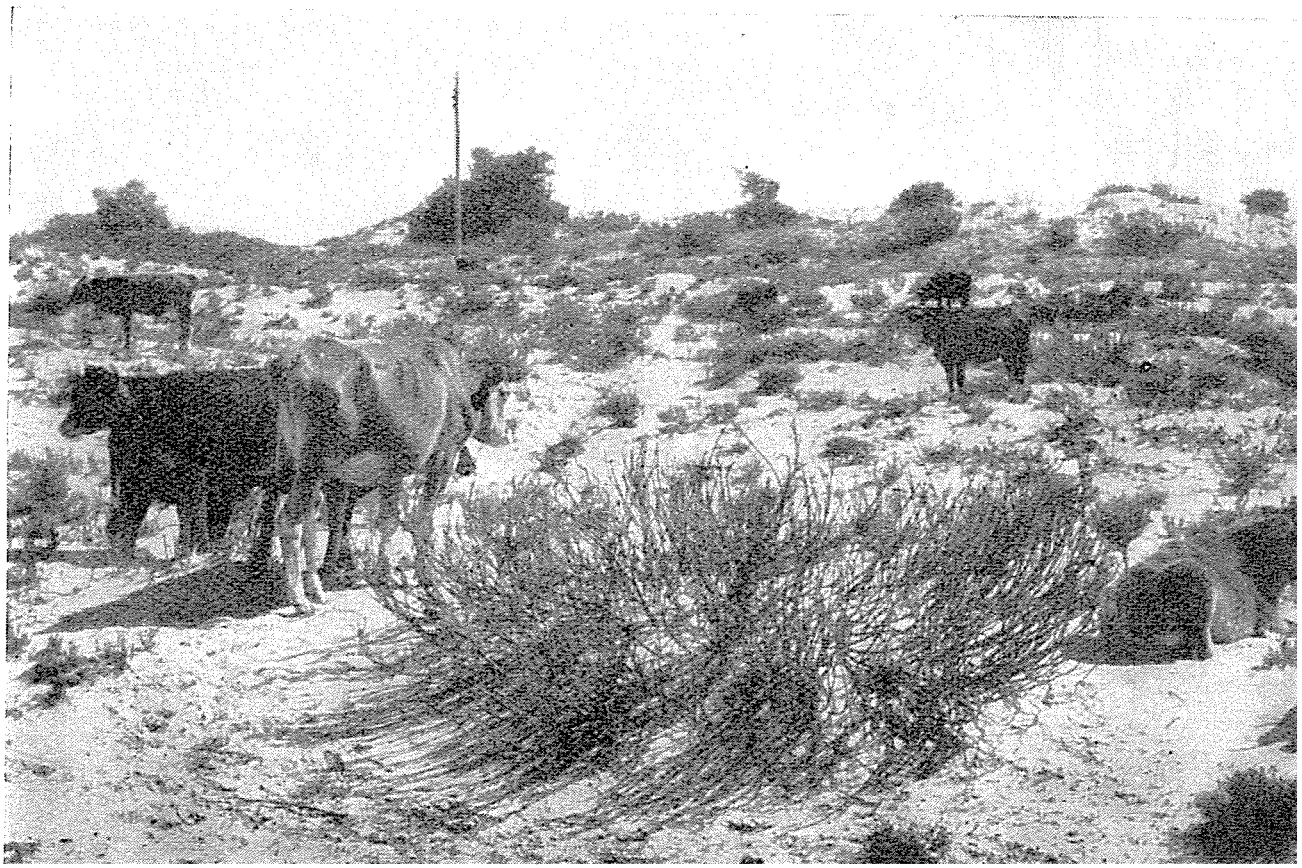
In 1954 a total of 3,022 head of cattle were exported from Libya, 2,877 of which were received by Malta, the remainder going to Egypt (120) and Italy (25). In the period 1950-51, 11,404 head of cattle (including calves) were slaughtered at the main population centers in Libya.

Physical characteristics of the breed

The Libyan shorthorned cattle are small, humpless, lightly built animals (Figures 13 and 14). The head is of moderate length with its greatest width at the level of the eyes, a wide muzzle and a straight to slightly concave profile. The forehead is flat or slightly concave.

FIGURE 12. *Libyan cattle grazing in desert scrub.*

Courtesy of D. E. Faulkner



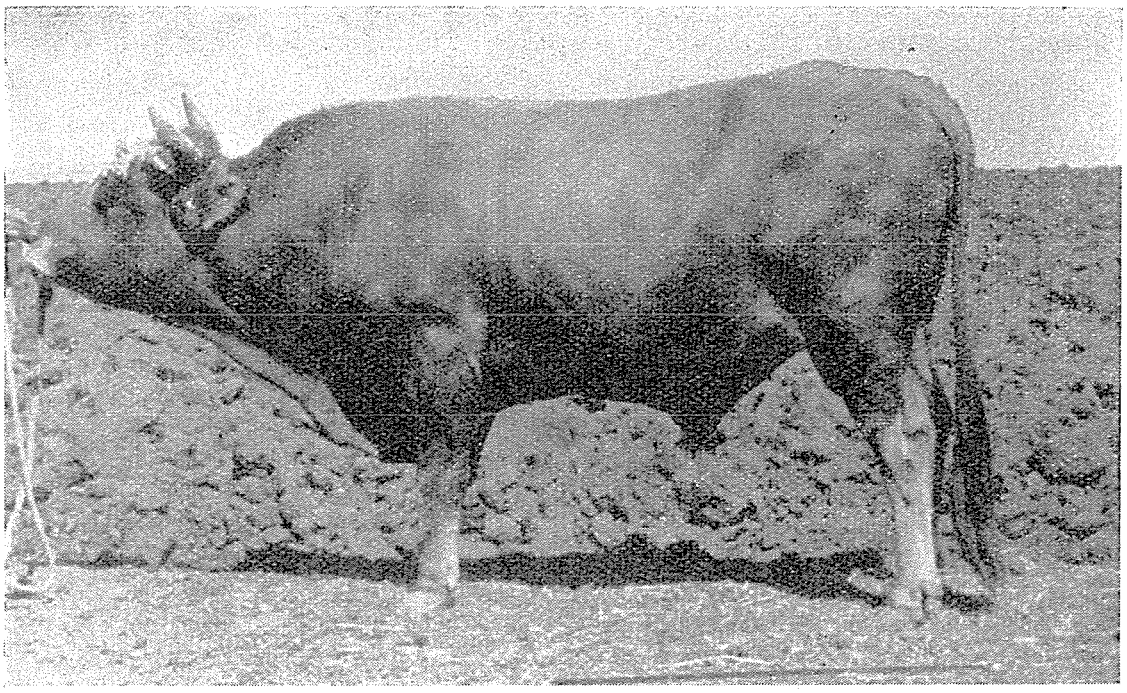
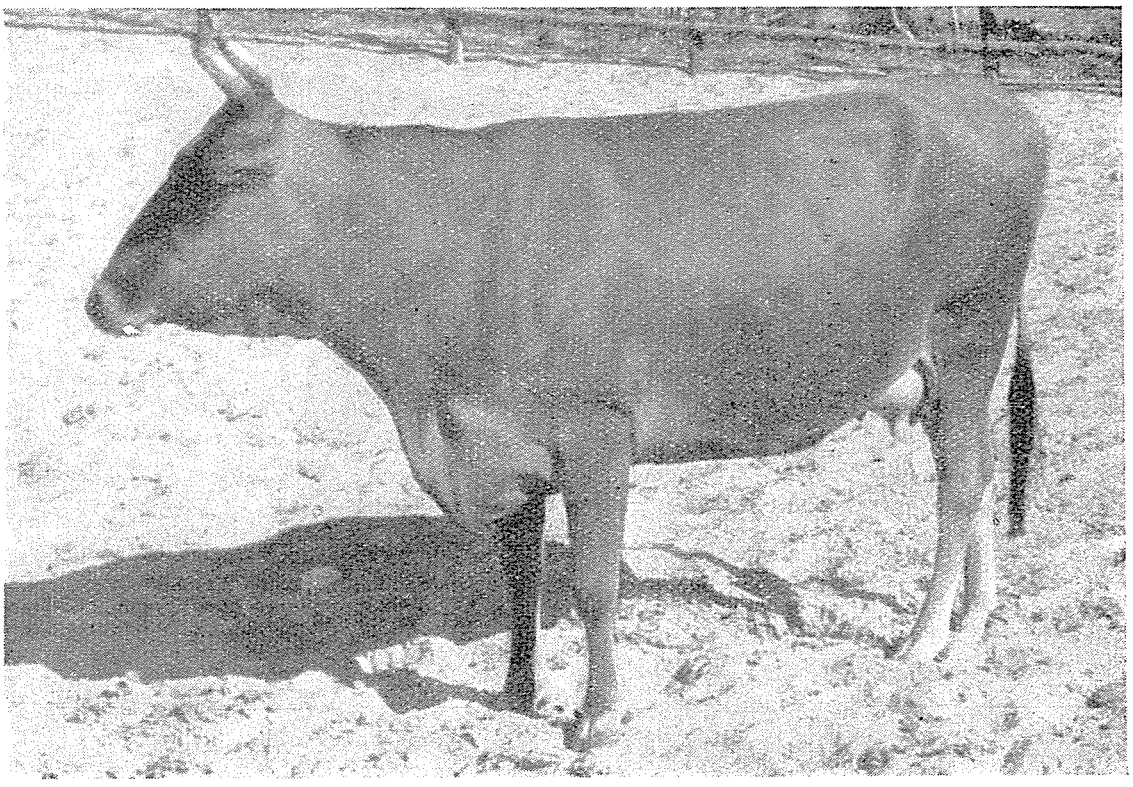


FIGURE 13. *A Libyan bull at the Mazzotti Experimental Station near Barche in Cyrenaica.*

FIGURE 14. *Libyan cow (height at withers, 118 cm.) under good nutritional conditions at the Sidi Mesri Experimental Station.*

Courtesy of D. E. Faulkner



The ears are short and rounded and are carried horizontally. The horns are thin and about 10 to 26 cm. in length, circular in cross section and ending in blunt tips. The usual horn color is cream but the tip is invariably black. The poll is usually covered by a quantity of fairly long hair.

The neck is short and well attached to the shoulders and brisket. The shoulders are compact but the withers tend to be high. Although the ribs tend to be flat the abdomen is usually of good capacity. The body is long and somewhat lacking in depth. The topline often shows a slight depression over the middle. The rump is long and lean, somewhat narrow, and tends to slope downwards from the prominent hook bones to the narrow pinbones. The tail setting is prominent and is often higher than the withers. The tail is slender with a well-marked colored switch which reaches well below the hocks.

The dewlap, for a non-zebu, is well developed in a considerable proportion of these cattle. It is thin and sometimes ends in two separate folds between and behind the front limbs. The umbilical fold and sheath are also well developed for non-zebus.

The thighs are narrow and poorly fleshed. The limbs are fairly well placed, of moderate length, and are very fine and light of bone. Many animals show a tendency to sickle hocks. The hoofs are relatively large and, though well formed, are often overgrown.

The udder is small but well shaped with small well-placed teats, and is strongly attached.

The skin is thin and pliable and is of black, light brown or red pigmentation. The muzzle is usually black. The hair is fine but there is a seasonal variation between the rough, harsh winter coat and the normal coat which is seen in summer. The most common coat colors are whole fawn, red or black. Red or fawn animals, especially bulls, often have some degree of black on the head, hindquarters and legs. Black is particularly common around the eyes, on the head and ears, and on the lower parts of the legs. A pale hair ring around the muzzle and a pale stripe down the back of a dark-colored animal are frequently seen; white patches sometimes occur on the abdomen and udder.

The average birthweights of male and female calves at the Sidi Mesri Experimental Station were 18 and 15 kg. respectively. The average liveweight of mature males at the same station was 400 kg. and that of mature females, 325 kg. The average liveweight of mature cattle brought to the Tripoli abattoir for slaughter was 280 kg. while the largest animals weighed about 300 kg. Other estimates of average liveweights also given by Faulkner (1956) are: cows, 270 kg., 290 kg.; bulls, 380 kg., up to 450 kg.

The average height at withers of 14 mature cows at Tripoli market was 111.0 cm. with a range of 103.0 to 117.0 cm. At Soko Juma market near Tripoli a further 14 mature cows had an average height at withers of 110.9 cm. with a range of 105.5 to 117.0 cm.

A mature bull which was measured at Sidi Mesri Experimental Station measured 127.0 cm. height at withers, 152 cm. length from shoulder point to pinbone, and 193.0 cm. heart girth. Five mature cows were measured at the same station. Their average measurements were: height at withers 114.0 cm., length from shoulder point to pinbone 134.5 cm., and heart girth 165.4 cm.

Functional characteristics of the breed

No information has been received as to the age at which cows calve for the first time. It has been reported that, although no general life statistics are available, there is local agreement that even under poor conditions they calve regularly at yearly intervals.

The mean lactation yield and duration, derived from 31 records made by cows in the herd of the Sidi Mesri Experimental Station, was 2,829 lb. of milk in 305.0 days. The maximum daily yield was 24.2 lb. In Cyrenaica it was reported that it was common for cows to give about 9 lb. of milk daily for approximately four months. Analyses of 147 milk samples at Sidi Mesri gave an average butterfat content of 3.2 percent.

Faulkner (1956) observes that, given reasonable feeding conditions, the Libyan cattle appear to fatten easily, killing out at 45 to 55 percent and yielding meat of reasonably good quality. The fat is, however, poorly distributed, being put on subcutaneously and around the kidneys.

The cattle are docile and easily trained for draft work.

None of the severe epizootic diseases appear to occur in Libya and ticks are rare under the prevailing environmental conditions. Faulkner (1956), however, mentions that cases of piroplasmosis and trypanosomiasis are occasionally reported. Tuberculosis, which is common among imported breeds, is of rare occurrence in the indigenous cattle. Anthrax and rabies occur throughout the country, while quarter-evil appears to be confined to Cyrenaica. The incidence of cysticercosis, strongylosis and echinococcus is high. Ringworm and paratyphoid are commonly diagnosed in calves.

Sources of breeding stock and information regarding the breed

Faulkner (1956) reports that the total number of cattle in Libya is 63,000. The indigenous Libyan cattle could be expected to form the largest group contributing to this total.

Further information on the Libyan cattle can be obtained from the Director-General of the Ministry of National Economy, Tripoli.

BROWN ATLAS

Origin

For the purpose of this descriptive account the term " Brown Atlas " has been understood to embrace the indigenous cattle types of Tunisia, Algeria and Morocco.

It appears probable that the Brown Atlas cattle are derived from types which have been established in the area from very ancient times. *Bos primogenius mauritanicus*, which was discovered by Thomas in North African quaternary deposits, is thought to be the main ancestral stock (Dechambre, 1922).

Bas-reliefs, dating from the Roman occupation of the area, show heads of cattle which appear to be essentially similar to the Brown Atlas of the present day and it would seem reasonable to assume that there has been little modification in the conformation of the indigenous cattle during historic times.

More recently, however, French settlers, in an attempt to increase the productive ability of their herds, have introduced exotic stocks, including most of the French breeds, which have been so freely crossed with the indigenous cattle that Brown Atlas cattle which show no signs of any such admixture have now become rare, at least in Algeria.

An attempt was made toward the close of the nineteenth century to form an organization for the preservation and improvement of the local cattle in Algeria. Little interest was, however, aroused and the movement did not receive sufficient support to permit its continuance. No further steps were taken in Algeria until 1942 when an experimental breeding station was initiated at Kroubs near Constantine which included prominently in its program the preservation of the Brown Atlas and an investigation into its productive potentialities. The herd at this station, which included in 1951, 3 bulls, 20 cows, and young stock, is one of the few surviving groups of purebred Brown Atlas cattle in Algeria (Jore d'Arces, M. P., *Personal Communication*).

Conditions in the native home of the breed

Location, topography and soils

Brown Atlas cattle are distributed along the Atlas complex of mountain ranges in Tunisia, Algeria and Morocco. The elevation of the mountains and plateaus varies from 900 meters to 4,000 meters.

Climate

The climate of those parts of Morocco and Algeria in which cattle can be maintained is of the Mediterranean type with a winter rainfall and a hot dry summer. The summer climate on the Atlantic coast of Morocco is, however, modified by the cool Canaries current, so that July temperatures are commonly below 70° F. and the high humidity and fairly frequent fog and low clouds relieve the drought which affects the remainder of the area. In winter the westerlies bring rain. In January mean temperature on the coast is about 18° F. lower, and inland 30° F. lower than in July. Snow and frost occasionally occur in the north, the seaward slopes of the Atlas mountains being snow-covered for most of the year.

East of the Straits of Gibraltar higher temperatures are experienced in summer, the mean temperature on the Algerian coast in the hottest month, August, being about 75° F. About 80 percent of the annual rainfall occurs in the winter-half of the year. In January the mean temperature is between 50° and 55° F. and frost is rare. While the whole of the area receives more than 20 inches of rainfall, there is considerable variation from year to year, the recorded extremes at Algiers having been 16 and 51 inches in a year.

The plateau of the Shotts has, both as a result of altitude and continentality, and the effect of the Atlas ranges between it and the sea, a steppe climate. Dry north winds bring severe cold in the winter with temperatures considerably below freezing point and violent snowstorms occur. Géryville has an average of 84 days with frost in the year. Day temperatures are as high as, or higher than, those occurring at sea level, but the nights are cool, the diurnal range reaching 30° F. Géryville, with a recorded winter minimum temperature of 9° F. has, in summer, reached 108° F. Rainfall is from 10 to 20 inches a year with the maximum in spring. Heavy thunderstorms occur in spring and autumn.

Rainfall is heavier in the Saharan Atlas than on the plateau. The range forms a sharp climatic divide between the land to the north with

a rainfall sufficient for plant growth and the barren Sahara to the south (Kendrew, 1953).

Climatological data for four stations in the area are presented in Table 3.

TABLE 3. – CLIMATOLOGICAL DATA FOR FOUR STATIONS IN THE BROWN ATLAS AREA

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Casablanca													
Mean temperature, °F.	53	54	57	59	62	68	71	73	71	67	60	56	63
Mean rainfall, in.	1.5	1.8	2.3	1.5	0.7	0.4	0.1	0.1	0.1	1.1	4.0	2.9	16.3
Marrakech													
Mean temperature, °F.	53	55	60	65	69	75	83	85	77	71	59	55	67
Mean rainfall, in.	0.8	1.0	1.7	0.9	0.6	0.3	0.1	0.1	0.4	0.7	1.7	0.7	8.9
Algiers													
Mean temperature, °F.	53	54	57	60	65	71	75	77	74	68	60	55	64
Mean rainfall, in.	4.6	3.6	2.9	1.6	1.6	0.6	0.1	0.2	1.7	2.8	5.0	5.1	29.8
Géryville													
Mean temperature, °F.	39	42	46	52	60	70	78	77	68	56	46	40	56
Mean rainfall, in.	0.9	1.2	2.4	1.7	2.2	0.7	0.2	0.5	1.2	1.5	1.3	1.5	15.3

SOURCE: Kendrew, 1953.

Vegetation

The vegetation of the Brown Atlas area includes both temperate and tropical species. Different species of palm (including the date palm) occur with the jujube, juniper, tamerisk, oleander, poplar, willow, alder, *Euphorbia* spp., and, on the Moroccan Atlas, cork oak covering very extensive areas.

Among the grasses represented in the area are *Dactylis glomerata* L., *Bromus* spp., *Agrostis* spp., *Agropyrum repens* Beauv., *Cynodon* spp., *Holcus lanatus* L., *Anthoxanthum odoratum* L., *Poa palustris* L., *P. sinaica* Steud. and *Festuca altissima* All. in association with *Carex* spp.

Legumes are numerous and include species of *Trifolium* and *Medicago*, as well as *Lotus* spp., *Vicia* spp., *Lathyrus* spp. and *Melilotus* spp.

Napier grass, Kikuyu grass and *Chloris gayana* have been introduced into Algeria and Morocco from further south in Africa and have been found to be successful in this environment (Duraud, 1942).

Management practices

The management of cattle in Algeria and Morocco is very largely determined by, first, the natural environment, and in particular the summer dry season, and secondly, the social organization and system of land tenure.

Land is held in Morocco under three different types of tenure: *biens Maghzen* lands, the administration of which is guaranteed by the state; *biens habous*, inalienable lands owned by religious foundations; and collective tribal land, inalienable and untaxed, over 3 millions of hectares of which, or a third of the agricultural land of Morocco, have been registered.

Individual holdings are very often reserved for cultivation, while the farmers' cattle are placed in the charge of a herdsman who is responsible for finding adequate pasture for the herd and who may, in Morocco, receive as payment for his services either a proportion of the value of the increase in the liveweight of the cattle in his charge, which may be fixed at a half, third, quarter or fifth, or a proportion of the calf crop, with which he may start a slaughter or breeding herd of his own.

Breeding is arranged so that the calves are dropped between early September and late January when the cows, on green rains grazing, are able to provide an abundance of milk.

Forage is not generally preserved and there may be heavy losses if the supply of natural pasture is interrupted. In 1928, for instance, when the Gharb area in Morocco was flooded, it was estimated that 30 percent of the cattle died, and in 1930 there was severe mortality when the pastures were heavily damaged by locusts.

Improved management practices, including grazing control, forage preservation as hay or silage and the use of crop residues for cattle feed, are practiced on the holdings of European colonists and by the more advanced indigenous stock owners (Duraud, 1942).

The Kabyle tribesmen in Algeria pay some attention to the protection of their cattle during the winter, although the shelter may be only a stone wall, a jujube hedge or a roofed but wall-less building within which the animals are confined during the night on the bare earth without litter. Some straw and carob nuts are fed to the cattle in addition to grazing.

The calf is separated from the dam during the first month and is only allowed to suckle twice daily, before milking, to stimulate milk

ejection and, at its conclusion, to withdraw the strippings. Weaning at 6 months causes the calves to lose condition but, if the pasture is good, they quickly recover. Working oxen are castrated at 2 years of age.

The cattle are used for draft purposes, sometimes, for heavy work, being harnessed in mixed teams with mules.

Physical characteristics of the breed

The Brown Atlas (Figures 15 and 16) is a sturdy, fairly compact animal reaching a greater development in Morocco than in the territories to the east. The head is short and broad with a straight to slightly concave profile and, as a result of the faint prominence of the orbital arches, a rather concave forehead. The horns are short, growing laterally from the poll, then turning forwards and upwards. The inclination of the horns is approximately at right angles to the line of the profile.

The neck is short and there is little development of the dewlap. The ribs are well rounded and the chest is deep. The topline is straight or has a slight dip in the center part. The rump is of medium length, tends to be light and slopes only slightly from front to rear. The sacrum is, in some individuals, slightly accentuated, giving the appearance of a downward break or step in the topline in front of the low tail setting. The tail is thick at the base and tapers to a full switch, falling well below the hocks. The limbs are fine and the hoofs are hard and close textured.

The hairy coat is short and close. The coat coloration of the cattle in the eastern part of Algeria from Tunis to Djurdjura is a light gray which, especially in bulls, shades into darker areas covering, to a greater or lesser extent, the head, shoulders, limbs, hindquarters and underline. In the remainder of the area, while the dark shading remains, the gray is replaced by fawn. There is often an area of light-colored hair surrounding the muzzle, which varies from slate-gray to black in color. The horns are white or grayish at the base with black tips, and the hoofs are slate-gray or black. The switch is black. The skin is thick, and of dark pigmentation.

In Morocco there are two varieties, distinguishable only by their coloration. One, found in the Atlas and continuous with the cattle of western Algeria, has a dark fawn hairy coat, light along the topline and with a white ring around the muzzle, but shading toward black on the head, limbs and switch, and with a black muzzle, tongue, mucous membranes and hoofs. The other, the *Race blonde des Zaers*, occurs in western Morocco, between the Atlas and the sea, and has an over-all

light coat coloration with pale muzzle, mucous membranes and hoofs. A pied type, intermediate between the preceding two, is found in the Fez-Meknès area (Duraud, 1942).

The height at withers varies from 1.15 to 1.25 meters with a depth of chest of 75-85 cm. in Algeria, to 1.18 to 1.30 meters in Morocco. The average birthweight of calves at the Station expérimentale d'élevage at Kroubs has been 20 kg. with a range of 14 to 27 kg. The liveweights of males and females at one year of age were about 60 kg. and 50 kg. respectively. At maturity, which is reached at about 7 years of age, males weigh between 250 and 420 kg. and females about 200 kg. (Jore d'Arces, M. P., *Personal Communication*).

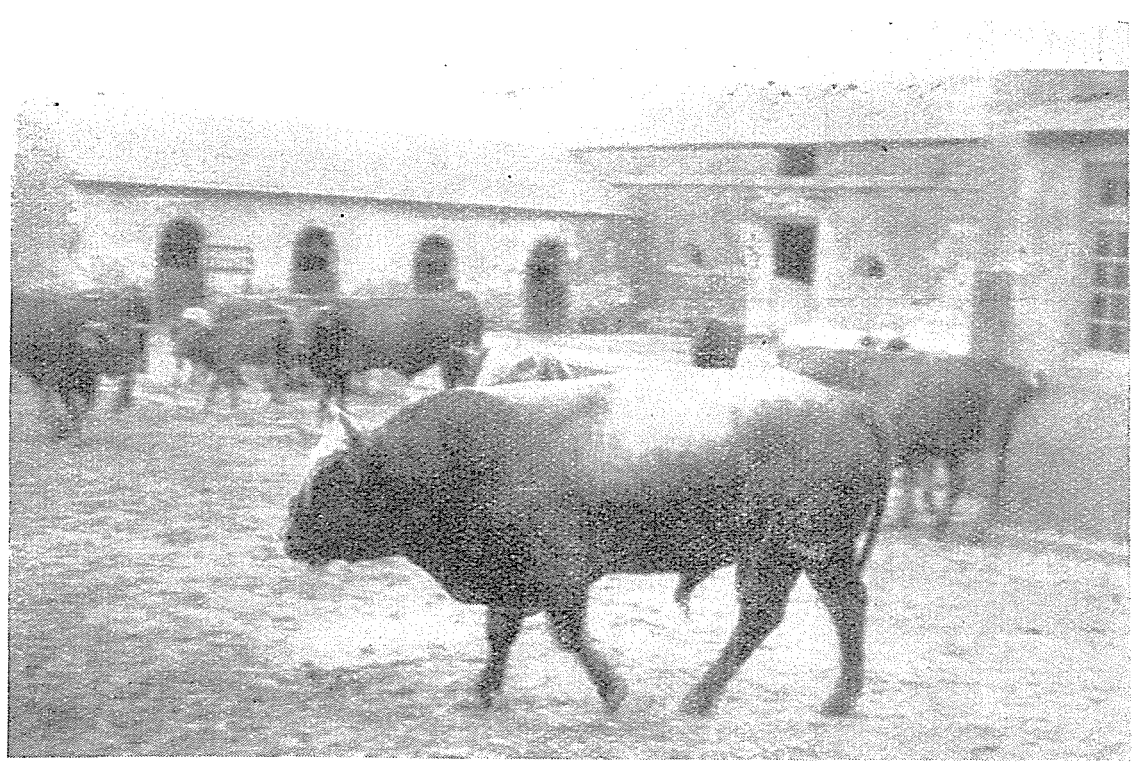
Functional characteristics of the breed

Heifers calve for the first time at between 22 and 24 months. Young bulls are allowed to serve the cows and heifers as soon as they reach sexual maturity at about 10 or 12 months. The bulls are generally quick to service.

At the time of writing no detailed records of milk and butterfat yields were available. Jore d'Arces (*Personal Communication*) suggests that the better cows in Algeria give about 8 liters of milk a day during the two months following calving, after which the yield falls rapidly

FIGURE 15. *Brown Atlas bull, Algeria.*

Courtesy of M. P. Jore d'Arces



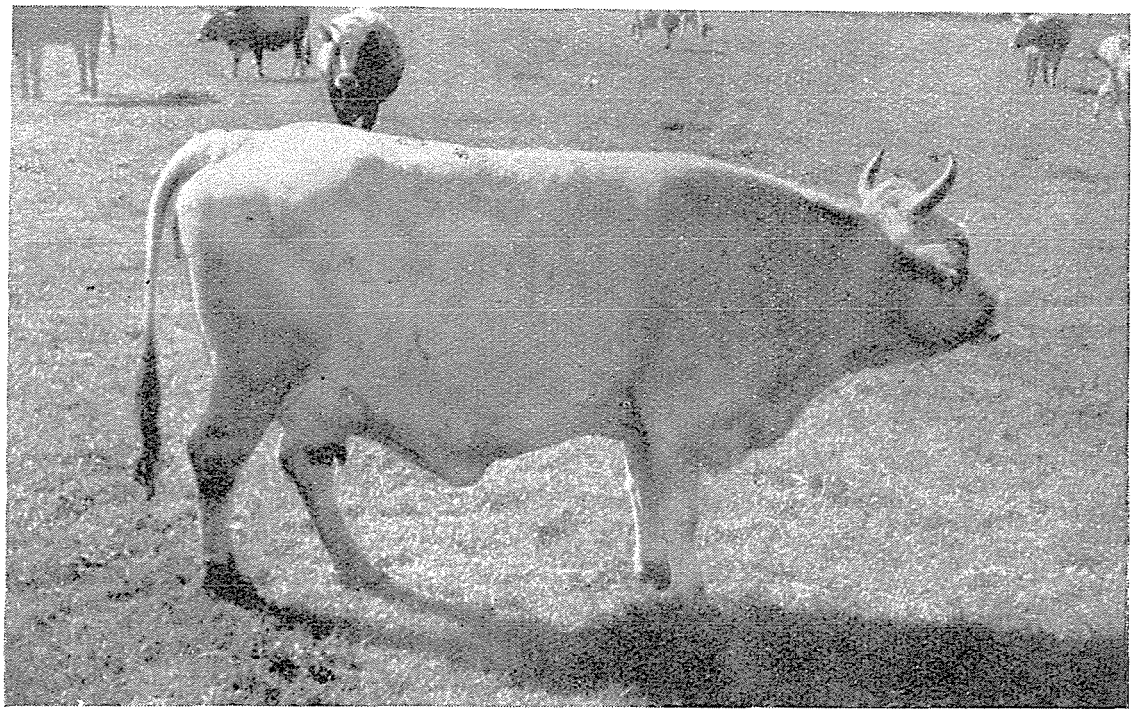


FIGURE 16. *Brown Atlas cow, Algeria.*

Courtesy of M. P. Jore d'Arces

until the lactation is terminated after 5 or 6 months, while Duraud (1942) is of the opinion that Moroccan cows give 8 to 12 liters a day when the pastures are at their best. The butterfat content of the milk (over 40 grams to the liter) is high. Records which are being kept at the Station d'élevage at Kroubs suggest that it is unlikely that Brown Atlas cows will equal the yields of Tarantais females at the station which have given 5,000 kg. of milk in 300 days.

Brown Atlas steers fatten well on grazing. Normally, on natural pastures, the cattle are fat from March to August, after which they deteriorate in condition until, in January and February, they have lost about 20 percent of their former liveweight. If the cattle are killed when in peak condition they yield between 45 and 49 percent of useful meat. The liveweight of steers between 2 and 5 years of age which are fat off grass is between 200 and 300 kg., while that of mature animals retired from the herds at 12 or 14 years of age is between 200 and 400 kg. (Jore d'Arces, M.P., *Personal Communication*). Diffloth (1922) refers to steers weighing 500 to 600 kg. and killing out at 50 to 55 percent. Duraud (1942) gives 50 to 55 as the killing out percentage of Brown Atlas cattle in Morocco.

The cattle make docile, active and steady draft animals, with a walking pace covering between 2.4 and 2.8 km. an hour.

While the Brown Atlas is resistant to many of the diseases and parasites to which imported European cattle are susceptible, it is subject to a number of epizootic and enzootic diseases occurring in Mediterranean countries, notably piroplasmosis and anthrax.

Sources of breeding stock and information regarding the breed

The only source of breeding stock and information on the Brown Atlas in Algeria is the Station expérimentale d'élevage at Kroubs (Constantine).

Information on the cattle of Morocco can be obtained from the Direction de la production agricole, Sous-Direction du Service vétérinaire, Ministère de l'agriculture, Rabat.