# *Group II*

## BACHAUR

### Origin

Phillips (1944) observes that though the Bachaur [1] has not been classified by other authors it appears to belong to the group of shorthorned white or light-gray cattle. The breed has very close similarity to the Hariana breed. Some think it may be a deteriorated strain of the Hariana. The breed is well-known for its draft qualities and ability to thrive under poorer conditions of feeding.

### Conditions in the Native Home of the Breed

*Location, Topography and Soils*

The breed is found in the Bachaur and Koilpur subdivisions of the Sitamarhi district of Bihar State, India. This area is situated in the north central part of Bihar, lying approximately between 26° and 26°6′ north latitude and 85° and 85°6′ east longitude, and consists of a low-lying alluvial plain transversed at intervals by ridges of high ground. Beds of nodular limestone are occasionally found in the tract. There are two important rivers in the tract, Lakhandai and Bagmati, the latter originating in Nepal. On account of the generally flat nature of the country, the rivers are subject to floods during the rainy season causing heavy inundations in the area. The major portion of the area is fertile

[1] *See* Figures 22 and 23.

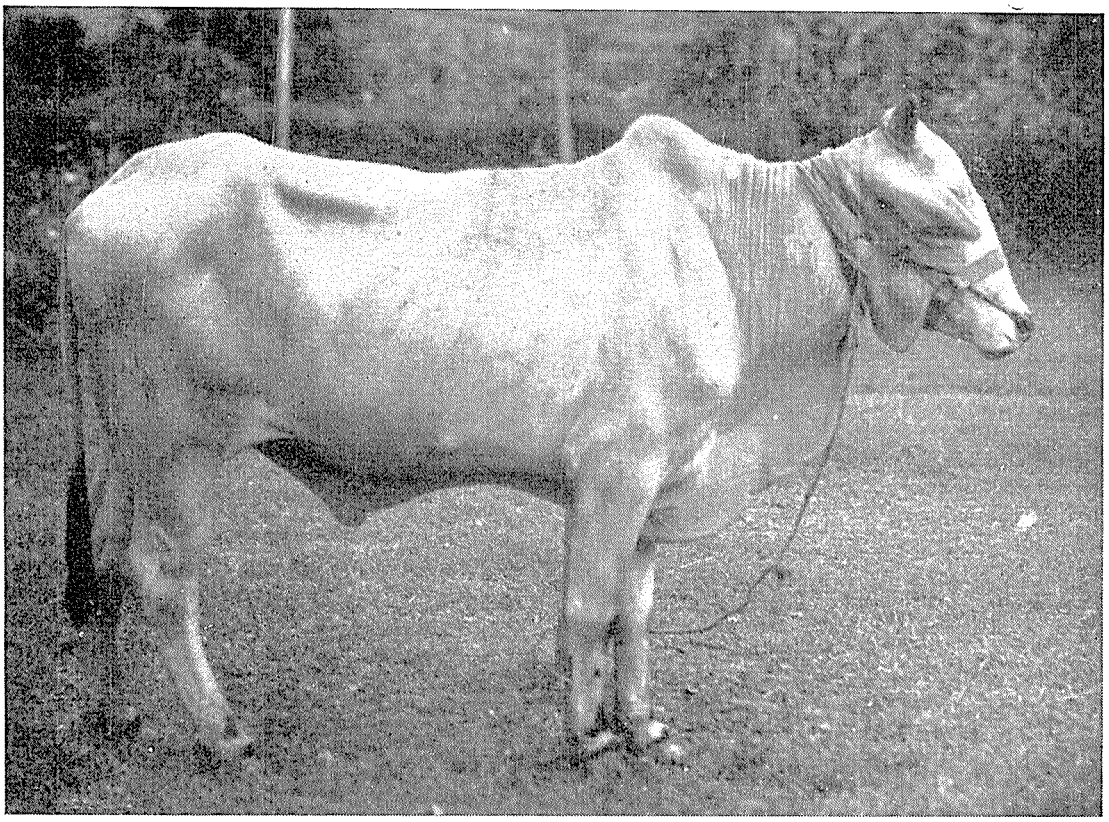


FIGURE 23. A Bachaur bullock. The breed is well-known for its draft qualities.

*By courtesy of Mr. S. K. Sen.*

and is intensely cultivated. Large-sized patches of grassland interspersed with alkaline soils are occasionally seen.

*Climate*

Dry westerly winds are experienced during the months of April to June. Though absolute maximum temperature during summer rarely exceeds 112 to 115°F. the mean maximum ranges from 100° to 105°F. during the months of April to June. Even during the coldest month, which is January, the mean maximum temperature is about 70°F. while the mean minimum is about 48°F. The average rainfall of the area is about 50 to 55 inches, the heaviest rainfall being in the months of July and August. Humidity is on an average 67 percent in March, 66 in April, 76 in May and varies from 84 to 90 percent during other months. Cyclonic storms of great intensity occur during the months of August and September.

*Vegetation*

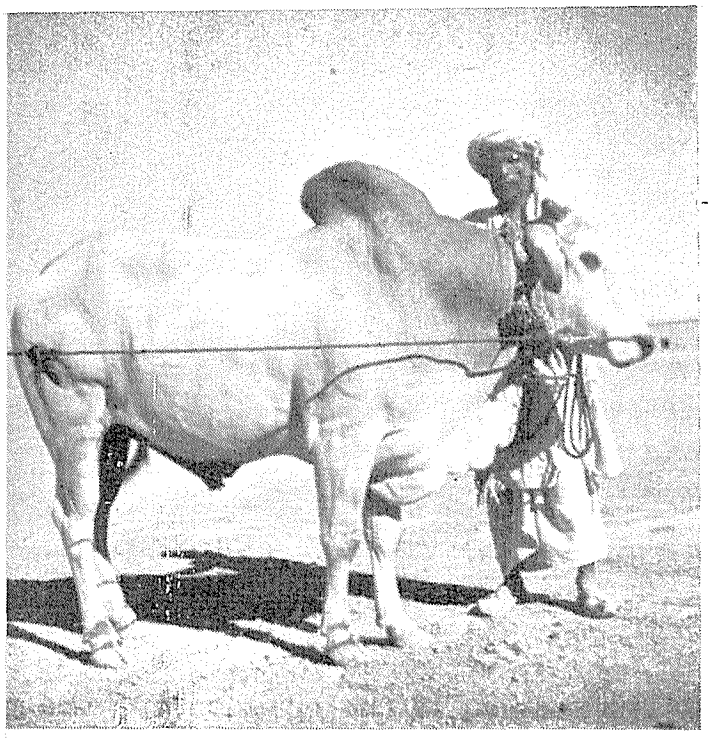
No special fodder crops are grown in the area for the cattle except *Lathyrus sativus* in the paddy fields and mustard which is sown thickly as a winter crop and then gradually thinned and used as green fodder. Of the various crops grown, paddy, barley, wheat, chickpeas, mustard, lentils and sugarcane are most important. By-products from these crops such as straws and husks are extensively used as cattle feeds. In the grassland areas, various kinds of grasses prevail which can stand waterlogging conditions of the soil. *Cynodon dactylin, Dichanthium annulatum* (*Andropogon annulatus*), *Cenchrus ciliaris, Eleusine indica* and *Heteropogon contortus* are commonly found in the area. Grazing is available only from 3 to 5 months in a year.

*Management Practices*

The Koir and Ahir communities are important cultivators as well as cattle breeders in the area. Individual members of these communities own large herds of cattle which are grazed in the nearby grassland areas, but the majority of the cultivators own only a few animals. Cows having bull calves are not milked at all and the calf is allowed to take all the milk. Young calves are taken for grazing in the areas adjacent to the villages along with older cattle and are observed to thrive well. Breeders pay particular attention to raising bullocks and also are careful in selecting good bulls for breeding purposes.

**Physical Characteristics of the Breed**

The animals of the breed are compact with straight backs, well-rounded barrels, short necks and muscular shoulders. The forehead is broad and flat or slightly convex. The eyes are large and prominent. The horns are medium-sized and stumpy. Ears are medium-sized and drooping. The hump is compact, firm and medium-sized. The sheath and navel flap are light and close to the body. The dewlap is medium-sized and not so heavy. The feet are fine, well-shaped and strong. The height of a bull behind the hump is 58 to 62 inches and the heartgirth measurements range from 68 to 72 inches. The tail is short and thick and usually does not go far beyond the hocks. The most common color is gray or graying white.



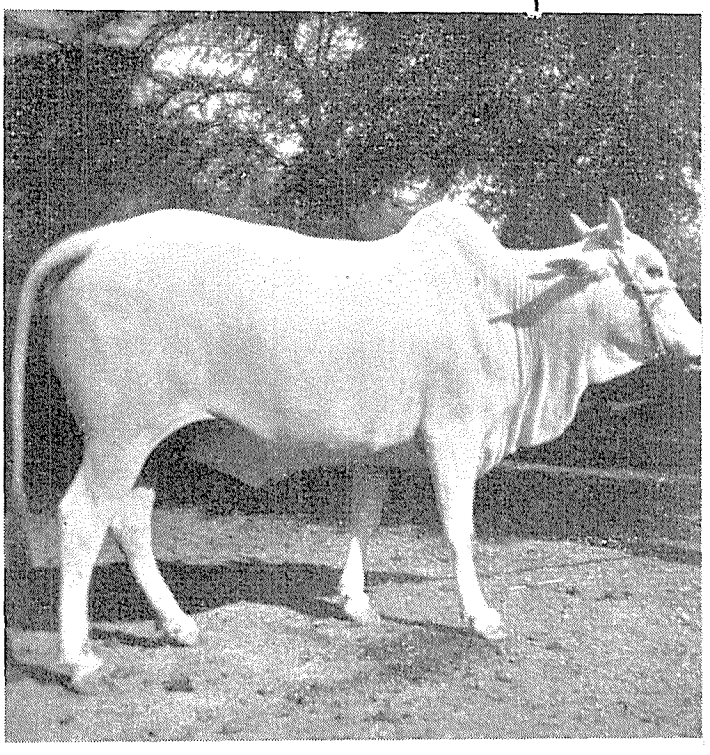
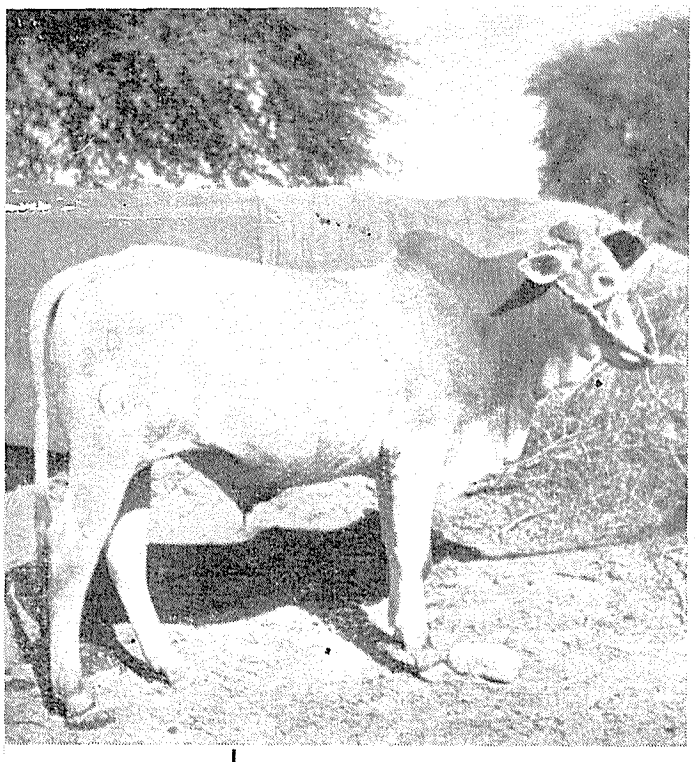
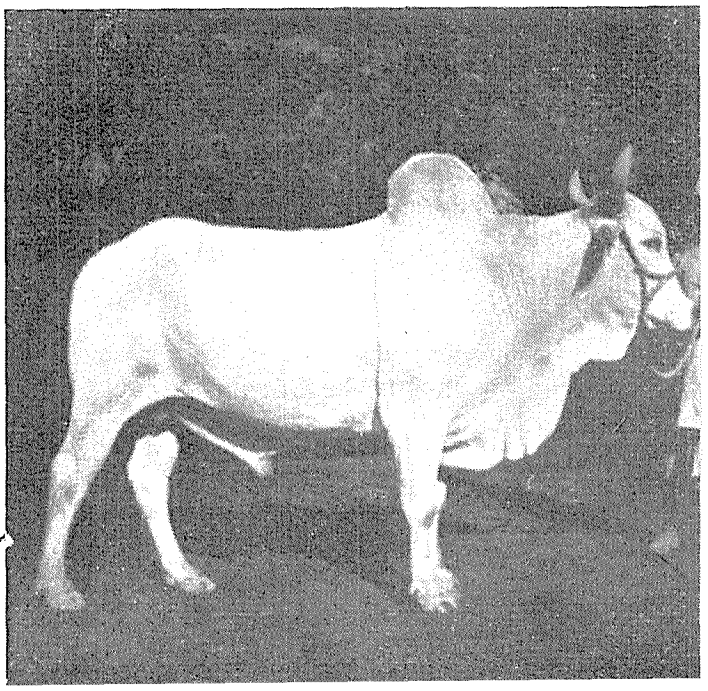


FIGURE 24. Bhagnaris are chiefly used for draft. The cows usually give a fair amount of milk. Above: a Bhagnari bull. Right: a Bhagnari cow.



The Bhagnari breed is also known as Nari, Kachhi and Dajal. Left: an 18 months' old Bhagnari bull. Below: a Bhagnari bullock.



### Functional Characteristics of the Breed

The breed is well-known in the area for its medium draft abilities. In the days of the East India Company during the early part of the nineteenth century, large numbers of bullocks of the breed were always in demand for transport purposes. Bullocks of this breed are medium-paced and a pair can carry loads in a cart up to $^2/_3$* of a ton. The cows are not good milk producers but average quality animals produce 2 to 4 lbs. of milk a day after feeding their calves.

### Performance in Other Areas

The breed is used in the adjacent areas of its native home mainly for draft purposes. It is supposed to be doing well as the demand for bullocks is steadily increasing, but no specific records of performance are available.

### Sources of Breeding Stock and Information Regarding the Breed

Large numbers of bullocks are usually available in the cattle fair held at Sitimarhi, Bihar, during the months of March and April.

Further enquiries regarding the breed may be made to the

1. Director of Animal Husbandry, Patna, Bihar, India.
2. Animal Husbandry Commissioner, Government of India, New Delhi, India.

## BHAGNARI

### Origin

The Bhagnari breed of cattle [1] belongs to that general group of cattle described (Phillips, 1944) as having short horns, a long coffin-shaped skull, orbital arches not prominent, a face that is slightly convex in profile, and white or light gray in color. These cattle may have entered Pakistan through the Bolan pass with the Rig Vedic Aryans and spread into the area now comprising

[1] *See* Figure 24.

part of Kalat State of Baluchistan (Olver, 1938). They are also known by other names, such as Nari, Kachhi and Dajal, though Bhagnari is the officially recognized name. The Bhagnari cattle are well-known in that part of Pakistan for their heavy draft qualities.

There are two types of Bhagnari cattle: a small type bred in the lower valley of the River Nari around Jacobabad and a large type bred in Upper Nari Valley, in the territory north of Jacobabad and extending up to Sibi. The Dajal strain found in the Dera Ghazikhan district of the Punjab, has resulted from the importation of bulls from Kalat State (Diack, 1893-1897). The first bulls were taken to that area about 100 years or more ago.

## Conditions in the Native Home of the Breed

### *Location, Topography and Soils*

Kachhi is a division of the Kalat State of Baluchistan where the Bhagnari cattle are principally bred (Minchin, 1907). This area lies between 27°53′ and 29°35′ N. and 67°11′ and 67°28′ E. It consists of a flat triangular plain 5,310 square miles in area with its base in the upper Sind Frontier District of Sind and is enclosed by the Marri and Bugti hills on the east and by the Kirthar and Central Brahui hill ranges of the Jhalawan country on the west. On the northeast side of its apex lies the district of Sibi. The principal rivers are the Nari, The Bolan, the Sukleji and the Mula. On entering Kachhi all these rivers are dissipated into a large number of channels spreading over the great alluvial stretches of which the area is composed. These rivers are subject to floods and the flood waters are utilized for irrigation purposes by means of erecting dams in the river beds. These dams all along the river line are a peculiar feature of the area. Floods usually occur during the months of July and August and also in spring.

The geological structure of the country is uniform, mostly consisting of a level bed of clay burnt by the sun and probably of great depth. The general aspect of the country is desolate and bare, especially those areas which are beyond the reach of river and channel floods. There are patches of desert which have practically no vegetable life. Locally, these areas are known as "pator patto", the largest of which is in the central portion of

the district which is traversed by the Sind-Pishin railway. The village Bhag, from which the breed takes its name is located about 12 miles to the north of the railway station, Belpat, on the Jacobabad-Quetta line.

The soil is extremely productive wherever it can be irrigated. The best soil in the tract is light loam with a moderate amount of sand. Another type of soil prevalent in some parts is light clay on the surface with a subsoil having a quantity of sand. This type is supposed to retain moisture and is largely utilized by cultivators for production of sorghum.

*Climate*

Climatological data for Jacobabad, which is the nearest station where meteorological observations are made, are summarized in Table 23.

**Table 23. Climatological Data for Jacobabad**

| MEASURE OF CLIMATE | AVERAGE DATA BY MONTHS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
| Mean maximum temp. °F . . . | 72.7 | 78.5 | 90.5 | 100.4 | 111.6 | 113.9 | 108.0 | 103.7 | 102.3 | 99.0 | 87.6 | 76.1 |
| Mean minimum temp. °F . . . | 43.8 | 49.1 | 59.9 | 70.2 | 79.0 | 84.9 | 85.0 | 82.2 | 77.0 | 64.7 | 52.8 | 44.9 |
| Highest max. temp. °F . . | 103.0 | 112.0 | 119.0 | 126.0 | 127.0 | 126.0 | 117.0 | 113.0 | 112.0 | 112.0 | 103.0 | 89.0 |
| Lowest minimum temp. °F . . . | 25.0 | 29.0 | 37.0 | 48.0 | 61.0 | 70.0 | 71.0 | 68.0 | 60.0 | 47.0 | 36.0 | 31.0 |
| Mean daily relative humidity per cent at 0800 hours . . . . | 71.0 | 62.0 | 58.0 | 49.0 | 50.0 | 66.0 | 70.0 | 81.0 | 77.0 | 60.0 | 63.0 | 69.0 |
| Mean daily relative humidity per cent at 1700 hours . . . . | 28.0 | 32.0 | 27.0 | 23.0 | 23.0 | 27.0 | 39.0 | 41.0 | 37.0 | 28.0 | 27.0 | 32.0 |

Information from the Meteorological Department, Government of Pakistan.

Kachhi is one of the hottest areas of Pakistan. Scorching winds blow in the summer. Winter lasts from the middle of November to the middle of March, when the morning and evening

air is cool and crisp but during the middle of the day it is hot in the sun. Frost may be expected during November and may cause damage to the crops. Though the area gets summer as well as winter rains the amount of rainfall is very scanty. In average years it may be 8 to 10 inches, and most of it falls during the months of July and August. These are very hot months of the year. Plowing and other field operations are usually carried on after sunset or before 10 o'clock in the morning.

*Vegetation*

There are no regular pastures or grazing lands in the tract but the land subject to flood irrigation provides abundant grazing after the spring and summer floods and rains. The principal grazing grounds are to be found near Jhal, Chattar, Kotra, Khari, Kunara and Shoran. The pasturage is common to the tribesmen in whose area it lies. The supply of forage is also supplemented by the collection of grasses from the hills. There are about a dozen varieties of good grasses prevailing in the area. *Panicum antidotale* during famine years supplies grain to the poorer population of human beings as well as fodder to the animals. Since this area gets very little rainfall, most of its cultivation is dependent on flood irrigation from rivers. In normal years, three crops are raised and harvested. The first or principal crop is sown in July and August and reaped in autumn. It consists of sorghum, millets and pulses such as *Phaseolus radiatus* and *P. mungo*. All the by-products from these crops, such as stover and straw, are utilized for cattle feeding. The second or spring crop consists of wheat, barley, mustard and rape. The third crop, sown during late spring, depends on the floods in the rivers. Cultivators usually raise fodder sorghum or *Setaria italica* for fodder purposes. Watermelons are also grown during this season.

*Management Practices*

On account of precarious rainfall conditions and scarcity of regular irrigation facilities, people have come to depend on livestock more than cultivation. The Magassis, Domkis and Rinds are some of the important livestock breeding tribes though none

of them breed animals in large numbers. They are primarily farmers and each one keeps only 3 or 4 head of cattle. On account of the large demand for Bhagnari bulls for draft, as well as for breeding purposes in other areas, the farmers pay great attention to the rearing of males. Actually, a farmer feels that his year is lost if a female calf is born.

Excessive heat and scarcity of drinking water are two great limitations to increasing the livestock production in the area. Farmers usually shift to Sind areas during famine years.

## Physical Characteristics of the Breed

The average Bhagnari animal has a long but compact deep body, with a short, powerful neck. The predominant color is white or gray deepening to almost black, particularly on the neck, shoulders and hump of the mature males. In cows, the color becomes slightly deeper during winter or in advanced stages of pregnancy. Bulls of a gray color usually change to white after castration. Gray cattle also show a white stripe along the backbone.

The forehead is usually flat and wide or slightly convex. The convexity is more pronounced in the bulls. Horns are stumpy, well set apart and generally curve outwards and upwards and inwards. They are thick at the base and taper towards blunt points.

Ears are medium-sized, broad, semi-pendulous and facing forwards. The average length in males is 11.75 inches and in females 10.4 inches, while the average width in males is 6.2 inches and in females 5.7 inches. Eyes are bright, full and placid, with black eyelashes. The hump in males is moderately developed and firmly fleshed. The dewlap is of medium thickness, small and never pendulous. In the male the sheath is moderate in length and semi-pendulous. In females the navel flap generally hangs, average size being 6 to 8 inches x 2 to 3 inches. The skin is of medium thickness and slightly loose. The pigmentation is dark. Hindquarters are powerful but sloping. Hooves are black, medium-sized and rounded. They are hard and well-shaped with digits close together. The tail is short, with a black switch.

The average measurements of Bhagnari cattle are summarized in Table 24.

**Table 24. Average Measurements of Bhagnari Cattle**

| MEASURE | At one year | At two years | Mature |
|---|---|---|---|
| ***Females*** | | | |
| Length from shoulder point to pinbones, in inches . . . . . | 35.67 ± 0.47 (12) | 43.31 ± 0.43 (12) | 52.8 ± 0.40 (40) |
| Height at withers, in inches . . | 38.5 ± 0.50 (12) | 44.2 ± 0.38 (12) | 51.0 ± 0.25 (40) |
| Depth of chest, in inches . . . | 16.8 ± 0.29 (12) | 22.25 ± 0.40 (12) | 25.85 ± 0.20 (40) |
| Width of hips, in inches . . . | 9.58 ± 0.48 (12) | 13.04 ± 0.19 (12) | 17.40 ± 0.17 (40) |
| Heart girth, in inches . . . . | 43.33 ± 0.40 (12) | 51.93 ± 0.60 (12) | 66.60 ± 0.92 (40) |

| MEASURE | At one year | At two years | Mature bull | Mature bullock |
|---|---|---|---|---|
| ***Males*** | | | | |
| Length from shoulder point to pinbones, in inches . . . . . | 38.25 ± 0.5 (12) | 44.8 ± 0.77 (12) | 61.43 ± 0.37 (69) | 61.94 ± 1.08 (16) |
| Height at withers, in inches . . . . . | 42.16 ± 0.27 (12) | 46.8 ± 0.50 (12) | 57.34 ± 0.23 (69) | 59.12 ± 0.76 (16) |
| Depth of chest, in inches . . . . . | 19.5 ± 0.30 (12) | 21.8 ± 0.40 (12) | 29.72 ± 0.61 (9) | 31.25 ± 0.42 (16) |
| Width of hips, in inches. . . . . | 10.58 ± 0.20 (12) | 12.87 ± 0.10 (12) | 18.94 ± 0.55 (9) | 19.82 ± 0.38 (16) |
| Heart girth, in inches | 48.0 ± 0.26 (12) | 53.5 ± 0.44 (12) | 74.70 ± 0.71 (69) | 76.80 ± 0.94 (16) |

Numbers sampled are shown in brackets.

## Functional Characteristics of the Breed

Bhagnari cattle are primarily used for draft purposes. Little or no attention has been paid to developing the milk producing qualities of the breed. It is, however, observed that under average conditions, cows, after having nursed the calf, yield fair quantities of milk. At the Sibi cattle show the record production per day was as much as 44 lbs. There is a considerable variation in their milk production per lactation, ranging from 1,000 lbs. to 5,000 lbs.

At the government cattle farm for Bhagnari cattle at Dadu, Sind, some records have been obtained. As the calves are not

weaned, milk production figures are only for the actual production after the calves are fed. It is estimated that on an average a calf takes about 1,000 lbs. of milk till weaning. Average production of all tested cows was 1,857 lbs. per lactation, the number sampled being 132. Average production of a special group of 22 cows producing 2,500 to 3,000 lbs. was 2,700 lbs. per lactation, while a small selected sample of 3 cows produced an average of 3,700 lbs. In a study of 128 lactations it was observed that the average lactation period was of a duration of 262 days, while an average of 111 records showed that the dry period was 158 days. An analysis of 131 records showed that the average calving interval was about 397 days.

From records of 28 cows at the Dadu farm it was observed that the average age at calving for the first time was 42.18 months. The minimum and maximum age at first calving observed in this sample was 29 and 50 months, respectively. Average birth weight of female calves was 45.5 lbs., the number of records being 33.

Bhagnari bulls usually start service at the age of about 2 years and 6 months to 3 years. Active breeding life of an average bull from a sample of 17 bulls showed that it was about 8 years ($7.96 \pm 0.88$ years). As a rule Bhagnari bulls are quick breeders.

Bhagnari bullocks are put to work when they are about 3 years of age, although they are not castrated until they are about 4 years old. They are given light work in the beginning but are accustomed to hard work when they have 6 or 8 teeth. As a rule Bhagnari bullocks are very docile, even-tempered and steady workers. It has been observed that these bullocks are particularly useful for heavy draft purposes and in irrigated areas for deep plowing. They are comparatively slow, but this is believed to be amply compensated for by their ability to work for longer hours and pull heavier loads under high temperature conditions.

In the village areas where the roads are dirt tracks only, a pair of bullocks will carry about 1 to 1¼ ton of load in an iron-tired cart at the rate of about 2 to 2½ miles per hour. On smooth, hard roads, in pneumatic-tired carts they are observed to carry as much as 2 tons of load at the rate of 3 to 3½ miles per hour. The daily distance covered in a cart varies from 20 to 25 miles.

The bullocks are observed to keep good physical condition while performing continuous work for very long hours. During intensive field operations they work 10 to 12 hours per day,

otherwise they work for 8 to 10 hours a day. In the towns and cities where they work mostly in carts hauling heavy loads they work practically throughout the year. In the field work, depending upon the area, they work 6 to 9 months in a year.

The breed had never been primarily utilized for production of meat but judging from the conformation, heavy liveweight, and tendency to fatten even under poor feeding conditions, it is conjectured that the breed would be quite suitable for beef production.

Bhagnari cattle are said to be hardy and fairly resistant to a number of tropical diseases, but no experimental studies are available to substantiate the statement.

## Performance in Other Areas

### *The Punjab*

The Bhagnari breed has been imported to the Dera Ghazi Khan district of the Punjab and utilized for grading-up the local cattle for the last 100 years. The breed, in this new environment, is known as Dajal.

The climatic and agricultural conditions of the Dajal tract are very similar to those in the Bhagnari tract and the breed has been observed to do very well in the Dajal tract for a very long time.

The Government of Pakistan has recently established a Bhagnari cattle breeding farm at Quadirabad, in the Dajal area, to supply superior stock. It is hoped to utilize the draft quality of the breed for some of the neighboring districts of the Punjab.

### *Sind*

In Sind, Bhagnari cattle are in great demand in the irrigated areas on the right bank of the river Indus. In north Sind they are used for most heavy field operations and are very much liked by the cultivators. The Government of Sind has established a Bhagnari cattle farm at Dadu. In the villages of the districts of Jacobabad, Larkana and Sukkur, Bhagnari bulls are used to improve the indigenous cattle.

### Sources of Breeding Stock and Information Regarding the Breed

Accurate census figures for Bhagnari cattle in Kalat State are not available. It is, however, estimated that the total number is about 400,000, while the estimates for the Dajal tract are over a million (Anonymous, 1949).

Breeding stock is usually available from the villages of the Kachhi subdivision of Kalat State in Baluchistan. The following villages are specially noted for excellent stock: Mithri, Bhag, Chhelgarhi, Hajishahr and other small villages North of Jacobabad.

There is an annual cattle fair at Sibi in Baluchistan during the month of February where large numbers of Bhagnari cattle are sold. The Deputy Director of Animal Husbandry, Quetta, Baluchistan, may be contacted for help and advice.

Animals of the Dajal strain of Bhagnari are available at the cattle fairs held at Dajal, Dera Ghazi Khan, Multan and Jhang.

Further enquiries regarding the breed may be made to the

1. Deputy Director, Animal Husbandry Department, Quetta, Baluchistan.

2. Animal Husbandry Commissioner to the Government of Pakistan, Karachi, Pakistan.

## GAOLAO

### Origin

Olver (1938) and Phillips (1944) classify the Gaolao cattle [1] in the group which are shorthorned, white or light-gray in color, with a long coffin-shaped skull, orbital arches not prominent and with a face slightly convex in profile. Olver also observes that the native home of the breed is located along the route taken by the Rig Vedic Aryans from the Northern passes through Central India to the South. There is a close similarity between the Ongole and the Gaolao except the latter are much lighter, with greater agility.

Parnerker observed in 1952 that in the 18th century the

[1] *See* Figure 25.

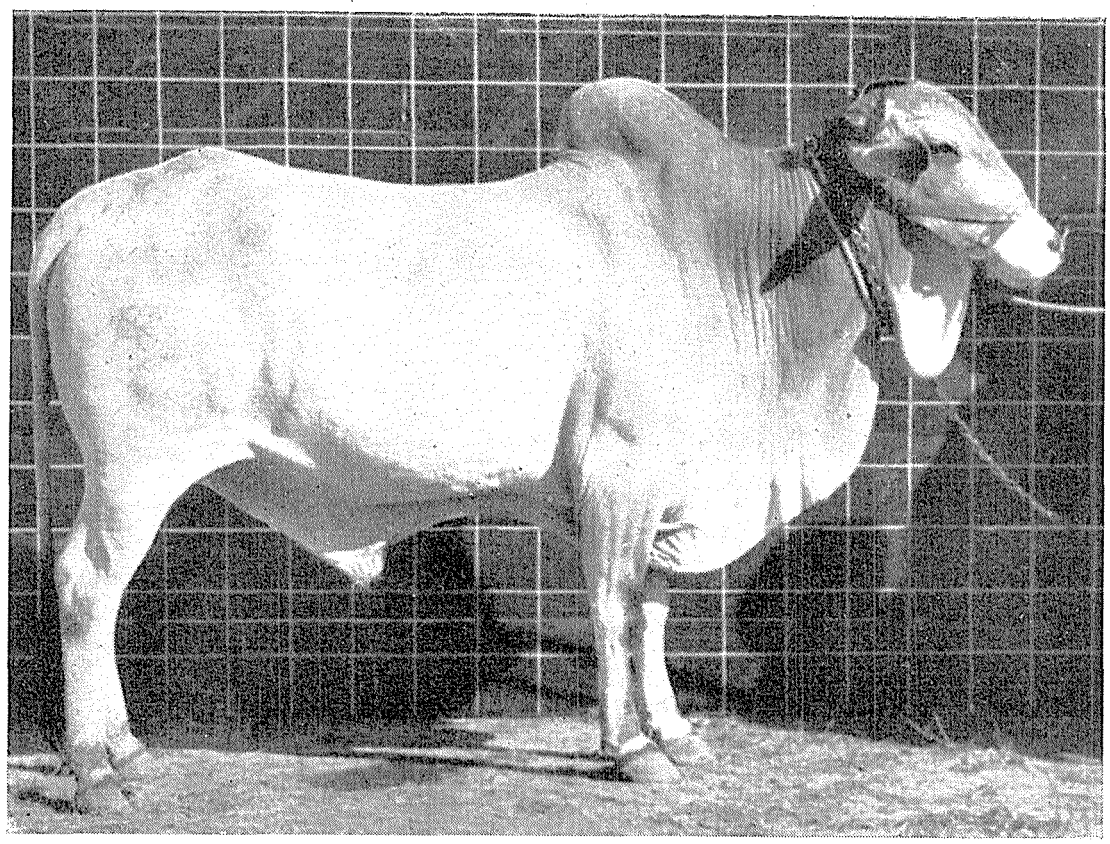
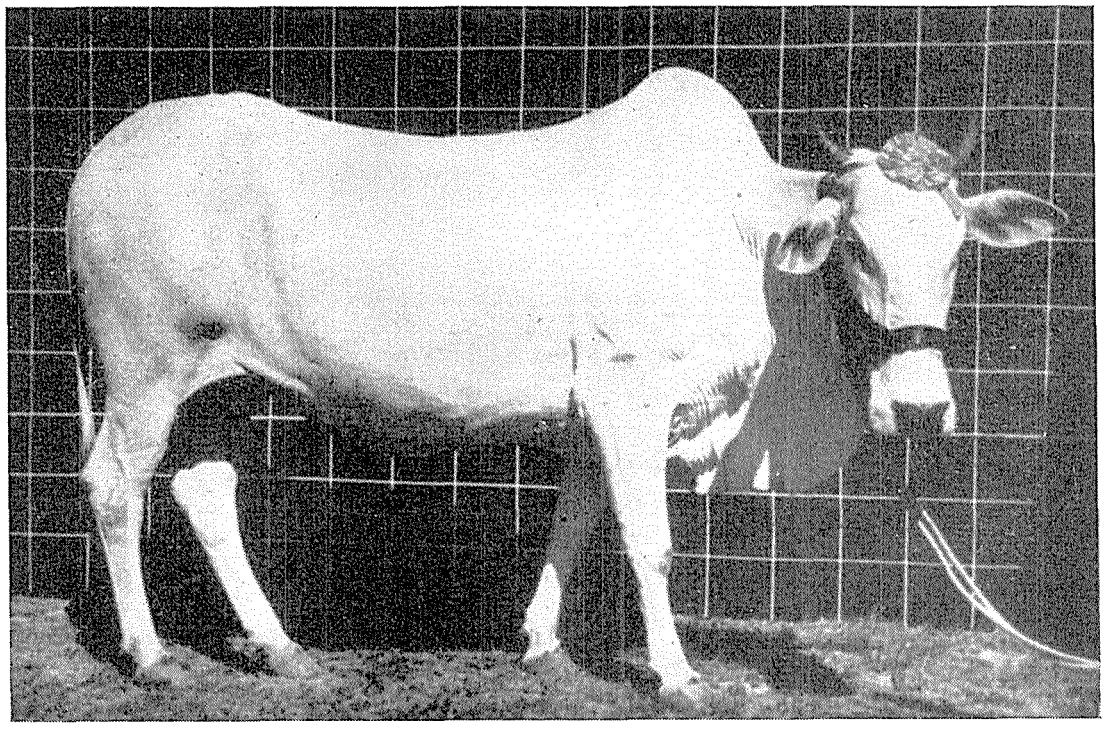


FIGURE 25. Gaolao cattle, found in Madyha Pradesh, closely resemble the Ongole breed. The bullocks are noted for their quick movement, but the cows have only a moderate milking capacity. Above: a Gaolao bull. Below: a Gaolao cow.



Marathas developed this breed into a fast-trotting type suitable for quick army transport in the hilly areas of Gondwana, Madhya Pradesh. It was used mainly for military purposes by the Maratha army when invading the local Gond Kingdom. Old historical records show that the breed had fair milk-producing capacity, but during the last two centuries selection has been directed mainly towards developing a capacity for quick draft. The breed is found principally in the districts of Wardha, Nagpur and Chindwara.

## Conditions in the Native Home of the Breed

### *Location, Topography and Soils*

The area where most of the Gaolao cattle are bred is hilly and consists of a long strip of land extending from northwest to southeast, the principal rivers being the Wardha and the Wainganga. There are numerous streams, the more important being the Bor, the Kannan, the Dham and the Asoda. All of these have rapid flow eastwards and are observed to cause much erosion. An outlying spur of the Satpura range runs down through the area. Most of the Arvi subdivision, which is supposed to be the center of the best specimens of the breed, is hilly. The southern portion is an undulating plain intersected by streams and broken here and there by isolated hills. The average altitude of the area is about 2,000 feet above sea level.

Nearly the whole area consists of a thin covering of black or brown soil over a sheet of trap rock. This soil varies in depth from 10 feet to a few inches, the average thickness being about 2 feet. The best black soil is found principally in the level ground along the left bank of the Wardha River. In the hilly country of the north, shallow brown soil is found mixed with sand.

### *Climate*

The summer becomes oppressive, particularly during the months from April to July. Winters are very mild. Climatological data for the area are summarized in Table 25, on the next page.

**Table 25. Climatological Data for Gaolao Area**

| MEASURE OF CLIMATE | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mean maximum temp. °F . . . | 79.0 | 82.5 | 90.8 | 98.1 | 102.0 | 93.6 | 83.9 | 81.8 | 84.8 | 86.9 | 82.1 | 78.2 |
| Mean minimum temp. °F . . . | 50.4 | 54.1 | 61.3 | 70.1 | 76.5 | 75.2 | 71.9 | 70.8 | 69.4 | 62.5 | 54.5 | 48.4 |
| Humidity per cent at 0800 hrs. I.S.T. . . | 70.0 | 64.0 | 52.0 | 41.0 | 44.0 | 69.0 | 83.0 | 84.0 | 79.0 | 65.0 | 66.0 | 71.0 |
| Rainfall, in inches . . . . | 0.93 | 0.95 | 0.71 | 0.41 | 0.77 | 6.84 | 10.58 | 10.3 | 7.07 | 1.76 | 1.06 | 0.45 |

Information from Indian Meteorological Department, New Delhi, India.

*Vegetation*

The Forest Department has preserved large areas of land at strategic places in the tract for the conservation of soil. These are mainly grasslands for grazing, and harvesting of grass for hay-making is allowed. Grazing is usually available from the middle of July to the end of October. Grasses mature quickly and become coarse and woody. These are harvested and preserved as hay for dry weather.

The following species of grasses are commonly found : *Cynodon dactylon, Andropogon annulatus, Iseilema (Anthistiria) wightii, Iseilema laxum (Anthistiria laxa), Andropogon contortus* and *Apluda varia.* The soil is suitable for growing crops such as sorghum, paddy, cotton, *Cajanus cajan, Cicer arietinum,* linseed and groundnut. Sorghum is grown extensively and the seed is used for human consumption while the stover is utilized for cattle. Lentils are also grown.

*Management Practices*

In general, cultivators do not keep more than six or eight animals but big landlords usually keep much larger numbers. An average big landlord in Arvi subdivision may carry as many as 100 head of cattle in his herd. He usually depends on the grazing that may be available in the nearby grasslands. For dry weather feeding, sufficient quantities of hay and sorghum stover are preserved. Cows and young stock are usually undernourished, but bullocks and young male calves ready for sale are usually

well-fed. Concentrates such as cottonseed, linseed or groundnut cake and rice bran are given.

A great deal of attention is paid to the training of young bullocks, particularly for speed: bullocks hitched to light carts are trained for racing, small wooden prods with sharp iron tips being occasionally used to goad the bullocks to run fast.

## Physical Characteristics of the Breed

Gaolao animals are of medium height, of rather light build and tend to be narrow and long. The head is markedly long and narrow with a straight profile usually tapering towards the muzzle and somewhat broader at the base of the horns. The forehead is usually flat, though it appears to recede at the top, giving a slightly convex appearance. The eyes are almond-shaped and placed slightly at angles. The ears are of medium size and are carried high. The horns are short and stumpy, blunt at the points and commonly slope slightly backwards.

The neck is short, with a moderately well-developed hump, which is usually loose and thus hangs on one side. The hind quarters are slightly drooping. Limbs are straight and muscular. Hooves are of medium size, hard and durable, and suited to hard road and hillside work. The dewlap is voluminous but the sheath is only moderately developed. The skin is thin but loose. The tail is comparatively short, reaching only a little below the hocks. Females are usually white and males gray over the neck, hump and quarters. Average data on certain body measurements are summarized in Table 26.

**Table 26. Average Measurements of Gaolao Cattle**

| MEASURE | Mature male | Mature female | Mature ox |
|---|---|---|---|
| Weight, in pounds . . . . . | 950 | 750 | 900 |
| Length from shoulder point to pin bones, in inches . . . . . | 47 | 41 | 43 |
| Height at withers, in inches . . . . | 57 | 49 | 50 |
| Heart girth, in inches . . . . . | 72 | 67 | 69 |

Data from the Government Cattle Breeding Farm, Garhi, Madhya Pradesh, India.

## Functional Characteristics of the Breed

As mentioned earlier, the breed has been developed for fast transportation purposes in hilly country. Within the last 20 years, however, more attention has been devoted to milking qualities, although, on account of poor feeding conditions, heifers calve late, at the age of four years or more. Though there is no regular breeding season, it is said that the majority of the animals breed from February to May and again in the months of October and November. Males start serving when they are about 2½ years old and the active breeding life is about 7 to 8 years. They are observed to be quick breeders. With regard to milk production, it has been observed that the average production of special groups of cows has been 1,800 pounds of milk in 250 days. The average calving interval has been 13 months. Superior animals have produced 2,660 pounds of milk in 381 days, with a calving interval of about 15 months, and an average percentage of fat of 5.5.

Male calves are castrated and trained for light work when they are about 2½ years old and weigh about 600 lbs. Gaolao bullocks, if properly trained, are active and willing workers. With an average load of a half ton in an iron-tired cart, a pair of bullocks can travel 20 to 25 miles a day within 7 to 8 hours actual travel. They are used for all kinds of agricultural work such as plowing, sowing, intercultural operations, threshing, lifting water from wells for irrigation, hauling agricultural produce to the markets, etc. It is estimated that they work for 270 days in a year at the rate of 8 to 10 hours per day.

## Performance in Other Areas

It is only recently that the breed has been utilized for grading local scrub cattle in the districts of Yeotmal and Amraoti and Raigarh tract of Balaghat district in Madhya Pradesh, and no data are available on the results.

## Sources of Breeding Stock and Information Regarding the Breed

It is estimated that there are about 440,000 head of Gaolao cattle in Madhya Pradesh (Anonymous, 1946). For further information regarding the breed, the following may be contacted:

1. Director of Civil Veterinary Services, Madhya Pradesh, Nagpur, India.

2. Secretary, Go Seva Sangh, Wardha, Madhya Pradesh, India.
3. Animal Husbandry Commissioner to the Government of India, New Delhi, India.

## HARIANA

### Origin

The Hariana breed [1] belongs to the group of cattle which are shortherned, white or light gray colored with a long coffin-shaped skull, orbital arches which are not prominent and with the face slightly convex in profile (Phillips, 1944). This type presumably entered through the northern passes with the Rig Vedic Aryans (Olver, 1938). There is close similarity in types amongst the cattle represented by the Bhagnari breed on the one hand and the Gaolao and the Ongole on the other hand. Ware (1942) supports Olver's view that this group entered India with Aryan invaders and further mentions that according to Smith (1923) this invasion occurred between 2,200 and 1,500 B. C. All the breeds represented in this group are located along the route taken by the invaders from the northern passes through Central India to the south, stretching from Kalat in Pakistan to a point on the southeast, a few miles north of Madras, India.

Hariana cattle take their name from the tract known as Hariana situated in the East Punjab, India, and lying between 28°30′ and 30° north latitude and 75°45′ and 76°30′ east longitude, chiefly in the eastern half of Hissar district and also comprising part of Rohtak and Gurgaon districts, and the States of Jind and Patiala. The name of Hariana is most probably derived from "*Hari*" (green) and is reminiscent of a time when this was a rich and fertile tract. Archaeological remains show that the country watered by the Sarswati was once the scene of a flourishing Hindu civilization (Anonymous, 1908). Olver (1936) observes that in Hariana cattle of the Delhi-Rohtak-Gurgaon tract is an example

[1] *See* Figures 26 and 27.

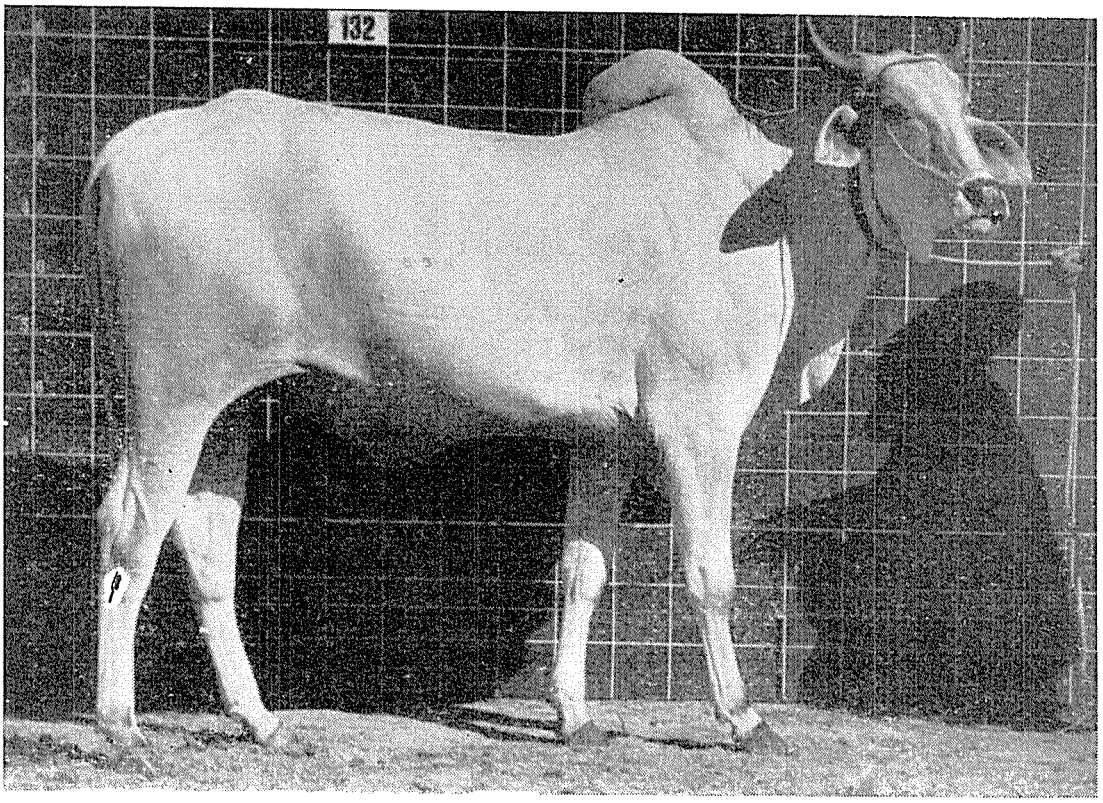



FIGURE 26. Harianas are found extensively in the northern part of India, particularly in the Punjab and Western Uttar Pradesh. The bullocks are powerful work animals.

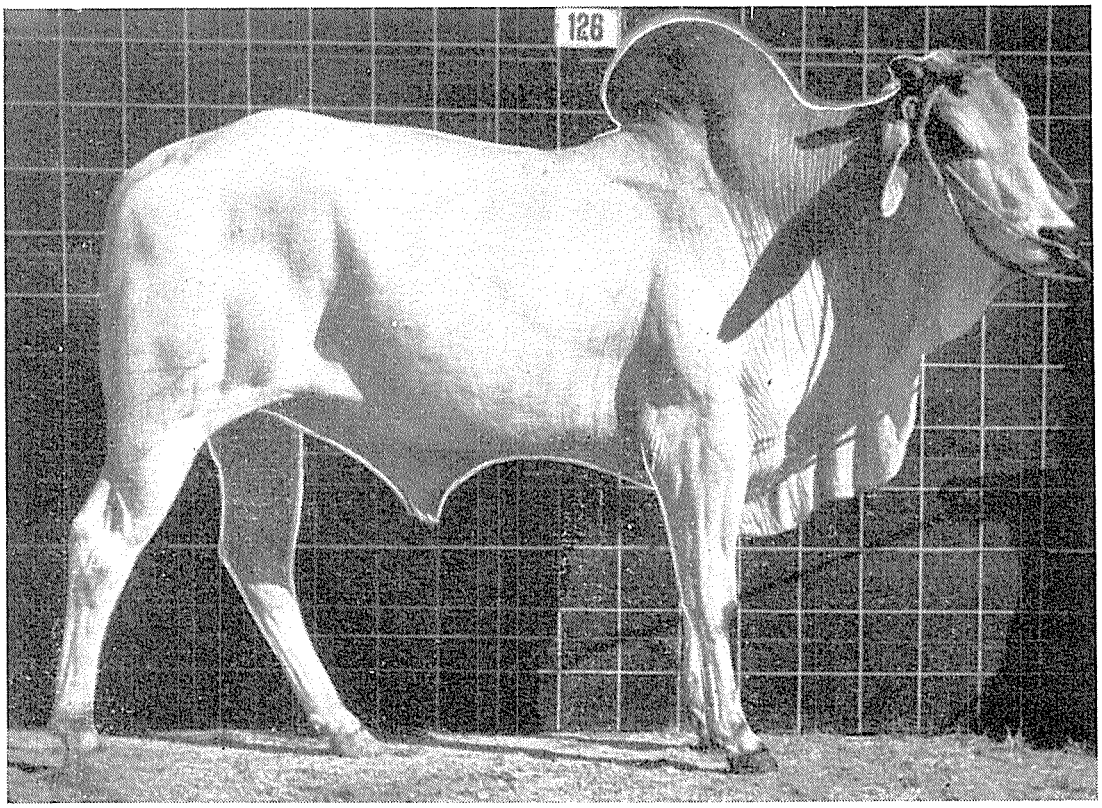
of an original draft breed in which development of milking qualities has received some attention, during the days of the Moghul Emperors when large quantities of milk were no doubt required in this area.

Besides the Hariana tract the breed is produced in more or less pure form in the territories represented by the States of Jind, Nabha, Patiala, Jaipur, Jodhpur, Loharu, Alwar, Bharatpur and the western districts of Uttar Pradesh such as Meerut, Bulandshahr and Aligarh.

## Conditions in the Native Home of the Breed

### *Location, Topography and Soils*

The Hariana tract, as mentioned above, forms a part of the East Punjab State in India. It is an irregular oval in shape, with its long axis lying northwest and southeast. On the northwest it is bounded by the Ghaggar Valley; on the west, southwest and south by the Bagar and Dhundauti or sandy tracts which



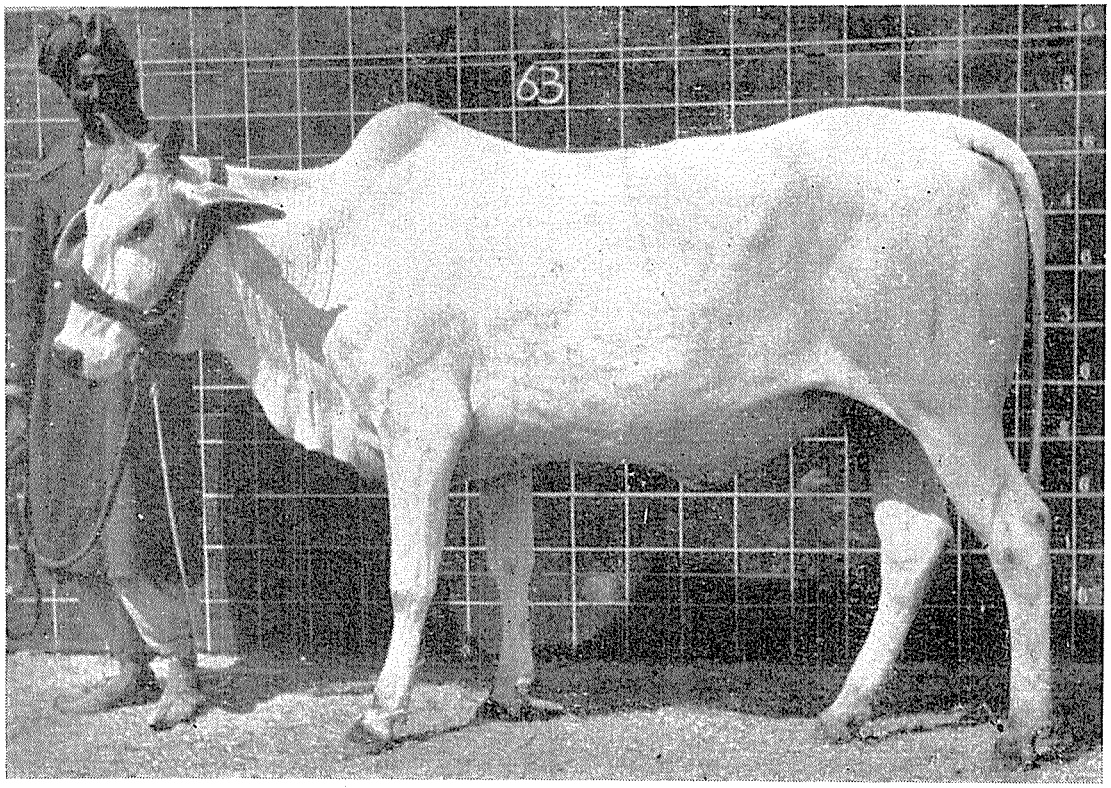




FIGURE 27. The Hariana is supposed to be one of the best dual-purpose breeds in India. Milk production of the cows is estimated average about 3,000 pounds per lactation. Above: a Hariana bull. Below: a Hariana cow.

are a continuation of the Rajasthan desert comprising particularly parts of Bikaner; on the east it is bounded by the Yamuna River. The average altitude of the area is about 700 feet above sea level.

The leading feature of the tract is its firm clay soil. In the Rohtak district the soil is mostly light colored alluvial loam; in Hissar, soft loam with reddish tinge interspersed with sand and clay. In some parts of the area, sand hills are present and in the low-lying parts the clay is hard. Calcareous limestone is also found in some parts of the area. All soils give excellent crop returns with sufficient rains but, unless irrigated, fail entirely in times of drought, though sandy soils as are prevalent in this area can yield good crops even with less rain. Saline efflorescence is not uncommon where the drainage lines have been obstructed. The average water level is quite deep, ranging from 60 to 100 feet, except in areas where there are canals where the water table may be 30 or 40 feet deep.

*Climate*

The Hariana tract has a relatively dry climate. Average annual rainfall for this area is about 18 inches. Rains usually occur during the months of July, August and September. During the summer months, day temperatures may go as high as 115°F., and sandstorms are common. Average wind velocity from May to August may vary from 2.2 to 4.2 miles per hour. Average climatological data are summarized in Table 27.

**Table 27. Climatological Data for the Hariana Tract**

| MEASURE OF CLIMATE | AVERAGE DATA BY MONTHS | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
| Mean maximum temp. °F . . . | 70.8 | 76.2 | 87.8 | 97.8 | 105.3 | 105.6 | 99.6 | 96.3 | 96.7 | 94.6 | 84.3 | 74.2 |
| Mean minimum temp °F . . . | 41.4 | 47.2 | 56.8 | 66.7 | 76.0 | 82.2 | 81.2 | 79.0 | 74.5 | 63.2 | 49.8 | 43.2 |
| Humidity per cent at 0800 hrs. I.S.T. . . | 72.0 | 68.0 | 54.0 | 44.0 | 39.0 | 51.0 | 70.0 | 73.0 | 68.0 | 57.0 | 57.0 | 72.0 |
| Rainfall, in inches . . . . | 0.50 | 0.54 | 0.64 | 0.26 | 0.54 | 1.26 | 4.28 | 4.87 | 2.81 | 0.61 | 0.06 | 0.39 |

Information from the Indian Meteorological Department, Government of India, New Delhi, India.

*Vegetation*

Various field crops such as *Pennisetum typhoideum, Sorghum vulgare* and *Eleusine coracana* are grown. Lentils and chickpeas are also grown. Barley, wheat and oilseed crops such as sesamum, rapeseed, mustard are also commonly sown. By-products from these crops are utilized for cattle feeding. In canal-irrigated areas in the tract fodder crops such as maize, Egyptian clover and sunflowers are occasionally grown, especially for cattle.

The tract has the following species of grasses which are extensively used for grazing as well as for haymaking; *Cynodon dactylon, Cyperus tuberosus, Eleusine aegyptiaca, Cenchrus echinatus, Pennisetum cenchroides, Panicum colonum* and *Andropogon annulatus.* A stunted kind of Zizyphus, *Zizyphus nummularia,* is extensively found in the area. Its leaves are greatly valued for cattle feeding.

*Management Practices*

The majority of breeders of Hariana cattle own less than twenty acres of cultivable land and they generally keep from 6 to 10 head of cattle each. The cattle are grazed on community pastures; usually there are considerably more cattle on these pastures than there should be in relation to their optimum carrying capacity. When rains are adequate, animals have enough to graze for 8 to 10 weeks.

Hariana cows are mainly kept for producing bullocks for sale, the milk yield being a secondary consideration. Usually only half of the milk is drawn from a cow during the first 2 or 3 months and the remainder is left to the calf to suck, especially if it is a male calf. Calves are generally reared on milk alone for the first month or six weeks, after which some grain and green fodder is allowed to the calf. Good milking cows are given stall feeding besides grazing.

During winter and summer months when there is no grazing cattle are fed chopped dry Sorghum or millet stover; straw from pulses along with leaves of *Zizyphus nummularia* is also fed. In early summer, ground chickpea and oats along with wheat straw is fed. Heavy yielders and working bullocks are also given concentrated feeds such as cottonseed, oilcakes, chickpeas, mungo

beans and cluster beans. Migration of cattle generally takes place when there is general famine on account of scanty rains.

## Physical Characteristics of the Breed

Animals of the Hariana breed are well-proportioned and compact in build. The head is carried high, giving a graceful appearance. The face is long and narrow with a flat or slightly convex forehead. There is a well-marked bony prominence at the center of the poll which is said to be characteristic of the breed. The muzzle is wide and black in color. Eyes are large and bright. Ears are relatively small and slightly pendulous. They are approximately 12 to 13 inches long. Horns are fine and short, ranging from 4 to 9 inches in length, being thinner in females than in males, and while more or less horizontal when short, may curve upwards and inwards as they grow. Banana horns, loose at the base, are occasionally seen but not favored by the breeders.

The neck is moderately long, thin and fine; it is thick in bulls and gives the appearance of being short on account of a big and well-developed hump, and is wide and strong in bullocks. The dewlap is small, thin and free from flesh folds but is fairly large in bulls. Approximate length of the dewlap is indicated by measurements on bullocks, from a sample of 40 bullocks which ranged from 52 to 75 inches with an average of 62 inches; the width ranged from 7 to 14½ inches with an average of 10 inches while the thickness of the dewlap ranged from 0.3 to 0.5 inches.

The hump in the males is large but decreases in size considerably after castration. It is of medium size in females. Limbs are moderately long and lean. Feet are small and the hooves are well-shaped, hard and black in color. The back is long and straight with good depth and breadth in males but slightly sloping forward in cows. The sheath is short and tight and the navel flap is very close to the body.

Hindquarters are slightly higher in females than forequarters. Loins are broad and level. Hips are broad and smoothly covered. The rump is broad but slightly sloping. The tail is rather short, thin and tapering, and carries a black switch reaching just below the hocks. The udder in the females is relatively capacious and extends well forward and behind. The teats are medium-sized, the fore teats being longer than the hind teats. The skin is fine,

thin and tight around the body. It ranges in thickness from 0.3 to 0.6 inches. It is of black color and is covered with a white or gray coat. In the case of bulls the color over the front quarters and hindquarters is slightly dark or dark gray. Any color other than white or gray is considered a disqualification for entry into the Hariana breed registry. Similarly, a white switch is also a disqualification.

Average data on certain body measurements are summarized in Table 28.

**Table 28. Average Measurements of Hariana Cattle**

| MEASURE | At one year | At two years | Mature |
|---|---|---|---|
| ***Females*** | | | |
| Weight, in pounds | 200.0 | 465.0 | 785.0 |
| Length from shoulder point to pin bones, in inches | 35.5 | 41.6 | 53.8 |
| Height at withers, in inches | 38.0 | 43.2 | 52.2 |
| Depth of chest, in inches | 12.8 | 14.8 | 23.3 |
| Width of hips, in inches | 10.5 | 13.4 | 17.4 |
| Heart girth in inches | 43.0 | 56.0 | 67.1 |

| MEASURE | At one year | At two years | Mature bull | Mature ox |
|---|---|---|---|---|
| ***Males*** | | | | |
| Weight, in pounds | 192.0 | 710.0 | 800–1 100 | 1 175 |
| Length from shoulder point to pin bones, in inches | 34.6 | 49.7 | 60.3 | 58.6 |
| Height at withers, in inches | 37.6 | 48.4 | 56.3 | 56.4 |
| Depth of chest, in inches | 11.5 | 20.6 | 26.7 | 26.8 |
| Width of hips, in inches | 10.0 | 13.2 | 20.0 | 18.6 |
| Heart girth in inches | 39.0 | 62.0 | 76.0 | 69.2 |

Data collected from Government Livestock Farm, Hissar, The Punjab, India.

## Functional Characteristics of the Breed

The Hariana breed is one of the most important dual purpose breeds of cattle in Northern India. The bullocks are powerful work animals, particularly for fast plowing and road transport. Cows are capable of producing a fair amount of milk and on account of this quality they are exported in large numbers from

their native area to the large towns of North and East India, notably, Cawnpore, Allahabad, Banares, Patna and Calcutta.

The Hariana breed of cattle cannot claim to be termed as early maturing. The average age at first calving is observed to be about 54 months, while the range lies between 33 to 72 months. Bhattacharya *et al.* (1950) observe from a study of 647 animals and 1,892 calvings that the average gestation period is 287 days. It is slightly shorter for female calves than for male calves. The incidence of twinning was observed to be 0.09 percent.

Average age of Hariana bulls when they are first ready to serve is about 3½ years; they are observed to be quick at service, and the active breeding life of a bull is estimated to be about 10 years. It is observed from a study (Aggarwala, 1952) of 10 bulls and 115 cows that the reaction time to consummate service for the bulls varied from 5 seconds to 1 hour, 52 minutes and 30 seconds, while the average time taken was 21 minutes and 35 seconds. The reaction time is taken as the interval between bringing the bull to a cow and the actual time of ejaculation.

Young males which are not to be retained for breeding are castrated at the age of about 3 years and gradually trained for working in plows and carts. Hariana bullocks are observed to be even-tempered, active and willing workers. On dirt tracks the bullocks work without shoes but when they work in carts on hard roads they are usually shod. On an average, a pair of bullocks can pull a load of about a ton in an iron-tired cart on a hard road at the rate of 2 miles per hour. They are supposed to cover a distance of 20 miles in a working day. In the Hariana tract itself a pair of bullocks can do all field operations including transportation of produce on a holding of approximately 14 acres.

Hariana cows are in great demand in the large towns in Uttar Pradesh, Bihar and Bengal, India. Data obtained in rural areas of the tract indicate that the cows average approximately 3,000 pounds of milk in a lactation period. Smith (1930) and Kothavalla and Kartha (1939) present data showing range in production per lactation from 1,562 to 6,742 pounds of milk. Dastur and Kothavalla (1946) have summarized the data based on 424 lactations of the Hariana cattle maintained at the Government Cattle Farm, Karnal, the Punjab, for a period of 12 years: the

average milk yield of purchased Harianas was 2,379 pounds in 255 days with 150 days dry, while the average yield of farmbred Harianas was 3,634 pounds in 304 days with 106 days dry, the highest yield observed being 7,412 pounds in 344 days.

From the Memorandum of the Ministry of Agriculture (1950) it is observed that from 427 individual records of Harianas from recognized farms the average milk yield from farmbred Harianas was 3,275 pounds in 301 days with 123 days dry, while from 97 individual records of purchased Harianas the average milk yield was 3,053 pounds in 296 days with 157 days dry.

Records from the Government Livestock Farm, Hissar, East Punjab show that the average production of all tested cows was 1,332 pounds of milk in a lactation period of 166 days, while the average production of superior cows was 2,938 pounds of milk testing 4.0 to 4.8 percent butterfat in 324 days. The average calving interval was observed to be about 19 months. From the same farm production records of various lactations for 3 years, 1948 to 1951, are summarized in Table 29.

**Table 29. Milk Production Records in Various Lactations**

| ORDER OF LACTATION | Number of records | Pounds of milk | Days in milk |
|---|---|---|---|
| 1st lactation . . . . . | 17 | 1 375 | 273 |
| 2nd ,, . . . . . | 92 | 1 785 | 263 |
| 3rd ,, . . . . . | 84 | 1 887 | 273 |
| 4th ,, . . . . . | 48 | 1 738 | 320 |
| 5th ,, . . . . . | 26 | 1 913 | 285 |
| 6th ,, . . . . . | 13 | 2 117 | 263 |

Observations at the Government Livestock Farm, Hissar, East Punjab, 1948-1951.

Singh and Tandon (1942) and Singh and Bhattacharya (1949) have studied the occurrence and mode of inheritance of syndactalysm or uncloven hoof in the Hariana breed of cattle. Flexed fetlocks have also been observed in Hariana cattle. Both of these characters are recessive and detract from the value of the animals as draft cattle.

Lall (1948) has studied the dentition in Hariana cattle. He

observes that the first pair of permanent incisors come up in about 50 percent of the animals at about 2 years, while at 2½ years all of them will have this pair. By the third year the second pair of incisors is up, and in the fourth year the third pair of incisors is up. The permanent dentition is complete between 4 ½ to 5 years. In the Hariana cattle examined in Bengal, dentition is slightly later. It seems that, compared to temperate zone cattle, the Harianas complete their dentition later.

Average body temperature, pulse rate and rate of respiration in Hariana cattle studied at the Indian Veterinary Research Institute, Izatnagar, India, are given in Table 30.

**Table 30. Average Body Temperature, Pulse Rate and Rate of Respiration in Hariana Cattle**

| AGE | No. of animals considered | Body temperature | Pulse rate | Rate of respiration |
|---|---|---|---|---|
| 3 months | 12 | 101.93 | 76.1 | 19.4 |
| 6 months | 12 | 101.77 | 73.0 | 18.0 |
| 1 year | 12 | 101.77 | 71.5 | 19.3 |
| 1 ½ years | 12 | 101.36 | 63.6 | 18.1 |
| 2 years | 12 | 101.18 | 58.3 | 17.7 |
| 3 years and above | 12 | 101.01 | 57.5 | 17.2 |

## Performance in Other Areas

Kaura (1950) reports that combination of draft and milk qualities in this breed along with its hardy constitution and ability to thrive in a variety of climates has led to its wide use in other States of India, particularly in Uttar Pradesh and Bengal, for pure breeding as well as for grading-up local inferior cattle.

In Uttar Pradesh, purebred herds are being maintained at the Government Farms at Madhurikund, Mathura, Aligarh, Jhansi and Babugarh. The average milk production of Hariana cows, based on 140 individual records at the Government Cattle Farm, Jhansi, was 2,970 pounds in 334 days with 110 days dry (Anonymous, 1950). Similarly milk production based on 132 records at the Government Cattle Farm, Madhurikund, was 2,815 pounds in 284 days with 118 days dry. In Uttar Pradesh, the Hariana

breed is used to grade-up the local cattle in the dry western districts where the average rainfall is 25 to 30 inches and the summer is very hot and dry, and also in the central, slightly humid districts where the average rainfall is from 35 to 45 inches but the summers are equally hot and dry.

Hariana cattle have been extensively used in grading-up local cattle in Bengal. No information is available regarding their behavior under the climatic and environmental conditions prevalent in Bengal. Large numbers of Hariana cows are maintained in Calcutta by the milk sellers. A herd of Hariana cattle is maintained at the Livestock Research Station at Haringhata, near Calcutta. The average yield of 156 cows at this farm in 1950 was 2,880 pounds with a calving interval of 417 days.

### Sources of Breeding Stock and Information Regarding the Breed

Hariana cattle are regularly sold in large numbers through accredited cattle dealers in the Hariana tract. Cattle breeding societies working under the guidance of the Indian Council of Agricultural Research, New Delhi, promote the various activities for the breed such as registration, testing, sale, etc.

It is estimated that there are approximately 1,191,000 Hariana cattle in its native home.

Further information regarding the breed may be had from:

1. The Animal Husbandry Commissioner, Government of India, New Delhi, India;
2. The Director, Veterinary Services, Punjab, Simla, India.

## KRISHNA VALLEY

### Origin

The Krishna Valley breed of cattle [1] is used exclusively in the black cotton soil of the watershed of the River Krishna and other

[1] *See* Figure 28.

adjacent rivers such as Ghatprabha and Malprabha in the southern portions of Bombay State and Krishna Valley tract of Hyderabad State (Anonymous, 1926-c).

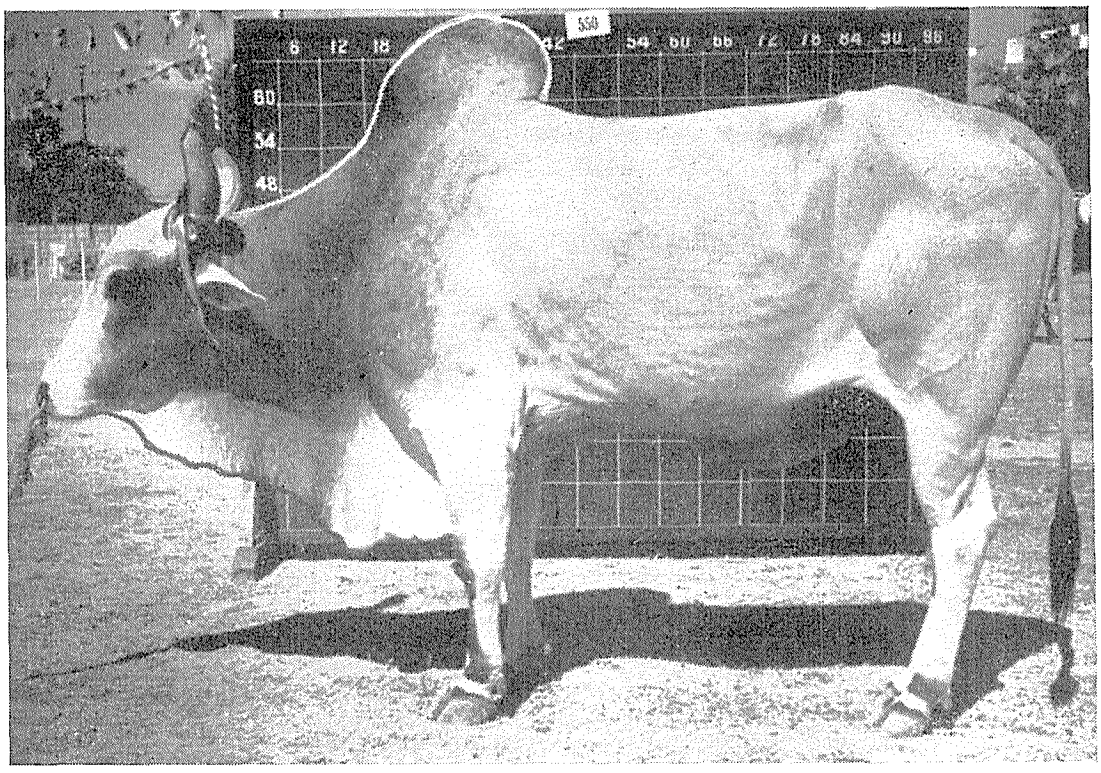
The breed is of recent origin: it is claimed that during the last two decades of the nineteenth century some of the Rajas of the Southern Mahratta country which lies in the watershed of these rivers tried to evolve a powerful bullock for agricultural purposes in the sticky black cotton soil. It is claimed that Gir cattle from Kathiawar, Ongole cattle from Madras, possibly Kankrej from Gujarat, and local cattle having Mysore-type blood in them were used to evolve the Krishna Valley breed. Maharaja Sangli, at one time a well-known breeder of Krishna Valley cattle, contributed substantially in making judicious use of all these strains to produce the desired type of animal which eventually became known as Krishna Valley. As animals of this general type were used for breeding on a wide scale even before the characteristics were fixed to any extent, there is wide variation in the characteristic of the breed. Massiveness in size was the chief dominating factor which attracted the attention of the cultivators.

The breed is found in the districts of Satara, Belgaum, Dharwar and parts of Bijapur of Bombay State and also in the native States of Miraj, Sangli, Kolhapur and Jamkhindi which are now part of Bombay State also. They are also bred in the southwestern part of Hyderabad State. The longitudinal position of the area is approximately between 15°8′ and 17°8′ N. and 74° and 78°E. The shape of the area resembles a long boot with its toe towards the east.

## Conditions in the Native Home of the Breed

### *Location, Topography and Soils*

The whole area is on a plateau east of the Sahyadri range of hills, also known as the Western Ghats. The average altitude of the area ranges from 1,800 to 2,500 feet above sea level. The whole area is broken by low ranges of hills mostly covered with brushwood, and the valleys are shallow: as mentioned elsewhere the principal rivers are Krishna, Ghatprabha and Malprabha while



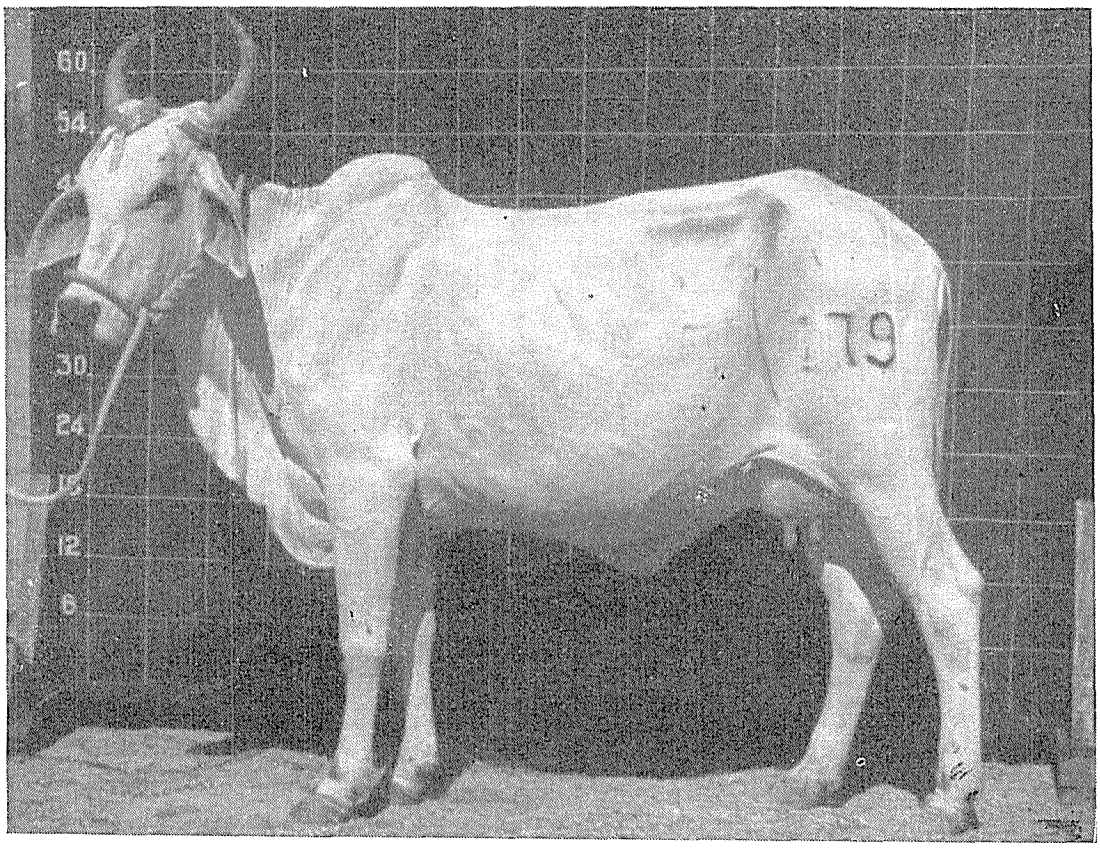


FIGURE 28. The Krishna Valley is a recent breed, and the type is not well fixed. The bullocks are massive, powerful animals useful for slow draft and heavy plowing. The cows are fair milkers. Above: a Krishna Valley bull. Below: a Krishna Valley cow.

there are several smaller streams with only a seasonal flow so that during hot months they usually dry up. The soils belong to three main classes: red, in the hills; black, which is generally found near the river banks, and most widely distributed in the Krishna Valley; and a third of light gray color and full of gravel. The black soil is particularly fertile. One of its varieties of black soil being friable but, when impregnated with moisture, forming a tough clay almost impervious to water, so making a valuable lining for tanks. The gray soil is not so tenacious and unless it receives abundance of irrigation it is not very productive: it also requires far more dressings of manure compared with black soil.

*Climate*

Rainfall and other pertinent meteorological observations are given in Table 31.

**Table 31. Climatological Data for the Krishna Valley Tract**

| MEASURE OF CLIMATE | Jan. | Feb. | March | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mean maximum temp. °F . . . | 83.5 | 88.3 | 93.7 | 96.0 | 93.1 | 81.4 | 76.1 | 76.3 | 79.3 | 83.3 | 82.5 | 81.8 |
| Mean minimum temp. °F . . . | 57.8 | 59.4 | 63.7 | 67.1 | 68.2 | 68.2 | 67.2 | 66.4 | 65.5 | 65.3 | 61.5 | 58.4 |
| Relative humidity at 0800 hours, I.S.T. . . . . | 60.0 | 51.0 | 46.0 | 58.0 | 70.0 | 86.0 | 93.0 | 93.0 | 90.0 | 79.0 | 65.0 | 60.0 |
| Rainfall, in inches . . . . | 0.13 | 0.05 | 0.27 | 1.60 | 2.46 | 8.14 | 16.15 | 9.67 | 4.88 | 4.67 | 1.74 | 0.37 |

Information from Indian Meteorological Department, Government of India, New Delhi. Average for ten years.

The climate is generally mild and dry. In the months of April and May there is considerable heat during the day but the nights are pleasant and cool, and even during the summer months there are occasional showers of rain with thunder, causing a considerable decrease in temperature. The cold and dry season

lasts from the middle of October to the middle of February, while the dry summer season is from February to June: from June to the middle of October is usually the rainy season or wet period. Rainfall decreases as one moves from the western portion of the region to the east: it ranges between 50 inches in the west to approximately 30 inches on the eastern side.

*Vegetation*

The dry crops of the tract are *Andropogon sorghum;* this is usually mixed with *Cajanus indicus. Pennisetum typhoideum,* groundnut, *Zea mays, Paspalum scrobiculatum, Eleusine coracana, Cicer arietinum, Dolichos lablab,* and *Phaseolus mungo* are some of the other crops. By-products from all of these crops are utilized for cattle feed. Cotton is extensively grown in the area. Irrigated crops of the area are sugarcane, tobacco, betel vines and various garden crops. Shevri (*Sesbania aegyptiaca*) is grown extensively along the banks of rivers; the plant remains green throughout the summer and the loppings are used for feeding cattle.

In pastures on the banks of the rivers the following grasses are available: spear grass, *Aristida depressa, Dicanthium caricosum* (*Andropogon caricosus*), *Andropogon contortus* and several other varieties which are highly relished by the cattle. Grasses grow quite tall, to a height of 4 feet, and are usually cut for haymaking two or three times during a season, beginning in July and ending in February.

*Management Practices*

Grazing lands in the area are extremely limited. Along the river banks areas which are likely to be flooded and eroded are being preserved with the cultivation of Acacia trees and grasses. Cattle are usually allowed to graze only after the grasses have been harvested for haymaking.

Due to the non-availability of grazing facilities and most of the agricultural land being under intensive cultivation, only useful animals are maintained by the villagers. All animals are stall-fed throughout the years, green feed of both summer-as well as winter-grown sorghum, maize, beans, grasses and hemp being available for about ten months of the year. The usual practice of the

cultivators in the area is to sow broadcast sorghum very thickly and then, when the crop is 3 or 4 feet high, to start thinning it gradually so that adequate green fodder is available every day.

During the dry period when no green feed is available the animals are fed sorghum stover, hay, straw from pulse crops such as *Cajanus indicus* or *Cicer arietinum.* Bullocks are usually fed along with roughages four pounds of concentrates consisting chiefly of *Dolichos biflorus,* crushed chickpea (*Cicer arietinum*), *Cajanus indicus,* or cotton seed. Milking cows are also given about two pounds of concentrates but other stock rarely get anything. It is the usual practice to feed the concentrates before or after milking but never at the time of milking.

Calves are not weaned but the male calves are allowed two teats while female calves are allowed only one teat till the cows go dry. Male calves usually get special care. When they are about 2 ½ years they are gradually broken to work. Between 3 and 4 years of age they are castrated and sold as working bullocks.

As the animals are stall-fed, the breeder is able to control the breeding of his cows. In many villages of the tract, bulls are kept specifically for this purpose, a fee being charged for the use of the bull.

## Physical Characteristics of the Breed

As the breed is an admixture of at least three distinct types, Gir from Kathiawar, Ongole from Madras State and local beasts with blood of the Mysore basic type (Olver, 1938), it shows a variety of characteristics which in its short history of formation have not become well fixed. However, certain characteristics were emphasized by the original breeders and had a greater chance of perpetuation.

The animal is large, having a massive frame with deep broad chest, but is loosely built, measuring 15 to 16 hands on the top of the hump and weighing 1,500 to 1,600 lbs. However, the tendency in the past few years has been to breed a slightly lighter but compact and more agile animal.

The color most sought after is gray-white with a darker shade on the forequarters and hindquarters in the males. Adult females look more white. Brown and white, black and white and mottled colors are often met with. The forehead has a distinct

bulge surmounted by small curved horns which usually emerge in an outward direction from the outer angles of the poll and curve slightly upwards and inwards but which vary a great deal in size and shape. The neck is short and thick and the dewlap is well-developed and pendulous. The sheath is also slightly pendulous. The ears are small and pointed and breeders prefer them not to droop too much.

The body is short but the barrel is large and well-developed. Legs are short and thick and look powerful. Hooves are said to be soft.

Average data on certain body measurements are summarized in Table 32.

**Table 32. Average Measurements of Krishna Valley Cattle**

| MEASURE | At one year | At two years | Mature |
|---|---|---|---|
| ***Females*** | | | |
| Weight, in pounds | 314.0 (3) | 548.0 (3) | 713.0 (31) |
| Length from shoulder point to pin bones, in inches | 38.0 (3) | 48.0 (3) | 52.0 (31) |
| Height at withers, in inches | 40.3 (3) | 46.0 (3) | 48.0 (31) |
| Depth of chest, in inches | 22.3 (3) | 26.0 (3) | 29.0 (31) |
| Width of hips, in inches | 10.0 (3) | 14.0 (3) | 16.0 (31) |
| Heart girth, in inches | 48.0 (3) | 59.0 (3) | 66.9 (31) |

| MEASURE | At one year | At two years | Mature bull | Mature bullock |
|---|---|---|---|---|
| ***Males*** | | | | |
| Weight, in pounds | 349.0 (7) | 606.0 (5) | 1 132.0 (6) | 1210.0 (9) |
| Length from shoulder point to pin bones, in inches | 41.0 (7) | 48.6 (5) | 59.2 (6) | 60.4 (9) |
| Height at withers, in inches | 42.0 (7) | 50.2 (5) | 56.0 (6) | 57.0 (9) |
| Depth of chest, in inches | 24.5 (7) | 29.4 (5) | 34.0 (6) | 36.0 (9) |
| Width of hips, in inches | 10.5 (7) | 15.2 (5) | 18.5 (6) | 18.5 (9) |
| Heart girth, in inches | 50.0 (7) | 60.4 (5) | 75.7 (6) | 77.1 (9) |

Numbers sampled are shown in brackets.

## Functional Characteristics of the Breed

The Krishna Valley is a heavy draft breed suitable for cultivation purposes in the black cotton soil area which becomes extremely difficult to work during the rainy season, and for

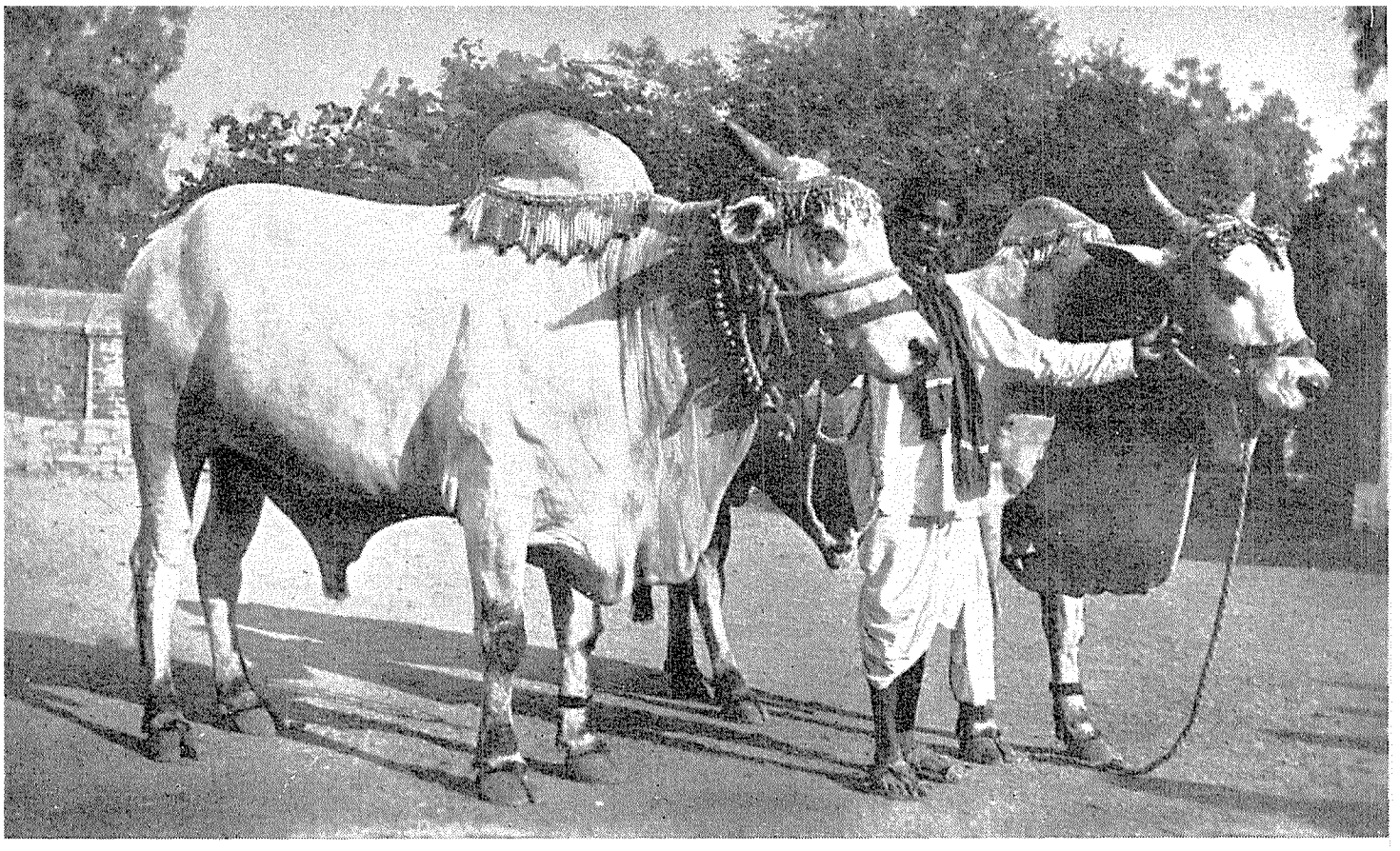


FIGURE 29. A pair of Krishna Valley bullocks. Breeders from Brazil and the United States imported animals of this breed on account of their size and weight, but the cattle did not retain their identity.

hauling heavy loads [1]. On account of contributions from Gir and Ongole it has also potentialities of milk production. However, the milk-producing capacity is extremely variable in the breed and no efforts on the part of the breeders were directed towards improving this characteristic.

Average data of 84 cows from the Government Cattle Breeding Farm at Hyderabad show an average yield of 2,147 pounds of milk in 271 days with a dry period of 193 days. Also records from recognized farms show an average of 2,731 pounds of milk in 314 days with a dry period of 164 days.

Average age at first calving is about 4 years. Males, which are usually well-fed, start serving when they are about 2 ½ years old. It is observed that the bulls are a bit slow as breeders.

Bull calves which are to be used for draft purposes are broken for work when they are about 2 ½ years old. Krishna Valley bullocks are observed to be even-tempered, and willing workers. They are not so quick in their action. In heavy soils they can perform field work with patience and without showing

[1] *See* Figure 29.

signs of fatigue. They get tired soon, however, if put to work in rough and stony areas. Under these conditions they usually develop hoof troubles.

A mature pair of bullocks will haul a two-ton load on metaled roads over short distances, but over long distances they usually haul about one ton at a pace of about 2 ½ miles per hour for 8 to 10 hours a day.

## Performance in Other Areas

On account of the apparent softness of the hooves and the heavy weight of the animals they are not generally appreciated by the cultivators in areas other than the native home of the breed. However, their large size and heavy weight attracted the attention of breeders from Brazil and the United States of America (Parr, 1926), but, though animals of the breed were exported to these countries, they did not retain their identity.

## Sources of Breeding Stock and Information Regarding the Breed

According to an estimate (Anonymous, 1946) the total number of Krishna Valley cattle is 650,000. The breed is reared by cultivators who own only a few animals each and there is always a scarcity of animals for sale. Young bulls are available for sale at animal fairs held at the following places in Bombay State: Chinchli, Jamkhindi, Ichalkaranji and Athni.

The following persons may be contacted for further information on the breed:

1. Livestock Expert to the Government of Bombay, Poona, Bombay, India.
2. Director of Veterinary and Animal Husbandry Department, Hyderabad State, Hyderabad, India.
3. Animal Husbandry Commissioner to the Government of India, New Delhi, India.

# MEWATI

## Origin

Mewati cattle [1] are found in the tract known as Mewat, but the breed is sometimes spoken of as Kosi, on account of the fact that large numbers of cattle of this breed are sold from the market at Kosi, a small town in the district of Mathura. Mewati cattle are similar in type to Hariana (Phillips, 1944), but show definite evidence of an admixture of Gir blood (Olver, 1938; Ware, 1942). Native habitats of Rath and Nagori cattle being adjacent to Mewat, these two breeds may also have contributed to the formation of the Mewati.

## Conditions in the Native Home of the Breed

### *Location, Topography and Soils*

Mewat is an ill-defined tract lying south of Delhi including the whole of Alwar and part of Bharatpur and a small part of Mathura district of Uttar Pradesh: it also includes a part of the Gurgaon district of the Punjab. Most of the area is flat, rocky and sandy, and is intersected by the lower ranges of the Aravalli hills. The soils may be divided into three classes: a stiffish clay which, though somewhat difficult to work, yields the heaviest crops; loamy soil, easier to work but requiring heavy manuring—about 60 percent of the cultivated area falls into this class of soil; a third type is sandy and is found at the foot of hills and along the banks of streams, being only suitable for lighter crops.

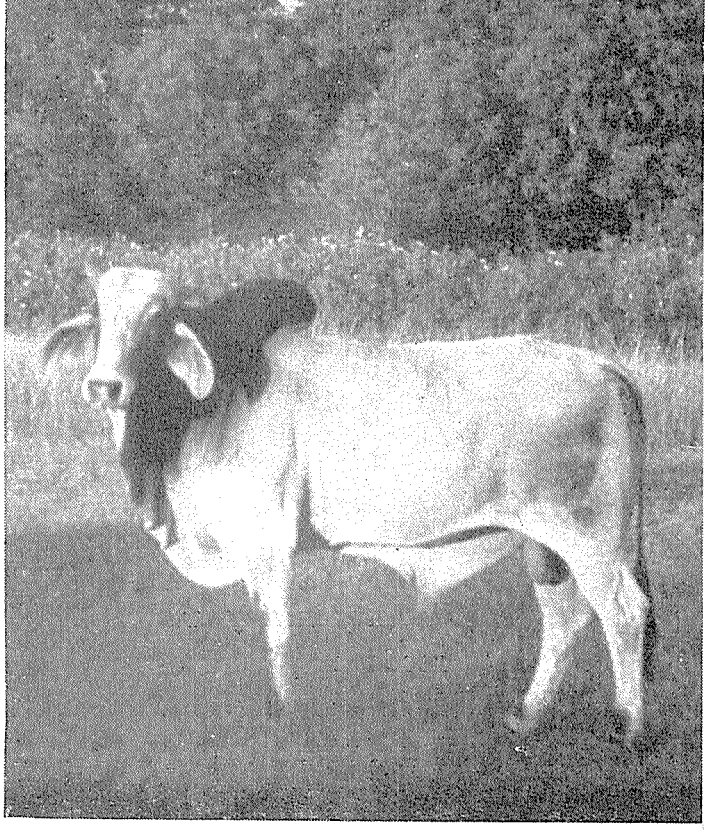
The water supply is mostly from ponds, and supplies are largely dependent on local rainfall, for there are few wells; sweet water is found at great depths, that from shallow depths being brackish.

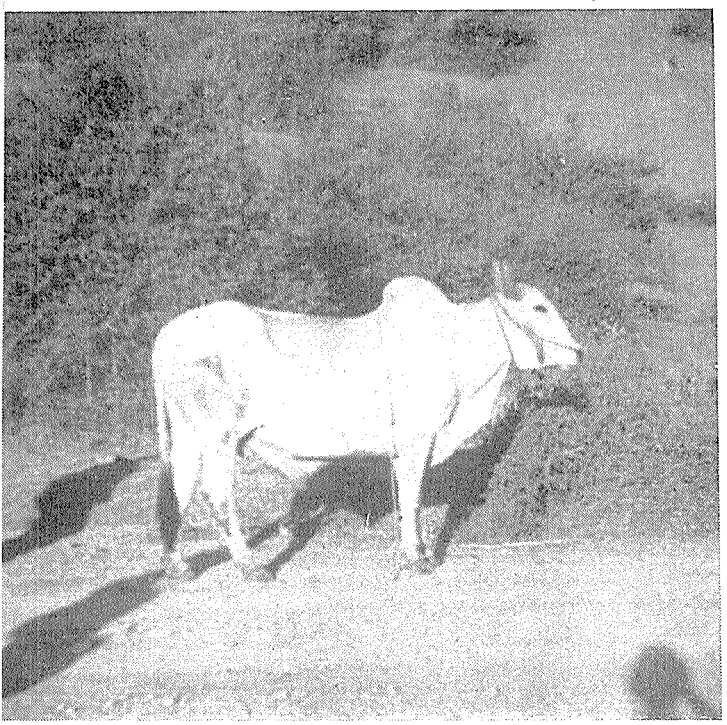
### *Climate*

The climate is dry throughout the year except in the months of July, August and September when it is hot and humid. Summer temperatures during May and June go as high as 115°F., and in

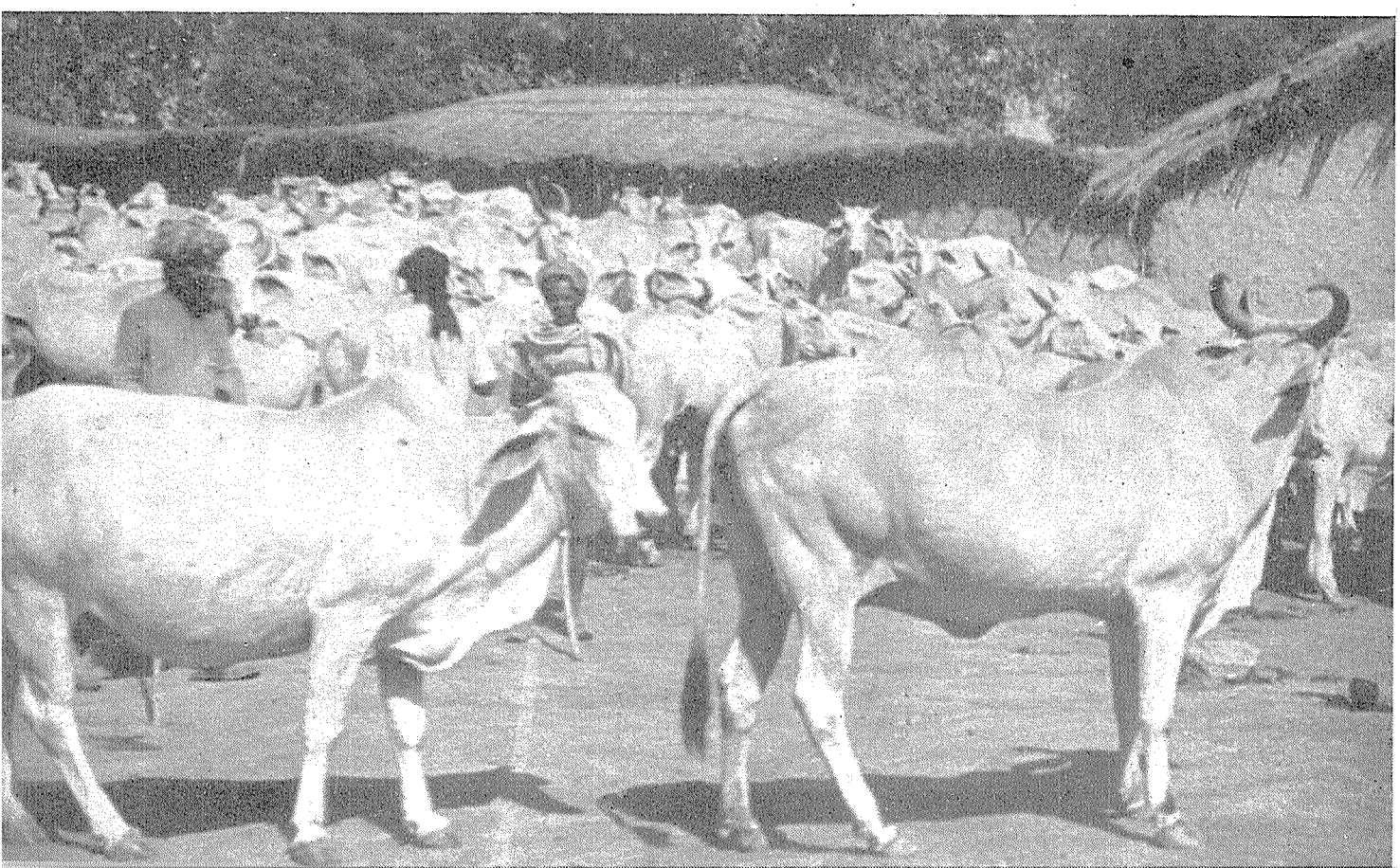
[1] *See* Figure 30.

FIGURE 30. The Mewati breed, also known as Kosi, resembles the Hariana, with some mixture of Gir blood. Right: a Mewati bull. Below: a Mewati bullock.





Mewati cattle are powerful and docile, and are useful for heavy plowing: the cows, seen below, are fair milkers.



this season sandstorms occur frequently which, though unpleasant, usually bring about a decrease in temperature. The average annual rainfall of the area is about 22 to 25 inches, four-fifths of which is received in July, August and September.

*Vegetation*

Though small areas are preserved as pasture areas, cattle have to depend mostly on the by-products of cereal farming. Sorghum, millets, *Cajanus cajan, Phaseolus radiatus, P. mungo,* wheat, barley and chickpeas are extensively grown. Of the oil-seeds, rapeseed and sesamum are largely raised. Of the grasses, *Pennisetum cenchroides, Andropogon pertusus* and *Cynodon dactylon* are most popular and commonly found.

*Management Practices*

As the bullocks of this breed are in greater demand by cultivators, breeders pay more attention to the rearing of bull calves. The cattle get very little grazing; only for a limited period of about 2 months, in August and September, are they taken out for grazing; otherwise they are stall-fed. In the winter months, they get chaffed sorghum or millets and during the summer, hay and various straws of wheat, barley, *Phaseolus mungo, P. radiatus,* etc. Concentrates such as oilcakes and crushed grains are given to working bullocks only.

**Physical Characteristics of the Breed**

Mewati cattle (Baldrey, 1909) are usually white in color with neck, shoulders and quarters of a darker shade: occasionally, individual beasts have Gir coloration. The face is long and narrow with the forehead slightly bulging. Horns emerge from the outer angles of the poll and are inclined to turn backwards at the points. Eyes are prominent and surrounded by a very dark rim. The muzzle is wide and square and the upper lip thick and overhanging, giving the upper part of the nose a contracted appearance. The muzzle is pitch black in color. The ears are pendulous but not so long.

The neck and the whole frame is strong but the limbs are light. The legs are relatively long and the frame of the body gives an impression of being loosely built. The chest is deep but the ribs

are flat. The head and neck show an upright carriage. The dewlap, though hanging, is not very loose. The sheath also is loose but not pendulous. The legs are fine and round with strong, somewhat large hooves, well-rounded in shape. The tail is long, the tuft nearly reaching the heels. Cows usually have well-developed udders. Average data on certain body measurements are summarized in Table 33.

**Table 33. Average Measurements of Mewati Cattle**

| MEASUREMENT | Mature cow | Mature bull | Mature bullock |
|---|---|---|---|
| Height at withers, in inches | 48 | 61 | 54 |
| Length from shoulder to pin bones, in inches | 48 | 69 | 57 |
| Heart girth, in inches | 60 | 74 | 66 |

Source: Singh and Singh (1936).

## Functional Characteristics of the Breed

Mewati cattle are, in general, sturdy, powerful and docile, and are useful for heavy plowing, carting and drawing water from deep wells. Bull calves are castrated when they are about 3 years of age and broken for light work. They are supposed to take a full load of the work when they are about 4½ years of age. A pair of bullocks can haul about 1,200 to 1,500 pounds of load in an iron-rimmed cart at an average speed of 3 miles per hour, a distance of 15 to 20 miles per day. In field work, they are worked for 8 to 10 hours per day.

The cows are supposed to be fair milkers. It is estimated that they produce on an average about 10 pounds of milk per day after feeding the calf, but definite data are lacking. Heifers are bred to calve when they are about 4 years old. Calves are not artificially weaned. Male calves usually receive a greater share of the milk than the female calves.

## Performance in Other Areas

Only bullocks of this breed are exported, largely to parts of Uttar Pradesh. They are very much appreciated for their steady work in the fields and are credited with economical feeding.

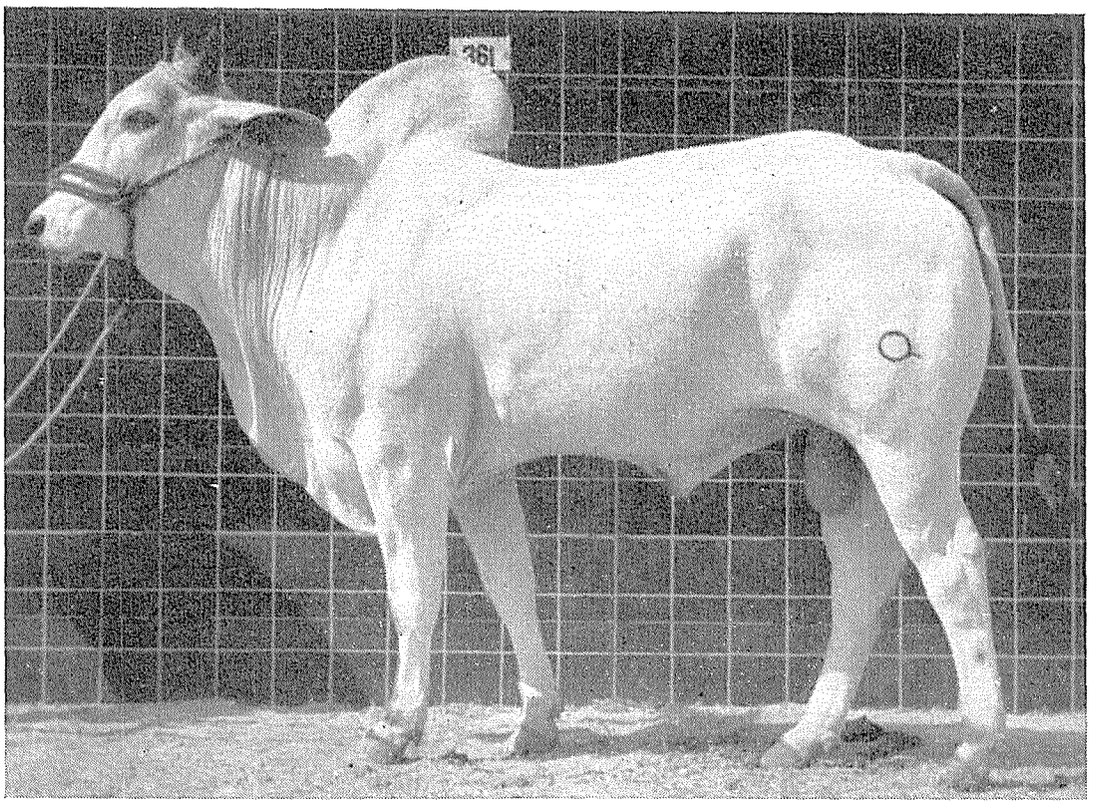
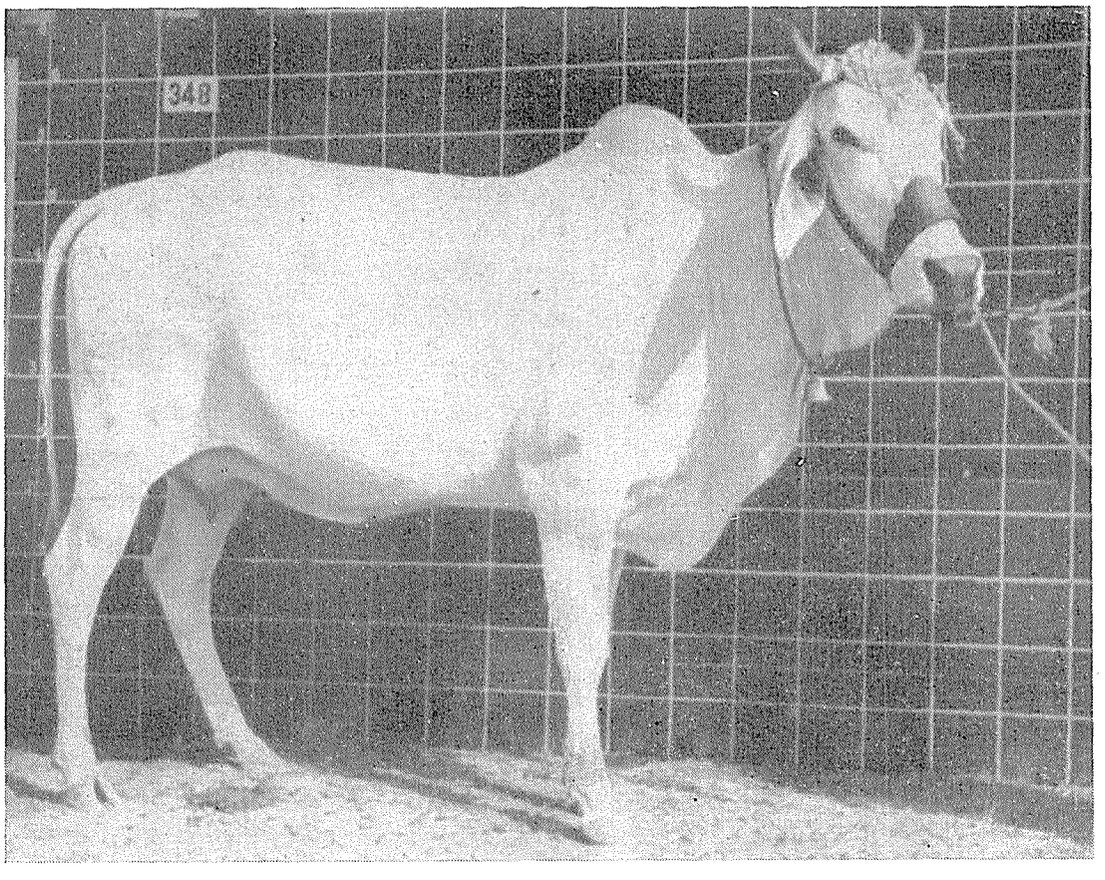


FIGURE 31. In the Barmar and Balotra districts of Jodhpur, Rajasthari, the milking qualities of the Nagori breed are fairly well-developed. Above: a Nagori bull. Below: a Nagori cow.



### Sources of Breeding Stock and Information Regarding the Breed

It is estimated that there are approximately 400,000 Mewati cattle in the area (Anonymous, 1946). For further information regarding the breed, the Animal Husbandry Commissioner to the Government of India, New Delhi, India, may be contacted.

## NAGORI

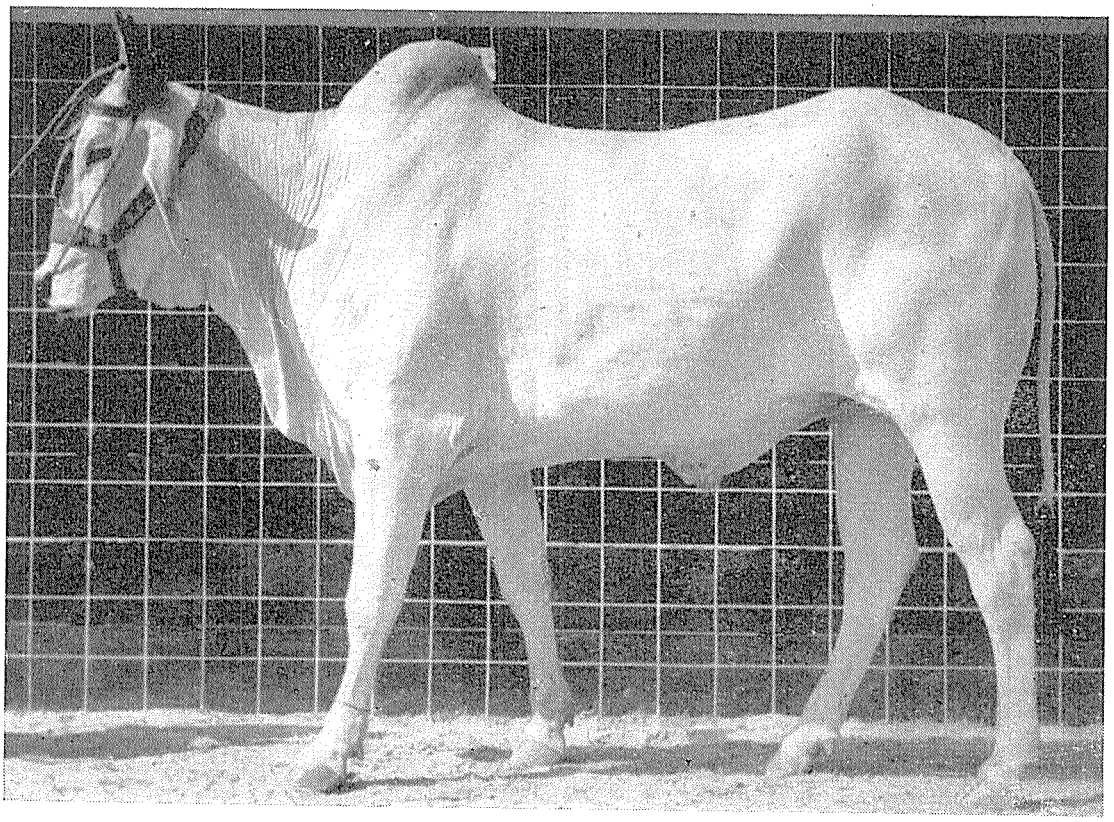
### Origin

Nagori cattle [1] are prevalent in the former Jodhpur State, now a part of the State of Rajasthan in India.

Ware (1942) and Phillips (1944) classify Nagori in the group of cattle with short-horned withe or light gray cattle with a long coffin-shaped skull, orbital arches not prominent, and face slightly convex in profile. Olver (1938), however, suggests that

[1] *See* Figures 31 and 32.

FIGURE 32. A Nagori bullock. Nagoris are some of the most famous trotting draft cattle in India, and are valued for fast road work.



probably the blood of gray lyre-horned cattle might have entered into the composition of Nagori cattle. Taking into consideration the proximity of the native homes of the Hariana in the north and northeast and Kankrej in the south and southwest, it seems reasonable to suppose that Nagori cattle may have evolved from these two groups. Frequency of famines in the native home has necessitated extensive movements of the cattle to other regions in search of fodder, and this has no doubt led to frequent intermixture.

## Conditions in the Native Home of the Breed

### *Location, Topography and Soils*

The tract of the country called Nagore lies to the north and northeast of Jodhpur, but Nagori cattle are also bred in the districts of Barmer and Balotra which are to the south and southwest. The longitudinal position of the area lies approximately between 71° and 74° east, while the latitudinal position is between 25°5′ and 27°5′ north. Most of the area covered by the tract is sandy plain with an average altitude of 700 feet, except towards the west, nearing the ranges of the Aravalli hills, where the soils in the foothills are sandy loam. In the area towards Balotra and Barmer the soil is sandy and the water is scarce and brackish, except along the banks of the River Luni.

### *Climate*

The climate is dry, even in the monsoon period, and characterized by extreme variations of temperature during the cold season. During the hot months the heat is apt to be intense during the day but nights are pleasant. Scorching winds blow with great violence during the months of April, May and June, and during this period sandstorms frequently occur. The climate is often pleasant towards the end of July and in August and September. October and part of November is again apt to be hot. Winter extends from November to March. Meteorological observations for the area are summarized in Table 34.

**Table 34. Climatological Data for the Nagore Tract**

| MEASURE OF CLIMATE | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mean maximum temp. °F . . . | 76.3 | 80.6 | 90.5 | 99.4 | 105.4 | 103.6 | 96.9 | 91.8 | 94.2 | 95.5 | 87.6 | 79.0 |
| Mean minimum temp °F . . . | 48.6 | 52.6 | 61.5 | 70.8 | 79.4 | 82.3 | 80.2 | 77.0 | 74.8 | 64.4 | 55.4 | 50.5 |
| Humidity percent at 0800 hrs. I.S.T. . . | 50.0 | 50.0 | 39.0 | 35.0 | 45.0 | 66.0 | 73.0 | 82.0 | 76.0 | 54.0 | 45.0 | 53.0 |
| Rainfall, in inches . . . . | 0.15 | 0.24 | 0.11 | 0.13 | 0.41 | 1.42 | 3.97 | 4.84 | 2.40 | 0.32 | 0.11 | 0.11 |

Information from the Indian Meteorological Department, Government of India, New Delhi, India.

*Vegetation*

Large pasture areas are preserved through State control. Whenever there are sufficient rains, ample grazing is available for the cattle for 3 to 4 months from August to October or November. Depending on irrigation facilities available, such as from wells, ponds or rivers, fodder crops such as lucerne and cluster beans (*Cyamopsis psoralioides*) are grown. Maize, sorghum and millets are grown as monsoon crops. By-products from these crops are extensively utilized as fodders for cattle. Pulses, such as *Cajanus cajan* and *Phaseolus mungo* are also grown. During winter months crops such as wheat, barley, *Cicer arietinum* are grown. Oilseeds, particularly sesamum and rapeseed, are grown.

*Management Practices*

As income from cattle forms the major share of the agricultural income, every cultivator keeps a number of cattle. Cultivators in the Barmer and Balotra areas devote more attention to the rearing of females as they derive some income from the sale of ghee (clarified butter) from their cows, while cultivators of Nagore pay more attention to the rearing of bullocks (Baldrey, 1909). On the other hand, a large number of young male calves is bought by the Nagore cultivators from the Balotra and Barmer areas for rearing.

Besides the cultivators, there is also a professional class of

breeders who depend entirely on cattle raising. These are known as Banjaras. Their cattle solely depend on the grazing and these people drive their cattle up to Sindh, Gujarat, and Malwa in search of grazing. Buying and selling of cattle is also one of their main activities.

Cultivators' animals are usually stall-fed. It is only during the daytime that the cattle are taken to the nearby pasture grounds. Grazing is available only for 3 to 4 months.

A calf at birth is allowed all the milk of the cow but if it is a heifer calf the allowance is reduced to half within a month and it may be weaned at about 4 months. Male calves are allowed to be nursed longer. It is usual amongst the cultivators to get the males castrated when they are about 6 months old. This practice naturally results in retaining only the best bulls. Bulls are selected by the villagers in the proportion of one bull to about 80 cows.

Cows in the Balotra and Barmer areas are well-fed. In Nagore the breeders usually procure good milking cows from Balotra and also 1 to 2 year old male calves.

**Physical Characteristics of the Breed**

Generally the Nagori cattle are fine, big, upstanding, active and docile, with white and gray color. They have long, deep and powerful frames, with straight backs and well-developed quarters. There is throughout the Nagori breed a tendency to legginess and lightness of bone, though the feet are strong. It is supposed that this characteristic has given the breed its agility and ease of movement.

The face is long and narrow but the forehead is flat and not so prominent. The eyelids are rather heavy and overhanging and the eyes are small, clear and bright. The ears are large and pendulous. The horns are moderate in size and emerge from the outer angles of the poll in an outward direction and are carried upwards with a gentle curve to turn in at the points. The neck is short and fine, and looks powerful. The dewlap is small and fine. The hump in the bulls is well-developed but not so firm and thus in many cases hangs over. The shoulders and forearms look muscular and powerful. The legs are straight with hooves compact, strong and small. The tail is of moderate length reaching

just below the hocks and terminating in a tuft of black hair. The sheath is small. The skin is fine and slightly loose. The cows usually have well-developed udders with large teats.

Average data on certain body measurements are summarized in Table 35.

**Table 35. Average Measurements of Nagori Cattle**

| MEASURE | At one year | At two years | Mature |
|---|---|---|---|
| ***Females*** | | | |
| Weight, in pounds | 230 | 450 | 700 |
| Length from shoulder point to pin bones, in inches | 36 | 42 | 50 |
| Height at withers, in inches | 36 | 48 | 55 |
| Depth of chest, in inches | 9 | 14 | 20 |
| Width of hips, in inches | 12 | 18 | 24 |
| Heart girth, in inches | 34 | 35 | 72 |

| MEASURE | At one year | At two years | Mature bull | Mature ox |
|---|---|---|---|---|
| ***Males*** | | | | |
| Weight, in pounds | 250 | 480 | 800 | 700 |
| Length from shoulder point to pin bones, in inches | 40 | 45 | 57 | 55 |
| Height at withers, in inches | 36 | 48 | 60 | 57 |
| Depth of chest, in inches | 10 | 15 | 24 | 22 |
| Width of hips, in inches | 10 | 20 | 27 | 24 |
| Heart girth, in inches | 35 | 50 | 80 | 75 |

Data collected at Nagur Cattle Breeding Farm, Rajasthan, India.

## Functional Characteristics of the Breed

The Nagori breed is one of the most famous trotting draft breeds of India and is generally appreciated for fast road work. As such, more attention has been paid by the breeders towards producing an agile yet powerful animal with a great deal of endurance. However, it may be mentioned that breeders, particularly in the Barmer and Balotra areas, have not neglected the milking qualities of the animal.

From records maintained at the Nagur Cattle Farm, Rajas-

than, it is observed that the heifers calve for the first time when they are about 40 months old. In rural areas, however, they seldom appear to calve earlier than 48 months. Males start breeding at the age of 3 years and the active breeding life is about 8 to 10 years. It is noted that though there is no marked breeding season in the Nagori, most animals are bred during the rainy season and in the winter months. The average weight at birth of female calves is 22 pounds while the males weigh 25 pounds.

The average milk production of cows kept at the Nagur Cattle Farm is 1,800 pounds in 225 days. This is actual production in addition to calf-suckling. The average calving interval is 460 days. In the rural areas of Barmer and Balotra the cows yield about 15 to 18 pounds of milk after feeding calves, but those in the Nagore area do not produce as much milk: about 12 to 15 pounds per day.

Nagori cattle are famous as trotters, being used all over Rajputana in light iron-wheeled carts for quick transportation. They are also worked for all agricultural purposes, such as plowing, cultivation, drawing water from wells and transportation of field produce to markets.

The Nagori breeder usually castrates his male calves when they are about 6 to 8 months of age, this early castration being supposed to allow the animals to develop agility and quickness in movement. It is normal practice to castrate animals during the months of April and May when the weather is dry. They are broken for light work when they are about 3 years old and weigh about 600 pounds, and are able to haul about 800 pounds of load in a light two-wheeled iron-rimmed cart on a sandy track and cover a distance of 36 miles in 8 hours actual travel or within a total period of 11 hours with 3 hours' rest. For short distances up to 20 miles, they can travel at the rate of 6 miles per hour.

**Performance in Other Areas**

Bullocks of this breed are exported to other areas such as Sindh, Punjab, Gujarat and Malwa, where they are utilized for light and quick transportation.

### Sources of Breeding Stock and Information Regarding the Breed

A big cattle fair is held annually at Balotra during April or May when large numbers of Nagori cattle change hands. Nagori cattle are also taken to the cattle market at Pushkar near Ajmer in Rajputana. It is estimated that the total number of Nagori cattle may be 376,000 (Anonymous, 1946). For further information regarding the breed, the Animal Husbandry Commissioner to the Government of India, New Delhi, India, may be contacted.

## ONGOLE

### Origin

The Ongole breed [1], like other breeds of cattle in India, takes its name from the geographical area in which it is produced. It is also called the Nellore breed for the reason that formerly Ongole Taluk, a division of a district, was included in the Nellore district, but now it is included in the Guntur district (Littlewood, 1936). The area is part of the Madras State of India.

Olver (1938), Ware (1942) and Phillips (1944) include this breed of cattle among the gray-white cattle of the North, having white or gray color, stumpy horns and a long coffin-shaped skull. It has a great similarity with the Gaolao breed of Madhya Pradesh and also has a resemblance to the Bhagnari type of cattle in the north of India. This similarity is not surprising in view of the fact that these breeds lie along the path taken by the Rig Vedic Aryans in their march from the north to the south of India.

It is claimed that the finest specimens of the breed are found in the area between the Gundalakama and Alluru rivers in the Ongole and Kandukur taluks, and also in the villages of Karumanchi, Nidamanur, Pondur, Jayavaram, Tungtoor and Karvadi and along the banks of River Musi. They are also famous from the taluks of Vinukonda and Narasaraopet (Littlewood, 1933).

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[1] *See* Figures 33 and 34.

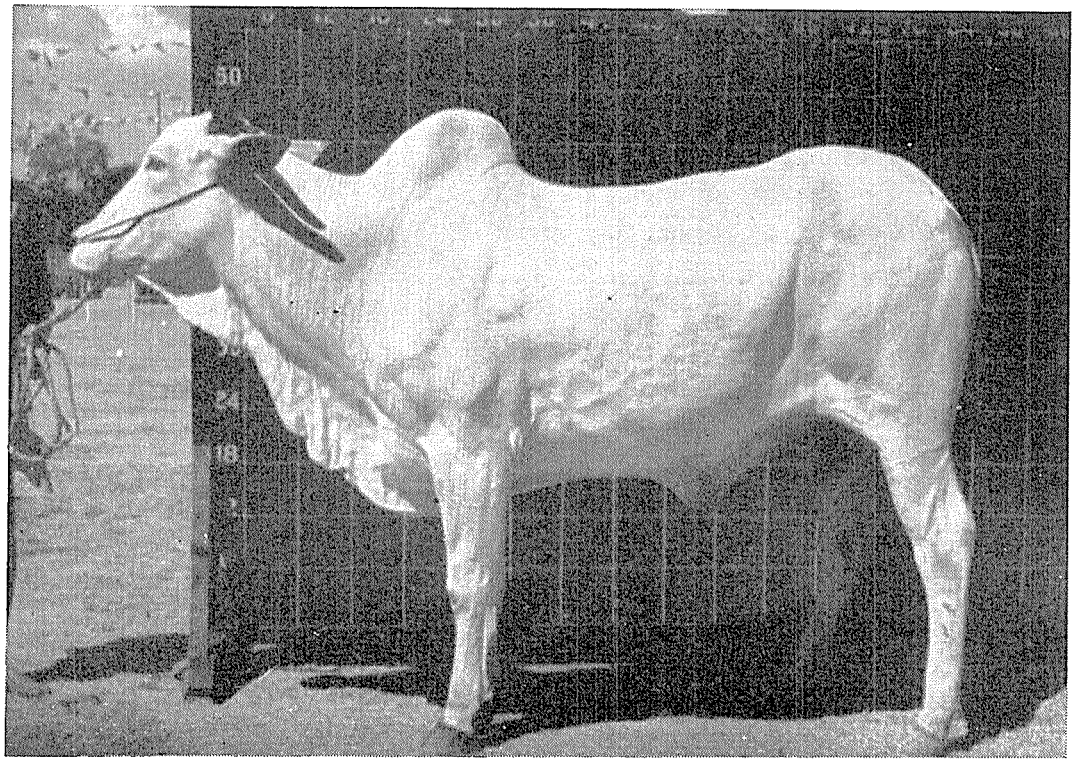
## Conditions in the Native Home of the Breed

*Location, Topography and Soils*

The area of this breed extends over parts of the districts of Kistna, Guntur and Nellore and now parts of Vizagapatam also, the longitudinal position approximately being between 79°4′ and 80°2′ east and the latitudinal between 15° and 16°1′ north. On the east of the tract lies the Bay of Bengal, on the west the area spreads to the Nallamalai range of Eastern Ghats, a series of hills. On the northern side it is bounded by the River Krishna which joins the Bay of Bengal in its eastward direction. In the south it is surrounded by the southern boundaries of Nellore district.

The Ongole tract is mostly flat but the hilly ranges begin as one moves west. There are a number of perennial streams and rivers running through the tract. Most of these run from west to east. The most important river, the Krishna, flows across the northern borders of the tract, while the Manneru, the

FIGURE 33. An Ongole bullock. Animals of the breed have been exported to Brazil, Ceylon, Fiji, Indochina, Indonesia and the United States, where there is some Ongole blood in the Santa Gertrudis breed.



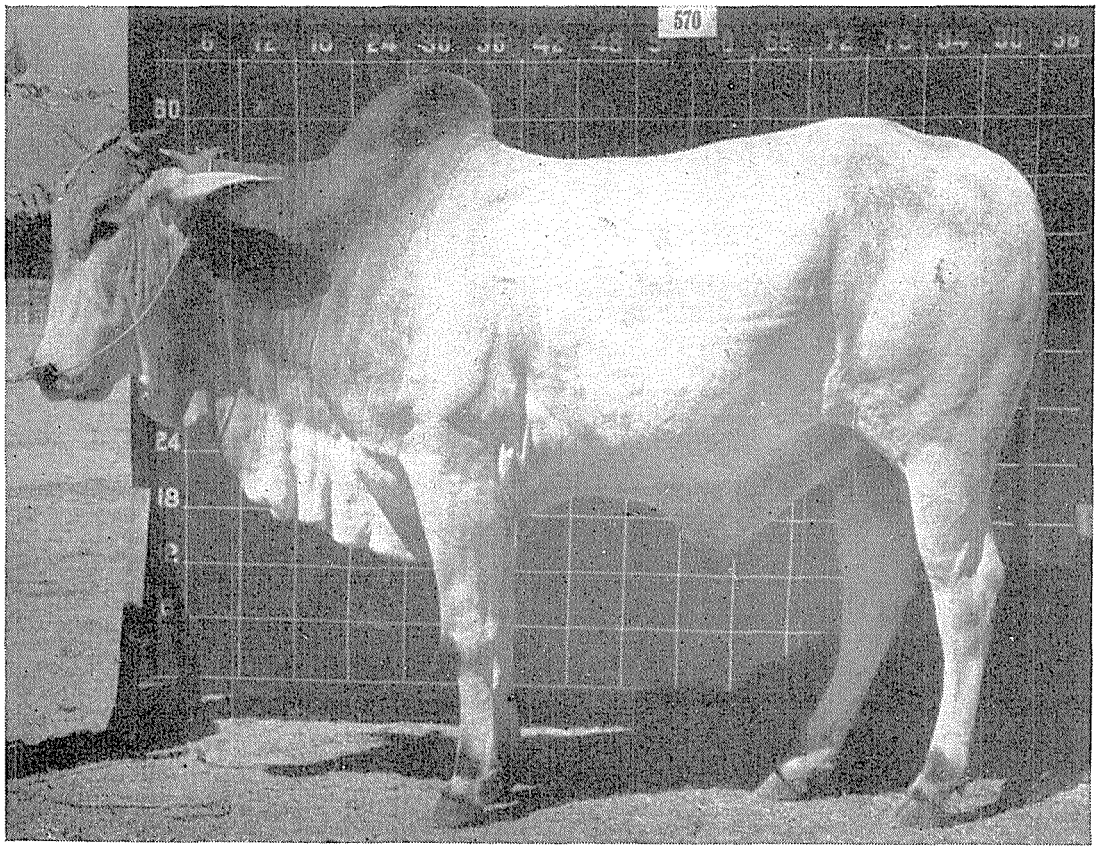
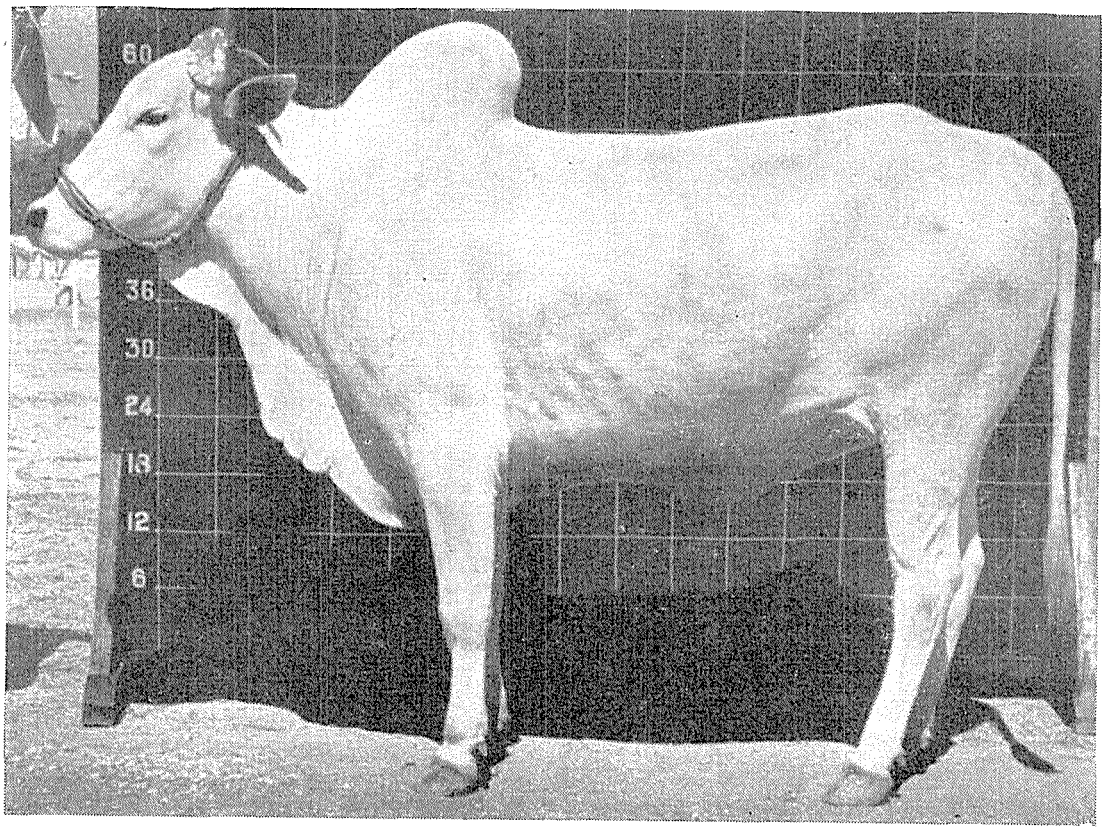


FIGURE 34. Ongole cattle, found in the Guntur district of Madras, are also called Nellore. They are used for heavy draft work: milk yield varies from a few hundred pounds to more than 5,000 pounds per lactation. Above: an Ongole bull. Below: an Ongole cow.



Paleru and the Musi rivers run across the center and the south of the tract. The banks of these rivers form excellent grazing areas; also, on account of the danger of floods, the adjoining areas are allowed to remain as grasslands. Gundlakama and Alluru rivers in the Kandukur subdivision of the Guntur district are specially well-known for their grazing areas as some of the finest specimens of Ongole cattle are produced in this section.

Soils towards the seacoast are alluvial and of very good quality. As one goes further from the sea this soil is mostly black cotton soil containing plenty of lime. As one reaches the eastern ranges of hills, the soil becomes poorer and is full of gravel, while the soil on the slopes of the hills is mostly red.

### *Climate*

The climate of the tract is dry and mild and is not subject to sudden changes. Sea breezes make the area near the coast generally cooler than the inland area. March to June are usually hot months: winter months, on the other hand, are very mild. The tract receives rains from the southwest monsoon from May to September, as well as the northeast monsoon from October to December, and so there is usually an exceptionally long pasture season. Average rainfall for the tract is from 30 to 35 inches.

Climatological data are summarized in Table 36.

**Table 36. Climatological Data for the Ongole Tract**

| MEASURE OF CLIMATE | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mean maximum temp. °F . . . | 86.5 | 90.9 | 95.9 | 99.9 | 104.8 | 99.5 | 94.2 | 93.4 | 92.7 | 91.0 | 87.5 | 86.1 |
| Mean minimum temp. °F . . . | 64.2 | 68.6 | 73.1 | 77.7 | 81.1 | 80.7 | 78.3 | 77.9 | 76.7 | 74.4 | 70.1 | 64.3 |
| Relative humidity at 0800 hrs. I.S.T. . . . . | 86.0 | 85.0 | 84.0 | 83.0 | 72.0 | 72.0 | 78.0 | 77.0 | 81.0 | 83.0 | 82.0 | 83.0 |
| Rainfall, in inches . . . . | 0.48 | 0.21 | 0.88 | 0.55 | 2.56 | 4.81 | 5.59 | 5.33 | 5.28 | 5.34 | 3.89 | 0.23 |

Source: Indian Meteorological Department, Government of India - average for ten years.

*Vegetation*

In the drier zones of the tract, where soil is mostly alluvial or black cotton type, there are some permanent pastures but there are also what are known as temporary pastures. On these fallow lands, which need regeneration, goats are folded prior to the monsoon. In the monsoon, excellent pasture springs up naturally and very rapidly; care is taken, however, to see that *Acacia* tree plants which also spring up naturally are well preserved. Temporary pastures are left down for 7 to 8 years, until the *Acacias* are sufficiently grown.

Grasses consist mainly of *Iseilema* (*Anthistiria*) *wightii, Andropogon monticolus* (*Chrysopogon montanus*). *A. caricosus* as well as leguminous plants, such as *Indigofera linifolia* and *Phaseolus trilobus.* The first-named grass is the most important and highly relished by the cattle. In the wetter areas in the south, where mostly paddy is grown, cultivated crops such as vetches and lentils and straw from paddy are fed. In drier areas straws from sorghum, *Panicum miliaceum* and also the vetches and pulses are fed. Extensive forest grazing areas in the western side towards the eastern hilly ranges offer many varieties of grasses. In the drier zones, oilseeds, notably groundnut, are grown, also cotton oilcakes and cottonseed are extensively used for cattle feeding.

*Management Practices*

In the alluvial tract there are no large breeders and the majority of cultivators own from 8 to 12 head of cattle. It is only in the shallower black soils, such as are seen in and around the Kandukur and Addanki subdivisions that one finds breeders owning up to 50 head of cattle. The system of feeding observed by the breeders of the different parts naturally depends upon the extent of pasturage available. In the low-lying parts in the south where paddy is principally grown, a certain portion of the dry land is often kept as pasturage for cattle. Most of the cattle, however, leave the villages during July to October and are sent to the western areas towards hilly ranges where extensive wastelands and jungle tracts exist. The breeders often club together and send their cattle in large numbers under professional graziers

known as Lambadies. If the northeast monsoon in favorable, the cattle have good feeding till January.

It has been mentioned that cows in this tract come in heat in two periods, February to March and August to October. This is attributed to good grazing in field or forests just previous to the above periods.

The bull calf usually receives much better attention and feeding than the heifer calf, being usually allowed all or a major part of the milk from its dam. After weaning, bull calves are given good fodder and some concentrates while the heifers get whatever they can pick from the fields or whatever fodder is left over ofter feeding work-cattle. Heifers mature late because of poor feeding.

Bull calves which are not to be retained for breeding are usually broken for work when they are 20 to 24 months old. Most of the bull calves are sold to cattle dealers at this age who take them to the western and northern districts where these bull calves are reared. In their new homes they are usually stall-fed and all care and attention is bestowed on them. The result is that they attain very good size. It is claimed that bull calves brought in at this age from the breeding tract and reared in these western districts grow into stronger bullocks and on an average have a working life of 8 to 10 years, but bullocks brought at later ages do not have the same efficiency and working life.

**Physical Characteristics of the Breed**

The Ongoles are large-sized animals with loosely knit frames, large dewlaps which are fleshy and hang in folds extending to the navel flap, and slightly pendulous sheaths. They have long bodies and short necks; limbs are long and muscular. The forehead is broad between the eyes and slightly prominent. Eyes are elliptical in shape with black eyelashes and a ring of black skin about ¼ to ½ inch wide around the eyes. Ears are moderately long, measuring on an average from 9 to 12 inches, and slightly drooping. Horns are short and stumpy, growing outwards and backwards, thick at the base and firm without cracks. In some animals the horns are loose; this is probably due to the horn core not growing well.

The hump in the males is well-developed and erect and filled

up on both sides and not concave. The skin is of medium thickness, mellow and elastic and often shows black mottled markings. The popular color is white. The male has dark gray markings on the head, neck and hump and sometimes black points on the knees and on the pasterns of both the fore and hind legs. A red or red and white animal of typical conformation is occasionally seen.

According to the herdbook standards established for the Ongole breed of cattle (Ware, 1938), the following are points of disqualification:

(*a*) red color and red patches on the body;
(*b*) white switch;
(*c*) white eyelashes;
(*d*) flesh colored muzzle;
(*e*) light colored hooves;
(*f*) dark gray markings on the hindquarters;
(*g*) dark mottle appearance on the body.

Average data on certain body measurements are summarized in Table 37.

**Table 37. Average Measurements of Ongole Cattle**

| MEASURE | At birth | At one year | At two years | Mature |
|---|---|---|---|---|
| ***Females*** | | | | |
| Weight, in pounds | 60 | 498 | 616 | 900–1000 |
| Length from shoulder point to pin bones, in inches | 27 | 46 | 46 | 52.5 |
| Height at withers, in inches | 30 | 46 | 47 | 52.0 |
| Depth of chest, in inches | — | 23 | 23 | |
| Width of hips, in inches | — | 16 | 16 | 19.0 |
| Heart girth, in inches | 27 | 57 | 58 | 68.0 |

| MEASURE | At birth | At one year | At two years | Mature |
|---|---|---|---|---|
| ***Males*** | | | | |
| Weight, in pounds | 66.7 | 481 | 770.0 | 1200–1350 |
| Length from shoulder point to pin bones, in inches | 30.5 | 46 | 53.0 | 62.7 |
| Height at withers, in inches | 31 | 47 | 52.0 | 58.5 |
| Depth of chest, in inches | — | 23 | 28.0 | — |
| Width of hips, in inches | — | 16 | 18 5 | 21.5 |
| Heart girth, in inches | 28 | 56 | 66.0 | 82.5 |

## Functional Characteristics of the Breed

Ongole cattle are efficiently used in their native home for both work and milk production. They are usually docile and the bullocks are very powerful, suitable for heavy plowing or cart work but are not considered to be suitable for fast work or trotting purposes, though of late a small, compact, hardy type is being developed and is used towards the northern parts of the Ongole tract; for the more western black cotton soil areas heavier animals are still in demand.

The cows are fair milkers giving an average yield not far short of the average of more developed milk breeds of Indian cattle. It is maintained that yields in well-kept herds average about 3,500 pounds per lactation. One estimate puts the average milk yield of the breed at 2,500 pounds with a daily average of 9 pounds. For the Madras milk trade Ongole cows are in great demand. Average milk production records are summarized in Table 38.

**Table 38. Milk Production of Ongole Cows**

| YEAR | Average lactation yields, pounds | Average lactation length, days | Average dry period, days |
|---|---|---|---|
| 1936-37 . . . . . | 2 938 | 316 | 141 |
| 1937-38 . . . . . | 3 161 | 303 | 129 |
| 1938-39 . . . . . | 2 689 | 306 | 128 |
| 1939-40 . . . . . | 3 338 | 329 | 265 |

Average percentage of fat in milk is 5.05 percent. Average calving interval is calculated at 16 months, while it is estimated that he average number of lactations during a lifetime is 6 to 7 Cows, if properly fed and managed, are regular breeders, most services taking place during two periods of the year, February to March and August to September. Average age at first calving on well-maintained farms is 3 to 3¼ years, while under village conditions it is estimated at 4 to 4½ years.

From studies conducted at the Indian Institute of Veterinary Research it is observed that the average gestation period for male calves was 289.7 days, while for female calves it was 287.4 days. Sex ratio of calves born was 94.5 males to 100 females. The inci-

dence of twinning was 0.45 per 100 births. Average weight of calves at birth is 60 pounds for females and 66 pounds for males. Calves as heavy as 84 pounds were produced on government farms. Calves are either white, white with reddish brown patches or reddish brown color at birth. They generally change to pure white when they are 6 months old.

Males specially reserved for breeding purposes are usually allowed to serve when they are 2 or 2½ years old. On account of the usual village practice of allowing bull calves to run with the herd they start serving earlier. Ongole bulls are rather slow in serving. Their average breeding life is 8 to 10 years.

Male calves which are not to be retained for breeding are castrated when they are 2½ to 3 years old. At this period they usually weigh about 800 pounds. Bullocks used for transportation purposes walk at the rate of 2 to 3 miles per hour and can cover about 24 miles in a day. The bullocks are used for one purpose or another almost throughout the year.

The physiological capacity of Indian breeds of cattle to tolerate the high temperature and in some regions high humidity is well-known, though studies actually conducted to test these qualities are few. The data in Table 39 were collected on a three-quarter-bred Holstein-Ongole heifer at Trinidad in the British West Indies (Duckworth and Rattray, 1948).

**Table 39. Hematology of the Three-Quarter-Bred Holstein-Ongole Calf During the First Year of Life**

| AGE (months) | Erythrocytes (millions per cu. mm.) | Coefficient of variation (%) | Leucocytes (thous. per cu. mm.) | Coefficient of variation (%) | Hemoglobin (gm. per 100 ml.) | Coefficient of variation (%) | Packed-cell volume (%) | Coefficient of variation (%) |
|---|---|---|---|---|---|---|---|---|
| 0-1 | 8.4 | 15.5 | 10.4 | 23.1 | 10.3 | 14.6 | 29.5 | 16.3 |
| 1-2 | 9.0 | 8.9 | 10.3 | 33.0 | 10.0 | 8.0 | 29.5 | 8.2 |
| 2-3 | 9.0 | 22.2 | 12.2 | 22.9 | 10.2 | 10.8 | 30.9 | 13.3 |
| 3-4 | 9.0 | 21.1 | 13.9 | 26.6 | 10.4 | 11.5 | 30.3 | 12.5 |
| 4-5 | 8.0 | 17.5 | 13.7 | 24.1 | 9.7 | 10.3 | 28.2 | 8.9 |
| 5-6 | 7.9 | 13.9 | 14.5 | 25.5 | 9.7 | 10.3 | 27.8 | 9.0 |
| 6-7 | 8.0 | 17.5 | 13.5 | 21.5 | 9.6 | 11.5 | 27.9 | 12.2 |
| 7-8 | 7.7 | 16.9 | 13.8 | 17.4 | 9.1 | 12.1 | 27.1 | 11.4 |
| 8-9 | 7.4 | 18.9 | 14.0 | 19.3 | 9.0 | 11.1 | 26.7 | 12.0 |
| 9-10 | 7.7 | 16.9 | 14.8 | 21.6 | 9.3 | 6.5 | 27.5 | 10.9 |
| 10-11 | 7.1 | 14.1 | 13.5 | 21.5 | 8.9 | 6.7 | 26.8 | 8.2 |
| 11-12 | 7.3 | 17.8 | 14.7 | 20.4 | 9.3 | 7.5 | 27.6 | 10.9 |

The following figures are for the hemoglobin content of blood from Ongole cattle in the Phillipines (Manresa *et al.*, 1940).

| *Description* | *Hemoglobin* (gm. per 100 ml.) |
|---|---|
| Young cattle | 8.7 |
| Adult cattle | 9.9 |
| Adult cattle | 9.8 |
| Adult cattle | 11.9 |

## Performance in Other Areas

### *Brazil*

Ongole cattle are known in the Americas as Nellore[1]. The State of Rio imported the first consignment of Ongoles in 1895, but the really large consignment of 800 animals was brought to Uberaba in Minas Gerais in 1906 from India. From these two states it spread to other states in Brazil. Ongoles are very popular in Brazil as they give good weight for age and on an average gain 1.98 pounds per day up to the age of 2 years when they will give an average live weight of 782.5 pounds, while under careful management and liberal feeding, 2 year old Ongole steers weighed 1,185 pounds at the experimental breeding center of Sertazinho.

Purebred Ongole cattle are maintained at the government's experimental livestock breeding station near Uberaba for improvement and study. The station is located in a zone of semi-humid tropical climate. The annual mean temperature is 72.0°F. It is 70.0°F. in the dry season and 73.5°F. during the rainy season. August is the driest month in the year with 55 percent humidity. The annual mean precipitation of the region is 64.4 inches, January being the most rainy month with 12.8 inches of rain on the average.

The calving season usually begins by the middle of February and continues up to the beginning of November. Calves are usually left with the cows on pasture. When 6 months old, bull calves are put on additional feed which usually consists of ground millet, rice or wheatbran and cottonseed, the mixture having 14 percent protein. At about 8½ to 9 months old they are

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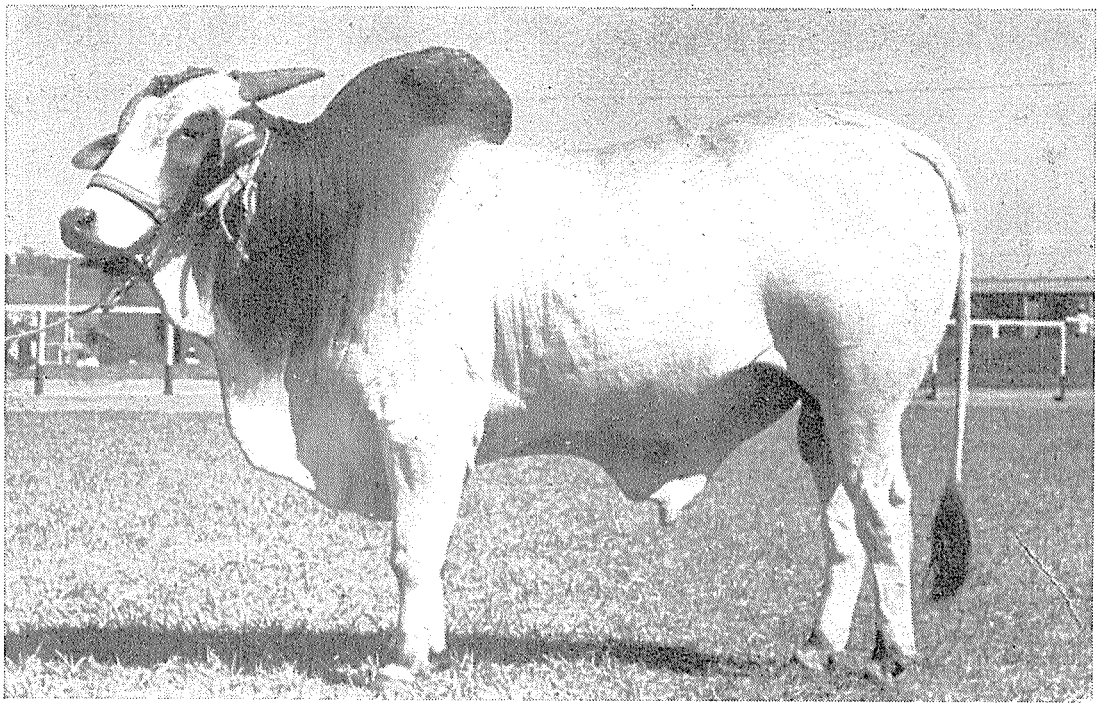
[1] *See* Figures 35 and 36.



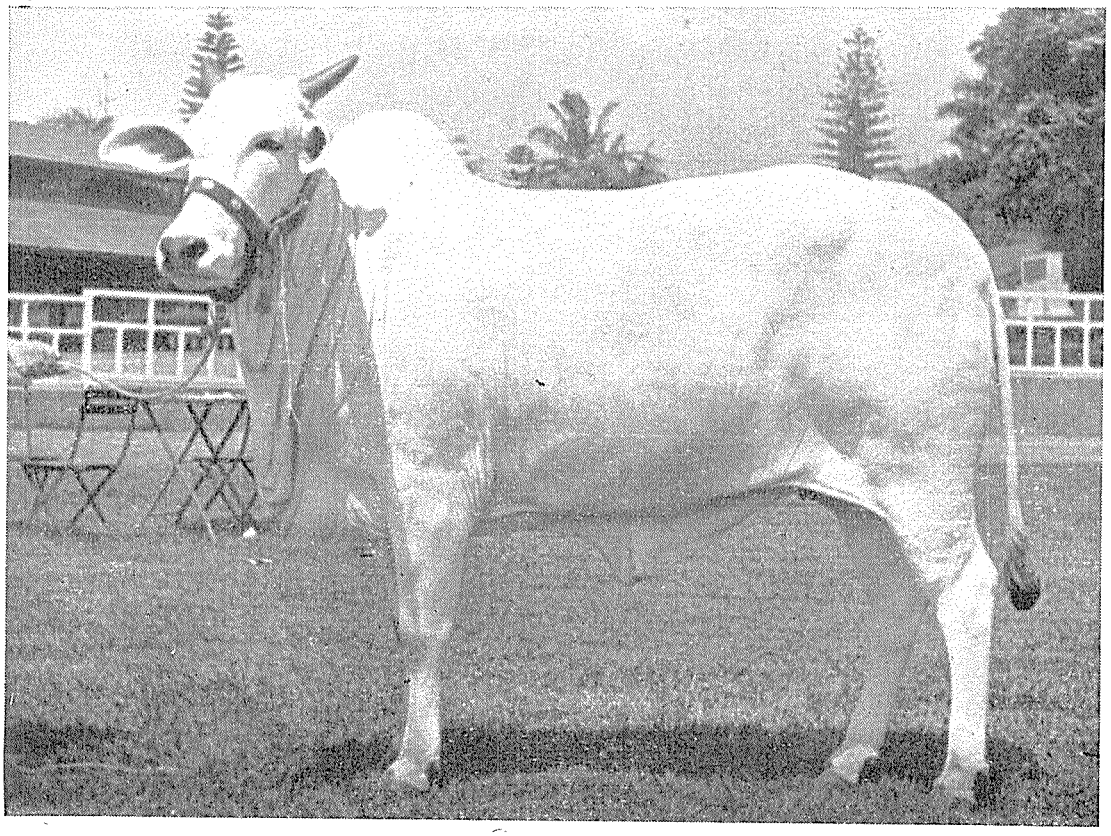


FIGURE 35. Ongoles, known as Nellores in Brazil, are popular and primarily used for beef production, being fattened on good pastures. Above: an Ongole bull in Brazil. Below: an Ongole cow in Brazil.

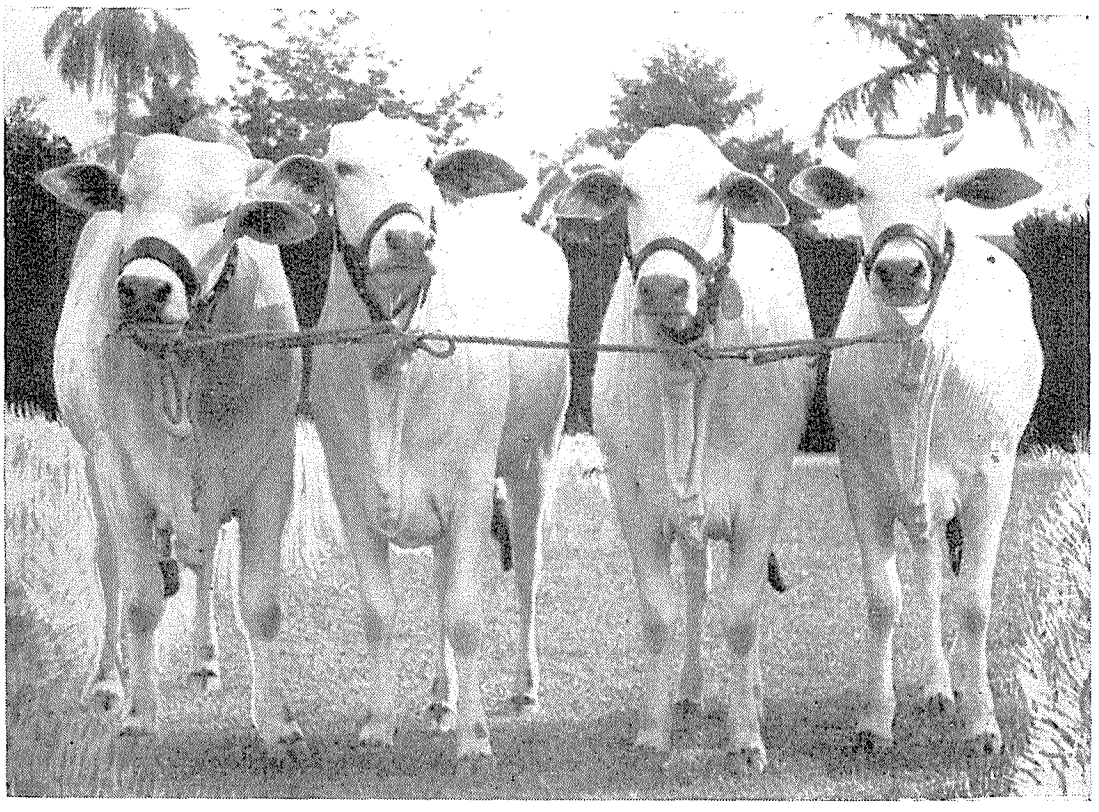


FIGURE 36. A group of Ongole heifers in Brazil.

weaned and separated into sex groups. Bulls are allowed to breed when about 24 months old and heifers when 24 to 27 months old.

Weights of animals at this station are give in Table 40.

**Table 40. Weights of Ongole Cattle, in Pounds**

| AGE | Male | Female |
|---|---|---|
| At birth | 65.7 ± 1.3 (21) | 54.7 ± 1.5 (30) |
| 3 months | 163.2 ± 3.3 (52) | 145.7 ± 3.7 (57) |
| 6 months | 284.4 ± 4.4 (54) | 260.6 ± 6.4 (54) |
| 9 months | 409.0 ± 9.2 (44) | 381.5 ± 8.1 (54) |
| 12 months | 511.6 ± 11.2 (32) | 431.7 ± 3.3 (50) |
| 15 months | 606.4 ± 16.1 (24) | 491.9 ± 11.7 (46) |
| 18 months | 730.9 ± 20.9 (18) | 561.2 ± 12.8 (42) |
| 21 months | 863.5 ± 34.6 (8) | 646.9 ± 14.8 (33) |
| 24 months | 962.3 ± 49.2 (7) | 689.0 ± 13.0 (35) |
| Daily gain in weight since birth until 24 months | 1.52 | 0.926 |

From figures of the Government's experimental livestock breeding station near Uberab, Brazil. Figures in brackets refer to the number of animals recorded.

*Ceylon*

Ongoles have been imported into Ceylon from time to time in the past, particularly in the northern dry zone of the island. They are liked by cultivators for heavy field work in dry lands, it has been observed that they thrive better in this part of Ceylon than in the wetter southern area. The higher output and cash value of the crops of this zone, combined with more adequate sources of nutritious fodder, enable them to be reared and maintained on a satisfactory plane of nutrition. The milking capacity of this breed has not been exploited to any extent.

*Fiji*

Ongoles were imported into Fiji long ago by the sugarcane estates for draft purposes. They are now mixed up with local cattle. Animals with more typical Ongole features are still prized by the estate owners for heavy cultivation and transportation work. Small cultivators use the cows for household milk production.

*Indochina*

In Indochina, Ongoles were imported along with some other Indian breeds primarily for improving the work stock.

There are three types of soils in this region. Red soils are prominent in the hilly regions; these areas are well-drained and supplied with plenty of water from streams. Gray soils in the plains and valleys are fertile but dependent on rain; during the rainy season they produce an abundance of cattle feed, but during the dry season scarcity of water makes it very precarious for cattle. The low deltaic regions are swampy where rice plantations are prevalent, and these are regions where Ongoles have been tried. Nearer the sea, however, the climate is milder; as one goes into the interior it is hot as well as humid, the long dry season and the long rainy season making the rearing of cattle difficult.

Various cultivated fodders such as sorghum, maize, Guinea grass, Elephant grass and wild sugarcane are available in the region.

The measurements summarized in Table 41 are reported for typical Ongole cattle in the region:

**Table 41. Measurements of Typical Ongole Cattle in Indochina**

| MEASUREMENTS | Bull, 4 years | Bullcalf, 2 years | Ox, 9 years | Cow, 5 years |
|---|---|---|---|---|
| Height behind the hump, in inches | 54.0 | 51.6 | 55.9 | 48.8 |
| Heart girth, in inches | 81.5 | 78.7 | 92.6 | 80.7 |
| Length from shoulder point to pin bones, in inches | 63.4 | 58.3 | 65.0 | 57.9 |
| Width of hips, in inches | 19.3 | 16.95 | 20.5 | 18.9 |
| Length of ears, in inches | 8.75 | 8.75 | 9.87 | 8.75 |

*Indonesia*

Indian cattle of South-Indian origin have been imported to the islands of Java, Sumatra, Borneo and North Celebes since 1906. These have been used mainly for breeding purposes, the primary aim being to improve the draft and beef production of the region. In the year 1914, 42 males, 496 females and 70 calves were introduced on Sumba island to establish a pure-bred stud center of the Ongole breed [1]. It was envisaged that breeding animals from this center would be used on other islands for improvement work. Sumba produced over 1,200 bulls prior to World War II for other breeding areas in Indonesia. They are used for pure breeding as well as grading-up native cattle. At present it is estimated that there are over 22,000 animals of this breed in Sumba and the number is increasing.

In Java, on natural grass plains, bulls at 5 years of age weigh 1,100 to 1,430 pounds, while individuals maintained and stall-fed weigh 1,320 to 1,760 pounds. They are primarily used for draft purposes. An authority gives his estimate of the draft ability of Ongoles in Java as follows: "If the draft accomplishment of native Javanese cattle is placed at 100, then the cross-bred bullock is equivalent to 128, while the pure-bred Ongole is equivalent to 172".

[1] *See* Figures 37 and 38.

FIGURE 37. A group of Ongole cattle on Sumba Island, Indonesia. There are more than 22,000 Ongole animals on the island.

Sumba, where the breed is maintained pure in large numbers, has the high temperature of the tropics, but humidity is low compared with other islands. The southern part of the island is mountainous, but the northwest and eastern part is plain. Mean rainfall of the area is 71.4 inches. December to May is the season of heavy rainfall while June to November is fairly dry. In the dry season there is a shortage of both grass as well as water, and cattle in large numbers are, therefore, exported. The breed is developed for draft and beef purposes. Animals are kept on ranges and never get supplementary feed.

As draft animals they are especially prized, for the bullocks are even-tempered and willing workes. The hooves of the animals are strong enough for all field work, but when working on metalled roads the hooves are covered with rubber patches.

Bullocks are broken for work when they are 18 to 24 months old and weigh about 550 to 650 pounds. In surabaja where the scavenging service employs Ongoles it is observed that they move at the rate of 3.1 miles per hour and work for 6 to 7 hours daily, carrying a load of about 2,800 pounds.

Age at first calving for the females is approximately 2 years and 6 months. They are ready for service when they are 18

to 24 months old. It seems that they are sexually mature earlier than in India.

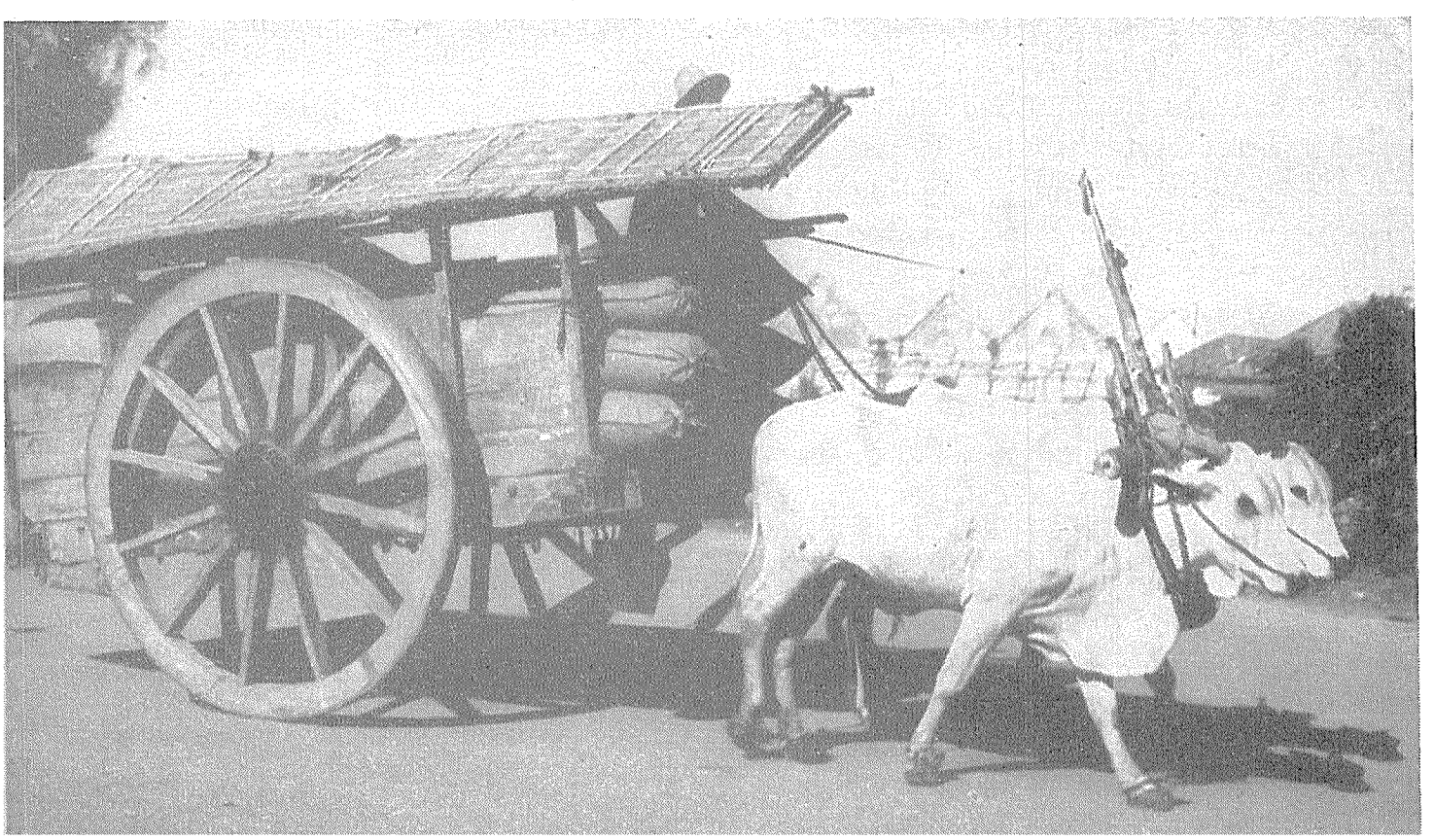
Weights and measurements of some typical animals are given in Table 42.

**Table 42. Weights and Measurements of Typical Ongole Animals in Sumba**

| MEASURE | Mature male | Mature female | Mature ox |
|---|---|---|---|
| Weight, in pounds | 1 164.0 | 838.0 | 995.0 |
| Length from shoulder point to pin bones, in inches | 63.4 | 53.5 | |
| Height at withers, in inches | 54.3 | 52.5 | |
| Heart girth, in inches | 78.2 | 65.7 | |
| Width of hips, in inches | 19.7 | 17.8 | |

It is observed that Ongoles when mature fatten easily on grassland. They are slaughtered from 4 to 6 years of age when they weigh approximately 1,100 pounds. Dressing percentage is approximately 50 percent.

FIGURE 38. Ongole bullocks in a cart, Surabaya, Indonesia. Note the rubber shoes to protect the animals' feet.



*Malaya*

Indian cattle constitute the majority in Malaya particularly in the western side of the peninsula south of Kedah. The early Indian settlers who were mostly from Madras State naturally took with them cattle of Ongole, Halliker and Kangayam types. As the cattle are used for all three purposes of milk, meat and draft, Ongoles acquired popularity.

Feed conditions, however, are not very favorable. Herbage becomes fibrous quickly as the inter-monsoon dry season advances and the animals kept on these pastures begin to lose condition, and though exact figures are not available it is observed that the present-day locally bred Ongoles are inferior to their parent stock (Marsh and Dawson, 1947, 1948).

*United States of America*

In 1906 a valuable importation was made by A. P. Borden, executor of the Pierce Estate, at Pierce, Wharton County, Texas. This shipment was mostly of Nellore (Ongole) breeding. Animals of this breed are popular in the United States where they are mostly found in the Gulf Coast region (Black, 1938).

Their physical characteristics are described as follows: they have smaller ears, finer bone and lighter color than Kankrej. Color varies from steel gray to almost white. Rhoad, while giving the genesis of the Santa Gertrudis breed writes: "The first exploratory cross on the King Ranch with the Brahman was made in 1910. The sire used was a half-bred Brahman-Shorthorn bull presented as a gift by the Tom O' Connor Ranch of Texas. This bull became known as the O' Connor bull and was destined to play an important part in the development of the Santa Gertrudis breed. He was a large, almost black bull and showed considerable Nellore (Ongole) breeding". Monkey, the famous foundation sire of the Santa Gertrudis breed, had traces of Ongole blood both in his sire as well as dam (Rhoad, 1949).

### Sources of Breeding Stock and Information Regarding the Breed

It is estimated that there are 1,502,000 cattle of this breed in India. In view of the vitality of these animals it is surmised that the numbers are increasing. For further information regarding the breed and its availability, the following may be contacted:

1. The Director of Animal Husbandry, Madras State, Madras, India.
2. Animal Husbandry Commissioner to the Government of India, New Delhi, India.

In Brazil, where some pure stock is maintained, these agencies may be approached for further information:

1. Departmento da Producao Animal, Divisao de Zootecnia, Postal Box 215-B, São Paulo, Brazil.
2. Sociedade Rural do Triangulo Mineiro, Postal Box 39, Uberaba - Minas Gerais, Brazil.

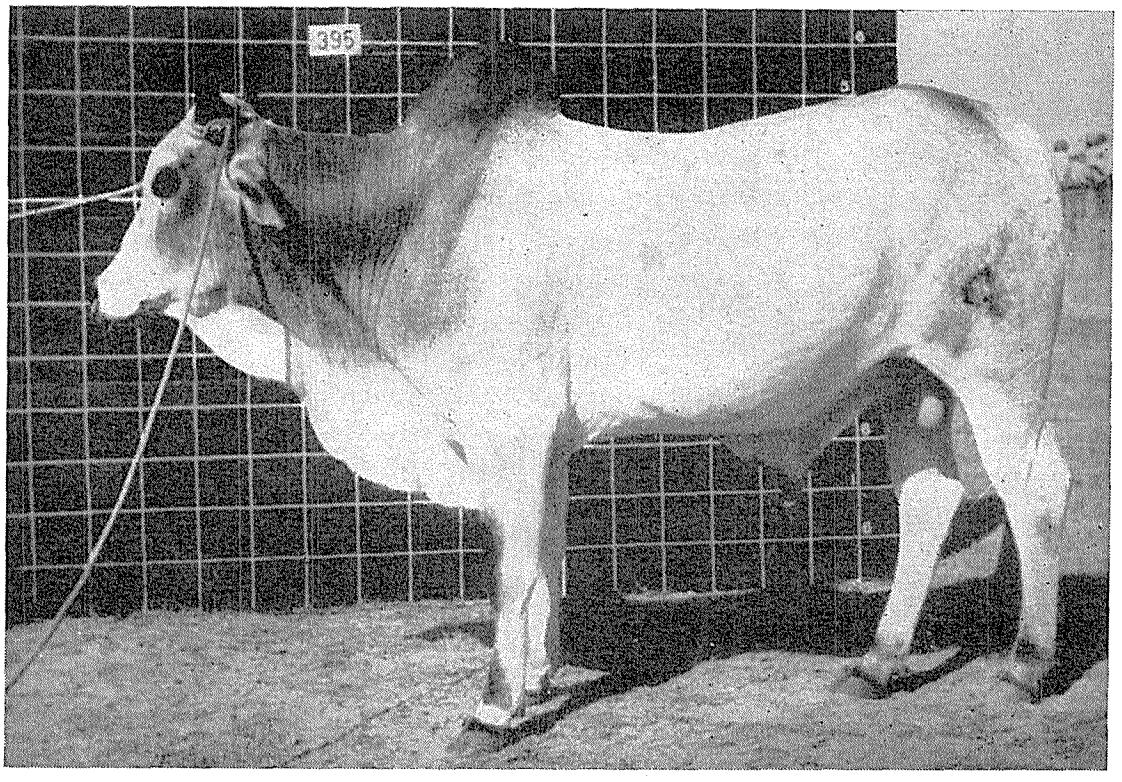
In Indonesia, where Ongoles are bred in large numbers, information will be supplied, on request, by the head of the Animal Industry Services, Department of Agriculture and Fisheries, Djakarta, Indonesia.

## RATH

### Origin

Rath cattle [1] belong to the white, narrow-faced, stumpy-horned group of cattle represented by the Hariana cattle. As a distinct type, they are bred in a very small area in Alwar of Rajasthan State. Particularly the area between Bansur and Narnaul and between Mundawar and Narnaul is noted for pure specimens of the breed (Baldrey, 1909). They are also bred in adjacent areas but, owing to the proximity of other similar breeds such as Hariana, Mewati and Nagore, they are likely to be mixed with these in strain. Rath cattle are reputed to be economical to maintain. As medium-sized draft cattle, they are considered very

[1] *See* Figures 39 and 40.



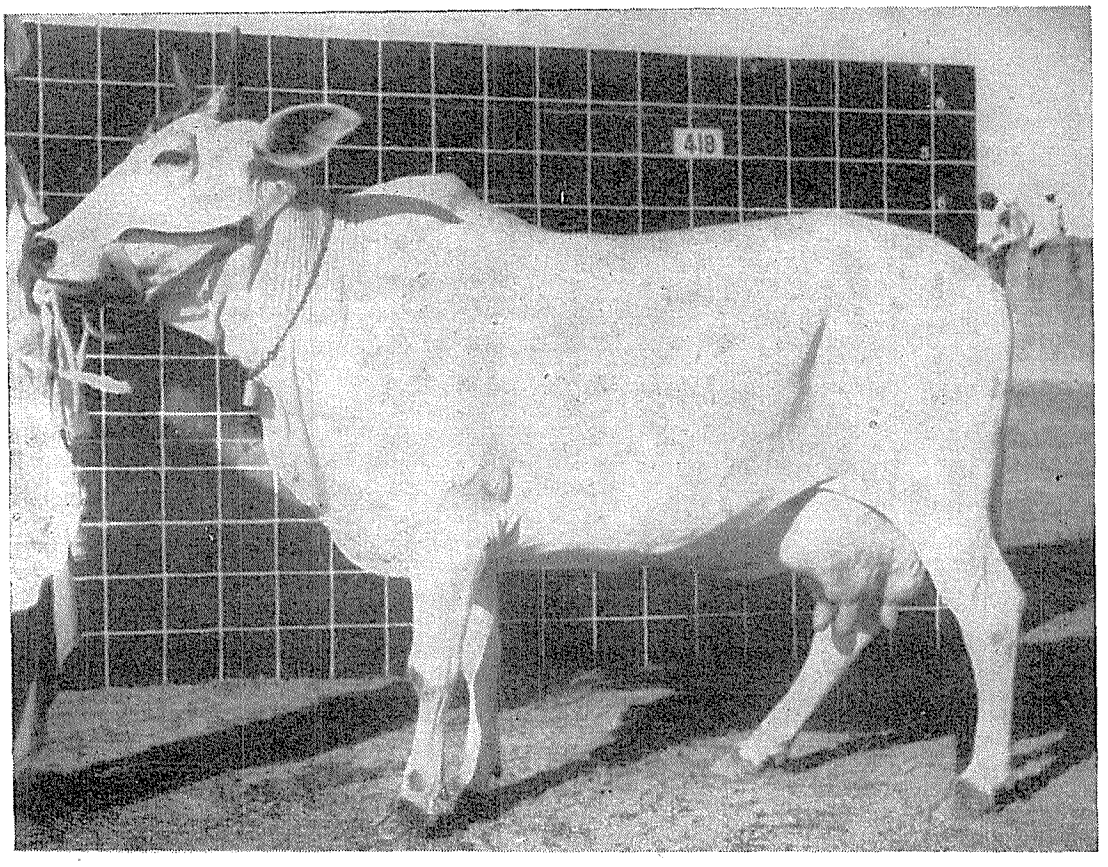




FIGURE 39. Rath cattle are powerful animals of medium size similar to the Hariana but somewhat smaller in size. Above: a Rath bull. Below: a Rath cow.

suitable for work in the plow or on the road. The cows are fairly good milkers (Olver, 1938; Phillips, 1944).

## Conditions in the Native Home of the Breed

### *Location, Topography and Soils*

The area where Rath cattle are bred lies in the north and west of Alwar and other adjacent territories in Rajasthan. The general surface of the area is flat and sandy but there are irregular chains and groups of low hills which, as a rule, are entirely barren and covered with rocks and stones. The soil is a deep sandy loam and with relatively little rain it yields good crops. The water supply is mostly from tanks, and dependent on the local rainfall: water in the shallow wells is brackish and only very deep wells provide sweet water.

### *Climate*

The climate of the area is dry but very hot during summer, particularly when scorching winds blow. During the winter months, cold winds are sometimes apt to be unpleasant, though the average winter, which extends from November to February, is dry and healthy. The rainfall of the area is very moderate. Meteorological observations for the area are summarized in Table 43.

**Table 43. Climatological Data for Rath Area**

| MEASURE OF CLIMATE | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mean maximum temp. °F . . . | 76.3 | 80.6 | 90.5 | 99.4 | 105.4 | 103.6 | 96.9 | 91.8 | 94.2 | 95.5 | 87.6 | 79.0 |
| Mean minimum temp °F . . . | 48.6 | 52.6 | 61.5 | 70.8 | 79.4 | 82.3 | 80.2 | 77.0 | 74.8 | 64.4 | 55.4 | 50.5 |
| Humidity per cent at 0800 hrs. I.S.T. . . | 50 0 | 50 0 | 39 0 | 35 0 | 45 0 | 66 0 | 73.0 | 82.0 | 76.0 | 54.0 | 45 0 | 53.0 |
| Rainfall, in inches . . . | 0.15 | 0.24 | 0.11 | 0.13 | 0.41 | 1.42 | 3.97 | 4.84 | 2.40 | 0.32 | 0.11 | 0.11 |

Information from the Indian Meteorological Department, Government of India, New Delhi, India.

*Vegetation*

There are only limited areas for pasture. Important species of grasses that are found there are *Cynodon dactylon, Pennisetum cenchroides, Cenchrus echinatus, Andropogon annulatus* and *Heteropogon contortus.* These are available for grazing from August to October, later they are harvested and preserved as hay.

As there is a scarcity of water in the area and also as the rainfall is not heavy, most of the dry farming crops are grown. Sorghum and *Pennisetum typhoideum* are extensively grown as summer weather crops, also *Cajanus cajan* and other lentils. Stovers and straws from these crops are utilized as fodder. Sorghum and cluster beans are grown as fodder crops also and fed green to cattle. Wherever water is available for irrigation, turnips and other root crops are grown for feeding cattle. Wheat, barley, *Phaseolus radiatus, P. mungo,* peas, mustard and rapeseed are grown and by-products from these crops utilized for cattle.

*Management Practices*

As pasture areas are so limited, most of the cultivators keep only a few animals of the breed, the number depending upon the amount of land available for cultivation. The water supply is also another limiting factor in breeding large numbers of animals. The cultivator, however, is very painstaking and besides the limited grazing and by-products from his farm-grown crops, he collects leaves from shrubs and trees such as *Zizyphus nummularia* and various types of *Acacia* and these are fed to the cattle mixed with chaff millet and sorghum stover or straws from wheat and barley.

Every village in the area has communal bulls in approximately the proportion of 1 bull to 100 cows. These bulls are selected by the villagers and paid for by philanthropic wealthy people. The bulls are fed by the community.

## Physical Characteristics of the Breed

Rath cattle are medium-sized but powerful, with white or gray coloring. In the bull, the coloring of the neck and shoulder is generally darker than the rest of the body. The face is straight,

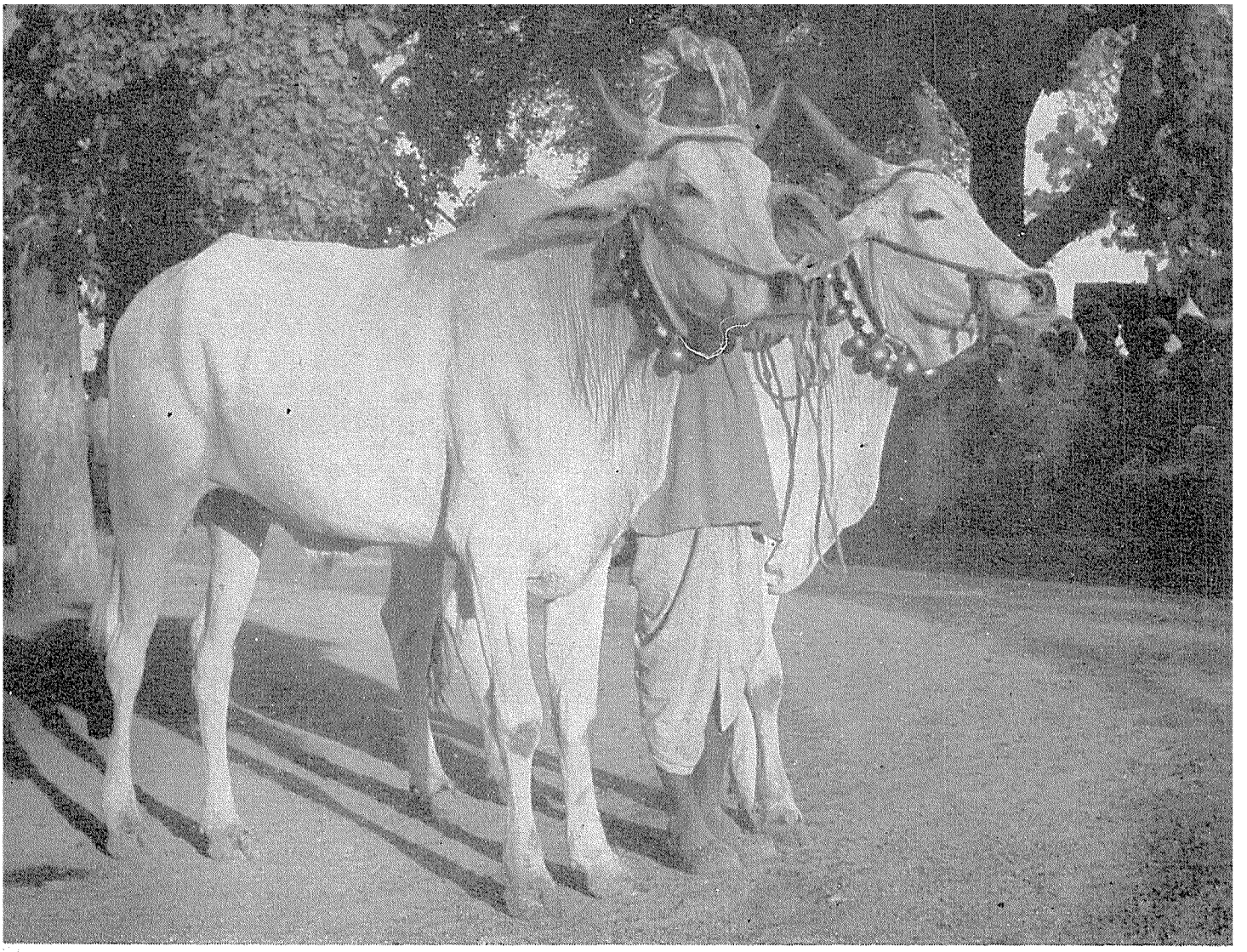


FIGURE 40. A pair of Rath bullocks: the animals of this breed are adapted to moderately heavy draft work.

narrow and medium-sized. The forehead is flat and does not show any protuberance in full-grown animals. Young animals under 3 years occasionally show this protuberance but it straightens up as the animal reaches maturity. The nasal bones are somewhat wide and coarse. The muzzle is wide and black. The eyes are wide open and clearly defined by the dark eyelids. Horns are small and emerge laterally in a somewhat forward direction from a moderately broad poll and curve inwards at the tips. The ears are short and pendulous, the inner surface facing forwards.

The neck is fairly long. The hump is moderately developed, placed well in front of the withers. The dewlap is light and the sheath is very small. The body is of moderate length with deep chest and well-sprung ribs. Quarters are well-developed and also the legs. The tail is short with black switch and set rather high giving the quarters a somewhat drooping effect. The feet are

small and compact. Average measurements of Rath cattle are given in Table 44.

**Table 44. Average Measurements of Rath Cattle**

| MEASUREMENTS | Cow | Bullock |
|---|---|---|
| Height at withers, in inches | 40–51 | 56–61 |
| Length from shoulder point to pin bones, in inches | 48–59 | 56–65 |
| Heart girth, in inches | 57–64 | 72–81 |

Data reported by Baldrey (1909).

## Functional Characteristics of the Breed

As the area in which Rath cattle are bred is dry and with very limited grazing, the number of animals in the area is restricted but, at the same time, this has kept the breed pure as no outside animals come into the region for grazing purposes. It is observed that they are economical to maintain and are regarded as a poor man's breed. The bullocks are very good workers in the plow or on the road for transport purposes. The dirt tracks in this area being of heavy sand, powerful and active bullocks are essential and Rath beasts are well suited for this work. They are observed to work steadily for 10 hours a day in fields and can travel about 20 miles a day carrying a load of half a ton in heavy sand. They are credited with long life.

An average cow that gets part grazing and part supplemental roughages, such as stovers and straws with little or no concentrates, is observed to produce 12 to 16 pounds of milk a day after feeding its calf, but accurate data are lacking. The average lactation period is of a short duration of approximately 200 days.

Bull calves are castrated when they are about 2½ to 3 years old.

## Performance in Other Areas

Some families from the area migrated to Berar in Madyha Pradesh with their cattle in the early years of this century. The

cattle were maintained pure and they have increased in number. Under conditions of black cotton soil the cattle have done well.

**Sources of Breeding Stock and Information Regarding the Breed**

Rath cattle are usually sold in large numbers in the markets of Rewari and Pushkar. For further information, the Animal Husbandry Commissioner to the Government of India, New Delhi, India, may be approached.