

# THE KANGAYAM, BREED OF CATTLE

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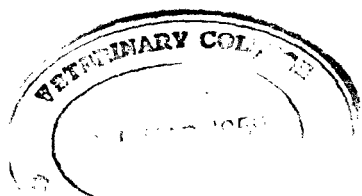


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# THE KANGAYAM BREED OF CATTLE

A MONOGRAPH



BY

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*Director of Animal Husbandry, Madras*

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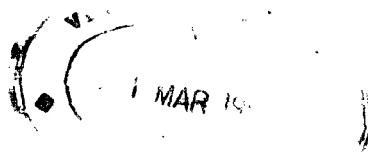
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*Dedicated to*  
***Sri Rai Bahadur N. Nallathambi Sarkarai Manradiar***  
*late Pattagar of Palayakottai,*  
*who is the founder and architect of the present*  
*Kangayam breed.*



Honble. M. Bhaktavatsalam  
Minister for Agriculture and Animal Husbandry, Madras State



## FOREWORD R

This monograph is a complete record of the history of the famous breed of Kangayam cattle, from the early days of its origin to the present day. The credit of evolving this breed from non-descript cattle, fixing the type and making it breed 'true' goes to the family of Pattagars of Palayakottai—more particularly to the late Sri N. Nallathambi Sarkarai Manradiar to whose memory this book has rightly been dedicated by the author. It may not be too much to say that he has immortalised the name of his family through this fine breed of cattle. Judged from the present day standards he may not be considered as a great scientist but yet his intuition in these livestock matters seems to have excelled all the accumulated knowledge of science. Otherwise it is impossible to account for this excellent piece of achievement in livestock development practically within the lifetime of a single individual. His son Sri N. Nallasenapathi Sarkarai Manradiar, the present Pattagar of Palayakottai is hard put to maintain the standard and still further improve on it and he is doing it with commendable skill and knowledge.

Livestock development is both an Art and a Science. The management part of it is indeed a fine art. A thorough knowledge of it is as essential as a knowledge of Genetics and it is only when both these combine that we can expect some improvement. This aspect of it is well brought out by a comparison of "Scheme" and "Non-scheme" animals at Palayakottai and the herd brought up at the Livestock Research Station, Hosur.

We live in an age of Statistics. It is the only accepted yard-stick at the present day to measure any progress made in any field, though the cynic might say that one can prove anything through statistics excepting the truth! The author has done well to unearth all the valuable data that lay buried in the family records of Pattagars and at the Livestock Research

Station, Hosur and presenting them in the form of this brochure. It is bound to prove of immense value in the intensive campaign of livestock development that is in progress in this State.

Though the results so far achieved to make this breed a dual purpose animal are not quite encouraging, the potentialities of this breed in that direction have been well established both at Hosur and at Palayakottai. With such wealth of data available, it must be possible for the 'experts' in the line to plan and programme properly and bring about a rapid development of cattle in the not distant future, through artificial insemination.

Many good things are lost to the World through lack of recording. Sri D. Pattabiraman, the present Director of Animal Husbandry Department, Madras, has done a distinct service through this timely publication. I commend this book to all lovers of cattle.

MADRAS  
13-5-57

M. BAKTHAVATSALAM  
*Minister for Agriculture*





Dr. D. Pattabhiraman, Director of Animal Husbandry, Madras

## PREFACE

One of the recognised breeds in India and the only descript breed in this State is the “Kangayam.” This breed derives its name from its native tract *viz.*, Kangayam area of the Coimbatore district. Breeds of cattle are usually built up by selective breeding under the co-operative action of many breeders but this breed has the singular feature that it had been mainly built up by the efforts of a single individual the late Pattagar of Palayakottai, Sri Rai Bahadur N. Nallathambi Sarkarai Manradiar. The ancestry of the Pattagar of Palayakottai is traced to 1000 A.D. The forefathers of the Pattagar have rendered help to Pandya Kings who in turn have conferred the title of “Uthama Kaminda” and powers to settle Social and religious disputes in the Community of Kongu Vellalas and their sub-castes. The title “Pattagar” is hereditary and passes on to the eldest son.

The main occupation of the Family is “Agricultural Farming and Cattle Breeding.”

“Uthama Kaminda” Sri N. Nalla Senapathi Sarkarai Manradiar, M.L.C. and President, District Board, Coimbatore is the present Pattagar of Palayakottai and he is the 35th descendant in the line of his ancestors.

It was only during the time of the present Pattagar’s grandfather Cattle Breeding took some shape on a small scale, but he did not live long to push his cherished objective to any appreciable extent. The father of the present Pattagar, Sri Rai Bahadur Nallathambi Sarkarai Manradiar, Pattagar of Palayakottai, had to shoulder the responsibility even in a very young age. His unceasing efforts, for over five decades, have contributed in no small measure to the building up of the breed and he may, therefore, be called the chief architect of the Kangayam Breed of Cattle.

A herd of this breed maintained at Livestock Research Station, Hosur Cattle Farm, showed a tendency for higher milk yield and it was, therefore, decided to undertake a scheme for detailed study on this breed in its native tract and accordingly the "Kangayam Cattle Improvement Scheme"; under the auspices of the Indian Council of Agricultural Research was started in the year 1942 and is being continued.

I had the unique opportunity of the benefits of the practical experiences of the late Pattagar, in Animal Breeding and Management and of studying this breed in particular both at Hosur Cattle Farm and at Palayakottai Farm for the last 16 years.

I am grateful to the Government of Madras for the kind permission accorded by them for this publication. My thanks are specially due the Minister for Agriculture who has kindly written the foreword notwithstanding the heavy demands on his time. I am indebted to the Pattagar of Palayakottai for readily volunteering to undertake the publication of this monograph at his cost. My thanks are also due to the Popular Education Publishers for the excellent manner in which they have brought out this publication. I acknowledge the valuable help rendered me by Sri J. C. Victor Animal husbandry statistician of my office in correcting the proofs and assisting to bring out this publication.

**D. PATTABHIRAMAN**

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## INTRODUCTION

The Kangayam Breed of Cattle derives its name from the Kangayam Division of Dharapuram Taluk of Coimbatore District where this breed of cattle is commonly met with. The breed is generally seen in the Southern and South-Eastern Taluks of Coimbatore District, *viz.*, Dharapuram, Udu-malpet, Palladam, Pollachi and Erode Taluks. The breed in its purest form and in largest numbers can be seen only with the Pattagar of Palayakottai and at Government Cattle Farm, Hosur, even though ryots owning 10 to 50 head of cattle of this breed are not uncommon in the area. The breed is also known as “Kanganad”, or “Kongu”.

The District of Coimbatore in general, and more so the Kangayam area, is a low rainfall area. The soil in general has low retentive power of moisture and is hard with a calcareous sub-soil. The area being generally devoid of irrigational facilities on one hand and a low undependable rainfall on the other, cultivation indeed is a hard job. The only alternate source to depend upon is lifting up of water from wells. The water table is low and it is not an uncommon sight to see water being lifted from wells of even 50 feet deep by mholes. The only consolation is that the climate and soil conditions are such as to facilitate the maintenance of a comparatively richer pasture for longer periods, a factor which can be considered an asset, in the matter of cattle rearing. This natural facility associated with the pressing need for “Food Production” necessitating a hardy type of cattle to tackle the various agricultural operations under difficult circumstances, probably led to the evolution of this hardy breed of cattle. The Kangayam breed of cattle is, therefore, essentially a draught breed. Much importance was not attached for milch character probably due to the fact that the greater and pressing demand was for motive power. The ryot was interested in the breeding efficiency of the animal

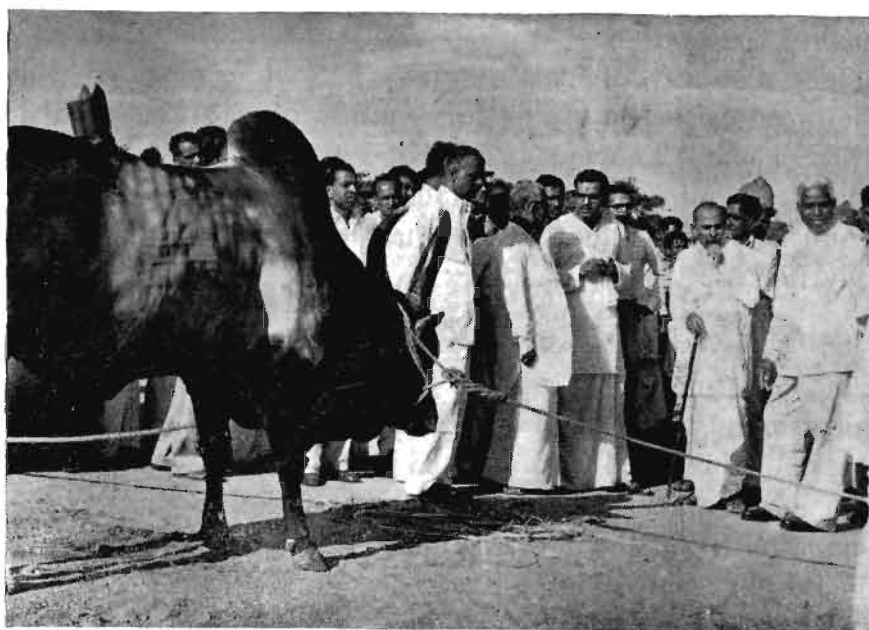
and its multiplication so as to provide more and more motive power. Due to compelling circumstances the breeding stock, in general, had to be maintained under ranch conditions and the habit of milking could not probably be encouraged to any large extent.

Kangayam breed of cattle meets the growing needs of the ryots for intensive livestock improvement work in the State and is one of the finest breeds of South India. Government also had undertaken to breed this herd in 1923 at the Livestock Research Station, Hosur Cattle Farm. The herd under the Farm conditions of Hosur Cattle Farm showed a tendency for increased milk production. It was, therefore, considered that the study of this breed under scientific management, will go a long way in assessing the latent potentialities for milk yield which could be brought out by managerial practices and selective breeding without deteriorating the draught, quality. Accordingly a scheme was undertaken at the farm of the Pattagar of Palayakottai—the only source at which the breed existed in a pure form and in considerable numbers. The Scheme is known as the “Kangayam Cattle Improvement Scheme” and is being run under the auspices of the Indian Council of Agricultural Research, New Delhi with effect from July 1942.

The Livestock Research Station at Hosur, maintained by this State Government, has also the Kangayam breed of cattle maintained in the purest form for the last 30 years. The foundation stock for this breed was obtained in 1924–25 from the Pattagar of Palayakottai. Since this breed was found to thrive well at this farm, it was the desire to improve this breed, so that pure-bred Kangayam pedigree bulls can be raised for distribution in the rural and urban parts of this State for improving the local non-descript cattle of this State. At this farm, though the breeding of Kangayam herd has been in vogue for over 30 years, a major portion of male breeding stock used for stud at this farm, were purchased from the Pattagar's farm with a view to introduce new blood as and when necessary. Strict

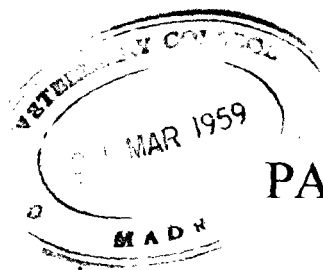
culling policy is being adopted at this farm so that all the animals, which do not conform to the desired breed characteristics are removed in the early stages. Care is also taken to select breeding bulls for stud at this farm, which are of superior type. The breeding plan at this farm is by selective breeding based on the performance of the ancestors and also on the progenies if available.

The pedigree records for all the animals are maintained at the Livestock Research Station, Hosur for the last 30 years, when this breed was introduced at this farm. But at the Palayakottai Farm, no records were maintained till 1942. When the scheme was introduced at this farm in 1942, systematic recording of all pedigree particulars was taken up for both the scheme and non-scheme animals. Thus the particulars given in this publication are based on the records of Kangayam cattle at both these farms.



The Minister for Agriculture, Madras at Palayakottai Cattle Farm

The details are given in two parts, the first part dealing with the performance of Kangayam at Palayakottai Farm and the second part dealing with the Kangayam at the Livestock Research Station, Hosur.



## PART I

### *1 Palayakottai Farm*

The Palayakottai cattle farm is situated in Pudur village in the Dharapuram taluk of Coimbatore district. It is connected by road with Erode Railway Station at a distance of 21 miles. The nearest post office is Palayakottai and the nearest Telegraph Station is Kangayam at a distance of 10 miles from the farm.

The Pattagar of Palayakottai—the owner of the Farm—has 15,000 acres of land. Roughly half of the total area is utilised for his cattle farm of which about 5,000 acres are used as pasture and about 2,500 acres are used for cultivation of fodder crops. The area receives on an average about 28" of rainfall per annum of which about 14" are received under the North-East Monsoon and about 7" are received during each of the South-West Monsoon and hot weather periods. Thus the area is mainly dependent upon North-East Monsoon. It is a known fact that the North-East Monsoon is undependable in this State and this area is no exception. The failure of monsoon rains with attendant famine conditions is not an uncommon feature of the area.

The soil is generally red loam of varying degrees, with a substrata of "Canker gravel". The presence of this gravel enhances the calcium content of the soil and thereby that of the grass grown. This also helps in the aeration of the soil by breaking the continuity of the soil and in the retention of moisture though only to a limited depth. The result is the soil supports splendidly well the shallow rooted flora and thus forms an ideal grass land.

The area is situated at an altitude of 600 feet above mean sea level. The climate, in general, is therefore hot. The summer is pretty severe the temperature touching 103°F usually during the month of May. The temperature does not ordinarily go below 80°F during the cooler months of November-January.





Kumar, the grandson of the late Pattagar

The sons of the present Pattagar of Palayakottai

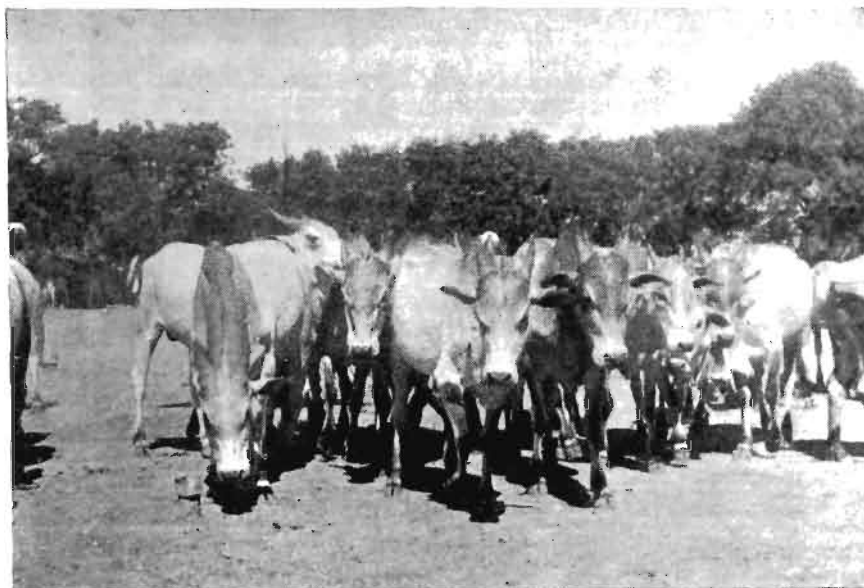




The present Pattagar of Palayakottai N. Nallasenapathi  
Sarkarai Manradiar, M.L.C.

### Managemental Practices at Palayakottai Farm :

The cattle are being maintained by the Pattagar of Palayakottai under semi-ranch conditions. The 5,000 acres set apart for grazing are divided into many paddocks by live-fencing. A thorny shrub—"Mullukiluvai" (*Balsomodendran berries*)—a highly drought resistant variety, is grown for this



Kangayam cattle being maintained at semi-ranch conditions

purpose. This forms a dense fencing, secure enough to impound cattle. The paddocks are provided with what are called "Vavies" (*i.e.*) wells sloped down at the ends so that the animals can easily get down and drink water.

The predominant grass seen on the pasture is "kolukattai" grass (*Cenchrus Ciliaris. L.*); other species like "Trachis Murica," "Setaria Verticulata," "Chloris Barbata," "Chrysopogan Mutanus" with legumes like "Indigo-fera Eneophylla," "Phaseolus Trilobus," etc., are also commonly seen. White Babul trees (*Accacia Albawillow*) are also seen extensively in the grazing area. A system of rotational and priority grazing is being adopted.

After the onset of monsoon, the cattle are sorted out according to age as young-stock under one year, 1 to 2 years, 2 to 3 years and sex-wise and are put into different paddocks, as young heifers of different ages in different paddocks and as young bulls of different age groups in various paddocks, where they remain day and night for months together. The groups

will contain 20 to 50 animals depending upon the condition and extent of pasture.

These animals are inspected periodically in the grazing area and such of those which do not thrive well in a group and which require special attention are picked out and put under separate paddocks. This habit of keeping them outside for months together makes the animals more hardy, tolerant to adversities and fierce in nature. The droppings of the cattle in the pasture area are not collected but the area is broken up once in 4 or 5 years and used for cultivation.

During the grazing season, concentrates are not fed to any animal except the breeding bulls. During the off-season, when the grazing is scarce, cows in milk, bulls intended for sale and bullocks are fed daily with the following concentrates :—

1. Groundnut cake.
2. Rice bran.
3. Cotton seed.
4. Residue of grain crops as cholam, ragi and cumbu (soaked in water).
5. White Babul pods.

All the ingredients are crushed and fed in a liquid form in specially constructed stone tubs which can accommodate 40 animals at a time. For feeding the animals individually every attendant is in charge of 2 animals which are brought to the feeding trough by him and fed with their ration in turn and taken back to the yard. This ensures individual attention. This part of the work in livestock management is the most important thing and is the key to success. The Pattagar has perfected this system and does not fail to attend to this part of work daily. They are fed twice a day according to the taste of the individual animal.

The young stock are not accustomed to the concentrate feeds and it is a job to handle and practise these animals to the feed. The animals have to be actually dragged to the feeding trough. The only feed they are accustomed to in the pasture area is the “Babul pods” and hence they are thrown in the feed trough where there is already a mixture of concentrates.

In addition, there is a practice of “pick-up” feeding for animals intended for sale. Blackgram, Horsegram, and Fenu-greek are soaked in water, ground into a paste and mixed along with the concentrates and fed. A handful of gingelly



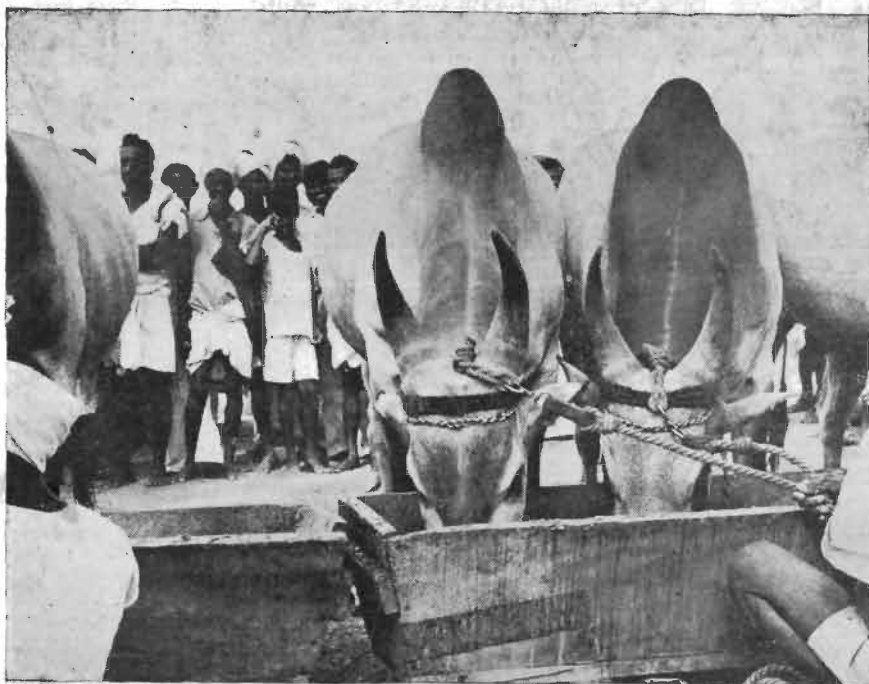
Individual attention while feeding

seed powder mixed with jaggery is also given daily to each animal intended for sale. It is claimed that this practice, improves the condition of the coat of the animals.

As the young animals are maintained under ranch conditions it is essential that they are broken up for handling before marketing. This is done usually when they are 3 years of age. This is indeed an art as it is not an easy affair to secure them due to their violent and fierce nature. A special enclosure with masonry wall of 10 feet height has been constructed for this purpose. The animals are driven into this enclosure, then roped by two experienced attendants from a distance. They are then muzzled with special muzzle ropes. A neck rope (Kalathu Kattai) and the leading rope also are attached. They are then tied with a leading rope to pegs just for few minutes to start with. They are tied for longer intervals gradually so that they gain the habit of being tied, in about a week's time. This is indeed a very sound practice since tying an unbroken animal for longer periods straightaway will be strongly resisted by the animal which will throw itself down violently thus leading to accidents.

After the animals are trained for "tying-up" habit they are broken up for "marketing and show." It is a pleasant

sight to see these animals being tied in an open yard evenly in a straight line in batches of 30, at a distance of 20 feet from each other and in rows of 5 feet to 10 feet apart. They are then handled daily by grooming and washing. They are fed specially with the special rations for "pick-up" condition and even forced feeding is resorted to, if the condition of the animal warrants it. These handling operations usually start by February-March so that the animals can be presented at the Kannapuram and Tiruppur Cattle Fairs which usually start by the end of April and June respectively.



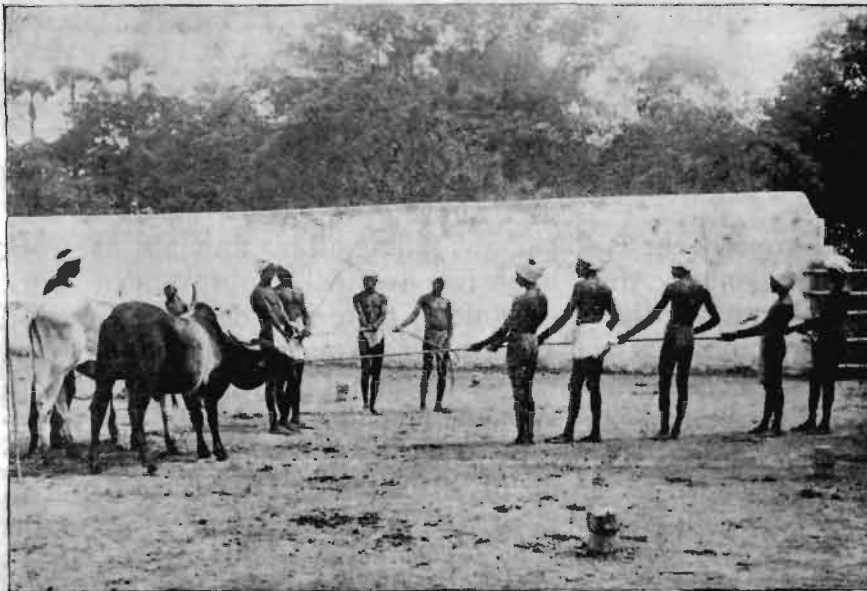
"Pick up" feeding for animals intended for sale

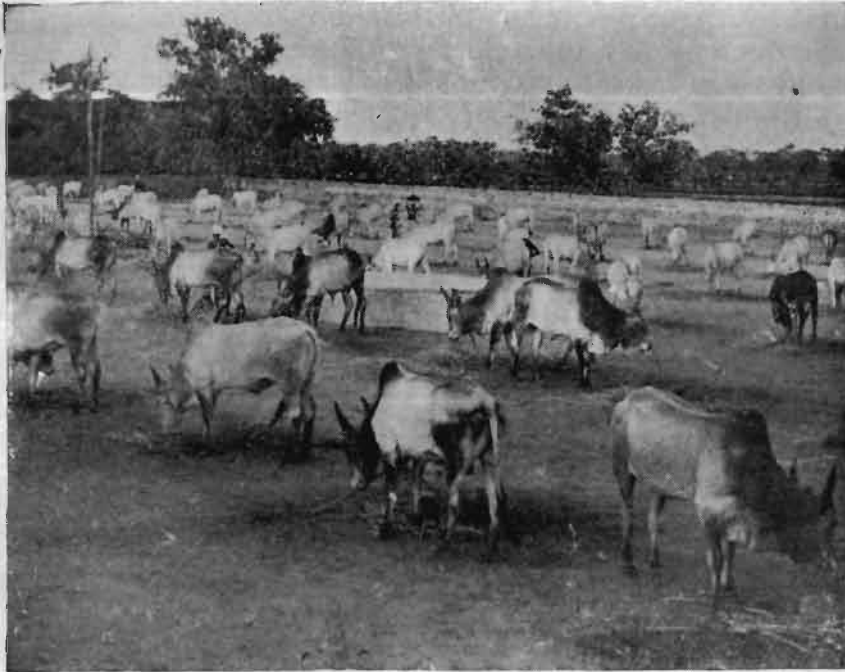
Formerly the Pattagar was selling all his animals as work bullocks only. After intensive livestock improvement work was taken up by the Government, there is a demand for good bulls and now all the bulls are sold as breeding bulls only. Usually only the bulls are sold and the heifers are seldom offered for sale. The heifers as already pointed out, are maintained in groups agewise. They are not mated till they are 3 years of age. A group of 30 heifers is selected and put in a paddock with an unrelated stud bull for a period of 3 months during the grazing season. It is claimed that within the 3 months all the heifers in the group get settled. Now breeding



"Breaking up" of animals

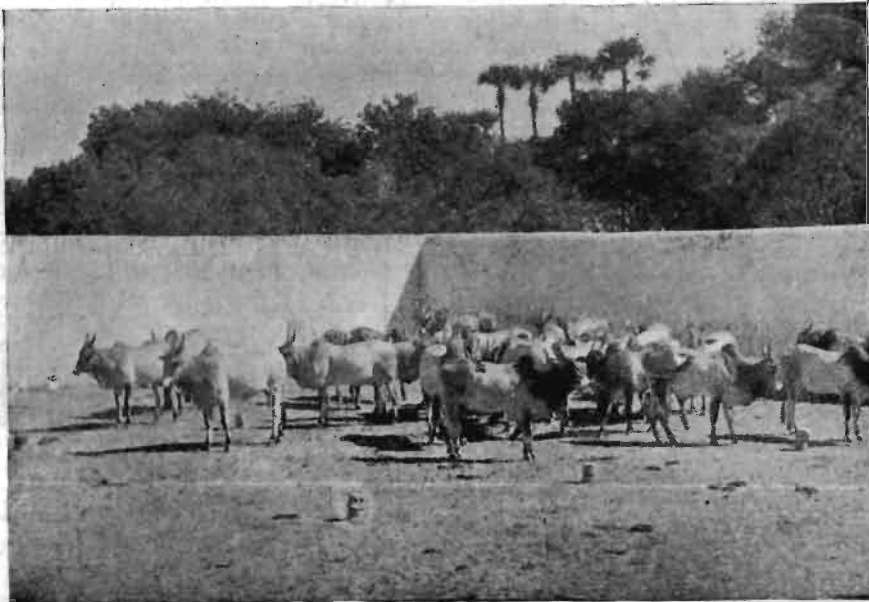
"Catching" bull





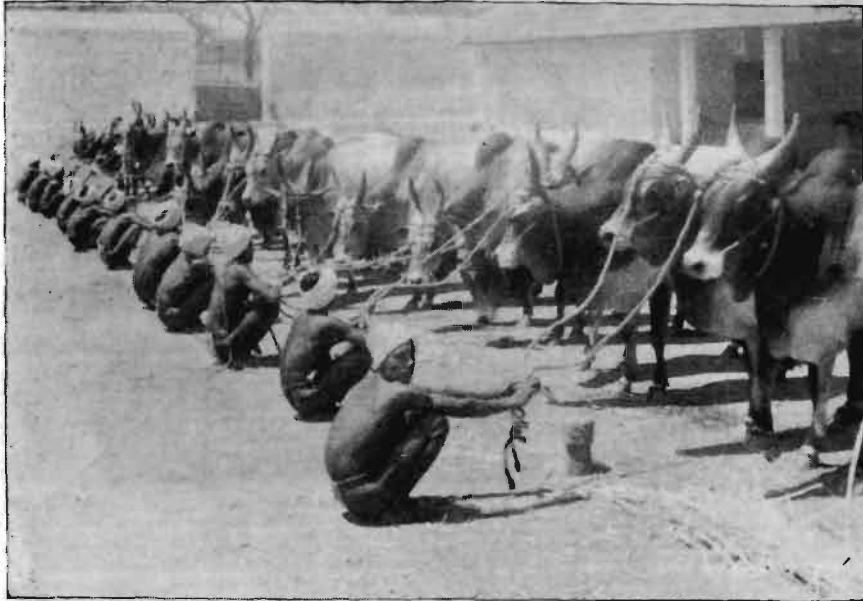
Animals tied in rows

"Broken up" bulls





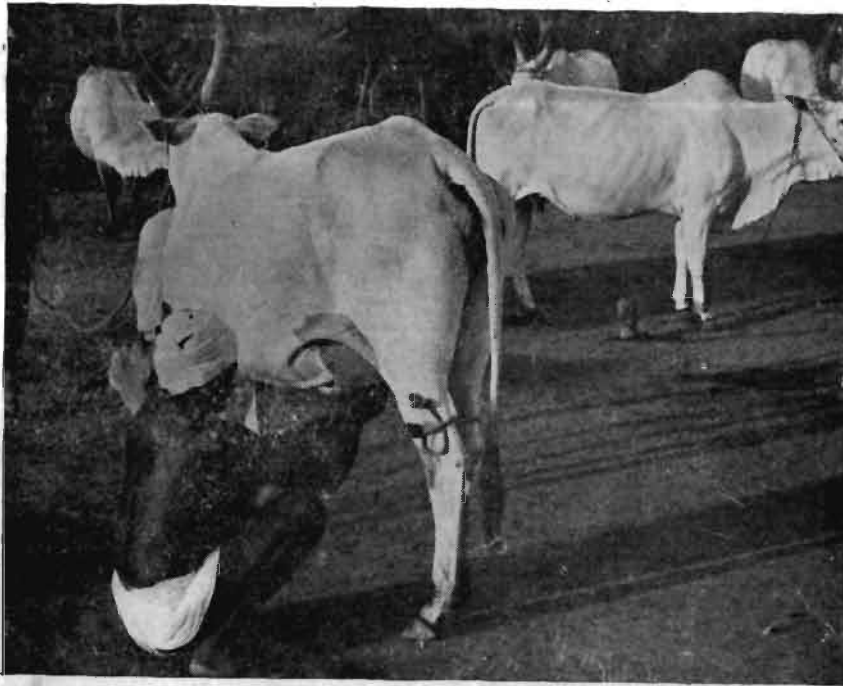
is controlled and all the animals, cows and heifers are brought into the yard for service and the bull allotted as per the breeding programme is only used. The Pattagar is a careful breeder. He has taken pains to keep the herd pure by carefully selecting sires from his own herd. He maintains 4 or 5 lines for this purpose and only mating of unrelated partners is resorted to.



"Broken up" bulls for sale

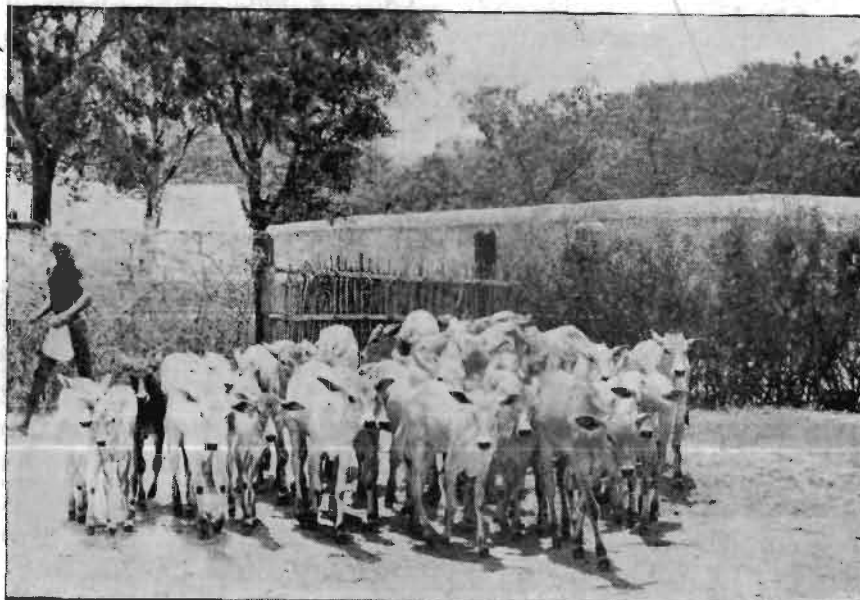
Cows are tied in the open yards both morning and evening for milking. Calves are allowed to suckle their dams in full for the first two months and as the calf advances in age, surplus milk is drawn from the cow, depending upon the milk yield of the cow. No milk is drawn if the cow is a poor-yielder and the calves are fed with milk from other cows if the yield of their dams is so low as not to meet the requirements of the calves. Thus, milk is being utilised for calf-rearing to the optimum level and only the surplus milk is used for domestic purposes. The cows are mated after calving in about 90 to 100 days.

The calf is allowed as much milk as it requires for the first two months, and is kept tied during that period with a muzzle on. After 2 months, green grass is put before the calf daily, until it has learnt to eat, when it is turned out to the pasture along with the other calves. The quantity of milk allowed is gradually reduced until the animal is weaned. The promising calves get extra quota of milk.

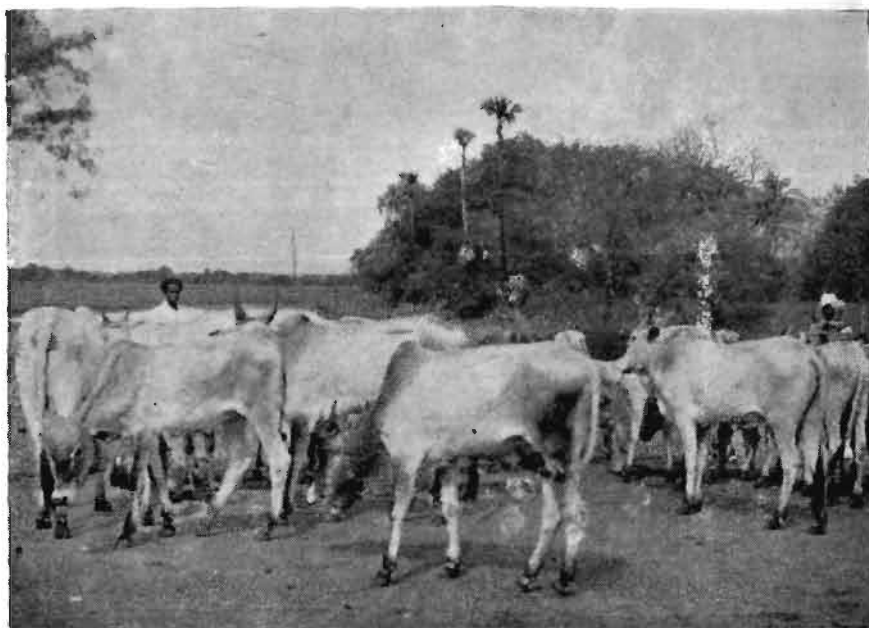


Milking of cows

Suckling calves



Bulls which are not fit for breeding are castrated when they cut the centrals and are converted into work cattle. They are trained for ploughing when they cut 4 teeth and at 6 teeth stage they are used for Mhote. The castration is usually done



Group of young bulls

in the month of November every year—a period when plenty of grazing will be available. Castration was being carried out formerly by Mulling. This is a cruel and painful method when compared to the modern method of castration by Burdizoo. Immediately after castration, the ears are trimmed. It is claimed that short and trimmed ears give an alert appearance to the animals.

#### **Castration by Mulling :**

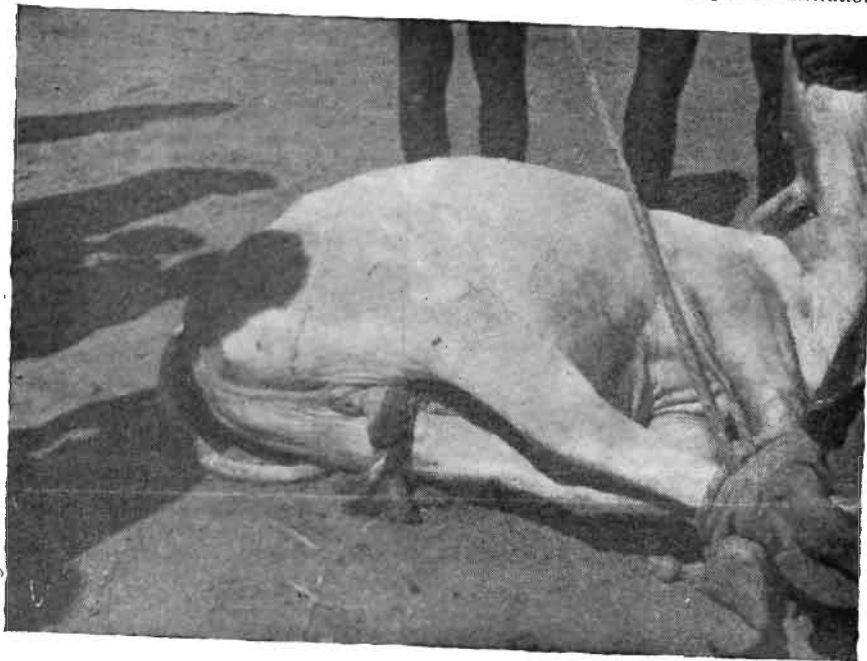
This is usually done by a pair of two rounded sticks (rulers) thick at the bottom end and thin at the top. Bottom ends are tied together with guts. These sticks are generally made of a special wood known as “Silai Unjal”, “Vellai Unjal” or “Nagethali” wood.

The stick is made into as a fine ruler, polished smoothly and is about 37" long. At the bottom end the thickness is  $5\frac{3}{4}$ ", middle portion 5" and at the top end is  $3\frac{3}{4}$ ". The two rulers are joined by guts at 4" from the bottom end.



Castration by Mulling

Imperfect castration



**Operation :**

The animal is cast and all the four legs are tied. The Scrotal bag is drawn outside with the testicles and the sticks are applied at the bottom of the scrotum, thus placing the testicles along the rulers. One man holds the rulers at the bottom end, places it over the thighs, another holds the top-end thus lifting the sticks and holding the two sticks tightly. The operator stands and puts pressure with his hands on the testicles one by one pushing gradually through the sticks. It is really a hard job for the operator. Unless he is an experienced operator he may not be a success. One should hear a breaking sound indicating the spermatic chord being broken. The ferocious and virulent animal before castration, becomes docile. At the same time the two ears are trimmed with an ordinary knife giving them a shape.

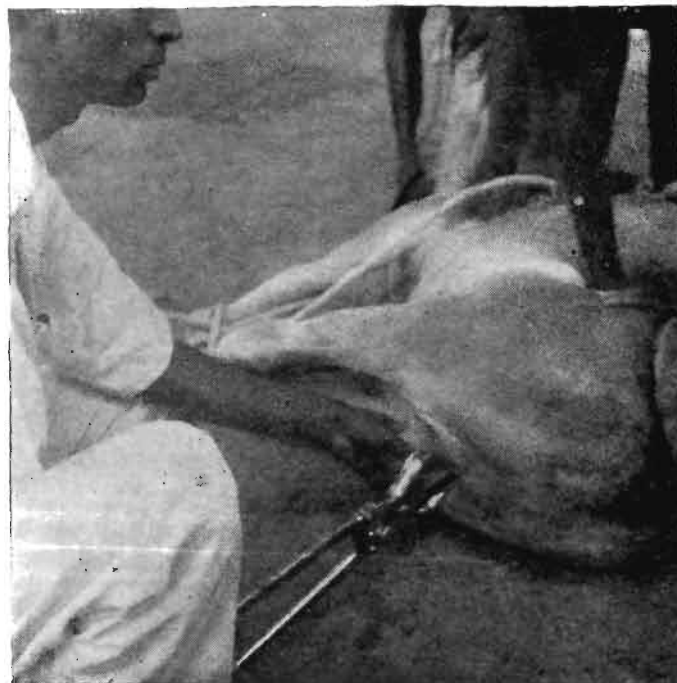


Pruning of ears

This practice has been replaced by "Burdizoo method" which is now very popular throughout and is known as "Bloodless and painless method of castration". Even now this practice by Mulling is resorted to at this farm for full grown animals over 4 years of age and the rest by Burdizoo.



Castration by Burdizoo





Training for ploughing

Training at Mhote work







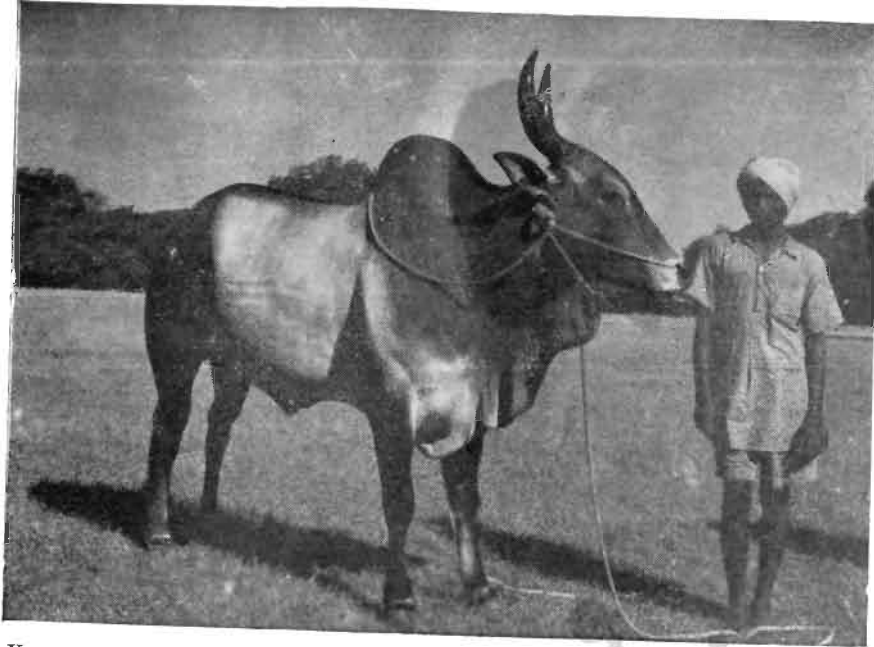
Ploughing

Training for draught



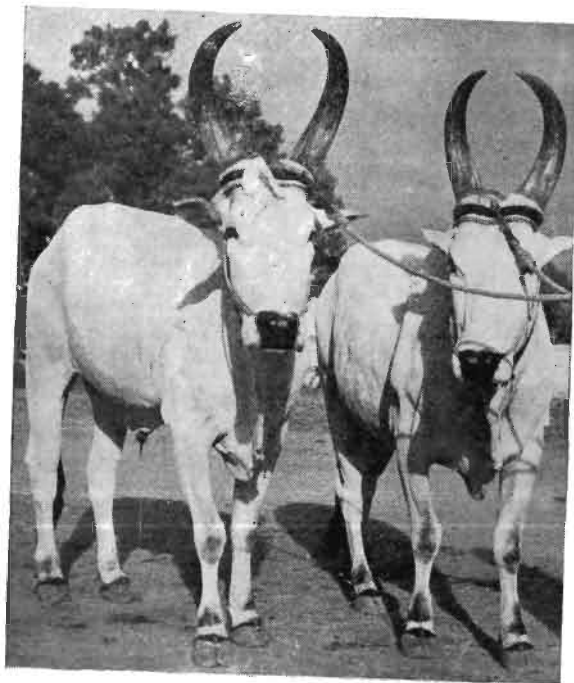
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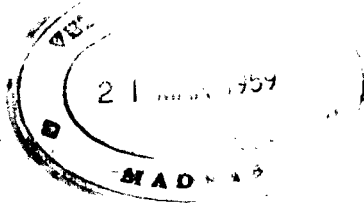




Kangayam bull

A pair of Kangayam bullocks





## 2 The Typical Kangayam Animal

### (a) General Characteristics :

The Kangayam is a medium sized animal, although large sized specimens are sometimes met with. Bulls weigh from 1,050 lbs. to 1,200 lbs. and mature cows from 700 lbs. to 800 lbs. It is purely a draught breed and is smart, active and brisk in appearance. The head is short with a broad level forehead and large horns of a distinctive type. It has a compact strong body. Bullocks are very strong and active and grey in colour. The colour of the bull is grey with dark grey to black markings on the head, neck, hump, shoulders and quarters. The colour of the cow is white or grey with black markings just in front of the fetlocks on all four legs and sometimes on the knees. Some cows have dark grey markings on the face and body which is not a disqualification. Calves are generally red in colour at birth and change to white and grey at the age of three to four months.

### (b) Head :

*Forehead* :—Broad and level, somewhat coarse in bulls with a groove in the centre.

*Face and muzzle* :—Face is short and straight, the muzzle is broad and black in colour.

*Eyes* :—Eyes are prominent and bright, elliptical in shape with black eye-lashes.

*Ears* :—Short and erect.

*Horns* :—Horns are stout and thick in bulls. They curve outwards and backwards and almost complete a circle at the point where they approach the tips.

### (c) Body and Limbs :

#### (i) FOREQUARTERS—

*Neck* :—Short and thick, well set on the body.

*Hump* :—Well developed and erect in bulls.

*Dewlap* :—Thin and short extending to the sternum only, free from fleshy folds.

*Chest* :—Deep and wide, broad between the fore-arms.

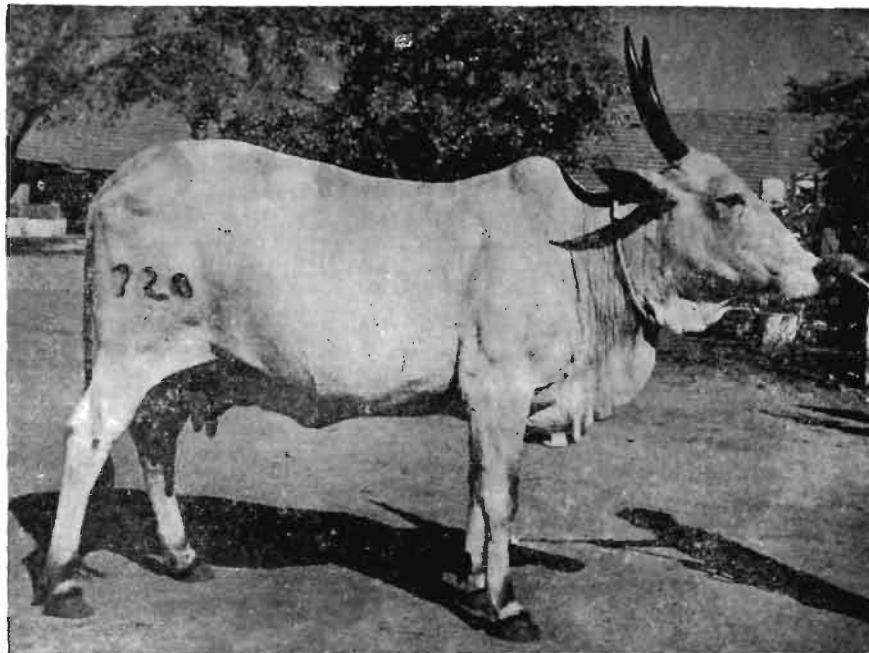
*Leg and shoulders* :—Legs are short, straight and squarely set under the body, with good fine bone. Shoulders are broad and muscular. Feet are hard, small, compact and black in colour with a narrow cleft between hooves.

(ii) **BARREL**—

The barrel is medium in length, well ribbed and compact.

*Back* :—Straight, of medium length, and broad.

*Ribs* :—Ribs are well arched and long.



Kangayam Cow

**Navel flap :**

It is very small in cows. Sheath is not pendulous ; it is well tucked into the body.

(iii) **HINDQUARTERS**—

The hind quarters are well muscled and developed and slightly dropping.

**Loins and hips :**

Loins are short and broad, hips wide apart.

**Rump and pin-bones :**

Rump is of medium length, broad and slightly inclining to the tail head. Pin-bones are wide apart.

*Flanks* :—Fairly wide.

**Thigh, buttocks and twists :**

Thighs are well developed, wide and muscular. The hocks are wide apart and strong and well set under the body.

**Tail :**

Tail is well set on the body ; it is broad and tapering and is moderately long with a good black switch which extends well below the hocks.

**(d) Udder, teats and milk veins :**

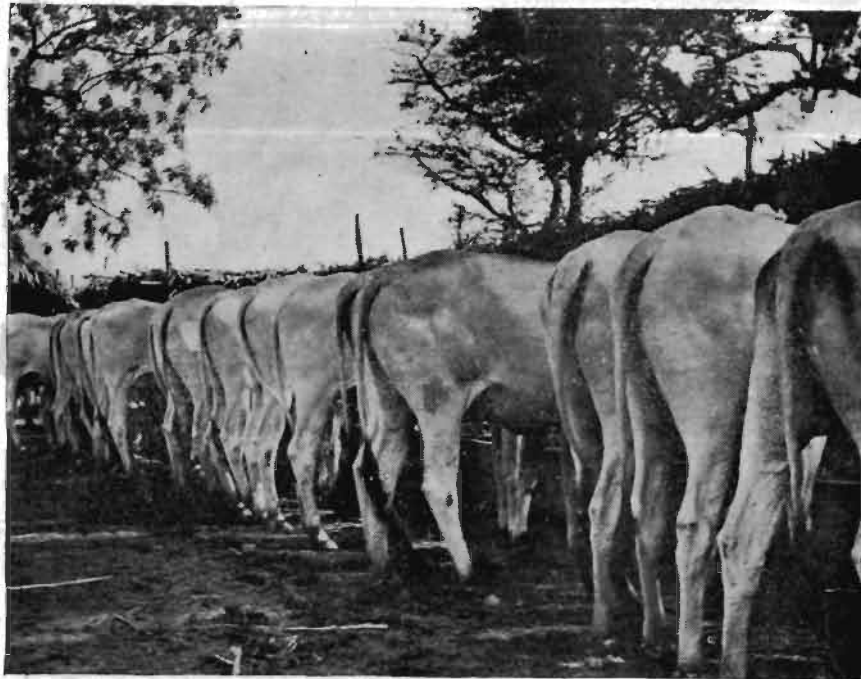
The udder is not very well developed, the teats are fairly small and well set apart. Milk veins are not prominent. The texture of the udder is fine and soft.

**(e) Skin, hair and escutcheon :**

The skin is mellow and pliable, black in colour, hair is fine, short and white in colour. Escutcheon is poor.

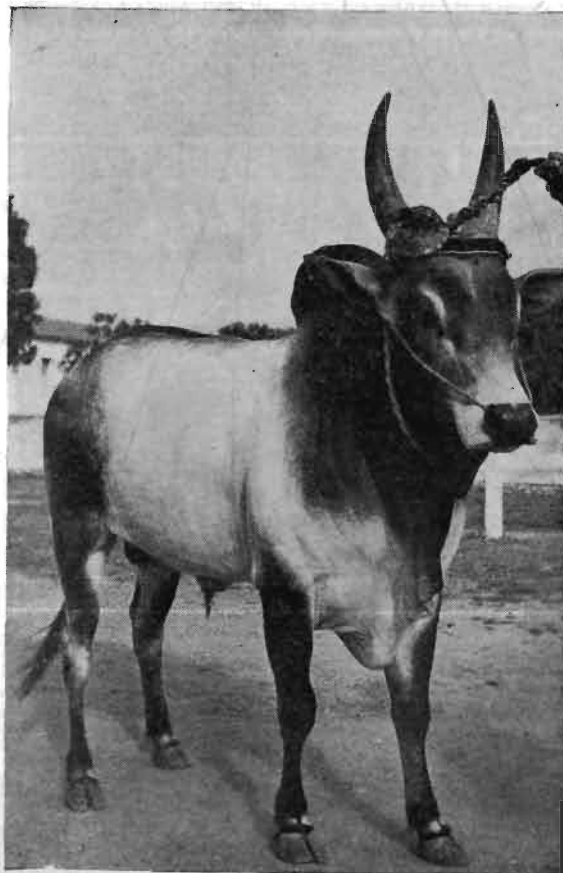
This breed is a recognised breed for registration in the Central Herd Book maintained by the Indian Council of Agricultural Research, New Delhi. According to the rules governing the registration an animal should generally have the characteristics as described above. In addition, a cow should have a milk yield of 1,000 lbs. in a lactation not exceeding 300 days. Any colour other than black on the muzzle is also considered a disqualification for registration.

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Group of Heifers

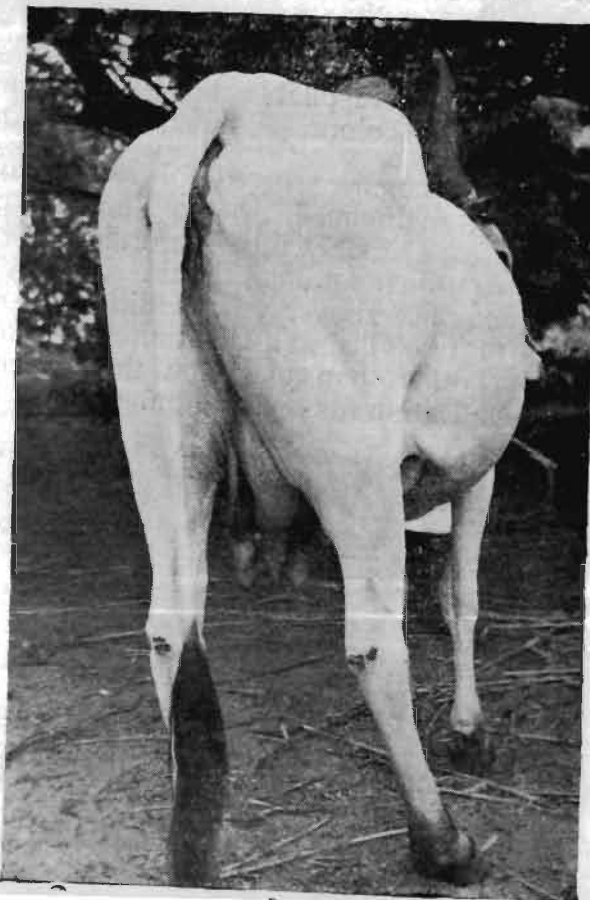
Young Kangayam Bull

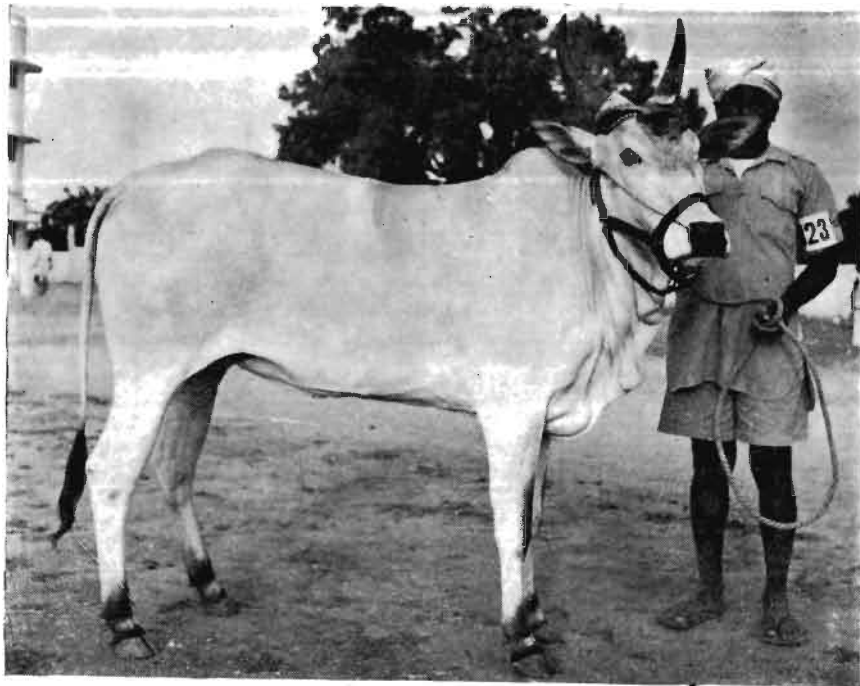




Group of Young Bulls

Udder of Kangayam Cow





Young Kangayam Heifer

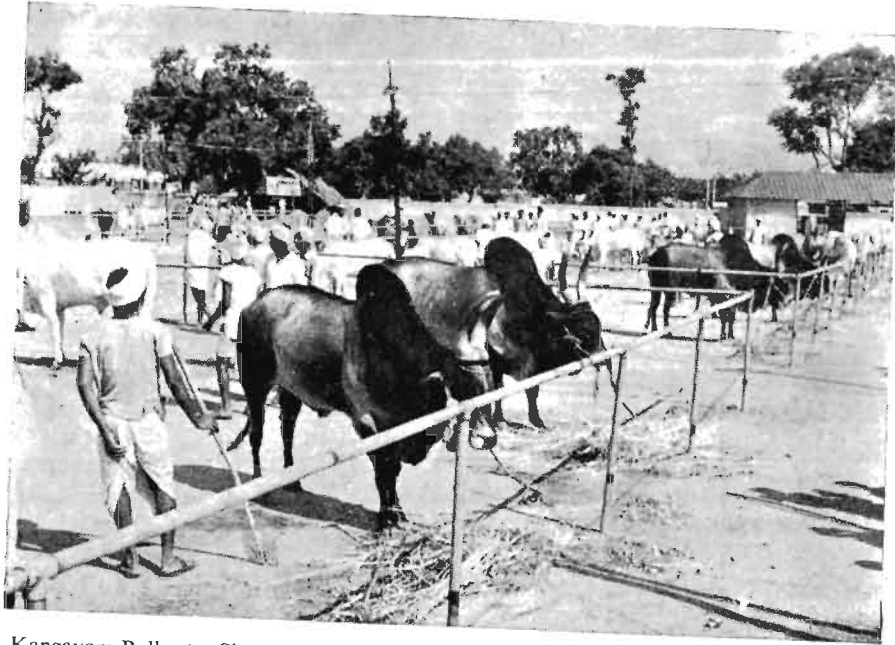
A Prize Kangayam Bull



Average measurements of typical Kangayam animals (in inches)

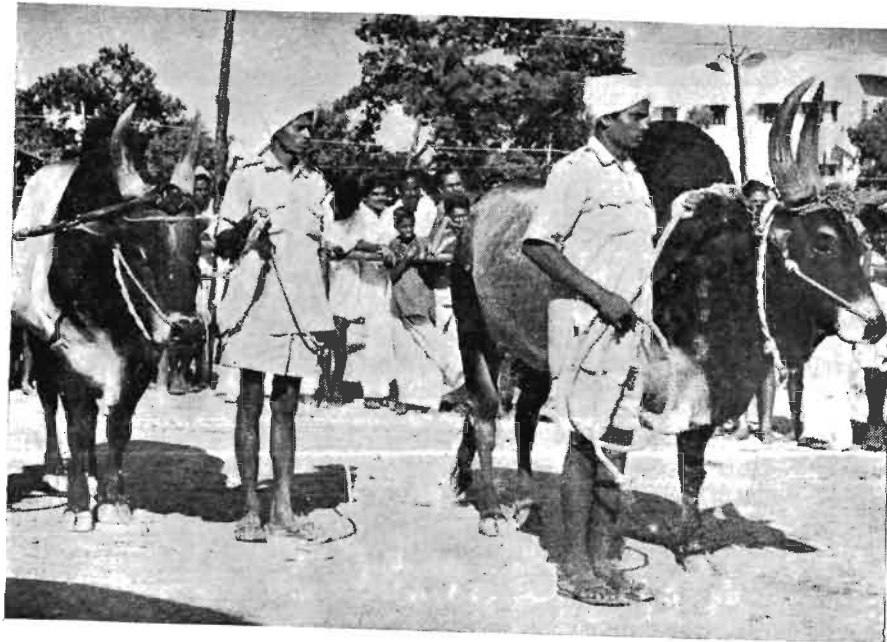
Description	Bulls			Cows		
	Maximum	Minimum	Average	Maximum	Minimum	Average
1. Height behind hump ...	54.0	51.0	52.0	48.0	45.0	47.0
2. Length from point of shoulder to pin-bones ...	63.0	55.5	60.5	56.0	49.0	53.0
3. Length of quarter from angles of hip to pin-bone ...	21.0	18.0	19.7	19.0	16.0	17.5
4. Height at angle of hip ...	54.0	50.5	52.5	50.5	46.5	48.5
5. Width between angles of hip ...	20.0	17.0	19.5	19.0	16.0	17.5
6. Height and pin-bone ...	49.5	44.0	47.5	46.0	41.5	43.5
7. Length of tail and height of end of switch from ground ...	53.0 & 8.0	46.0 & 2.0	48.0 & 5.0	48.5 & 12.0	37.0 & 6.0	43.5 & 7.3
8. Girth ...	76.0	69.0	74.0	70.5	58.5	64.0
9. Height at point of elbow ...	30.5	27.0	29.0	29.0	27.0	28.0
10. Measurement of bone below knee	8.0	7.0	7.4	7.0	6.0	6.5
11. Length of face from occipital crest to upper edge of muzzle.	20.0	18.0	19.0	19.0	17.0	17.6
12. Width of face immediately above eye ...	10.5	9.0	9.5	9.0	7.5	8.0
13. Length of lower surface of ear measured from tip to junction of ear to face ...	8.5	7.5	8.0	8.0	7.0	7.5
14. Greatest width of ear ...	6.0	5.0	5.6	6.0	5.0	5.5
15. Slope of rump, i.e., height to hook-bone minus height to pin-bone ...	6.5	4.0	5.0	6.5	3.5	5.0
16. Length of horns ...	18.0	12.0	15.5	23.0	9.0	16.0
17. Thickness of horn at base ...	13.0	10.0	11.5	10.5	7.0	8.5
18. Average weight ...	1,150 lb.			750 lb.		





Kangayam Bulls at a Show

Winners at the Show



### 3 *Flora of the Palayakottai Farm*

In any study undertaken in connection with livestock improvement, particularly relating to a type of animal found in a particular tract, and that too thriving under ranch or semi-ranch conditions, it is an essential pre-requisite to study the environmental conditions. The climate, the rainfall, the soil in general, the nature and quality of the flora deserve consideration.

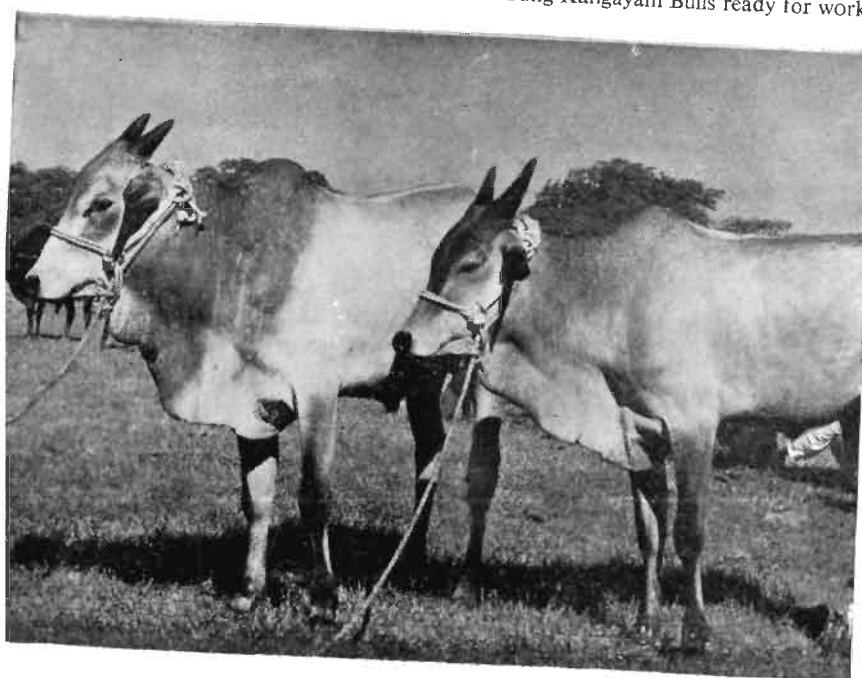


Green fodder at the Farm

The climate of the tract, can be said to be generally hotter than that of the plains of South India. The rainfall is low with varied distribution. The average rainfall for 25 years ending with January 1954 is 28" spread over 31 rainy days. Roughly about one-half of this rainfall is received during the north-east monsoon period (*viz.*) October to January, while the rest is received equally during the south-west monsoon and hot weather periods (*viz.*) during June to September and February to May respectively. Due to some reason or other, the north-east monsoon fails frequently in the region and hence these areas are subject to famine conditions frequently. The graph showing the total annual rainfall with the rainfall for the different seasons indicates the wide fluctuations arising out of the vagaries of nature. It also illustrates that the north-east monsoon rains are more



Young Kangayam Bulls beside green pastures



Young Kangayam Bulls ready for work

S. No.	Local Vernacular name	Botanical name
1.	Kolukattai grass	.. <i>Cenchrus Ciliaris</i>
2.	Vennampul	.. <i>Trachys Murica Steudl</i>
3.	Ottampul ..	.. <i>Setaria Verticillata Beaux</i>
4.	Kuruttupul	.. <i>Chloris barbatta</i>
5.	Cholapul ..	<div> <i>Chrysopogan Montanus-Trin</i>  <i>Brachiaria Mutica-Stapl</i>  <i>Sporobolus Orientalis Kunth.</i> </div>



They enjoy their bath well

The above grasses are readily relished by cattle and they are also nutritious. In addition, the following legumes are also commonly met with in the Pasture Area :

1. Naripayathankodi—*Phaseolus Trilobus* A.I.T.
2. Cheppu Neringi—*Indigofera Eneophylla* LLAL.
3. Savanikodi—*Merrenia Tridentata* Hall F.
4. Poonaipudukodi—*Crotalaria Globosa*.

The nutritive value of the above fodder grasses etc., along with the common concentrates used in the tract is given below :

S. No.	Name of fodder	Moisture	Ash	1. Grasses and Legumes			
				Results of Analysis per cent			Protein.
				Insolubles	Ca O	P <sub>2</sub> O <sub>5</sub>	
1	Kolukattai grass.	6.95	12.20	8.54	0.36	0.19	5.02
2	Vennampul ...	5.15	13.00	2.49	1.71	0.48	6.89
3	Ottanpul ...	4.60	13.82	1.13	0.66	0.35	8.56
4	Kuruttupul ...	9.19	12.12	5.74	0.48	0.46	5.04
5	Cholapul ...	7.55	5.37	3.16	0.34	0.10	3.05
✓6	Brachiaria Mutica.	6.11	9.39	4.20	0.34	0.77	6.18
✓7	Sporobolus Orientalis ...	5.17	21.27	14.90	0.34	0.30	6.15
8	Naripayathankodi.	6.51	6.67	0.83	1.59	0.55	9.19
9	Cheppuneringi ...	7.07	16.36	3.75	5.17	0.36	11.88
10	Savanikodi ...	5.78	8.70	0.83	2.82	0.40	11.80
11	Poonaiyuddu-kodi ...	6.97	10.41	1.31	1.91	0.50	10.14

NOTE.—(1) Item No. 9 is richest in protein superior even to grains like cumbu, etc.

(2) All the grasses are rich in calcium and also in phosphorus, probably due to the nature of the soil as already detailed above. It is essential that calcium and phosphorus should not only be present in any feed but a proper ratio also should exist. A ratio of 2 : 1 (*i.e.*) 2 of calcium and 1 of phosphorous is considered as the optimum. Excess of one will lead to the deficiency of the other.

Apart from the grasses, there are many trees in the pasture area and the most important among them which is being

fully utilised for cattle rearing is the "White Babul Tree" (*Acacia Alba* Wild).



*Fresh from bath.*

The pods of this tree are extensively used. The results of analysis of the pods of White Babul are furnished below :

(Per cent)			
Moisture	..	..	7.33
Ash	..	..	6.84
Crude Protein	..	..	14.86
Ether extractives	..	..	1.67
Crude Fibre	..	..	11.50
Carbohydrates (by diff)			57.80
			100.00
			Ca O 1.61
			P <sub>2</sub> O <sub>5</sub> 0.44
			Insolubles 0.23

The babul pods are very rich in protein containing roughly about 15%. The calcium content is also high but Ca : P. ratio is poor.

The following is the result of analysis of other items of concentrates used in the area :

S. No.	Name of articles	Moisture	Ash	Crude protein	Ether extractives	Crude fibre	Carbo-hydrates
1	Groundnut cake.	7.34	5.16	50.32	6.78	4.20	26.20
2	Cotton seeds ...	8.58	3.68	20.02	17.91	24.25	25.56
3	Rice bran ...	7.45	13.72	12.00	20.83	6.61	39.39
4	Cholam (Chithrai Cholam) ...	11.66	1.99	10.94	5.10	1.50	68.81
5	Cumbu ...	10.27	2.46	9.32	5.36	1.09	71.60

The flora of the pasture area contains all the nutrients in adequate quantities and hence the necessity for feeding concentrates arises only when the pasture is scanty.

The pasture management is on very sound principles. There is abundance of calcium and phosphorous in the soil in the form of "Canker Gravel" as already mentioned. This helps the growth of legumes of high value like "Phaseolus Trilobus" familiarly known as "Pillipasera" or "Naripayaru." By their efficiency in fixing the nitrogen to the soil through their bacterial nodes the legumes build up the fertility of the soil which in turn promotes better growth of other grasses. More animals are grazed on the area due to abundant growth of grass and more nutrients in the form of organic manure along with  $P_2O_5$  CaO are returned to the soil, by the animals (since the animal body will utilise only the required quantities of  $P_2O_5$  and CaO and excess will be voided in the faeces), and thus the cycle is repeated. This is the practice adopted in foreign countries like New Zealand where dairy animals are maintained exclusively on pastures. The pasture to start with, in those countries, is built up at a high cost by providing a very heavy dose of phosphatic manures so as to initiate the growth of legumes and thus set in train the cycle of actions. Here, in the Kangayam area nature has given this facility in the form of deposited layers of phosphatic and calcium manures and the sequence of events follows. In New Zealand the periodical application of phosphatic manures is essential while in this area the periodical turning in of the soil by breaking the soil and cultivating a crop once in 4 or 5 years serves the purpose adequately.

It is also a matter for consideration how the Kolukkattai grass came to be established in the area. The Kolukkattai grass has the habit of forming comparatively bigger tufted growth, with the result that the volume of Kolukkattai grass turned out in a particular area will be more than other grasses. This evidently shows a comparatively deep and extensive rooting habit of this grass. This rooting habit of Kolukkattai breaks up the soil though in a slow manner and the inter-space that is available between the plants due to this process encourages the settling down of other grasses and legumes. Thus the Kolukkattai not only settles itself but also encourages the settling down of other forages and legumes.



A Kangayam Calf  
(4 months old)



## *4 Studies on Calvings*

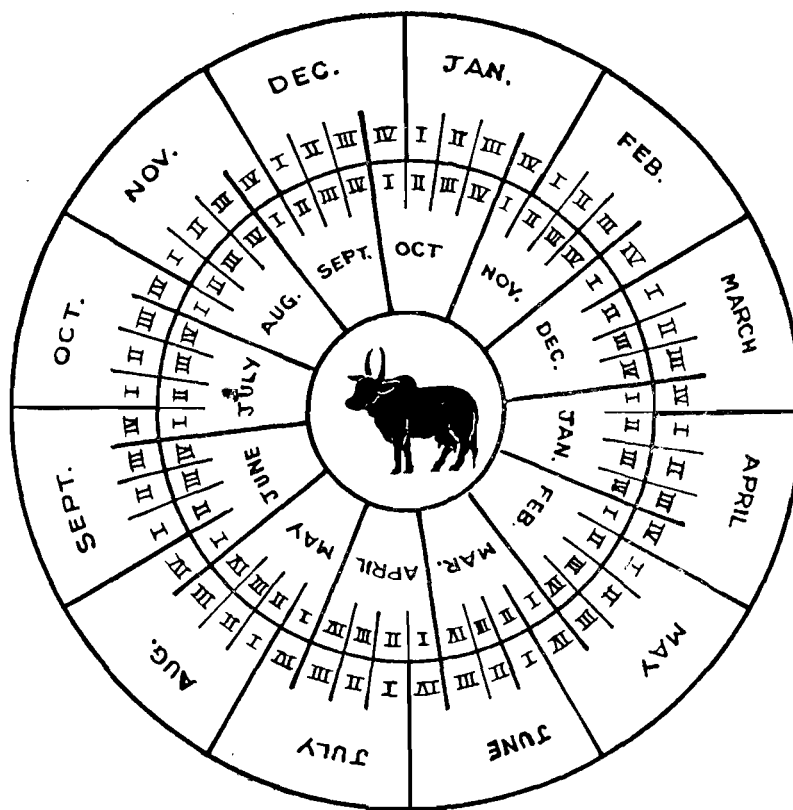
The Kangayam breed in general can be said to be a regular breeder giving birth to a calf in about 15 to 18 months. It is not uncommon also to find cows calving regularly once in twelve months. Though the Pattagar followed various lines of breeding he did not maintain any reliable records. The inception of the "Kangayam Cattle Improvement Scheme" in the year 1942 at the farm of the Pattagar was, therefore, the starting point for the proper maintenance of breeding records. Records are being maintained since then, not only for the animals included in the scheme but also for the other animals in the herd. The scheme in essence was "the selection of 60 heifers and 2 bulls, scientific breeding and management of these animals and studying the various aspects like breeding, calving, progress of calves, maturity, milk yield etc." A simultaneous study of the "main herd of Pattagar" is also being made so that the latter can form "control data." After the advent of the scheme the managerial practices in the scheme herd were changed to suit the requirements. No bull was allowed in the grazing area ; instead, hand-mating was resorted to by getting the cows in heat to the service yard and allowing service by the allotted bull, so that the control of breeding and recording of data may be possible. Secondly slight changes in the feeding practices were introduced so that an optimum plane of nutrition can be maintained throughout the year, as far as practicable.

### **Seasonal variations :**

The data will, therefore, be discussed separately both for "Scheme" and Non-scheme" animals. In the present study, viz., the "calving habit" of this breed, the data are analysed and discussed for the period 1942-43 to 1954-55. It is to be remembered that the herd in general depends much on the pastures for their nutrition. As the condition of pastures is dependent on seasonal factors, which are not uniform throughout the year and from year to year, it is to be reasonably expected that there should be variations in the number of calvingss obtained monthwise depending upon the seasonal variations. The average rainfall received during the years 1941-42 to 1954-55 and the average incidence of calvings during the years 1942-43

## RAZA RING READY RECKONER OF GESTATION

(An easy guide to arrive at the probable date of calving from the date of service)

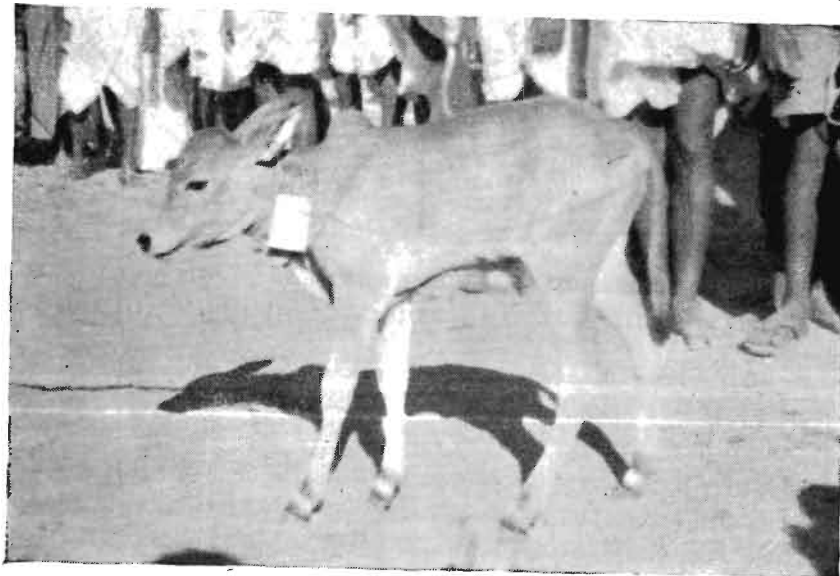


OUTER CIRCLE DENOTES PERIOD OF SERVICE IN MONTH AND WEEKS  
 INNER CIRCLE DENOTES EXPECTED PERIOD OF CALVING IN MONTH AND WEEKS



Calves Born by Artificial Insemination

Another Calf Born by Artificial Insemination



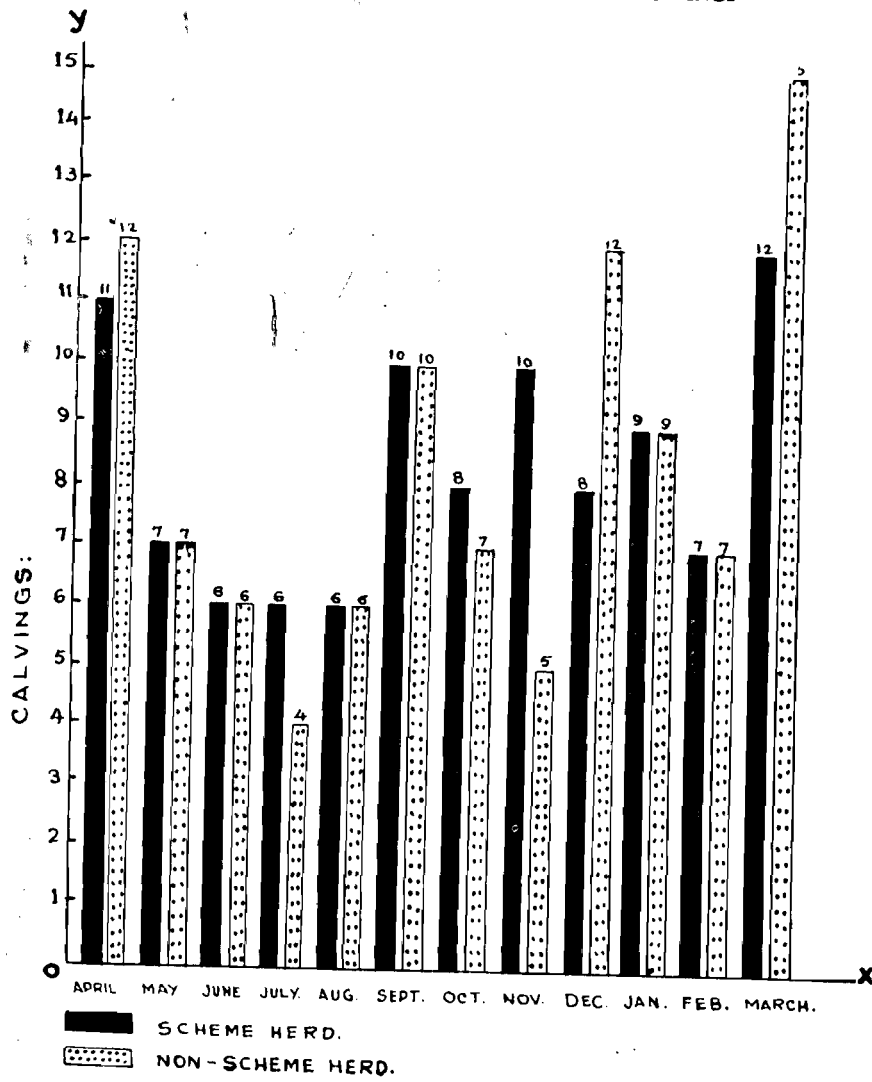


Kangayam Calf Rally

to 1954-55 are tabulated below, expressed in terms of per cent for the year. This covers a total of 1,744 calvings.

Months		Percentage of average rainfall	Average number of calvings	
			Scheme herd	Non-scheme herd
April	..	9	11	12
May	..	9	7	7
June	..	2	6	6
July	..	3	6	4
August	..	9	6	6
September	..	13	10	10
October	..	25	8	7
November	..	19	10	5
December	..	6	8	12
January	..	3	9	9
February	..	1	7	7
March	..	1	12	15

GRAPH SHOWING THE DISTRIBUTION OF CALVINGS



It would be seen from the above that during the period September to November nearly 57% of the total rainfall is being received. Maximum calving occurs during the months of March and April and the minimum during the months of June to August. After summer showers the pasture regains its flora and usually the cattle are turned out in the pastures either late in May or early in June (*i.e.*), on the onset of the south-west monsoon. The pasture is, therefore, in an usable condition from June onwards resulting in higher plane of nutrition leading to greater incidence of heat with greater percentage of fecundity culminating in greater percentage of calvings during March and April. The peak monsoon period does not help the fresh growth of pasture, in general. Further, many animals would have also been settled before September under favourable conditions and this explains the low incidence of calvings during June–August. The variation between the scheme and non-scheme animals in the matter of distribution of calvings during different months is probably due to the tempering effect on the adversities of the climate by supplemental feeding practices adopted for the scheme animals.

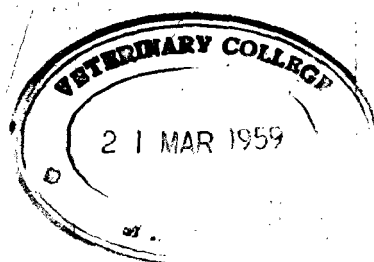


TABLE I  
Rainfall statement at Palayakottai from 1941-1942 to 1953-1954

	Apr.		May		June		July		Aug		Sep.		Oct.		Nov.		Dec.		Jan.		Feb.		Mar.		Total rain- fall in inches
	I	D	I	D	I	D	I	D	I	D	I	D	I	D	I	D	I	D	I	D	I	D	I	D	
1941-42.	...	...	1.39	2	...	...	...	...	0.58	1	2.61	4	4.81	4	8.44	9	1.85	1	...	...	0.65	1	...	...	20.33
1942-43	4.80	2	0.70	1	1.74	1	0.48	2	4.22	1	3.94	4	7.48	4	...	...	2.83	6	4.36	4	1.00	2	...	...	31.55
1943-44	2.07	4	4.50	4	...	...	...	...	0.81	2	2.64	4	9.77	10	2.87	4	...	...	...	...	1.26	1	2.30	3	26.22
1944-45	1.80	1	0.56	1	1.38	1	...	...	3.97	5	7.30	8	8.61	10	19.86	10	6.76	5	...	...	...	...	...	...	50.24
1945-46	2.65	4	3.47	4	...	...	1.17	2	0.70	2	0.88	2	9.52	9	2.18	5	0.10	1	1.25	1	...	...	...	...	21.92
1946-47	0.95	1	4.55	4	...	...	...	...	1.50	2	6.99	4	5.22	6	10.17	5	3.15	4	...	...	...	...	1.91	2	34.44
1947-48	5.20	6	0.35	1	1.85	1	...	...	1.50	2	4.50	4	3.50	4	...	...	...	...	0.50	1	...	...	...	...	17.40
1948-49	1.34	3	3.67	5	...	...	...	...	4.14	3	1.98	2	5.13	7	7.00	4	...	...	0.70	1	...	...	0.26	1	24.22
1949-50	0.92	2	2.20	5	1.86	1	0.99	3	4.99	7	1.40	1	8.86	8	1.21	2	...	...	...	...	1.95	2	...	...	24.38
1950-51	...	...	...	...	...	...	...	...	3.37	7	0.52	1	6.47	11	2.95	3	...	...	...	...	...	...	...	...	13.31
1951-52	4.25	3	1.52	2	...	...	...	...	2.65	2	1.82	3	0.75	2	3.11	4	...	...	...	...	0.70	1	0.84	1	15.64
1952-53	...	...	2.75	2	...	...	5.35	4	1.42	4	2.60	4	4.10	6	1.05	1	4.50	5	...	...	...	...	...	...	21.77
1953-54	5.44	8	3.79	6	0.55	1	2.32	3	1.17	3	5.43	5	8.68	8	3.82	4	...	...	2.66	6	...	...	...	...	33.86
Total ...	29.42	34	29.45	37	7.38	5	10.31	14	31.02	41	42.61	46	82.90	89	62.66	51	19.19	22	9.47	13	5.56	7	5.31	7	335.28

I = Inches.  
D = Days.

GRAPH SHOWING SEX OF TOTAL NUMBER OF CALVES BORN  
DURING 1942-43 TO 1954-55

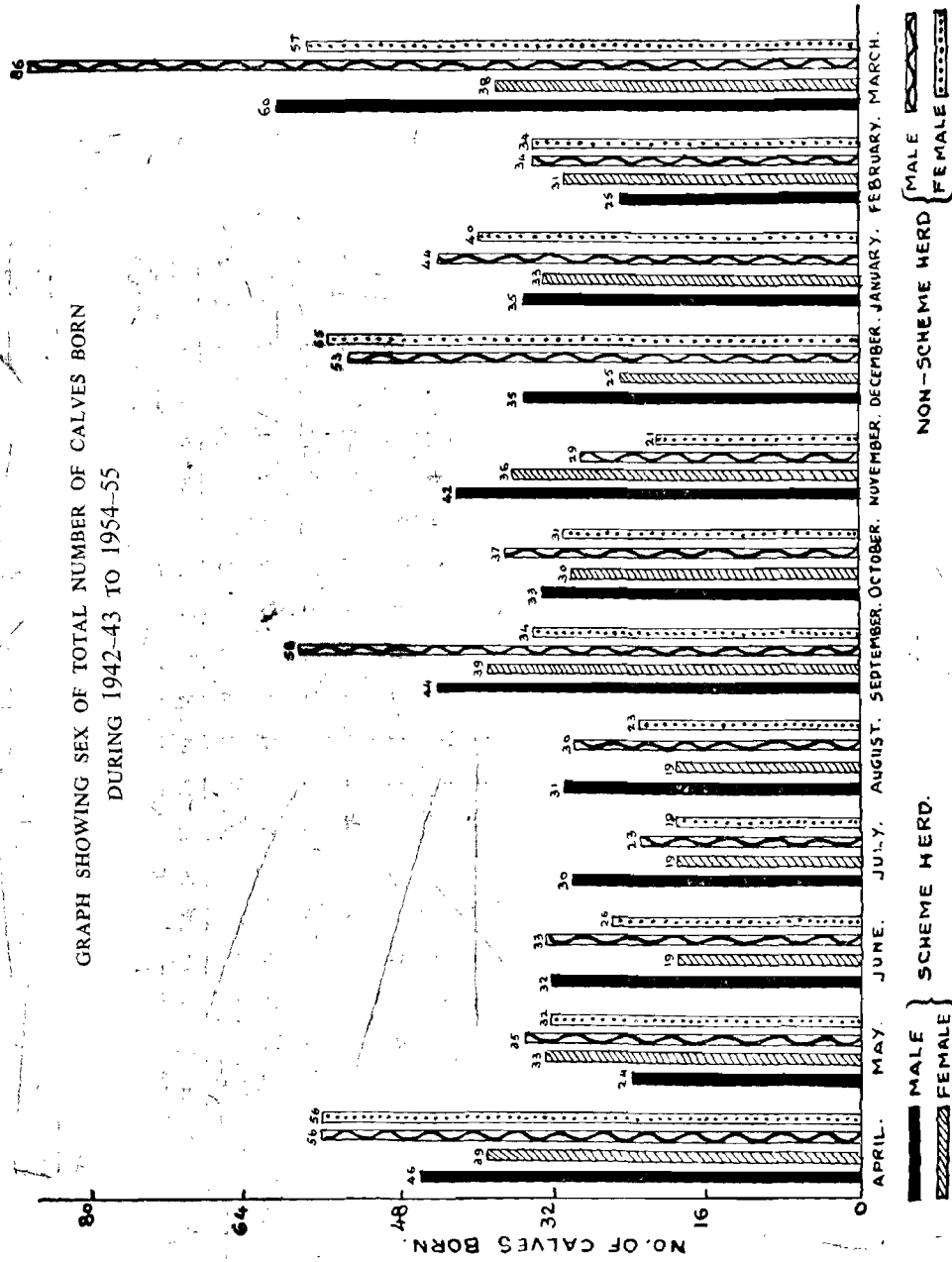




TABLE II  
Calvings in different months during the year 1942-1943 to 1954-1955 in the Scheme Herd

Year	Apr.		May		June		July		Aug.		Sep.		Oct.		Nov.		Dec.		Jan.		Feb.		Mar.		Total Male	Total Female	Total calving	
	M. F.	M. F.	M. F.	M. F.	M. F.	M. F.	M. F.	M. F.	M. F.	M. F.	M. F.	M. F.	M. F.	M. F.	M. F.	M. F.	M. F.	M. F.	M. F.	M. F.	M. F.	M. F.	M. F.					
1942-43	...	...	...	...	...	...	1	1	...	1	3	2	2	2	...	...	...	...	...	...	1	...	3	1	12	7	19	
1943-44	...	1	2	2	2	4	2	2	1	1	2	2	2	...	1	...	...	1	3	1	1	...	...	3	1	17	34	
1944-45	...	1	1	3	3	5	1	2	2	6	3	1	1	3	...	4	2	1	...	3	5	1	1	...	30	19	49	
1945-46	...	2	5	2	2	...	1	1	1	4	1	7	2	2	3	5	3	...	1	1	2	1	5	3	...	28	54	
1946-47	...	5	3	...	6	1	1	1	1	2	2	4	4	2	1	1	3	...	1	3	2	3	1	1	1	23	26	49
1947-48	...	5	2	2	3	2	1	1	...	1	4	7	6	4	4	3	4	1	1	3	3	4	2	4	4	37	34	71
1948-49	...	5	3	2	1	2	2	1	1	1	1	2	...	2	1	2	3	6	3	2	5	1	2	5	4	31	26	57
1949-50	...	2	2	2	1	3	4	6	1	...	...	5	2	4	4	6	4	1	1	3	...	1	...	1	4	35	23	58
1950-51	...	4	2	3	6	3	2	2	1	5	1	1	4	4	3	4	6	8	3	2	3	...	2	3	2	39	35	74
1951-52	...	1	...	...	3	...	1	2	4	2	2	3	1	...	...	1	4	5	2	6	3	6	4	7	3	33	27	60
1952-53	...	6	4	3	1	5	...	2	2	2	1	4	7	3	5	7	2	6	3	3	3	1	3	5	4	47	35	82
1953-54	...	10	6	3	2	4	3	7	3	2	...	2	5	2	2	6	1	3	6	3	2	4	7	14	7	60	44	104
1954-55	...	4	9	2	3	3	1	2	1	4	1	3	3	5	4	3	4	3	1	3	4	2	4	11	7	45	42	87
Total	...	46	39	24	33	32	19	30	19	31	19	44	39	33	30	42	36	35	25	35	33	25	31	60	38	437	361	798
Total Male and Female.		85		57		51	49		50		83	63			78		60		68		56		98					
Percentage	...	11	7		6	6		6		6		10	8		8	10		8		9		7		12		55	45	100

TABLE III  
Calvings in different months during the year 1942-1943 to 1954-1955 in Non-scheme Herd

Year	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Total Males	Total Females	Total calvings Males and Females
1944-45	...	1 2 1 1 ...	...	...	2 1 4 3 2 3 1 1 5 7 7 6 ...	...	...	...	...	...	...	6	23	30	53
1945-46	...	1 7 6 4 4 5 2 ...	...	...	5 1 6 2 7 4 1 4 4 2 3 4 5 3 15 7	...	...	...	...	...	...	...	59	43	102
1946-47	...	6 9 4 3 3 2 4 2 2 6 5 3 4 4 3 2 3 3 4 6	...	...	...	...	...	...	...	...	...	...	48	46	94
1947-48	...	10 9 6 5 2 3 2 4 4 5 10 11 5 5 11 2 2 5 3 1 5 11 8 13	...	...	...	...	...	...	...	...	...	...	58	74	132
1948-49	...	7 6 1 1 2 3 6 ...	...	...	3 2 2 ...	...	...	...	...	...	...	...	35	44	79
1949-50	...	9 11 2 7 6 4 2 4 2 3 3 2 4 1 4 3 4 2 2 2 1 1 ...	...	...	...	...	...	...	...	...	...	...	39	41	80
1950-51	...	9 8 7 3 5 3 4 2 1 2 6 2 3 2 6 2 5 3 5 6 1 2 39 3	...	...	...	...	...	...	...	...	...	...	91	38	129
1951-52	...	...	1 1 1 1 2 ...	...	...	...	...	...	...	...	...	...	37	22	59
1952-53	...	8 1 1 3 2 1 1 ...	...	...	...	...	...	...	...	...	...	...	48	31	79
1953-54	...	1 1 4 1 4 3 1 3 5 2 2 3 2 1 4 ...	...	...	...	...	...	...	...	...	...	...	38	28	66
1954-55	...	5 3 3 2 3 ...	...	...	...	...	...	...	...	...	...	...	42	31	73
Total	...	56 56 35 32 33 26 23 19 30 23 58 34 37 31 29 21 53 55 44 40 34 34 86 57	...	...	...	...	...	...	...	...	...	...	518	428	946
Total Males and Females.	112	67	59	42	53	92	68	50	108	84	68	143			
Percentage	12	7	6	4	6	10	7	5	12	9	7	15	55	45	100

There had been a steady increase in the incidence of calvings in the "Scheme herd" as compared with non-scheme herd. One contributory factor for the better performance of the scheme herd even under adversities of climate is due to the rational feeding practices adopted for the scheme herd to overcome the draught conditions to the extent practicable. The intensity of calving is an essential feature for the development of any herd and this has been achieved under the improved scientific management practices adopted for the scheme herd.

### Calving interval:

The next point that is to be considered under this chapter is the calving interval. The available data on the subject is tabulated below under Tables A and B.

TABLE (A)

Data on average calving interval between different calvings

Calving interval	Scheme herd		Non-scheme herd	
	Number of records studied	Average calving interval in days	Number of records studied	Average calving interval in days
I. Interval	120	498	178	465
II. Do.	110	448	133	476
III. Do.	109	447	83	474
IV. Do.	86	446	53	468
V. Do.	63	457	37	447
VI. Do.	56	470	25	463
VII. Do.	39	447	8	404
VIII. Do.	27	476	1	360
IX. Do.	1	349	...	...
X. Do.	1	382	...	...

TABLE (B)

Data on average calving intervals classified by generations of animals studied

Generation	Scheme herd		Non-scheme herd	
	Number of records studied	Average calving interval in days	Number of records studied	Average calving interval in days
Foundation stock	59	458	86	478
First generation	56	490	182	495
Second generation	12	478	33	545
Third generation	...	...	5	585

The data in Table A shows considerable progressive improvement in the average calving interval particularly in the scheme herd while the non-scheme herd shows greater fluctuations. The reasons for the variation between the scheme and non-scheme herds are quite obvious.

A consideration of Table B shows that the interval is appreciating between foundation and First Generation and between foundation and Second Generation in the scheme herd as well as the non-scheme herd. This can be attributed to the generation records ranging over a period of years. In the same year there will be calvings in the animals belonging to different generations and naturally the latter years will see more calvings of subsequent generations. It has already been shown that the climatic and other conditions have shown much variations particularly during the latter half of the period reviewed. Thus, there had been more calvings under the old circumstances for the subsequent generations as against more number of calvings for the foundation stock under favourable circumstances. Even under adversities the effect of the improved practices for the scheme herd has come out in the form of narrowing down of the difference. Thus there has been a positive progress particularly in the scheme animals during the period reviewed.

#### **Inheritance through female line :**

The Pattagar's herd consists of animals descending from many lines. For easy identification each family has its name showing its origin. In these studies we have come across 29 lines in the scheme herd cows and 29 lines in the non-scheme herd cows. The data are, therefore, tabulated for each line classifying the same for different generations with an abstract of the number of records studied and the average calving interval recorded for that line.

TABLE (C)  
Data of calving interval in different families—Scheme herd

S. No.	Name of family	Founda- tion stock	Generation			Total records studied	Average calving interval in days
			First	Second	Third		
1	Mani Kideri	...	472	476	...	6	475
2	Kattupalayam	...	440	451	...	6	442
3	Athamadu	...	472	480	484	7	483
4	Mottai Madu	...	434	444	442	10	440
5	Parvathi Madu	...	410	420	424	4	415
6	Naga Madu	...	411	...	...	1	411
7	Andi Madu	...	450	458	452	4	454
8	Ramathalai Madu	...	440	446	...	3	443
9	Karuppa Goundan Madu.	490	500	493	...	6	495
10	Peria Madu	...	452	463	...	2	457
11	Rameswarathu Madu	...	470	478	...	3	474
12	Monnaval Madu	...	450	454	455	3	452
13	Mailai Kederi	...	448	456	...	3	452
14	Thinagarapalayam Madu.	440	448	...	...	2	444
15	Mondi Madu	...	420	440	438	4	430
16	Vellai Madu	...	468	474	...	4	471
17	Kavandan Madu	...	320	324	...	2	322
18	Valathotavalasu	...	416	428	...	4	422
19	Moga Madu	...	460	470	469	4	465
20	Bava Madu	...	399	...	...	1	399
21	Sakkili Madu	...	562	...	...	1	562
22	Kankatchi Madu	...	402	430	...	2	416
23	Kalla Kideri	...	416	...	...	1	416
24	Poochikalai Thangachi...	414	...	...	...	1	414
25	Sadayapalayam Madu	...	443	...	...	1	443
26	Layathu Madu	...	486	...	...	1	486
27	Thondu Madu	...	400	424	...	2	412
28	Kunavellai Madu	...	415	...	...	1	415
29	Pachathanni Madu	...	584	...	...	1	584

TABLE (D)

Data on calving in different families—Non-scheme herd

S. No.	Name of family	Founda- tion stock	Generation			Total records studied	Average calving interval in days
			First	Second	Third		
1	Rameswarathu Madu ...	...	508	409	...	18	477
2	Poochikalai Thangachi...	...	445	541	...	8	493
3	Athamottai Madu ...	479	518	758	...	17	558
4	Elappu Mottai Madu ...	506	409	...	...	10	474
5	Pannadi Mottai Madu.	...	536	422	...	9	498
6	Monnaival Mattin Kalai.	511	...	818	...	10	613
7	Maga Madu ...	426	555	499	...	18	507
8	Anadi Madu ...	457	523	...	518	12	505
9	Sadayapalayam Madu ...	417	433	768	...	16	494
10	Thinagarapalayam Madu.	565	464	...	...	16	515
11	Kalla Kideri ...	506	...	...	...	3	506
12	Valathottavalasu Kideri.	...	392	475	...	14	434
13	Sakkili Madu ...	...	522	...	...	4	522
14	Thondu Madu ...	483	517	...	...	9	506
15	Bhava Madu ...	...	470	...	...	6	470
16	Kattupalayam Madu ...	...	430	...	...	6	430
17	Kolla Madu ...	544	434	477	...	16	465
18	Matha Madu ...	...	434	477	...	4	456
19	Poosai Mottai Madu ...	624	477	591	...	8	565
20	Enikkal Mottai Madu ...	526	420	...	...	14	455
21	Koonavelli Madu ...	...	...	355	609	4	482
22	Layathu Madu ...	...	476	467	737	3	560
23	Peria Madu ...	449	485	...	...	5	461
24	Pachathanni Madu ...	406	378	558	501	14	468
25	Rettai Kannu Madu ...	436	389	...	...	11	413
26	Kavundan Madu ...	395	417	...	...	17	410
27	Korali Madu ...	...	527	...	...	2	527
28	Mailai Kideri ...	444	505	505	...	9	490
29	Vellai Madu ...	454	604	376	...	16	472

A perusal of Table C—Scheme herd—indicates that the interval ranges from 322 days to 584 days. The maximum and minimum averages are based on two and one record respectively, as such it is unsafe to draw any inference. The data on the whole does not appear to suggest a possible correlation to the cow family vis-a-vis calving interval. A perusal of Table D—non-scheme herd shows the minimum as 613 and maximum as 410. These data show greater variation. Further the families which have recorded greater average interval are those in which considerable number of subsequent generation animals have come into performance. In the light of the generation variation already discussed it is apparent that no possible correlation could be attributed to cow family vis-a-vis calving interval. In other words the data on both the scheme and non-scheme herd cows do not suggest a possible genetical correlation descending from the female lines.

#### Climatic influence :

A herd depends much on the pasture conditions for their sustenance and pasture depends on climatic conditions which vary. It will therefore be interesting to note how the calving interval has worked out for animals, born during different years. The data on the same are furnished below :

Year of birth			Scheme herd		Non-scheme herd	
			Number of records studied	Average length of calving interval in days	Number of records studied	Average length of calving interval in days
1933	...	...	...	...	3	551
1934	...	...	...	...	27	494
1935	...	...	...	...	4	543
1936	...	...	...	...	6	456
1937	...	...	...	...	27	435
1938	...	...	14	450	5	521
1939	...	...	1	393	19	498
1940	...	...	22	459	2	596
1941	...	...	19	479	5	450
1942	...	...	7	494	49	466
1943	...	...	11	489	40	470
1944	...	...	9	477	33	489
1945	...	...	5	483	16	444
1946	...	...	7	402	12	442
1947	...	...	12	495	34	478
1948	...	...	10	432	22	560
1949	...	...	10	436	13	498
1950	...	...	3	388	...	...

The same data is abstracted for 5 years intervals and furnished below :

1933-37	..	67	496
1938-42	..	80	506
1943-47	..	123	470
1948-49	..	35	412

It will be interesting to note that the groups which had opportunities for performance during a comparatively favourable period of years, have shown better performance (vide the graph on rainfall on page 28).

#### Inheritance through male line :

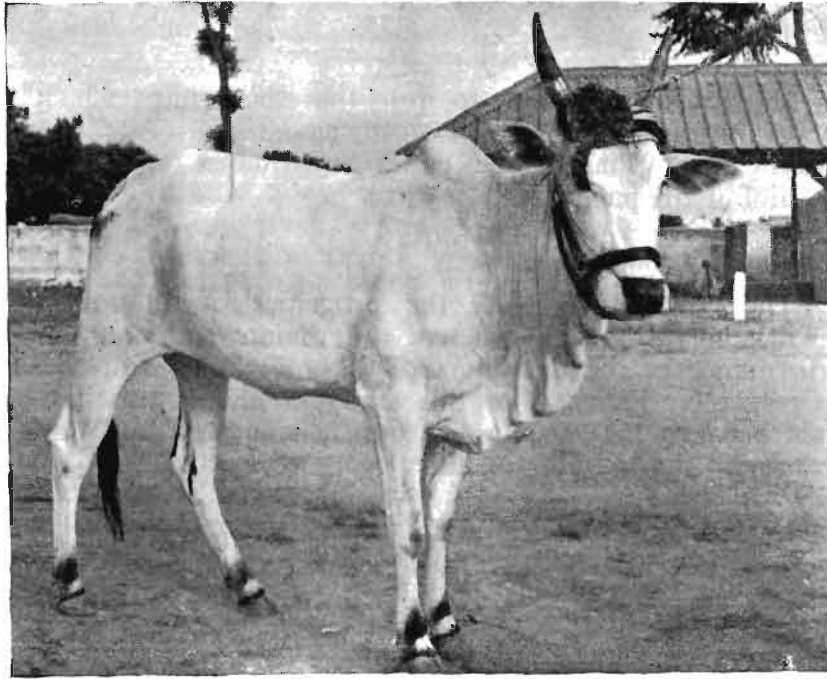
The cows studied are the progenies of different bulls. It will, therefore, be instructive to tabulate and compare the performance of the daughters of different bulls with those of the respective dams. For this study no distinction has been made between the scheme and non-scheme herd and the data are tabulated for both together.

S. No.	Name of sire	Number of dam daughter pairs studied	Average calving interval of dams in days	Average calving interval of daughters in days	Difference	Estimated influence of sires
1	Hosur Raj, 399	2	436	443	7	3.5
2	Athakideri Kalai, 1	9	455	464	9	4.5
3	Nagamattu Kalai	15	474	471	— 3	— 1.5
4	Kallan Kideri Kalai, 93	3	509	536	27	13.5
5	Rameswarathu Mattu Kalai, 4	6	429	409	— 20	— 10.0
6	Karuppa Gowndan Mattu Kalai	3	525	493	— 32	— 16.0
7	Kallapalayam Mattu Kalai, 04	18	483	554	71	35.5
8	Athakideri Kalai, 06	9	448	401	— 47	— 23.5
9	Manikideri Kalai	1	493	403	— 90	— 45.0
10	Periamattu Kalai ...	10	466	524	58	29.0

The influence that could be attributed to the sire ranges from an increase of 35.5 to a decrease of 45.0 days. The decrease of 45.0 is the result of study of only one pair and hence unsafe to draw inference. The increase of 35.5 group consisted of 18 pairs, with considerable number of subsequent generation



animals. But considering the above data in the light of the discussions on generation basis it is suggestive that there is no possible transmission of this character by the sires used.



Kangayam Heifer

## 5 Maturity

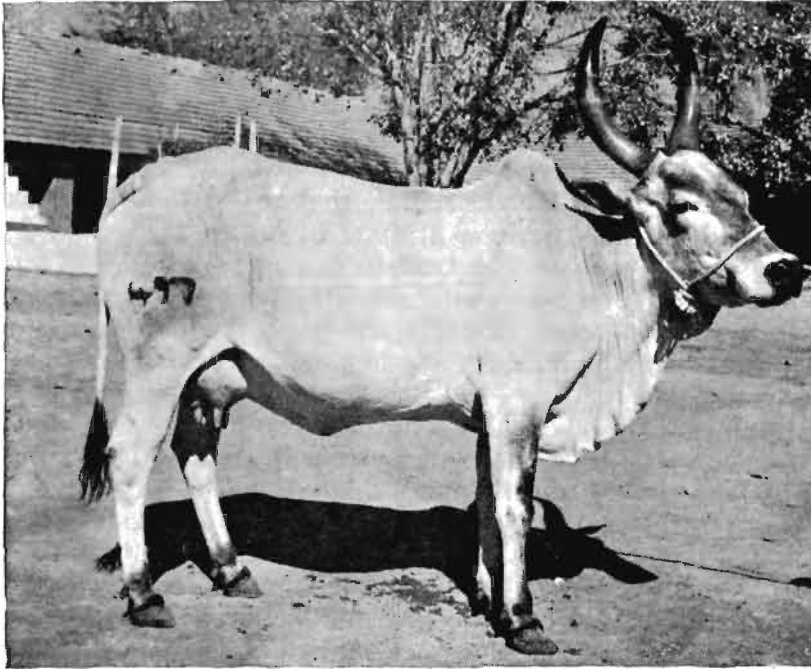
The term maturity as applied to breeding stock implies not only the attainment of sexual development both in its physiological and physisic aspects but also the attainment of proper body size, so that the female that has to shoulder greater responsibilities, may be in a fit state of health to discharge all such responsibilities to the best advantage without impairing its own health and stamina. The responsibility of the female in the matter of reproduction itself is more onerous than its counterpart—the male, since she has first to develop a healthy viable “Ovum” or Egg—the future off-spring—in her ovaries. She should create favourable external symptoms and behaviour so that she can attract the male partner in time and get inseminated. She should afford favourable conditions in the vaginal and uterine tracts so that the introduced sperms can successfully negotiate the many ordeals and fuse with the ovum at the proper time and in the proper manner. She should create favourable conditions in the uterus to receive the fertilised ovum, house it safely, securely, nourish and nurture it till the stipulated period and finally expel successfully the fully grown calf in a healthy and safe condition. These are ordeals by themselves but that is not the end and is only the beginning of discharging a greater responsibility to the owner and its calf (*viz.*) milk production.

For any work it is an established fact that a sound physique is quite essential, without which the turnover may become poor and might even endanger the life of the individual concerned leading to premature death. The undertaking of such responsibilities of reproduction and milk production require greater stamina and the old saying that “Well begun is half done” is more appropriate in this case.

A cow is an economical animal. It is considered that the first 10 years of the life of a cow is its best part of life and hence the maximum benefit from a cow should be obtained within this period. This is possible only if a cow attains maturity at as early an age as possible. This question has been studied by many workers in various parts of the world and the consensus of opinion on the subject is that a heifer is fit for breeding work when she attains about  $\frac{2}{3}$  of its adult body weight irrespective of its age. A heifer aged 18 or 20 months is considered more fit for breeding if she has attained the proper body weight

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than a heifer aged 4 or 5 years but not attained proper body weight.



Kangayam Cow

A Kangayam heifer calf weighs on an average 44 lbs. at birth and an adult average cow weighs 750 lbs. The problem, therefore, resolves itself to one of rearing a calf from 44 lbs. to an adolescent of 500 lbs. as quickly as possible. This is essentially a question of nutritional management. The conditions under which the Kangayam herds are maintained have already been described in the previous chapters (*viz.*) semi-ranch conditions, depending upon pasture. Consequently the observations made in the "Scheme" and "Non-scheme" herds are discussed with reference to various associated factors.

#### **Seasonal influence:**

A perusal of a total record of 295 heifers, belonging to both herds reveals that the minimum age at first calving was 36.0 months and the maximum age was 50.4 months. As far as the rearing of the young stock was concerned the practice was to place them under semi-ranch condition the success of which depended entirely on the seasonal factors. It is, therefore, worth while considering the behaviour of the heifers born in different years. The average ages at first calving for

heifers born in different years is tabulated below from 1933 onwards so that all the available data may be brought under the purview of the analysis.

TABLE (A)

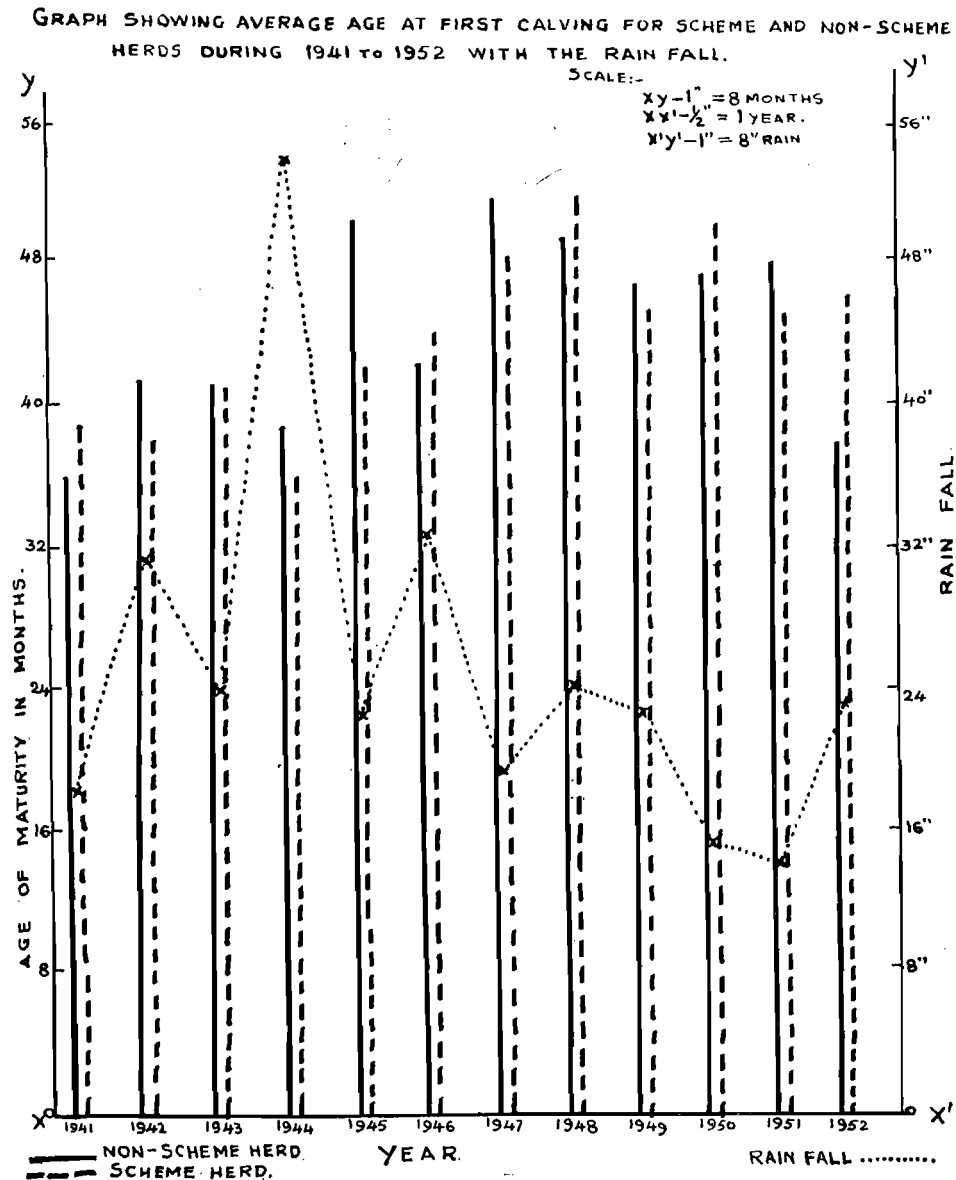
Statement showing average age at first calving of heifers born during different years

Year of birth	Non-scheme herd		Scheme herd		Annual rainfall in inches
	Number of heifers studied	Average age at first calving in months	Number of heifers studied	Average age at first calving in months	
1933	3	41.0	...	...	34.16
1934	12	47.8	...	...	32.48
1935	3	40.7	...	...	23.60
1936	5	44.0	...	...	20.02
1937	9	46.3	...	...	27.21
1938	5	41.0	...	...	24.63
1939	7	46.8	...	...	36.89
1940	1	36.0	...	...	45.04
1941	1	36.0	12	39	19.68
1942	7	41.3	22	38	31.20
1943	16	41.4	14	41	23.66
1944	10	38.6	7	36	53.80
1945	6	50.4	4	42	21.92
1946	4	42.0	13	44	32.53
1947	17	51.9	4	48	19.31
1948	17	49.0	9	52	23.96
1949	11	46.9	13	45	22.69
1950	3	46.7	13	50	15.26
1951	3	47.7	17	45	14.10
1952	3	37.7	24	46	23.31

NOTE :—The data for the years 1941 to 1952 are presented in graph on next page.

A perusal of the above statement reveals that the scheme heifers have recorded a comparatively lower age at the time of first calving than the non-scheme heifers the exception being

those born during the years 1941, 1946, 1948 and 1950. Among these the difference observed during the years 1941, 1946 and 1950 is probably due to lesser number of observations in the non-scheme herd, the numbers observed being 1, 4 and 3 as against 12, 13 and 13 in the scheme herd. The difference noticed in 1948 group is probably due to the severe drought conditions of 1950 and 1951.



A heifer should get a good start as a young suckling calf and it should also have favourable conditions just at the age nearing maturity. In other words adversities during the first year of birth and on the 3rd and 4th year are likely to result in delayed calving. The drought conditions of 1936 had told upon the 1934 births, while the drought conditions of 1941 were reflected in the 1939 births. The favourable conditions of 1944 have had good results for the 1941 births while the adverse conditions of 1947 were badly reflected in the 1945 births. The continuous adversities of 1950 and 1951 had badly affected the 1947 and 1948 born heifers while the slight improvement in the climate of 1952 had shown a considerable improvement in the performance of 1949 born heifers. The favourable condition of 1953 does not appear to have exercised much influence on the 1950 calves probably due to the consecutive severe droughts of 1950 and 1951. No arithmetical variation proportionate to the rainfall can be felt, since the effect of the rainfall can be reflected on the animals only through an intermediary factor, pasture. Nevertheless, the above state of affairs indicates that the influence of climatic factors is not insignificant in the matter of maturity, particularly for animals maintained under semi-ranch conditions, and they are probably the major factors influencing maturity. As the climatic factors in general have cumulative effects when considered over long periods, it would be worth considering the behaviour of heifers for groups of years. The data for scheme heifers are therefore grouped for two five year periods and given below :

S. No.	Period	Number of heifers studied	Average age at 1st calving in months
1	1941-45	59	39.2
2	1946-50	52	47.8

During both the groups of years there had been considerable number of heifers for observation and the difference in the numbers studied in each group is also limited. The average age obtained for the 1st group is very low as compared to that of the 2nd group and the increase recorded in the 2nd group is 22% more than that of the 1st group. The calves

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in the 1st group were born during 1941 to 1945 reaching their performance age during 1944 to 1948, while those in the 2nd group were born during 1946 to 1950 reaching their performance age during 1949 to 1953. Thus the climatic conditions which prevailed during the periods 1941 to 1948 and 1946 to 1953 have influenced the performances of group numbers 1 and 2 respectively. The total rainfall received during these periods are 226.06" and 185.02" respectively the first period recording an increase of 22% over that of the second period. The increased facilities that were available to the tune of about 22% have resulted in the improved results of about 22%. Of course, the correct arithmetical proportion might be a coincidence and yet it illustrates fully the influence of climatic conditions on the age of maturity and rightly leads to the inference that this is the major factor affecting maturity, in this case, which is in conformity with the observations recorded elsewhere.

#### Generations :

As already discussed in an early chapter the progress of performance in successive generations is a complex phenomenon as it embraces the conditions that prevailed for years together and the opportunities of greater numbers coming under good, bad and indifferent years being unregulated and being a matter of chance. However, the results of observations are tabulated generationwise for both the herds separately.

TABLE (B)

Statement showing average age at first calving of heifers considered generationwise

Generation	Scheme herd		Non-scheme herd	
	Number of heifers studied	Average age at first calving in months	Number of heifers studied	Average age at first calving in months
Foundation stock	57	40	32	43.8
First generation	94	45	59	48.0
Second generation	40	45	30	47.4
Third generation	1	43	4	48.5

A comparative study of the Table 'B' with that of Table 'A' shows how undependable is this consideration on generation basis in a study of this kind which depends much on nutritional

aspect and when the animals concerned are maintained under semi-ranch conditions.

#### Genetical influence:

As the heifers studied are the progenies of different sires it would be interesting to have dam-daughter comparison on maturity ages obtained for the progenies of the different sires used. The following table furnishes the available data for 11 sires.

Influence of sire on maturity age obtained in Kangayam herd of Palayakottai

S. No.	Name of sire	Number of dam daughter pairs studied	Average age at first calving for dams in months	Age at first calving for daughters in months	Difference for daughters over the dams	Estimated influence of sire
1	Hosur Raj ...	2	43.5	41.0	— 2.5	— 1.35
2	Atha Kideri Kalai, No. 1 ...	9	41.4	40.1	— 1.3	— 0.65
3	Nagamattu Kalai ...	15	39.5	41.1	1.6	0.80
4	Kollankideri Kalai, No. 93 ...	3	36.6	51.0	14.4	7.2
5	Rameswarathu Mattin Kalai.	6	39.1	46.6	7.5	3.75
6	Karuppu Gowndan Mattu Kalai.	3	42.6	47.3	4.7	2.35
7	Kattur Palayam Mattu Kalai.	18	41.4	44.0	2.6	1.3
8	Athakideri Kalai, 0.6 ...	8	37.8	44.9	7.1	3.56
9	Manikideri Kalai, 0.13 ...	1	35.0	45.0	10.0	5.0
10	Periamattin Kalai, 2 ...	13	40.8	45.5	4.7	2.35
11	Poosai Mattin Mottai Kalai, 233.	4	38.7	41.2	2.5	1.25

The above data suggests nothing about the transmissibility of this character through sire.

The heifers studied descend from 29 and 32 lines on the female line in the scheme and non-scheme herds respectively. The data for each family is furnished in Tables I and II respectively for the scheme and non-scheme herds. These also are not suggestive of any possible inheritance from the female line for this character.



TABLE I (SCHEME)  
Average age of heifers of different families at first calving

S. No.	Name of family	No. of heifers	Average age at first calving in months
1.	Manikideri Family ..	9	45.8
2.	Kattupalayam Family ..	15	43.2
3.	Athamattu Family ..	11	42.9
4.	Mottai Mattu Family ..	23	43.4
5.	Parvathi Family ..	6	44.0
6.	Nagamattu Family ..	4	44.2
7.	Andi Mattu Family ..	7	43.0
8.	Ramathalai Mattu Family ..	5	46.0
9.	Karuppa Goundan Mattu Family ..	11	44.0
10.	Peria Mattu Family ..	3	43.6
11.	Rameswarathumattu Family ..	10	44.1
12.	Monnaval Mattu Family ..	7	48.1
13.	Mailai Kideri Family ..	3	39.3
14.	Thinagarapalayam Family ..	2	46.0
15.	Mondimattu Family ..	4	43.7
16.	Vellaimattu Family ..	5	45.4
17.	Kavandanmattu Family ..	3	40.3
18.	Valathotavalasu Family ..	6	38.3
19.	Mogamattu Family ..	7	45.3
20.	Bavamattu Family ..	3	41.1
21.	Sakkili Mattu Family ..	3	47.6
22.	Kankatchimattu Family ..	3	37.3
23.	Kallakideri Family ..	7	46.5
24.	Poochikalai Thangachi Family ..	3	40.0
25.	Sadayapalayam Family ..	3	43.3
26.	Thondu Mattu Family ..	2	44.5
27.	Layathumattu Family ..	2	39.5
28.	Koonavellaimattu Family ..	2	46.5
29.	Pachathanni Kideri Family ..	2	45.5

TABLE II

Average age of heifers of different families at first calving  
(Non-scheme)

S. No.	Family	No. of heifers	Average age at first calving in months
1.	Rameswarathumattin Family	7	44.3
2.	Poochi Kalai Thangachi Family	2	43.5
3.	Athamottai Mattin Family	6	44.0
4.	Elappumottai Mattin Family	2	50.0
5.	Pannadimottai Mattin Family	2	42.0
6.	Monnaival Mattin Family ..	3	48.0
7.	Nagamadu Family ..	6	47.0
8.	Andimadu Family	4	48.0
9.	Sadayapalayam Mattin Family	4	48.0
10.	Thinagarapalayam Mattin Family ..	3	41.0
11.	Kambu Kideri Family ..	2	40.5
12.	Kallukideri Family ..	2	44.0
13.	Valathottavalasumattin Family	2	43.5
14.	Sakkilimattin Family ..	2	57.5
15.	Thondumadu Family ..	4	51.7
16.	Bhavamadu Family ..	2	43.5
17.	Kattupalayam Madu Family	2	40.5
18.	Kollamattin Family ..	4	40.0
19.	Muthaimattin Kideri Family	1	46.0
20.	Poosaimattin Family ..	3	41.3
21.	Enikkalmottai Mattin Family	6	41.1
22.	Koonavellai Mattin Family	3	44.0
23.	Layathumattin Family ..	3	46.6
24.	Periyamattin Family ..	4	48.2
25.	Pachathanni Madu Family ..	7	52.6
26.	Rettai Kandru Mattin Family	4	49.0
27.	Kavundan Madu Family ..	4	45.8
28.	Koralimadu Family ..	1	49.0
29.	Mailai Kideri Family ..	4	48.5
30.	Vellai Mattin Family ..	2	43.5
31.	Gopal Mottai Mattin Family	1	46.0
32.	Kankatchi Madu Family ..	1	54.0

**Age at first calving and milk yield :**

“How far the attempt in early maturity affects the milk yield?” is a question that poses itself when emphasis is laid on early maturity. Strictly speaking early maturity does not by itself exert any influence, advantageous or otherwise in the milk yield which is dependent on many other factors as well. However, it is reasonably to be expected that an animal growing at a faster pace should comparatively do better than a “lag-behind.” In a similar way, a belated maturer might do somewhat better than others. The first lactation yields of the heifers grouped on age-basis at the time of first calving is reproduced below separately both for the non-scheme and scheme herd.

Age at first calving grouped with their milk yield, for the Non-scheme and Scheme herds

S. No.	Age at first calving in months class in terval			Non-scheme herd		Scheme herd	
				Number of records studied	Average yield for the first lactation in lbs.	Number of records studied	Average yield for the first lactation in lbs.
1	34 to 39	...	...	16	1,453.0	57	1,622.0
2	40 to 45	...	...	20	1,469.0	58	1,856.0
3	46 to 50	...	...	23	1,377.0	47	1,347.0
4	50 to 55	...	...	12	1,235.0	22	1,851.0
5	56 to 60	...	...	10	1,084.0	4	1,521.0
6	61 to 65	...	...	5	1,050.0	2	2,066.0
7	66 to 72	...	...	3	1,087.0	Nil	...

There is no appreciable variation leading to any definite inference.



## 6 Milk Yield

It has been said that Kangayam is a draught type of cattle and the milk yield is of secondary importance. It has therefore been desirable to improve the milch quality in this breed by selective breeding and management. Milk production is really one part of the reproductive process. In this breed of cattle, we really want the type of the breed to be fixed well and also the regularity of breeding, longevity and other allied characters, simultaneously along with improvement shown in milk yield. Prior to 1942, the cows on the farm were left to their calves due to the belief in the incompatibility between milk yield and draught qualities in Kangayam breed of cattle. But experience of breeding Kangayam cattle at the Livestock Research Station, Hosur, revealed that the capacity of milk production in Kangayam cows is rather latent when some of these cows produced over 5,000 lbs. in a single lactation. It was later found out that heritability of milk in Kangayam breed of cattle is 30 to 40 per cent. All the above factors revealed that there is a possibility of increasing the milk production in Kangayam cows. Thus one of the objects of the farm is to increase the milk yield of Kangayam cows, without impairing the draught quality of the males.

Since this farm is located in a famine affected area and is liable to be affected by the vagaries of the monsoons, it is not possible to make an uniform supply of green fodder or provide good pasture area at least during the major part of the year. There were days, when dry fodder had to be imported from distant places and animals had to sustain themselves on palmyrah leaves as roughage. It may be mentioned here that one of the outstanding qualities of this breed is to thrive even on scanty rations during the famine days. It is really surprising to note that the general condition of the herd maintained under pasture is always good, inspite of the drought conditions at the farm.

The following table gives the annual production of milk and other details for both the scheme and non-scheme herds.

Milk yield of the herd from the year 1942-43 to 1954-55 (Scheme)

Year	Average number of cows in the herd	Average number of cows in milk	Percentage of cows in milk to the total in the herd	Total production of milk in lbs.	Average annual production of milk per cow in milk (lbs.)	Average annual production of milk per cow in the herd (lbs.)	Average daily milk yield per milking cow in lbs.	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1942-43	...	...	...	LBS. OZ.	LBS.	LBS.	LBS.	
	60	11.1	18.3	26,122 0	2,353.3	435.4	10.6	
1943-44	43	24.9	55.8	63,075 0	2,132.3	1,466.9	7.3	
1944-45	58	33.6	56.9	91,168 0	2,713.3	1,727.1	7.5	
1945-46	67	36.3	53.7	91,744 0	2,524.4	1,369.3	7.0	
1946-47	70	41.0	58.6	95,076 0	2,316.5	1,358.2	6.5	
1947-48	75	43.2	57.3	93,152 0	2,137.8	1,242.0	6.0	
1948-49	80	41.3	51.3	73,357 0	1,776.2	916.9	5.0	
1949-50	88	48.2	54.5	105,265 0	2,183.8	1,196.2	6.0	
1950-51	80	56.4	63.8	85,534 0	1,516.6	1,069.2	4.6	
1951-52	92	42.1	45.7	82,278 0	1,954.3	894.3	5.4	
1952-53	112	54.4	48.2	112,630 0	2,070.4	1,005.6	5.7	
1953-54	105	65.7	62.0	116,419 0	1,771.9	1,108.7	5.0	
1954-55	125	62.3	49.6	124,524 0	1,998.8	996.4	5.5	

Milk yield of the herd from the year 1943-44 to 1954-55 (Non-scheme)

1943-44	...	...	8	4.0	50.0	7,402	0	1,850.6	925.3	7.2
1944-45	...	...	54	29.8	55.2	60,815	0	2,040.7	112.2	5.4
1945-46	...	...	107	45.7	42.7	82,043	0	1,795.3	766.8	5.0
1946-47	...	...	94	33.9	36.1	62,621	0	1,847.2	666.2	5.1
1947-48	...	...	132	60.3	45.7	120,430	0	1,997.1	912.3	5.4
1948-49	...	...	136	43.5	32.0	70,242	0	1,614.8	516.5	4.4
1949-50	...	...	148	53.7	36.3	94,307	0	1,756.0	637.2	4.8
1950-51	...	...	149	43.7	29.3	66,566	0	1,519.3	446.8	4.3
1951-52	...	...	152	32.3	21.2	66,392	0	2,055.5	436.8	5.6
1952-53	...	...	171	47.0	27.5	82,568	0	1,756.8	483.4	4.6
1953-54	...	...	191	40.3	21.1	71,274	0	1,768.6	373.2	4.6
1954-55	...	...	191	35.0	18.3	69,098	0	1,974.2	361.8	5.4

It is seen from the above table that there is a lot of variation within and between the two groups of animals—"scheme" and "non-scheme." Under the scheme the animals are fed with the rations prescribed under the schedule, whereas the non-scheme animals have the natural feed and concentrates as has been in vogue at the Pattagar's farm. It is desirable to know the milk yield performances of the animals under the scheme and the non-scheme, since the main object of maintaining the scheme animals is to find out the milk potency in this breed, so that the milk yield may be increased without impairing the draught qualities.

From a perusal of the table it is seen that the average annual production of milk under the scheme animals in the herd varied from 435.4 lbs. in 1942-43 to 1727.1 in 1944-45. During these two years a rapid progress in the average annual production of milk had been made and in the consecutive years the progress of average annual production had not been appreciable. The average annual production of milk yield in the herd under the non-scheme is far below that of the scheme animals.

From the overall averages of annual milk yield of animals under both the scheme and non-scheme, it is seen that during the course of 12 years, there were 81.2 cows in the herd and 43.1 cows in milk under the scheme as compared with 127.8 cows in the herd and 39.1 cows in milk under the non-scheme. Thus on an average during a year 52.0% of cows remained in milk under the scheme, whereas 34.6% cows remained in milk under the non-scheme. Apart from the percentage of cows in milk, the average annual production of milk per cow in milk under the scheme in a year is 2111.5 lbs as compared with 1831.4 lbs under the non-scheme. Similarly the annual milk yield average of the animals in the herd and the daily average milk yield are 1137.4 lbs. and 6.3 lbs respectively under the scheme and those of the non-scheme are 553.2 lbs. and 5.2 lbs.

#### **Milk yield of the herd for Five-Year Periods :**

The following table gives the milk yield particulars for five year period for both the scheme and non-scheme.

Period		Average number of cows in the herd	Average number of cows in milk	Percentage of cows in milk to the total cows in the herd	Average annual production of milk per cow in milk	Average annual production of milk per cow in the herd	Daily average milk yield per milking cow
<i>Scheme—</i>							
1942-47	...	59.6	29.4	48.7	2,408.0	1,271.4	7.8
1947-52	...	83.0	46.2	54.5	1,913.7	1,063.7	5.4
1952-55	...	114.0	60.8	53.3	1,947.0	1,036.9	5.4
<i>Non-scheme—</i>							
1943-48	...	79.0	34.7	45.9	1,906.2	676.6	5.6
1948-53	...	151.2	44.0	29.3	1,740.5	504.1	4.7
1953-55	...	191.0	37.7	19.7	1,871.4	367.5	5.0

The five year periods also indicate in general a better performance of the milking herd under the scheme than the non-scheme milking herd. Both in the scheme and non-scheme animals, there has been a good record of average annual production of milk per cow in milk during the first five year period and there is a fall in the second five year period and a rise in third five year period. The fall in the second five year period may be attributed to the famine conditions prevailing in the area during the period. As regards the milking herd averages during the five year periods there is a considerable difference between the scheme and non-scheme animals, which again is due to different management practices, under the scheme and non-scheme.

#### **Milk yield by generations :**

The scheme comprises of 97 animals from the date of inception of the scheme in 1942. Completed lactation particulars are available for these animals and they have been included for the purpose of generation-wise classification. Of these 97 animals, 48 are from the foundation stock, 27 from the first generation and 22 from the second generation.



Under the non-scheme, there are 100 animals, which have complete lactation particulars from the foundation stock to the third generation since 1943. Of these 100 animals, 26 animals are from the foundation stock, 52 from the first generation, 19 from the second generation and 3 from the third generation.

The milk yield particulars of the scheme and non-scheme animals are tabulated below :

Generation	Average number of records	Average milk yield in lbs.	Average days in milk	Daily average milk in lbs.	Average dry days	Average fat per cent
<i>Scheme—</i>						
Foundation stock...	48	1,613	280	5.8	173	4.9
First generation ...	27	1,461	264	5.4	190	4.6
Second generation.	22	1,267	260	4.5	161	4.0
<i>Non-scheme—</i>						
Foundation stock...	26	1,318	297	4.5	190	5.1
First generation ...	52	1,501.5	290	5.0	167	4.5
Second generation	19	1,429.0	293	4.3	208	4.1
Third generation ...	3	1,016.5	217	5.0	184	3.4

The generation-wise comparison in respect of the scheme animals indicates that the average milk yield is high in the foundation stock and there is a fall in the subsequent generations. In all the other allied factors also, it is seen that the foundation stock average is more than that of other generations. This indicates that the selection of cows as foundation stock for the scheme, should have been based on milk characters and the subsequent generations were not able to maintain the standard.

In the non-scheme herd, the average milk yield of the first generation is the highest and this is followed up to an

extent in the second generation. Since the number of animals in the third generation is small, the average milk yield of that generation cannot be illustrative.

All the above factors indicate that there is scope for further selection among the female progenies, both under the scheme and the non-scheme, to improve the milch characters. It may also be mentioned here that the average fat percentage, as recorded, is also appreciably high for an average cow of this tract.

The following table gives the frequency distribution of animals in milk yield under different generations.

Lactation milk yield group	Foundation stock	First generation	Second generation
<i>Scheme :—</i>			
Below 1000 lbs. ..	7	23	3
1000 to 2000 lbs. ..	34	44	16
2000 to 3000 lbs. ..	16	10	3
3000 to 4000 lbs. ..	1	1	1
4000 to 5000 lbs. ..	2	..	..
<i>Non-scheme :—</i>			
Below 1000 lbs. ..	6	10	4
1000 to 2000 lbs. ..	18	32	12
2000 to 3000 lbs. ..	2	9	3
3000 to 4000 lbs. ..	..	1	3
4000 to 5000 lbs. ..	..	..	..

The above table indicates that considering the individual groups as foundation stock, first generation and second generation, the concentration of more number of animals is from the range between 1000 to 2000 lbs., indicating that the breed irrespective of generations, averages midway between 1000–2000 lbs.

#### **Average lactation yield of different families :**

The following table gives the performance of milk yield in different families for the scheme and non-scheme.

TABLE  
Average lactation yield of different families (Scheme)

S. No.	Name of Family	Total number of cows	Number of completed lactation	Average lactation yield of completed lactation
				Lbs.
1	Manikideri ... ..	9	36	2,205
2	Kattupalayam family ... ..	7	35	1,649
3	Athamattu family ... ..	8	27	1,842
4	Mottaimattu family ... ..	11	55	1,420
5	Parvathi kideri family ... ..	5	22	1,747
6	Nagamattu family ... ..	2	8	2,813
7	Andimattu family ... ..	4	17	1,756
8	Ramathalai mattu family ... ..	3	12	1,162
9	Karuppa Goundan mattu family ... ..	6	24	1,889
10	Periamattu family ... ..	2	9	1,669
11	Rameswarathumattu family ... ..	3	12	1,047
12	Monnaval mattu family ... ..	3	13	1,678
13	Mailai kideri family ... ..	3	15	1,292
14	Thinagarapalayam mattu family ... ..	2	9	1,908
15	Mondimattu family ... ..	4	19	2,165
16	Vellaimattu family ... ..	6	27	1,482
17	Kavundanmattu family ... ..	2	13	2,227
18	Valathotavalasu family ... ..	4	14	2,068
19	Mogamattu family ... ..	6	23	1,541
20	Bavamattu family ... ..	1	3	1,126
21	Sakkilimattu family ... ..	1	4	2,699
22	Kankatchimattu family ... ..	2	9	2,141
23	Kallikideri family ... ..	6	22	1,080
24	Poochikalai Thangachi family ... ..	1	4	1,748
25	Sadayapalayam mattu family ... ..	3	14	1,590
26	Thondumattu family ... ..	2	9	975
27	Layattumattu family ... ..	2	11	1,638
28	Kunavellaimattu family ... ..	3	14	1,535
29	Pachathannikideri family ... ..	2	11	1,822

TABLE  
Average lactation yield of different families (Non-scheme)

S. No.	Name of Family	Total number of cows	Number of completed lactation	Average lactation yield of completed lactation
				Lbs.
1	Rameswaram madu	6	20	1,204.0
2	Poochi Kalai Thangachi kideri	2	10	1,177.0
3	Athamottai madu	5	15	1,003.0
4	Elappu mottai madu	3	11	1,107.0
5	Pannadi mottai madu	3	10	2,088.0
6	Monnival madu	3	11	1,191.0
7	Nagamadu	6	22	1,457.0
8	Andimadu	4	14	1,660.5
9	Sadayapalayam madu	5	17	1,264.0
10	Thinagarapalayam madu	4	17	1,327.0
11	Kallakideri	1	3	1,906.0
12	Valathottavalasu madu	4	14	1,705.0
13	Sakkilimadu	2	6	2,458.0
14	Thondumadu	3	10	1,341.0
15	Bhavamadu	1	6	1,350.0
16	Kattupalayam madu	1	6	1,107.0
17	Kollamadu	5	17	1,801.5
18	Muthamadu	2	5	1,375.5
19	Possaimottai madu	3	7	1,561.0
20	Enikkalmottai madu	3	15	1,528.0
21	Kunavellaimadu	2	6	541.5
22	Layathumadu	3	4	1,927.0
23	Periamadu	3	7	1,379.0
24	Pacha Thanni madu	6	13	1,177.0
25	Rettai Kannan madu	2	12	592.5
26	Kavundan madu	4	19	1,528.0
27	Korali madu	1	2	1,306.0
28	Mailai kideri	4	12	1,296.0
29	Vellaimadu	4	16	1,721.5
30	Gopalmottai madu	2	7	753.5
31	Kankatchi madu	2	4	1,419.0
32	Kombu kideri	1	3	2,452.0

From the above table, among the number of families in the scheme herd the following families have given milk yield more than 2000 lbs. on an average of each completed lactation.

- (1) Nagamattu family (2813 lbs.)
- (2) Sakkilimattu family (2699 lbs.)
- (3) Kavundamattu family (2227 lbs.)
- (4) Manikideri (2205 lbs.)
- (5) Mondimattu family (2165 lbs.)
- (6) Kankachimattu family (2141 lbs.)
- (7) Valathottavalasu family (2068 lbs.)

While considering the performance of the family, it is necessary to take into consideration the number of cows in each of the family. The maximum of 11 cows are in the Mottaimattu family but the average milk yield is 1420 lbs. and the next family which has the maximum of 9 is Manikedari whose average yield of milk is 2205 lbs. Thus if one considers the average milk yield and the number of cows in a family which may be representative the family of Manikideri can be considered good.

As regards the non-scheme animals the number of cows in each family is very small, the maximum being 6. There are only three families; Sakkilimadu (2458 lbs.), Kombukideri (2452 lbs.) and Pannadi Mottai Madu (2088 lbs.). These have given more than 2000 lbs. as average milk yield of completed lactation, but the number of cows are only 2, 1 and 3 respectively in each family. Hence it is not possible to say, which family is good, since the families do not show a representative picture.

#### Milk yield of cows born in different years :

The following table gives the average lactation yield of completed lactations born in different years both under the scheme and non-scheme.

Year of birth	Number of cows		Total number of lactations (scheme)	Total number of lactations (non-scheme)	Average milk yield of completed lactation in lbs.	
	Scheme	Non-scheme			Scheme	Non-scheme
1938	...	1	3	6	2,308	612
1939	...	15	22	22	2,212	1,589
1940	...	21	84	3	1,771	2,452
1941	...	19	87	5	1,584	1,801
1942	...	7	35	46	1,248	1,646
1943	...	8	32	43	1,773	1,090
1944	...	9	52	37	1,227	1,620
1945	...	5	37	11	1,191	1,745
1946	...	7	35	12	1,502	1,628
1947	...	12	32	43	1,582	1,214
1948	...	10	38	35	1,158	1,417
1949	...	8	23	16	1,876	1,293

Average lactation milk yield for five year periods

Period	Total number of cows		Total number of lactation		Average completed lactation yield	
	Scheme	Non-scheme	Scheme	Non-scheme	Scheme	Non-scheme
1938-42 ...	64	17	284	82	1,825	1,620
1943-47 ...	41	41	188	146	1,455	1,459

From the above table, it is seen that the average milk yield of the completed lactations of the animals born in different years both under the scheme and non-scheme vary among themselves, depending upon the number of animals in each year. The maximum number of 21 cows is recorded in the year 1940 under the scheme with the average milk yield of 1771 lbs. but under the non-scheme, the maximum number of cows was 16 with the average milk yield of 1582 lbs. in the year 1947.

From the two five year period table, the number of animals under the scheme is more in the first five year period, than under the non-scheme, with an average milk yield of 1825 lbs. under the scheme. The average is fairly high, as seen from the performances of Kangayam breed in general. In the second five year period, the average milk yield is almost the same for both the animals under the scheme and non-scheme.

#### Performance of milk yield of the sires used :

The following table gives the performance of the daughters of 8 bulls used at the farm, as compared with their corresponding dams.

S. No.	Name of Sire used			Number of dam daughter pairs	Average milk yield of dams in lbs.	Average milk yield of daughters in lbs.
1	Hosur Raj	...	...	6	2,501	2,098
2	Athakideri kalai, No. 1	...	...	14	1,824	1,285
3	Nagamattu Kalai	...	...	16	2,356	1,477
4	Kallankiderai, 03	...	...	5	2,166	1,444
5	Athakiderai Kalai, 06	...	...	8	1,859	1,518
6	Kattupalayan Mattukalai, 04	...	...	14	1,336	932
7	Periamattu Kalai	...	...	4	2,113	1,726
8	Rameswarathumattu Kalai, 4	...	...	3	821	908

It is seen from the above table that the daughters' performance is much less than the dams, indicating, that the sires used are not in a position to transmit milk characters. This is apparent in a breed of this type, which is purely a draught one.

## 7 *Production of bulls at Palayakottai Farm*

It has already been said that the Kangayam breed of cattle is one of the descript breeds available in the South and is purely a draught type; as such, there is a very good demand for the bulls of this breed not only in the breeding tract of Coimbatore District, but also in other districts of this State for grading up the local cattle, to suit agricultural operations. This farm produces pure bred Kangayam pedigree bulls, which are mainly used for breeding purposes under various schemes of Livestock Improvement, sponsored by the State Government, District Board, National Extension Service and various private bodies. The animals are selected, when they are about 2½ years old or when they cut their first pair of teeth at which age, they generally commence service.

The following table gives the particulars of bulls produced and issued under the scheme and non-scheme :

Year	No. of bulls produced		No. of bulls issued	
	Scheme	Non-scheme	Scheme	Non-scheme
1945-46 ..	25	4	19	1
1946-47 ..	25	12	20	10
1947-48 ..	30	99	24	49
1948-49 ..	27	60	22	44
1949-50 ..	32	38	17	28
1950-51 ..	36	69	22	56
1951-52 ..	33	53	15	32
1952-53 ..	30	40	15	11
1953-54 ..	37	24	15	12
1954-55 ..	55	45	15	17
Total ..	330	444	184	260

The above table indicates that during the course of 10 years both under the scheme and non-scheme 774 breeding bulls have been produced, out of which 444 bulls have been issued to the State under various Livestock Development Schemes. Thus it can be seen on an average 77.4 bulls are produced annually at this farm.

## PART II

### 8 *Kangayam Cattle at Hosur Livestock Research Station*

Earlier in this book, the characteristics of Kangayam breed of cattle at Palayakottai, the home tract of this breed, have been described. It is very interesting to study the adaptability of this breed in places away from the home tract under different environmental conditions.

The Livestock Research Station at Hosur, situated in Salem District of this State, is maintaining the Kangayam breed of cattle since 1924-25 and is being run by the State Government. From 1924-25 for a period of 14 years upto 1937-38, it was under the Agriculture Department and since 1st April 1938, this farm is under the control of Animal Husbandry Department. This farm has a total acreage of 1,646 of which 453 acres are occupied by buildings and roads and 124 acres are used for irrigated and unirrigated fodder and food crops and the rest of the area is being maintained under pasture for the purposes of hay making and grazing of animals. The nature of soil in this area varies from rich black and retentive clay loam to good hard and red gravel.

It is situated at a height of about 3,000 ft. above sea-level. There are 5 rain-fed tanks attached to the farm and they are the only source of water supply to the farm apart from the bore well recently installed.

The following table gives the average rainfall month-wise from 1938-39 to 1955-56 :

TABLE 1

	Rainfall (in inches)	Rainy days
January .. .. .	0.48	2.6
February .. .. .	1.95	1.5
March .. .. .	1.14	2.0



			Rainfall (in inches)	Rainy days
April	..	..	3.30	5.6
May	..	..	4.89	9.2
June	..	..	1.89	5.0
July	..	..	2.73	8.7
August	..	..	3.19	8.6
September	..	..	4.70	10.1
October	..	..	6.93	10.7
November	..	..	3.57	8.6
December	..	..	1.50	4.3
Total	..	..	36.26	77.1

The rainfall during the years 1937-38 to 1955-56 indicates that there is variation between years and the maximum was recorded as 48.68 in 1943-44 and the minimum as 20.55 in 1953-54.

The mean maximum temperature recorded at the farm during the year was 89.5° F and the mean minimum temperature was 68° F. The climatic conditions at this farm have been divided into three periods as "hot weather period" from February to May, as "South-west monsoon" from June to September and as "North-east monsoon" from October to January. During these three periods, the mean distribution of rainfall and number of rainy days for the last 2 years are as follows :

	Rainfall	Number of rainy days
Hot weather period ...	9.8"	10.9
South-west monsoon ...	9.0"	27.5
North-east monsoon ..	11.0"	19.5

The summer showers are quite favourable to prepare the lands well in advance, and sowings are undertaken in the south-west monsoon. The north-east monsoon is very favourable to the standing crops.

#### **Fodder Production :**

The total area of the farm is 1,646 acres of which 124 acres are utilised for the cultivation of fodder and food crops, representing 7.5% of the total area. Of the area under cultivation, 3.5 acres are under wet cultivation. The topography of

the area under cultivation is such that the soil condition varies from light loam to heavy clay. Fodder and grain crops, fodder grasses and legumes are grown in this area for feeding the livestock of this farm. The surplus fodder during the season are preserved by ensiling the same. Various fodder crops such as, Cholan, Maize, Teosinte, and other grasses are grown. To augment the supply of nutrient fodders, larger areas under leguminous fodders are also taken up. The cultivated fodder crops at this farm are grown in different areas to suit the conditions and requirements at the farm. On an average a major part of 34.0 acres is set apart for Cholan and the next crop is guinea grass whose average acreage is 12 acres. The average production of cultivated fodder crops per year is 1,765,745.0 lbs. and the average yield per acre is 16,244.2 lbs.



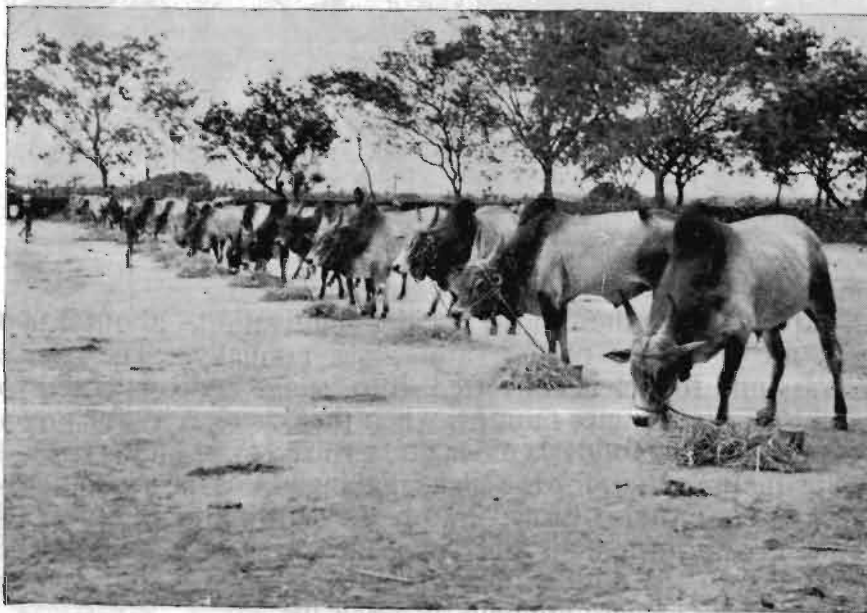
View of Hosur Farm

Apart from the above fodder cultivation, about 1,000 acres are used for pasture and grass annually. The excess of grass and fodder is converted into silage and this is fed to animals in the summer months, when there is scarcity for green fodder. Cholan fodder, guinea grass, mixed grass and Teosinte are the main sources for the silage making at this farm. In addition, grasses are also turned into hay according to the requirements of the farm and this is done from the middle of November to the middle of January every year. The average yield of hay per acre annually is 1,384 lbs.



Silage Making

Bulls for distribution.





Fodder Production

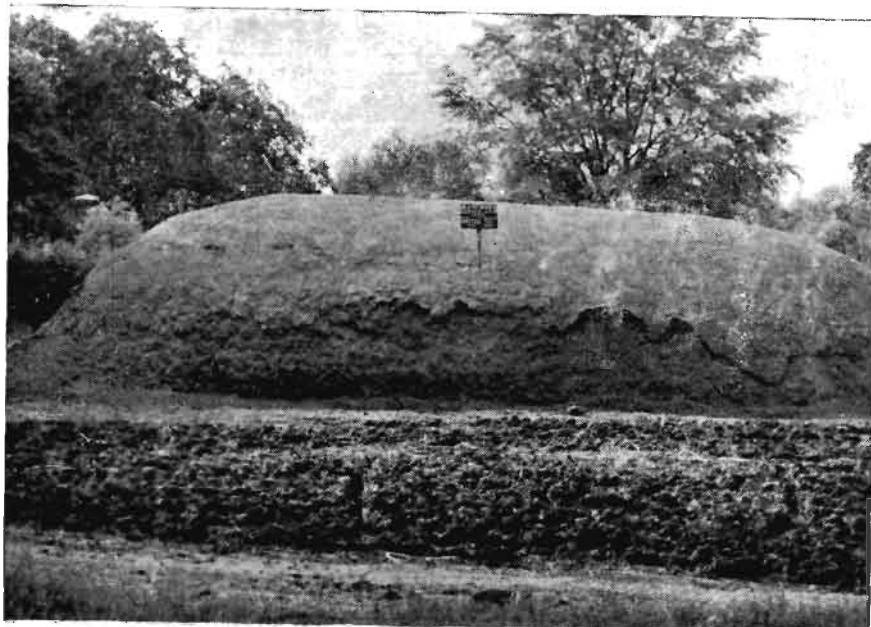
Silage Preparation (Carting)



V-6



Silage Making



## *9 General Management Practices*

The cattle at this farm are fed on balanced rations as per the schedule, separately for young stock, milch animals, dry stock, bulls and work animals. The calves are not weaned at birth but allowed to suckle the dams at the time of milking. Twice a day milking is practised at this farm.

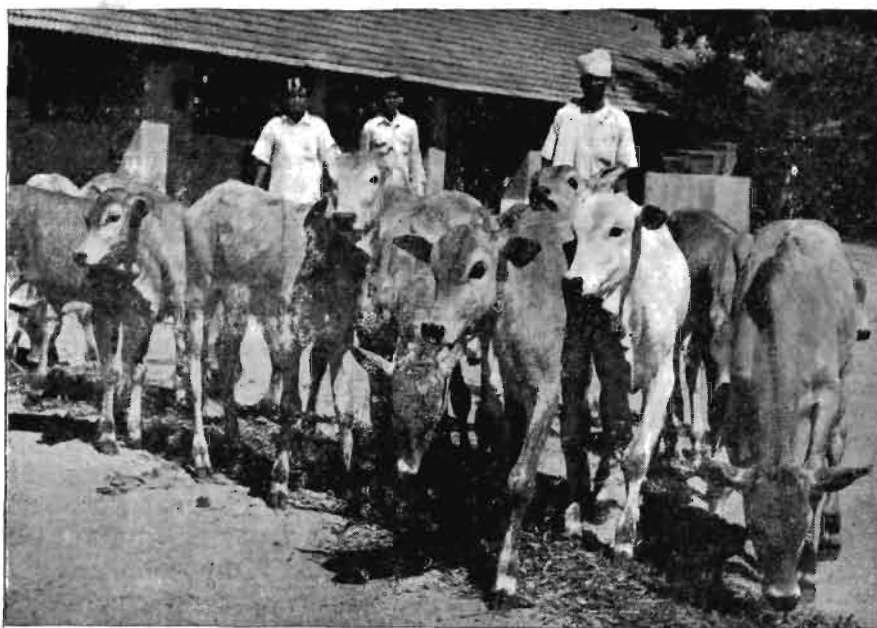
The green fodder produced and the pasture available at this farm are sufficient for the animals. The young stock is divided into different groups and fed according to age. Special feed is given to milking animals according to the quantity of milk produced at the rate of 1 lb. of concentrate mixture per 3 lbs. of milk produced in a day. During the summer, when green fodder, is insufficient silage is fed to animals and in addition hay produced at the farm is also fed at the rate of 10-15 lbs. per animal. All dry cows used for dairy or breeding purposes are given a concentrated food as a part of the maintenance ration. If very good grazing and plenty of green fodder are available, the ration of the concentrated food is cut down. Cows in calf are given a slightly increased ration for six weeks before calving in order to produce a good calf and to increase the flush of milk at the time of calving. The calves are fed with skimmed milk upto the age of six months as per the schedule.

All calves born are tattooed soon after birth and numbers are serially given. After one year, they are branded and transferred as adult stock. At this farm records are being maintained for each individual animal since its birth to its disposal. Separate registers are maintained for each breed on the performance, progenies, milk yield and other associated characteristics such as number of days in milk, number of days dry, calving interval, fat percentage during the lactation, etc.

### **Object:**

Prior to the State Government taking over this farm, this farm was maintained by the Military as an Army Remount Depot for 96 years. When the farm was taken over from the Military in 1924-25 there were no cattle in the farm, but only 30 horses which were taken over along with the farm, for work purposes, such as ploughing, carting, hay making etc.

The main object in taking over the farm as far as the Kangayam breed is concerned is as follows : (1) Raising good pure bred herds of Kangayam, (2) production of good pedigree Kangayam bulls for distribution in the rural and urban parts of this State for Livestock Improvement work.



Kangayam Young Stock

Hence the initial stock required for the above purpose was obtained from the Pattagar of Palayakottai comprising of 30 animals, on 16-1-25 and in addition a few Kangayam animals were transferred from Coimbatore Dairy Farm of this State on 11-1-25. The strength of Kangayam herd at the Livestock Research Station, Hosur at the end of 1924-25 was as follows :

		Cows and heifers over one year	Breeding Bulls and bull calves over one year	Bull calves	Heifer calves	Total
Kangayam	...	41	7	3	3	54

During the year 1927-28 it was decided to use this farm purely as a research station, instead of undertaking commercial dairying. In March 1928, a further breeding stock of Kangayam, consisting of 7 cows, 12 heifers, 6 bulls and 1 calf



Kangayam Bulls at Hosur Cattle Farm

Kangayam Cows at Hosur Cattle Farm





were purchased from the Pattagar of Palayakottai. The cows purchased had little milking instinct, many yielding only to the calf. When this farm was transferred from the Agriculture Department to this department during 1938-39 the chief object, as laid down, was to maintain the best types of Kangayam breeds of cattle along with other breeds such as Sindhi and Hallikar besides raising pedigree bulls and issuing them for live-stock improvement work.

#### **Strength of the herd:**

All the foundation stock animals were purchased from the Pattagar of Palayakottai and these animals formed the cream of the Pattagar's stock with good records of milch strain. The building up of a pure Kangayam herd at this farm is of considerable importance to this State.

The following tables give the details of total strength of Kangayam cattle at this farm, since its inception.

TABLE 2

Year	Number of animals	Year	Number of animals
1924-25 ..	54	1939-40 ..	305
1925-26 ..	60	1940-41 ..	320
		1941-42 ..	337
1926-27 ..	90	1942-43 ..	385
1927-28 ..	135	1943-44 ..	445
1928-29 ..	143	1944-45 ..	465
1929-30 ..	172	1945-46 ..	450
1930-31 ..	195	1946-47 ..	428
1931-32 ..	236	1947-48 ..	478
1932-33 ..	260	1948-49 ..	560
1933-34 ..	276	1949-50 ..	551
1934-35 ..	320	1950-51 ..	561
1935-36 ..	317	1951-52 ..	615
1936-37 ..	334	1952-53 ..	528
1937-38 ..	326	1953-54 ..	477
1938-39 ..	367	1954-55 ..	384

TABLE 3

Distribution of Breeding Stock at the close of each year

Close of the year	Female		Total	Male		Total	Total breeding Stock
	Cows and heifers	Heifer calves		Stud bulls and young bulls	Bull Calves		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1924-25 ...	41	3	44	7	3	10	54
1925-26 ...	43	5	48	8	4	12	60
1926-27 ...	41	20	61	7	22	29	90
1927-28 ...	75	16	91	30	14	44	135
1928-29 ...	78	20	98	26	19	45	143
1929-30 ...	106	19	125	26	21	47	172
1930-31 ...	120	20	140	32	23	58	195
1931-32 ...	131	40	171	41	24	65	236
1932-33 ...	150	40	190	37	33	70	260
1933-34 ...	172	25	197	52	27	79	276
1934-35 ...	169	47	216	63	41	104	320
1935-36 ...	189	32	221	63	33	96	317
1936-37 ...	181	44	225	69	40	109	334
1937-38 ...	186	35	221	71	34	105	326
1938-39 ...	191	55	246	78	43	121	367
1939-40 ...	154	37	191	76	38	114	305
1940-41 ...	179	46	225	62	33	95	320
1941-42 ...	211	45	256	32	49	81	337
1942-43 ...	239	52	291	40	34	94	385
1943-44 ...	276	52	328	73	44	117	445
1944-45 ...	276	46	322	93	50	143	465
1945-46 ...	285	42	327	86	37	123	450
1946-47 ...	294	30	324	71	33	104	428
1947-48 ...	303	52	355	72	51	123	478
1948-49 ...	315	70	385	100	75	175	560
1949-50 ...	319	69	388	107	56	163	551
1950-51 ...	346	44	390	129	42	171	561
1951-52 ...	389	41	430	123	62	185	615
1952-53 ...	311	47	358	121	49	170	528
1953-54 ...	273	51	324	106	47	153	477
1954-55 ...	214	37	251	87	46	133	384

TABLE 4

The changes brought about in Five Year periods over the breeding stock are given below :

Five year periods		Total strength of the Breeding stock at the last year of the period
1924-25 to 1928-29	..	143
1929-30 to 1933-34	..	276
1934-35 to 1937-38	..	326
1938-39 to 1942-43	..	385
1943-44 to 1947-48	..	478
1948-49 to 1952-53	..	528
1953-54 to 1954-55	..	384

The breeding stock consisted of 54 animals in the beginning of the farm and it reached 384 at the end of 1954-55, showing a considerable increase during the period of 31 years, but it may be mentioned that the strength of breeding stock from 1938-39 to 1954-55 is almost same, though there has been variation in the intermediate five year periods. This is mainly due to the culling policy adopted at this farm, and due to the policy to reduce overstocking at this farm.

#### **Births:**

During the period from 1924-25 to 1954-55 a total number of 2,442 calves were born of which 1,248 were male calves and 1194 were female calves. The sex ratio in this case is 51.1 per cent for male and 48.9 per cent for female calves.

TABLE 5

The following are the particulars of calves born at this farm from 1924-25 to 1953-54 :

Year	Calves born		Total	Percentage of	
	Female	Male		Female	Male
1924-25 ..	..	..	..	..	..
1925-26 ..	8	..	8	100.0	..
1926-27 ..	9	6	15	60.0	40.0
1927-28 ..	14	6	20	70.0	30.0
1928-29 ..	9	14	23	39.1	60.9
1929-30 ..	18	11	29	62.1	37.9
1930-31 ..	20	11	31	64.5	35.5
1931-32 ..	9	25	34	26.5	73.5
1932-33 ..	20	17	37	54.1	45.9
1933-34 ..	20	19	39	51.3	48.7
1934-35 ..	26	20	46	56.5	43.5
1935-36 ..	31	18	39	53.8	46.2
1936-37 ..	28	27	55	50.9	49.1
1937-38 ..	14	15	29	48.3	51.7
1938-39 ..	28	38	66	42.4	57.6
1939-40 ..	27	29	56	48.2	51.8
1940-41 ..	18	28	46	39.1	60.9
1941-42 ..	35	28	63	55.6	44.4
1942-43 ..	34	29	63	54.0	46.0
1943-44 ..	23	19	42	54.8	45.2
1944-45 ..	25	26	51	49.0	51.0
1945-46 ..	26	18	44	59.1	40.9
1946-47 ..	30	32	62	48.4	51.6
1947-48 ..	30	46	76	39.5	60.5
1948-49 ..	47	47	94	50.0	50.0
1949-50 ..	51	65	116	44.0	56.0
1950-51 ..	52	60	112	46.4	53.6
1951-52 ..	53	72	125	42.4	57.6
1952-53 ..	48	71	119	40.3	59.7
1953-54 ..	70	51	121	57.9	42.1

In order to find out, whether the theoretical sex ratio 50 : 50 differs significantly with the ratio obtained as 51.1 and 48.9, statistical test was adopted and the result revealed that the observed sex ratio 51.1 : 48.9 is in conformity with the expected ratio 50 : 50.

The following table gives the distribution of calvings in different months of the year :

TABLE 6

Months	Number of calvings
January .. .. .	131
February .. .. .	144
March .. .. .	137
April .. .. .	193
May .. .. .	192
June .. .. .	190
July .. .. .	162
August .. .. .	184
September .. .. .	175
October .. .. .	159
November .. .. .	137
December .. .. .	125

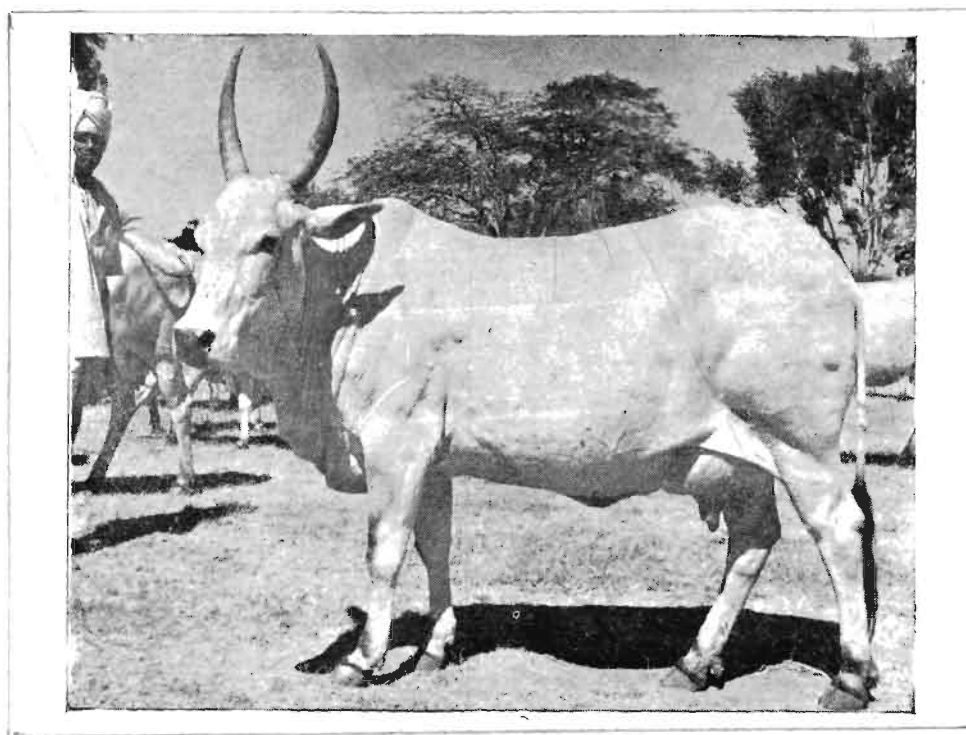
From the above table it is observed that the distribution of calvings in different seasons of the years did not differ significantly for the cows in the different generations and the distribution also indicated that the calvings were unevenly distributed in different months and the greater concentration of calvings occurred in April, May and June and lesser concentration in December and January. The correlation between rainfall and the number of calvings in different months of year is 0.46 which is not statistically significant, indicating that there is no relationship between rainfall and the number of calvings.

#### Birth weight of calves :

The birth weight records of 1,397 calves born during 1941-42 to 1954-55 reveal that the average weight of calf is 44.9 lbs. Out of the total number of 1,397 calves, there were 678 heifer calves with an average birth weight of 43.5 lbs. and 719 bull calves of average birth weight of 46.3 lbs. There is an increase of 2.8 lbs. in the bull calves over the heifer calves.

### Disease position of Kangayam Cattle at the Farm :

The mortality during 1925-26 to 1954-55 indicates that the disease position at this farm was not alarming, considering the total stock of animals at the end of each year. The average annual percentage of mortality during this period is only 4.6. It is seen that the percentage of mortality was high during 1925-26, when it was 14.3% and there was a slow decline till 1927-28 to 8.8 per cent and from this year onwards the mortality had been on the decline ranging from 5.7 to 1.9 per cent. Though the total stock position was always on the increase, year after year, the mortality was very low, thereby indicating a control of diseases among cattle at this farm.

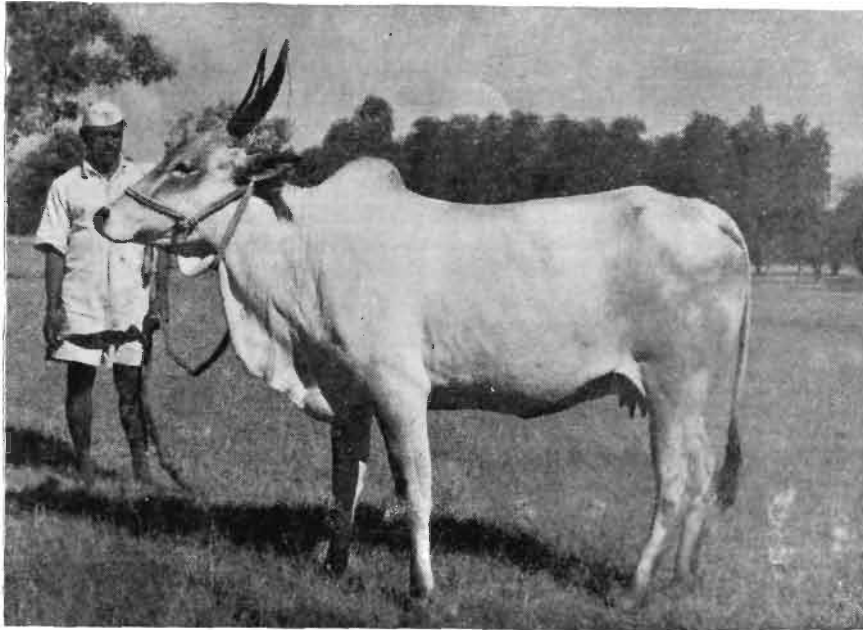


Kangayam Cow—Mother of 13 calves.

Among the contagious diseases, Rinderpest, Black Quarter and Foot and Mouth were prevailing at the farm during the period. Preventive Inoculations against Rinderpest are being done periodically every year. The farm is free from Rinderpest since 1929-30.

Black Quarter was prevailing at this farm as early as 1926-27 and continued to occur till 1944-45 and afterwards there was

no occurrence of this disease at this farm. Periodical vaccination against Black Quarter is being done every year and the animals are protected against Black Quarter in time. Foot and Mouth Disease appeared very often at the farm. Though the mortality due to this disease is negligible, yet the after-effects of this disease are severe since they reduce the vitality of the affected animals besides being responsible for the so-called 'panting' among affected cattle.



A graceful Kangayam Cow

## *10 More Glimpses into the Hosur Farm*

### **1. COWS**

#### **Foundation Stock :**

The foundation stock of Kangayam consisted of 69 cows of which 8 were received from the Coimbatore Dairy in 1924-25 and the other 61 animals were purchased from the Pattagar of Palayakottai from 16-1-25 to 24-3-50. Out of these 69 cows, two were removed from the herd, as they were not of descript origin, one was sold away immediately after calving and two had no lactation records, as such there were only 64 cows which constituted the foundation stock.

#### **First generation of cows :**

The 64 cows in the foundation stock produced 382 calves of which 189 were heifers. 163 calves became adult and 101 of them calved and remained at the farm in milk for one or more lactations. These 101 cows comprised the first generation of farm bred Kangayam cows in the farm.

#### **Second generation :**

The total number of calves born to the 101 first generation cows was 453. Of these 256 were heifers and 222 of them became adult. The number of animals that calved and remained in milk in the farm was 138 and these formed the second generation of farm bred Kangayam cows at this farm.

#### **Third generation :**

The 138 cows of the second generation produced 609 calves of which 338 were heifers. 293 heifers became adult and 156 of them remained at the farm in milk. These 156 cows constituted the third generation of farm bred Kangayam cows.

#### **Fourth generation :**

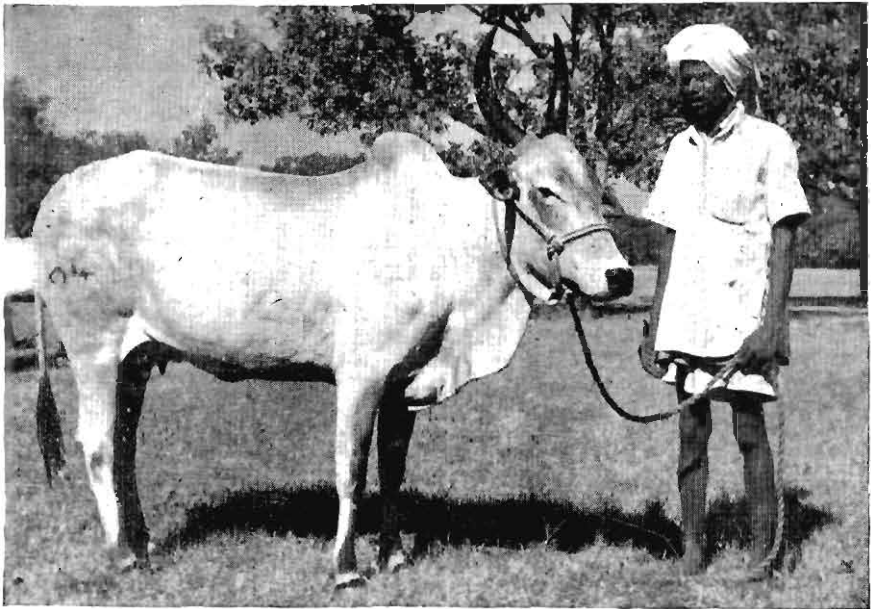
530 calves were born to the 156 cows of the third generation. Among these, 265 were heifer calves and 218 of them became adult. The number of cows that calved and had one or more lactations in this farm was 99. These cows formed the fourth generation.

#### **Fifth generation :**

The number of calves brought forth by the 99 cows of the fourth generation was 254 among which, there were 140 heifer calves. 99 of these became adult, but only 29 calved and had



lactations at this farm. These 29 cows formed the fifth generation cows. Out of these 29 cows, one had no complete lactation record.



Kangayam Cow at Hosur

#### **Sixth generation:**

The total number of calves born to the above mentioned 29 cows was 54 of which 30 were heifers. 17 of these became adult, but only four of them calved and remained in milk at the farm. These four cows formed the sixth generation of this breed.

#### **Seventh generation:**

The total number of calves born to the 6th generation cows was only 6. One heifer calf became adult, calved and remained at the farm for one lactation. This cow formed the seventh generation of Kangayam at this farm.

Thus in all there were 591 animals with 2,244 records available for the generations of Kangayam at Livestock Research Station, Hosur, giving on an average 3.8 records per animal.

## **2. BULLS**

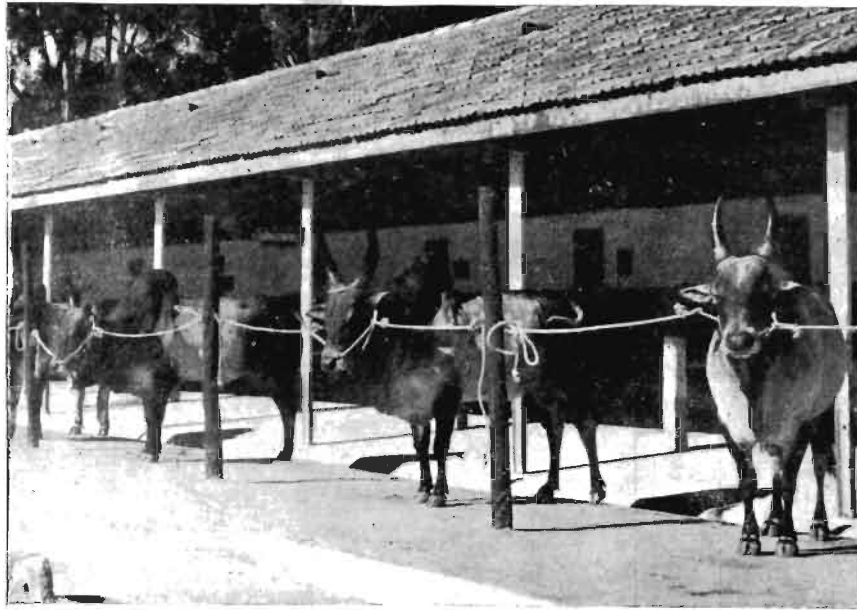
#### **Foundation Stock:**

The foundation stock of Kangayam bulls consisted of 17 bulls of which 14 were purchased from the Pattagar of Palaya-

TABLE 7  
Distribution of cows in different generations and lactations

Order of generation	Number of lactation records available													Total number of cows	Total number of records	Average number of records
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)			
Foundation stock	...	5	6	7	4	8	9	9	8	2	2	4	...	64	357	5.6
First generation	...	18	18	9	15	8	9	5	8	3	3	1	3	101	451	4.5
Second generation	...	36	16	17	9	17	11	6	10	4	3	4	4	138	599	4.3
Third generation	...	55	33	9	15	11	7	8	7	8	1	1	1	156	522	3.3
Fourth generation	...	44	19	10	9	10	1	2	1	3	...	...	...	99	253	2.6
Fifth generation	...	19	3	3	...	1	1	...	1	...	...	...	...	28	53	1.9
Sixth generation	...	2	1	...	1	...	...	...	...	...	...	...	...	4	8	2.0
Seventh generation	...	1	...	...	...	...	...	...	...	...	...	...	...	1	1	...
Total													...	591	2,244	...

kottai. Two bulls were received in 1924 and 1926 from the Coimbatore Dairy. One Kangayam bull belonging to the Pattagar of Palayakottai, was received as a present from the Governor of Madras in 1950-51 and used as stud at this farm.



Kangayam Bulls at Hosur

#### **First generation of bulls :**

Seven hundred and eighty-eight bull calves were born to the 17 foundation stock of Kangayam bulls, out of which only 10 were selected for stud purposes, considering the type, conformation and pedigree particulars. The rest were either sold away or transferred to other places for breeding work. The 10 Kangayam bulls formed the first generation of bulls.

#### **Second generation of bulls :**

Out of the 290 bull calves born to 10 first generation bulls, only 6 were selected for stud purposes and these six constituted the second generation of bulls.

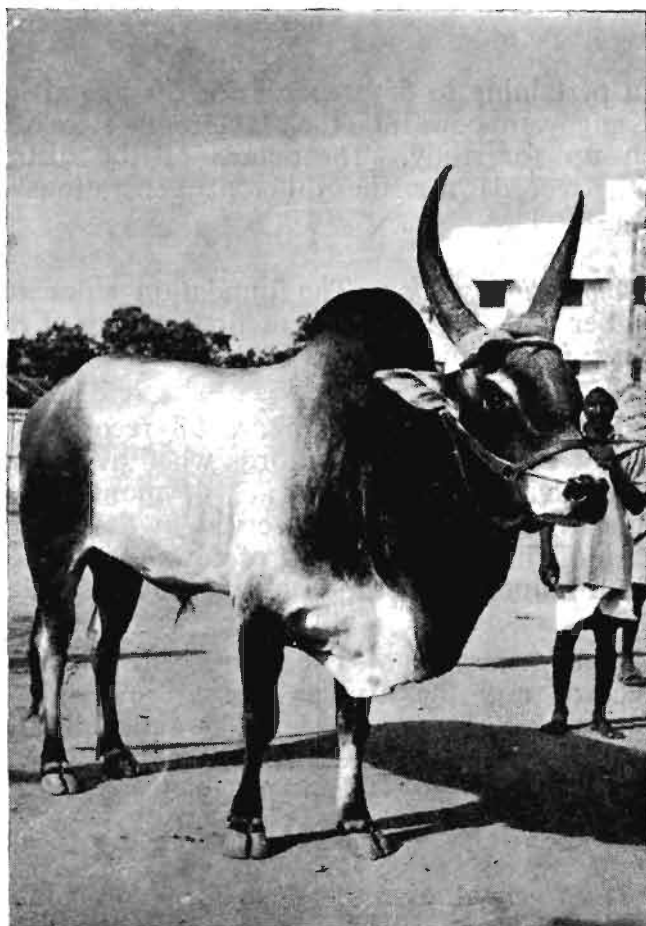
#### **Third generation of bulls :**

The six second generation bulls produced 102 bull calves of which two bulls were selected for stud at this farm forming the third generation of bulls.

#### **Fourth generation of bulls :**

The two bulls of the third generation produced 34 bull calves of which only one bull was used at stud for this generation and this only bull also remained at stud for only one year at

this farm and then removed. No male progeny of this bull was used in stud at the farm.



The Kangayam Bull

In all, 36 bulls from the foundation stock to the fourth generation were used for stud at the farm since 1924-25. But it may be seen that all the farm bred Kangayam bulls have been eliminated after the fourth generation and fresh bulls purchased from the Pattagar's farm have been introduced at this farm for breeding purposes since 1953-54 with a view to get uniformity in type and conformation.

Tracing the 30 years' history of Kangayam breed at the Livestock Research Station, Hosur Cattle Farm, the Kangayam cows had reached the seventh generation and the bulls used were in the fourth generation.

## 11 Calvings

Data pertaining to 559 records for the age at first calving of the Kangayam cows at the Livestock Research Station are taken up for study. The details of the distribution of cows with records for the different generations are given below :—

(a) *Foundation stock* :—The foundation stock records are 36 in number and the mean age at first calving of the animals is 1399 days, *i.e.*, 46 months and 19 days.

(b) *First generation* :—There are 98 records for the first generation of cows and these records when averaged gives the age at first calving as 1254 days, *i.e.*, 41 months and 24 days. A very good improvement is observed in the average age at first calving of the first generation of cows over the foundation stock with a reduction of 4 months and 25 days.

(c) *Second generation* :—The second generation cows consist of 138 records and the average age at first calving for this generation is 1268 days *i.e.*, 42 months and 8 days. Though there is not much improvement over the first generation, an appreciable change has taken place over the foundation stock.

(d) *Third generation* :—There are 155 cows of this generation whose average age at first calving is 1432 days, *i.e.*, 47 months and 22 days. A marked increase has taken place over the previous generations.

(e) *Fourth generation* :—Ninety-nine cows' records of this generation have the average age at first calving as 1501 days, *i.e.*, 50 months and 1 day. It is observed that a steady increase in age at first calving is seen from the first generation onwards upto the fourth generation.

(f) *Fifth generation* :—Twenty-nine cows of this generation have given the average age at first calving as 1465 days, *i.e.*, 48 months and 25 days. A considerable improvement has taken place in this generation over the previous generation.

(g) *Sixth generation* :—There are only four cows for this generation whose average age at first calving is 1428 days *i.e.*, 47 months and 18 days.

TABLE 8

The above results are tabulated below :—

S.No.	Number of generations	Number of animals	Average age at first calving (months)
1.	Foundation stock	36	46.6
2.	First generation	98	41.8
3.	Second generation	138	42.3
4.	Third generation	155	47.7
5.	Fourth generation	99	50.0
6.	Fifth generation	29	48.8
7.	Sixth generation	4	47.6

From the above table, it is evident that the first and second generation cows matured earlier than the foundation stock and thereafter there has been an increase in the other generations.

The 559 cows in different generations and in different periods give the average age at first calving as 1372 days *i.e.*, 45 months and 22 days for the Kangayam cows at the Livestock Research Station, Hosur.

**Average age at first calving of heifers born in different years:**

The following table gives the number of heifers and the average age at first calving during each year.

TABLE 9

Year		Number of heifers	Average age at first calving in months	Year		Number of heifers	Average age at first calving in months
1922	...	1	35.9	1938	...	25	41.3
1923	...	1	34.5	1939	...	26	42.7
1924	...	2	35.2	1940	...	27	47.1
1925	...	3	38.9	1941	...	21	50.1
1926	...	6	42.5	1942	...	25	60.6
1927	...	11	48.8	1943	...	27	55.8
1928	...	11	40.2	1944	...	36	51.3
1929	...	19	40.8	1945	...	27	45.1
1930	...	9	39.4	1946	...	21	43.4
1931	...	20	38.3	1947	...	21	48.9
1932	...	19	39.8	1948	...	34	49.5
1933	...	18	43.2	1949	...	21	50.9
1934	...	25	40.0	1950	...	7	45.0
1935	...	22	40.7	1951	...	2	34.3
1936	...	26	39.2	1952	...	10	39.3
1937	...	12	39.3				

From a perusal of the above table, it is seen that there has been a lot of variation in the average age at first calving of different heifers born in different years.

The five year period average age at first calving since 1922 is given below :

TABLE 10

Period	Number of heifers	Average age at first calving in months
1922-26	13	39.1
1927-30	50	41.9
1931-35	104	39.9
1936-40	116	41.7
1941-45	136	51.9
1946-50	104	47.4
1951-52	12	38.4

It is observed from the quinquennial periods that the average age at first calving was highest in the period from 1941-45 and is now on the decrease, indicating an improvement in the recent years.

**Average age at first calving as per the sires used :**

A study on the comparative performance of the dams and daughters of the various sires, as to the age of the dams and their respective daughters at first calving was undertaken and the details are tabulated below :

TABLE 11

Number of sire used	Number of Dam daughter pairs	Average age of dams at first calving (in months)	Average age of the daughters at first calving (in months)	Difference between Dam and Daughter
33	10	42.8	39.8	3.0
34	35	42.2	41.2	1.0
47	8	41.5	45.1	-3.6
50	6	57.2	42.4	-14.8
90	32	41.8	40.9	0.9
132	8	38.0	38.4	-0.4
231	29	41.3	45.2	-3.9
308	46	40.1	50.1	-10.0
307	66	41.3	53.7	-12.4
554	34	45.8	46.9	-0.9
555	19	45.4	47.4	-2.0
85	27	40.2	41.6	-1.4
104	15	35.4	39.8	-4.4
39	3	39.3	44.8	-5.5
612	9	42.5	48.1	-5.6
531	13	50.5	46.2	4.3
269	30	40.9	48.5	-7.6
357	16	42.1	48.0	-5.9
119	7	41.6	42.7	-1.1
118	4	38.7	38.9	-0.2
506	14	45.9	48.7	-2.8



From table 11 it is seen that 21 bulls of Kangayam have been used. The average age at first calving of the dam-daughter has been studied. Out of these only the daughters of five bulls used, showed considerable decrease, whereas in the remaining 16 bulls there has been an increase in the average age at first calving. When the study of dam-daughter comparison is made with regard to age at first calving it is found that the daughters on an average had the first calving at a later age than their dams by 2.1 months.

When the individual merits of these sires are considered Sire Nos. 34 and 90 have 35 and 32 daughters to be compared and there has been an appreciable decrease in the daughters born to the above sires, showing an improvement in the early maturity.

Sire Nos. 307 and 308 have 46 and 66 daughters to be compared respectively. Though these bulls had been widely used, yet the results of early maturity of the daughters are not appreciable and this has resulted in the increase of the over-all age of first calving of the daughters. The rest of the bulls' daughters do not show any appreciable difference over their corresponding dams.

It is seen that out of the total of 421 daughters born to the 21 bulls only 96 daughters showed a decrease in the average age at first calving, but still the over-all age of the 421 daughters as compared with their corresponding dams shows an increase of only 2.1 months for the daughters. The period of stay of these bulls ranges about 30 years indicating the different environmental conditions under which the dams and daughters are placed. Thus while considering the above data, the sires used do not seem to have any influence over this factor.

### Calving Interval

#### FIRST LACTATION INTERVAL :

391 lactation records of the interval between the first calving and second calving were considered and the details are tabulated below as per the generation.

TABLE 12

Serial No.	Number of generations	Number of individuals	Average in days
1.	Foundation stock ..	44	475.7
2.	First generation ..	82	482.9
3.	Second generation ..	104	526.3
4.	Third generation ..	100	536.8
5.	Fourth generation ..	52	524.4
6.	Fifth generation ..	6	464.7
7.	Sixth generation ..	3	505.0

## SECOND LACTATION INTERVAL :

A total number of 306 lactation records are available for this interval and they are tabulated below :

TABLE 13

Serial No.	Number of generations	Number of individuals	Average (days)
1.	Foundation stock ..	43	446.0
2.	First generation ..	63	463.4
3.	Second generation ..	84	469.2
4.	Third generation ..	74	446.7
5.	Fourth generation ..	37	478.4
6.	Fifth generation ..	4	506.3
7.	Sixth generation ..	1	485.0

## THIRD LACTATION INTERVAL :

There are 254 records and they are tabulated below :

TABLE 14

Serial No.	Number of generations	Number of individuals	Average (days)
1.	Foundation stock ..	38	447.4
2.	First generation ..	57	415.4
3.	Second generation ..	68	453.8
4.	Third generation ..	62	473.5
5.	Fourth generation ..	25	479.1
6.	Fifth generation ..	3	530.3
7.	Sixth generation ..	1	455.0

## FOURTH LACTATION INTERVAL :

There are 205 calving interval records and the details are given below :

TABLE 15

Serial No.	Number of generations	Number of individuals	Average (days)
1.	Foundation stock ..	39	458.2
2.	First generation ..	41	420.0
3.	Second generation ..	59	453.5
4.	Third generation ..	45	454.9
5.	Fourth generation ..	18	434.4
6.	Fifth generation ..	3	439.7

## FIFTH LACTATION INTERVAL :

There are 162 calving interval records and they are distributed as given below :

TABLE 16

Serial No.	Number of generations	Number of individuals	Average (days)
1.	Foundation stock ..	36	434.9
2.	First generation ..	34	450.6
3.	Second generation ..	45	486.6
4.	Third generation ..	36	501.4
5.	Fourth generation ..	9	460.7
6.	Fifth generation ..	2	407.5

## SIXTH LACTATION INTERVAL :

There are 121 calving interval records and they are tabulated as follows :

TABLE 17

Serial No.	Number of generations	Number of individuals	Average (days)
1.	Foundation stock ..	27	433.6
2.	First generation ..	27	448.9
3.	Second generation ..	33	491.3
4.	Third generation ..	28	482.2
5.	Fourth generation ..	5	507.2
6.	Fifth generation ..	1	359.0

**SEVENTH LACTATION INTERVAL :**

The 92 calving interval records are tabulated below :

TABLE 18

Serial No.	Number of generations	Number of individuals	Average (days)
1.	Foundation stock ..	23	445.4
2.	First generation ..	20	448.0
3.	Second generation ..	24	476.0
4.	Third generation ..	19	434.2
5.	Fourth generation ..	5	512.4
6.	Fifth generation ..	1	380.0

**EIGHTH LACTATION INTERVAL :**

There are 63 calving interval records as shown below :

TABLE 19

Serial No.	Number of generations	Number of individuals	Average (days)
1.	Foundation stock ..	13	447.8
2.	First generation ..	16	486.5
3.	Second generation ..	18	432.8
4.	Third generation ..	13	437.6
5.	Fourth generation ..	3	424.3

**NINTH LACTATION INTERVAL :**

Thirty-one calving interval records of this lactation are tabulated below :

TABLE 20

Serial No.	Number of generations	Number of individuals	Average (days)
1.	Foundation stock ..	7	384.0
2.	First generation ..	7	545.6
3.	Second generation ..	13	531.8
4.	Third generation ..	3	483.7
5.	Fourth generation ..	1	365.0

## TENTH LACTATION INTERVAL :

The 18 calving interval lactation records are tabulated below :

TABLE 21

Serial No.	Number of generations	Number of individuals	Average (days)
1.	Foundation stock ..	4	428.8
2.	First generation ..	5	582.2
3.	Second generation ..	7	435.7
4.	Third generation ..	2	344.5

## ELEVENTH LACTATION INTERVAL :

Eleven calving interval records of this lactation are distributed as below :

TABLE 22

Serial No.	Number of generations	Number of individuals	Average (days)
1.	First generation ..	4	517.0
2.	Second generation ..	6	431.0
3.	Third generation ..	1	401.0

## TWELFTH LACTATION INTERVAL :

Six records of this lactation calving interval are given below :

TABLE 23

Serial No.	Number of generations	Number of individuals	Average (days)
1.	First generation ..	1	384.0
2.	Second generation ..	5	495.2

From the tables 12 to 23 given above it is seen in general that there is not much variation within lactations and between generations.

The average calving interval for each lactation is tabulated below :

TABLE 24

Serial No.	Number of lactations of calving intervals	Number of animals	Average (days)
1.	First lactation ..	391	513
2.	Second lactation ..	306	461
3.	Third lactation ..	254	453
4.	Fourth lactation ..	205	446
5.	Fifth lactation ..	162	468
6.	Sixth lactation ..	121	466
7.	Seventh lactation ..	92	449
8.	Eighth lactation ..	63	445
9.	Ninth lactation ..	31	492
10.	Tenth lactation ..	18	465
11.	Eleventh lactation ..	11	460
12.	Twelfth lactation ..	6	471

From a perusal of the above averages, it is seen that the maximum number of days in the calving interval is in the first lactation and the minimum is in the fourth and eighth lactations.

#### CALVING INTERVAL BY GENERATION :

The following table gives the distribution of 1660 calving interval records as per the generations.

TABLE 25

Serial No.	Number of generations	Number of animals	Average in days
1	Foundation stock ..	274	448
2	First generation ..	357	455
3	Second generation ..	466	481
4	Third generation ..	383	482
5	Fourth generation ..	155	486
6	Fifth generation ..	20	464
7	Sixth generation ..	5	491

The above averages indicate, that there is no appreciable improvement in the calving interval from one generation to the succeeding generation.

#### Calving Interval (Herd) :

The weighted average calving interval of the 1660 records was 471 days, i.e., 1 year, 3 months and 16 days.

## 12 Milk Yield at Hosur

The following table gives the total number of cows which completed the lactation during the year, the total milk yield of such cows for the completed lactations, the average milk yield per cow for the year and the daily average milk yield.

TABLE No. 26

Years	Number of cows in the herd	Number of cows in milk	Percentage of cows in milk to the total cows in the herd	Total production of milk of completed lactations	Average milk yield per cow in milk	Average milk yield per cow in herd	Average daily milk yield per cow in milk
				LBS.	LBS.	LBS.	LBS.
1938-39 ...	125	88	70.4	146,496.8	1,627.7	1172.0	6.0
1939-40 ...	96	69	72.9	133,273.8	1,931.5	1,388.3	6.7
1940-41 ...	107	86	80.4	166,838.0	1,934.2	1,559.2	7.0
1942-43 ...	138	82	59.4	121,350.8	1,479.9	879.4	6.2
1943-44 ...	146	79	54.1	113,621.8	1,438.2	778.2	5.3
1944-45 ...	158	117	74.1	156,469.0	1,337.3	990.3	4.6
1946-47 ...	136	72	52.9	89,871.0	1,248.0	660.8	4.5
1947-48 ...	176	69	39.2	87,663.4	1,270.3	498.1	4.8
1948-49 ...	197	127	64.5	177,645.5	1,398.8	901.8	5.8
1949-50 ...	191	61	31.9	86,583.0	1,419.4	453.3	5.5
1950-51 ...	162	125	77.2	182,320.8	1,458.5	1,125.4	5.4
1951-52 ...	193	87	45.1	106,044.8	1,218.9	549.5	5.8
1952-53 ...	165	122	73.9	147,022.8	1,200.8	891.0	5.3

There has been a wide variation in the milk yield performance of Kangayam cows in different years, indicating that there is every scope for improving the milk yield. In the beginning of the years from 1938-39 to 1940-41, the average milk yield of completed lactation of cows remained high, so also the daily average milk yield and in the following years, there is no appreciable improvement, but the daily milk yield average remained the same with very little variation from 1948-49 to 1952-53.

The following table gives the details as seen in a five year period :

TABLE 27

Years	Number of cows in the herd	Number of cows in milk	Percentage cows in milk to the total cows in the herd	Total production of milk	Average milk yield per cow in milk	Average milk yield per cow in herd	Average daily milk yield per cow in milk
				LBS.	LBS.	LBS.	LBS.
1938-39 to 1942-43	116.5	81.3	70.8	141,989.9	1,743.3	1,249.7	6.5
1943-44 to 1947-48	133.0	84.3	55.1	111,906.3	1,323.5	731.9	4.8
1948-49 to 1952-53	181.6	104.4	58.5	139,923.4	1,339.3	784.2	5.4

The table indicates that though there has been an increase in the average milk yield of completed lactations in the first five year period, the second and third had very little variation. The daily average milk yield of cows in milk in the five year period from 1948-49 to 1952-53 has shown an increase over the previous five year period. The variation observed above in the milk yield indicates that there is scope for improving the inherent capacity of milk production in this herd subject to environmental conditions. The following table gives the particulars of cows that completed the lactations from 1926-27 to 1953-54 with the number of cows in milk and average milk yield.



TABLE 28

Year			Number of cows in milk	Total annual production of milk of completed lactation	Average milk yield per cow	Average daily milk yield per cow
					LBS.	LBS.
1926-27	...	...	27	34,811.0	1,289.3	5.2
1927-28	...	...	33	42,542.8	1,289.2	6.0
1928-29	...	...	35	36,272.8	1,036.4	6.1
1929-30	...	...	18	24,101.8	1,339.5	5.0
1930-31	...	...	33	60,125.0	1,822.0	6.2
1931-32	...	...	63	93,191.0	1,479.0	6.9
1933-34	...	...	68	98,957.0	1,455.3	5.8
1934-35	...	...	65	116,601.8	1,793.9	6.3
1935-36	...	...	75	154,425.8	2,059.0	5.6
1936-37	...	...	83	159,507.8	1,921.8	6.7
1937-38	...	...	72	122,734.0	1,704.6	6.0
1938-39	...	...	88	146,496.8	1,627.7	6.0
1939-40	...	...	69	133,273.8	1,931.5	6.7
1940-41	...	...	86	166,383.0	1,934.2	7.0
1942-43	...	...	82	121,350.8	1,479.9	6.2
1943-44	...	...	79	113,621.8	1,438.2	5.3
1944-45	...	...	117	156,469.0	1,337.2	4.6
1946-47	...	...	72	89,871.0	1,248.0	4.5
1947-48	...	...	69	87,663.4	1,270.3	4.8
1948-49	...	...	127	177,645.5	1,398.8	5.8
1949-50	...	...	61	86,583.0	1,419.4	5.5
1950-51	...	...	125	182,320.8	1,458.5	5.4
1951-52	...	...	87	106,044.8	1,218.9	5.8
1952-53	...	...	122	147,022.8	1,200.8	5.3
1953-54	...	...	98	213,267.8	2,176.2	5.8
Average	...	...	74	110,744.0	1,533.2	5.7

It is clear that on an average during the last 25 years, 74 cows of Kangayam breed remained in milk. The annual average milk yield of completed lactations of cows in the year is 1533.2 lbs. with a daily milk yield average of 5.7 lbs.

#### Milk yield by generations :

The Kangayam breed at Livestock Research Station, Hosur, has been built up for the last 30 years and now there are animals in seventh generation. The lactation records of all these animals have been analysed as per their lactation and generation are presented below :—

TABLE 29

#### First Lactation

There are 515 lactation records for this lactation from the foundation stock to the seventh generation. The details are given below :

Serial number	Number of generations	Number of animals	Average milk yield	Standard error of the mean	Coefficient of variation
			LBS.		
1	Foundation stock ...	47	1,479.0	86.8	40.2
2	First generation ...	93	1,696.4	82.8	47.1
3	Second generation ...	128	1,536.5	53.6	39.5
4	Third generation ...	141	1,279.4	43.7	40.6
5	Fourth generation ...	79	1,173.1	51.8	12.4
6	Fifth generation ...	22	941.7	69.4	34.8
7	Sixth generation ...	4	1,084.4	...	...
8	Seventh generation ...	1	825.3	...	...

From the above table it is seen that the average milk yield was high in the first generation as compared with other generations. The weighted average milk yield of all the 515 lactation records, is 1403.1 lbs. for the first lactation.

*Second Lactation*

There are 364 lactation records for this lactation distributed as shown below :

TABLE 30

Serial number	Number of generations	Number of animals	Average milk yield	Standard error of the mean	Coefficient of variation
LBS.					
1	Foundation stock	46	1,534.6	97.8	43.2
2	First generation	73	1,769.4	78.0	37.7
3	Second generation	92	1,671.1	69.5	40.0
4	Third generation	93	1,397.2	62.7	43.3
5	Fourth generation	52	1,341.0	83.8	45.0
6	Fifth generation	6	960.3	...	...
7	Sixth generation	2	1,391.4	...	...

There is a considerable increase in the first generation's average milk yield over the other generations. The weighted average of all these 364 records is 1547.8 lbs. in the second lactation.

*Third Lactation*

In all 293 lactation records are available for this lactation over all generations. The details are given below :

TABLE 31

Serial number	Number of generations	Number of animals	Average milk yield	Standard error of the mean	Coefficient of variation
LBS.					
1	Foundation stock	41	1,681.3	134.1	51.1
2	First generation	65	1,916.7	93.3	39.3
3	Second generation	82	1,798.5	79.7	40.1
4	Third generation	66	1,490.6	68.6	37.4
5	Fourth generation	32	1,384.5	78.6	32.1
6	Fifth generation	6	1,018.8	...	...
7	Sixth generation	1	1,478.8	...	...

In this lactation also the average milk yield is highest in the first generation and the weighted average of all the 293 records is 1676.6 lbs. for third lactation.

#### *Fourth Lactation*

The fourth lactation records comprise of 241, covering upto fifth generation as detailed below :

TABLE 32

Serial number	Number of generations	Number of animals	Average milk yield	Standard error of the mean	Coefficient of variation
			LBS.		
1	Foundation stock	41	1,768.4	145.5	51.4
2	First generation	51	1,884.8	93.7	35.5
3	Second generation	66	1,697.9	96.1	46.0
4	Third generation	55	1,607.0	128.3	59.2
5	Fourth generation	25	1,329.1	60.2	22.7
6	Fifth generation	3	1,157.0	...	...

In this lactation also the average milk yield is highest in the first generation and the weighted average of all the records is 1685.9 lbs. for fourth lactation.

#### *Fifth Lactation*

The fifth lactation records number 202 in all from the foundation stock to fifth generation.

The details are given below :

TABLE 33

Serial number	Number of generations	Number of animals	Average milk yield	Standard error of the mean	Coefficient of variation
			LBS.		
1	Foundation stock	41	1,860.4	126	43.4
2	First generation	40	2,008.9	121.3	38.2
3	Second generation	58	1,752.7	89.3	38.8
4	Third generation	43	1,586.8	98.6	40.8
5	Fourth generation	17	1,350.2	114.2	34.9
6	Fifth generation	3	1,354.5	...	...

From the study of the averages, as in the previous lactations the first generation's average milk yield is the highest and the weighted average milk of the fifth lactation is 1750.2 lbs.

*Sixth Lactation*

There are 146 records available for this lactation and the details are tabulated below :—

TABLE 35

Serial number	Number of generations	Number of animals	Average milk yield	Standard error of the mean	Coefficient of variation
LBS.					
1	Foundation stock	30	2,093.4	177.7	46.5
2	First generation	33	2,063.0	152.9	42.6
3	Second generation	41	1,526.9	126.7	53.1
4	Third generation	34	1,687.5	106.1	36.7
5	Fourth generation	6	1,660.7	...	...
6	Fifth generation	2	1,569.0	...	...

In this lactation, the performance of all the generations can be considered to be good, though the averages of milk yield in the foundation stock and the first generation are more than 2000 lbs. The weighted average milk yield for this lactation is 1807.9 lbs.

*Seventh Lactation*

There are 109 records for this lactation and the details are tabulated below :—

TABLE 36

Serial number	Number of generations	Number of animals	Average milk yield	Standard error of the mean	Coefficient of variation
LBS.					
1	Foundation stock	26	2,202.8	149.9	34.7
2	First generation	22	2,142.1	177.9	39.0
3	Second generation	29	1,365.9	95.2	37.6
4	Third generation	25	1,482.9	131.0	44.0
5	Fourth generation	6	1,748.6	...	...
6	Fifth generation	1	691.8	...	...

In this lactation also the first generation's average milk yield is the highest and the weighted average milk yield for this lactation is 1763.9 lbs.

#### *Eighth Lactation*

There are 85 records covering upto fifth generation as shown below :—

TABLE 37

Serial number	Number of generations	Number of animals	Average milk yield	Standard error of the mean	Coefficient of variation
LBS.					
1	Foundation stock	18	2,253.1	331.1	41.6
2	First generation	18	1,909.5	217.7	47.0
3	Second generation	26	1,466.1	104.4	36.2
4	Third generation	18	1,640.0	158.2	40.9
5	Fourth generation	4	1,609.2	...	...
6	Fifth generation	1	473	...	...

The average milk yield for the foundation stock is high in this lactation. Except for the fall in the second generation's yield, the average milk yield is appreciable. The weighted average milk yield for this lactation is 1758.5 lbs.

#### *Ninth Lactation*

51 records comprise this lactation from the foundation stock to fourth generation. The details are furnished below :

TABLE 38

Serial number	Number of generations	Number of animals	Average milk yield	Standard error of the mean	Coefficient of variation
LBS.					
1	Foundation stock	10	2,516.1	331.1	41.6
2	First generation	11	1,574.6	332.5	70.0
3	Second generation	16	1,265.8	99.3	31.4
4	Third generation	11	1,214.0	152.6	41.7
5	Fourth generation	3	1,612.5	...	...

The foundation stock's average milk yield is very high for this lactation. The weighted average milk yield for this lactation is 1586.5 lbs.

*Tenth Lactation*

There are only 26 records available for this lactation and the number of records in each of the generation is also very small. The details are given below :—

TABLE 38

Serial No.	Number of generations	Number of animals	Average milk yield (lbs.)
1	Foundation stock	.. 6	2478.8
2	First generation	.. 7	1779.6
3	Second generation	.. 10	1411.6
4	Third generation	.. 3	1270.4

It is very much appreciable that the foundation stock's average milk yield is high even in the latter lactation. The weighted average milk yield is 1740.7 lbs. for this lactation.

*Eleventh Lactation*

The 20 records for this lactation are given below :

TABLE 39

Serial No.	Number of generations	Number of animals	Average milk yield (lbs.)
1	Foundation stock	.. 4	2700.6
2	First generation	.. 5	1171.1
3	Second generation	.. 9	1240.1
4	Third generation	.. 2	1139.4

The weighted average milk yield for this lactation is 1454.9 lbs.

*Twelfth Lactation*

10 lactation records are distributed below :

TABLE 40

Serial No.	Number of generations	Number of animals	Average milk yield (lbs.)
1	Foundation stock	.. 3	1693.9
2	First generation	.. 6	1239.7
3	Second generation	.. 1	998.0

The weighted average is 1351.8 lbs. of milk yield.

*Thirteenth Lactation*

TABLE 41

Serial No.	Number of generations	Number of animals	Average milk yield (lbs.)
1	First generation	.. 1	1638.5
2	Second generation	.. 2	1477.0

The weighted average is 1530.8 lbs. of milk yield.

In all there are 2065 lactation records for all the generations and the following table gives the weighted average for each lactation.

TABLE 42

Serial No.	Number of lactation	Number of records.	Weighted average milk yield in lbs.
1	First lactation	.. 515	1403.1
2	Second lactation	.. 364	1547.8
3	Third lactation	.. 293	1676.6
4	Fourth lactation	.. 241	1685.9



Serial No.	Number of lactation		Number of records.	Weighted average milk yield in lbs.
5	Fifth lactation	..	202	1750.2
6	Sixth lactation ..	..	146	1807.9
7	Seventh lactation	..	109	1673.9
8	Eighth lactation	..	85	1758.5
9	Ninth lactation	..	51	1586.8
10	Tenth lactation ..	..	26	1740.7
11	Eleventh lactation	..	20	1454.9
12	Twelfth lactation	..	10	1351.8
13	Thirteenth lactation	..	3	1530.8

The average milk yield of all the 2065 records is 1605.9 *lbs.* From a perusal of the above Table, it is seen that there is an increase from 1403.1 *lbs.* from the first lactation to the sixth lactation, whose average milk yield (1807.9 *lbs.*) is the highest recorded. From sixth lactation onwards there is a decrease, except in the tenth lactation, which may be due to the small size of the sample.

The above 2065 records are tabulated below on a generation basis.

TABLE 44

Serial No.	Number of generations		Number of animals	Average milk yield (lbs.)
1	Foundation stock	..	310	1833.2
2	First generation	..	422	1848.2
3	Second generation	..	565	1609.8
4	Third generation	..	492	1442.6
5	Fourth generation	..	224	1317.6
6	Fifth generation	..	44	1009.8
7	Sixth generation	..	7	1182.7
8	Seventh generation	..	1	823.5

A perusal of the average milk yield of the generation indicates that though the entire sample consists of 2065 individual lactations, the number of individuals is fairly big upto fourth generation and that in the fifth to seventh generations it is comparatively small.

The average milk yield in the first generation is very much appreciable and is almost on a par with the foundation stock. This may be attributed to the selection of the foundation stock, which is from a good milk yield strain, the main source being from the Kangayam herd of the Pattagar of Palayakottai.

### Lactation period

While studying the milk yield performance of the animals on completed lactations, it is desirable to know the allied factors such as the lactation period, and the daily average milk yield for the lactation period.

The following Tables give the particulars as per the lactations and generations.

Serial number	Number of lactation		Number of records	Average lactation period in days	Daily average milk yield for lactation period
					LBS.
1	First lactation	...	515	256	5.2
2	Second lactation	...	364	265	5.8
3	Third lactation	...	293	266	6.3
4	Fourth lactation	...	241	266	6.3
5	Fifth lactation	...	202	268	6.4
6	Sixth lactation	...	146	276	6.7
7	Seventh lactation	...	109	267	6.5
8	Eighth lactation	...	85	273	6.4
9	Ninth lactation	...	51	260	5.9
10	Tenth lactation	...	26	270	6.0
11	Eleventh lactation	...	20	270	5.4
12	Twelfth lactation	...	10	257	5.3
13	Thirteenth lactation	...	3	228	6.4

It is seen that the lactation period and the daily average milk yield for the lactation period is highest in the sixth lactation and this is in accordance with the previous statement, where the highest lactation record is in the sixth lactation. But from a perusal of the averages, there is not much variation in the lactation period between lactations and the average lactation period. All the 2065 records give 264 days with the daily average milk yield for the lactation period as 5.9 lbs.

The following table gives the generation-wise distribution of the lactation period and its daily milk yield average.

TABLE 45

Serial number	Number of generations			Number of records	Average lactation period in days	Daily average milk yield
						LBS.
1	Foundation stock	...	...	310	263	6.8
2	First generation	...	...	422	227	6.8
3	Second generation	...	...	565	271	5.9
4	Third generation	...	...	492	253	5.4
5	Fourth generation	...	...	224	253	5.1
6	Fifth generation	...	...	44	223	4.5
7	Sixth generation	...	...	7	258	4.6
8	Seventh generation	...	...	1	232	3.5

From the above table, it is seen that the average lactation period for the second generation is the highest.

#### Heavy milk yielders:

Reviewing the milk yield particulars of the Kangayam cows, it is observed that there are 10 animals yielding between 4000–5000 lbs. of milk in a single lactation, 3 animals between 5000–6000 lbs. and one animal over 6000 lbs.

Of the 10 animals between 4000–5000 lbs. three are from the foundation stock, five from the first generation and two from the second generation. The three animals between 5000–6000 lbs. are distributed as 1 in each of the first, second and third generation. The only animal over 6000 lbs. is from the third generation.

The above particulars indicate that though the Kangayam breed of cattle is purely a draught type and the milk yield character is one of secondary importance, yet from the varying milk yield performance of cows, there are indications that there is a possibility of improving the milk yield by selective breeding.

The details of the animals that have yielded ~~milk~~ over 5000 lbs. are given below :

(1) Cow No. 163 :—

This cow is from the first generation of cows and has yielded 5470.9 lbs. in the first lactation. This has completed 6 lactations with 2 bull calves and 4 heifer calves.

(2) Cow No. 398 :—

This cow is from the second generation of cows and has yielded 5074 lbs. in the fourth lactation. Seven progenies were born to this bull of which 4 are heifers and 3 are bulls. All the bulls were disposed of. The 4 heifers are at the farm as cow Nos. 593, 670, 825 and 897. Cow No. 593 has yielded 5163 lbs. as the highest milk yield and cow No. 670 has given 3761 lbs. and cows Nos. 825 and 897 have not yet calved.

(3) Cow No. 593 :—

This cow is from the third generation of cows and has yielded 5163 lbs. in the fourth lactation as the highest. There were 4 progenies born to this cow, of which one was a heifer and three were bull calves. All the bull calves have been disposed of and the only heifer calf has not yet calved.

(4) Cow No. 598 :—

This cow is from the third generation of cows and has yielded 6254 lbs. in the fourth lactation as the highest. There were five progenies for this cow, of which one is a heifer and four are bull calves. The only heifer calf has become adult now, but not yet calved. Out of the four bull calves, two have been auctioned and the other two are remaining at the farm as young ones having been born in 1953 and 1954. This cow's performance is the best of all the Kangayam cows in the herd so far. It was born on 27-5-42 to sire No. 307 and Dam 433 and the dam's highest milk yield was 2705 lbs. Cow No. 598 has completed 5 lactations with the following milk yield.

1st lactation	..	..	4092 lbs.
2nd lactation	..	..	5072 lbs.
3rd lactation	..	..	2956 lbs.
4th lactation	..	..	6254 lbs.
5th lactation	..	..	4132 lbs.

The following Table gives particulars of the 14 Kangayam cows whose highest milk yield was over 4000 lbs.

TABLE 47

Serial number	Cow number		Highest milk yield of the cow	Number of the lactation in which highest milk is recorded	Number of calves born	Sire number	Dam number	Dam's highest milk yield
Foundation Stock								
1	37	...	4,104.5	3	10	...	...	...
2	67	...	4,422.5	6	8	...	...	...
3	34	...	4,206.0	10	11	...	...	...
First Generation								
4	209	...	4,779.0	1	6	39	67	4,422.5
5	160	...	4,139.0	3	4	33	13	2,126.0
6	206	...	4,188.5	4	7	90	38	2,917.4
7	9	...	4,075.5	6	10	Gangan	Ramba	1,649.0
8	163	...	5,470.9	1	6	39	61	2,346.0
9	164	...	4,135.0	7	13	39	67	4,422.5
Second Generation								
10	536	...	4,439.0	2	6	307	209	4,779.0
11	720	...	4,163.0	3	6	269	206	4,188.0
12	398	...	5,074.0	4	9	119	191	3,005.0
Third Generation								
13	598	...	6,254.0	4	5	307	433	2,705.5
14	593	...	5,163.0	4	4	306	398	5,074.0

**Cows which had ten or more lactations at the farm :**

There are 25 Kangayam cows whose records reveal 10 or more lactations during their lifetime at the farm. Of these 6 cows are from the foundation stock, 7 from the first generation, 9 from the second generation and 3 from the third generation.

A tabulated statement giving the details of the total milk produced, number of lactations and the number of calvings is given below :

TABLE 48

Serial number	Cow Number		Period of stay at the Farm	Total number of lactations	Total milk produced in lbs.	Total number of calves produced		
						Female	Male	Total
(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)
Foundation Stock								
1	14	...	1925-37	11	25,836.9	3	8	11
2	34	...	1925-38	11	32,189.4	7	4	11
3	38	...	1925-39	11	23,713.7	7	4	11
4	119	...	1930-46	11	26,046.9	4	7	11
5	17	...	1925-38	10	28,860.2	7	3	10
6	28	...	1925-37	10	11,720.4	5	5	10
First Generation								
7	164	...	1931-49	13	39,638.0	8	5	13
8	294	...	1934-52	12	13,445.6	7	5	12
9	283	...	1934-52	12	21,408.3	6	6	12
10	131	...	1929-45	12	16,089.2	5	6	11
11	245	...	1933-52	11	11,059.8	4	7	11
12	144	...	1929-45	10	14,132.4	4	6	10
13	406	...	1938-54	10	23,198.6	4	6	10
Second Generation								
14	343	...	1936-54	13	21,341.8	5	8	13
15	168	...	1931-52	13	23,826.0	6	6	12
16	331	...	1936-53	13	16,673.3	6	7	13
17	281	...	1933-50	12	9,189.5	7	5	12
18	211	...	1932-50	12	18,697.5	7	5	12
19	313	...	1935-50	11	14,010.5	7	4	11
20	281	...	1934-49	11	17,269.8	5	6	11
21	282	...	1931-48	12	21,808.5	6	6	12
22	365	...	1936-53	11	14,908.5	8	3	11
Third Generation								
23	329	...	1936-54	13	21,081.8	8	5	13
24	377	...	1936-53	11	15,734.1	4	7	11
25	280	...	1934-52	10	11,796.3	5	5	10

From the above table, it is seen that the maximum of 13 calvings have been recorded among Kangayam cows at Livestock Research Station, Hosur.

#### Average number of calvings:

In order to find out the average number of calvings among the Kangayam cows, the pedigree history sheets of 262 Kangayam cows, which had the normal period of stay at the farm, were studied and the average number of calvings for a Kangayam cow has been 6.4

#### Productive life of Kangayam cows:

The study of the average productive life of Kangayam cows at the Livestock Research Station, Hosur, has been undertaken with 1386 lactation records on 523 Kangayam cows from first six generations.

A statement showing the details as per the generations is given below :

TABLE 48

Serial number	Number of generations	Number of animals	Average age at first calving (days)	Average calving interval (days)	Average age at calvings (days)	Average productive life (Lactation)
1	First generation	98	1,254.1	455.3	2,048.1	2.7
2	Second generation	138	1,268.2	480.9	2,053.2	2.6
3	Third generation	155	1,431.8	480.0	2,038.1	2.3
4	Fourth generation	99	1,501.0	486.2	1,925.0	1.9
5	Fifth generation	29	1,465.1	463.9	1,657.0	1.4
6	Sixth generation	4	1,427.5	491.0	1,738.6	1.6

The weighted average of 523 animals gives the productive life of Kangayam cows at Livestock Research Station, Hosur as 2.3 lactations.

## *13 Sire index and progeny testing*

The foundation stock and the subsequent four generations consist of 36 bulls of which records are available for 15 bulls for the dam-daughter comparative study. The milk yields of dams and daughters are adjusted to 270 days, the average lactation period for this breed at the farm.

### **Foundation Stock:**

#### **(1) Sire No. 33 :—**

This bull was born in 1922 and purchased from the Pattagar of Palayakottai in February 1928 for stud purposes, as one of the foundation stock of bulls to be used at this farm. This animal was at stud for 5 years and had produced 32 heifer calves of which records of 12 are available for comparison.

The average adjusted milk yield of the first lactation of daughters is 1535.3 lbs., whereas the average adjusted milk yield of the corresponding dams is 1557.1 lbs. The sire index of this bull is  $1513.5 \pm 174.9$  lbs.

#### **(2) Sire No. 35 :—**

This bull was born in 1924 and purchased from the Pattagar of Palayakottai in February 1928 for stud at the farm. This bull remained at stud for 9 years, having produced 81 heifer calves of which 33 records are now available for the comparative study.

The average adjusted milk yield of the daughters is 1480.2 lbs. and that of the dams is 1587.2 lbs. The sire index of this bull is  $1373.4 \pm 134.5$  lbs.

#### **(3) Sire No. 47 :—**

This bull was received from the Coimbatore dairy in 1926 and remained at stud only for 2 years. During that time there were 21 heifer calves born to this bull of which records of 11 daughters are available for study. The average adjusted milk yield of the daughters is 1514.2 lbs. and that of the dams is 1719.3 lbs. The sire index of this bull is  $1309.1 \pm 285.5$  lbs.



(4) *Sire No. 50* :—

This is the first foundation bull to arrive at the farm on 30-9-24 from the Coimbatore dairy, when the farm was started in 1924-25. This remained at stud for 3 years and produced 21 heifer calves of which 12 daughters' records are available for comparison. The average adjusted milk yield of the daughters is 1723.8 lbs. and that of the dams is 1648.4 lbs. The sire index of this bull is  $1799.2 \pm 188.4$  lbs. The increase of milk yield observed in the daughters over the dams is not significant.

(5) *Sire No. 90* :—

This bull was born in 1926 and purchased from the Pattagar of Palayakottai on 5th December 1930 and used for stud purposes for 9 years at the farm. It was widely used and 83 heifer calves were born to this bull of which the records of 34 daughters are considered for comparative study.

The average adjusted milk yield of the daughters of this bull is 1561.1 lbs. and that of the dams is 1691.4 lbs. The sire index of this bull is  $1430.8 \pm 113.9$  lbs.

(6) *Sire No. 231* :—

This bull was born in 1931 and purchased from the Pattagar of Palayakottai on 19th December 1935. This was at stud for 7 years and produced 64 heifer calves of which records of 28 daughters are available for the study. The average adjusted milk yield of the daughters of this bull is 1206.6 lbs. and that of the dams is 1366.4 lbs. The Sire Index of this bull is  $1046.8 \pm 155.5$  lbs.

(7) *Sire No. 306* :—

This bull was born in 1934 and purchased from the Pattagar of Palayakottai on 28th March 1938. This remained at stud for 8 years and produced 81 heifer calves of which records of 46 daughters are available for comparison.

The average adjusted milk yield of the daughters is 1208.3 lbs. and that of the dams is 1604.9 lbs. The sire index of this bull is  $811.7 \pm 174.1$  lbs.

(8) *Sire No. 307* :—

This bull was born in 1934 and purchased from the Pattagar of Palayakottai on 29th March 1938. This bull remained at stud for 7 years and has produced 121 heifer calves of which 59 records are now available for the comparative study. This bull was also used very widely at the farm.

The average adjusted milk yield of the daughters is 1359.8 lbs. and that of the dams is 1548.8 lbs. The sire index of this bull is  $1170.8 \pm 123.5$  lbs.

(9) *Sire No. 554* :—

This bull was born on 10th January 1941 and purchased from the Pattagar of Palayakottai on 9th August 1944. This was used at stud at the farm for 9 years and had produced 114 heifer calves, of which 23 records are now available for comparison.

The average milk yield adjusted for the daughters is 1272.9 lbs. and for the dams 1497.3 lbs. The sire index of this bull is  $1408.5 \pm 163.8$  lbs.

**First generation of farm bred bulls**

(1) *Sire No. 85* :—

This bull is from the first generation of farm bred bulls and remained at stud for 7 years. This has produced 61 heifer calves of which 26 records are available for the comparison. The average adjusted milk yield of the daughters is 1594.2 lbs. and that of the dams is 1392.8 lbs. The sire index of this bull is  $1795.6 \pm 134.7$  lbs.

By Progeny Testing the increase of the daughters, average milk yield over the corresponding dams is significant. This bull is good as far as milch qualities are concerned. The dam's highest milk yield of this bull is 3714.5 lbs.

(2) *Sire No. 104* :—

This bull is also from the first generation of farm bred bulls and remained at stud for 6 years. Out of the 36 heifer calves born to this bull, records of 14 daughters are available for comparison.

The adjusted average milk yield of the daughters is 1545.2 lbs. and that of the dams is 1606.9 lbs. The sire index of this bull is  $1483.4 \pm 119.2$  lbs.

(3) *Sire No. 269* :—

This bull is also from the first generation of farm bred bulls and was at stud for 10 years, with 74 heifer calves born at the farm. For the comparative study, 29 records are available.

The average adjusted milk yield of the daughters is 1267.6 lbs. and that of the corresponding dams is 1532.2 lbs. The sire index of this bull is  $1003.0 \pm 127.8$  lbs.

(4) *Sire No. 531* :—

This bull is also from the first generation of farm bred bulls and was at stud for 7 years, during which period 61 heifer calves were born. There are now 12 records of the daughters available for the comparison. The average adjusted milk yield of the daughters is 1681.1 lbs. and that of the dams is 1443.0 lbs. The sire index of this bull is  $1919.2 \pm 309.0$  lbs.

The test of significance revealed that the increase in milk yield of the daughters was not significant.

**Second generation of farm bred bulls:***Sire No. 391* :—

This bull is from the second generation of farm bred bulls and remained at stud for 10 years ; 52 heifer calves were born to this bull of which 14 daughters' records are available for comparison.

The average adjusted milk yield of the daughters is 1450.2 lbs. and that of the dams is 1214.9 lbs. The sire index of this bull is  $1685.6 \pm 109.6$  lbs.

While applying the test of significance, it is seen that the daughters' increase over the dams is highly significant. Since the dams used for this bull were also of the average merit, the increase in the daughter's average could well be attributed to the bull. The bull's dam highest milk yield of this is 4135.0 lbs.

**Third generation of farm bred bulls:***Sire No. 506* :—

This bull is from the third generation of farm bred bulls and was at stud for five years, with 43 heifer calves, born to it, of which 13 daughters' records are available for the comparison. The average adjusted milk yield of the daughters is 1101.7 lbs. and that of the dams is 1347.2 lbs. The sire index of this bull is  $856.2 \pm 113.3$  lbs.

While considering the performance of all the fifteen bulls in general, of all the generations, only four bulls, *i.e.*, Nos. 50, 85, 531 and 391 show an increase in the average milk yield of daughters over their dams. Out of these four bulls, the increase is not significant in bulls Nos. 50 and 531. The remaining two bulls Nos. 85 and 391 are considered to be good bulls and it can be said that bull No. 391 is the best of the bulls used at the farm.

A statement showing the average milk yield of dam-daughters with their sire index is given below :—

TABLE 49

Serial number	Bull number	Number of Dam Daughter pairs	Average number of days in milk		Average milk yield in lbs.		Average milk yield adjusted to 270 days in lbs.		Sire Index
			Dams	Daughters	Dams	Daughters	Dams	Daughters	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1	33	12	220	255	1,272.8	1,486.6	1,557.1	1,535.3	1,513.5 ± 174.9
2	35	33	239	234	1,395.1	1,589.3	1,587.2	1,480.2	1,373.4 ± 134.5
3	47	11	263	216	1,623.4	1,335.9	1,719.3	1,514.2	1,309.1 ± 285.5
4	50	12	263	273	1,591.7	1,729.2	1,648.4	1,723.8	1,799.2 ± 188.4
5	90	34	262	289	1,429.9	1,688.5	1,691.4	1,561.1	1,430.8 ± 113.9
6	231	28	283	259	1,551.4	1,149.0	1,366.4	1,206.6	1,046.8 ± 155.5
7	306	46	288	271	1,777.7	1,212.4	1,604.9	1,208.3	811.7 ± 174.1
8	307	59	272	254	1,557.1	1,218.4	1,548.8	1,359.8	1,170.8 ± 123.5
9	554	23	279	230	1,562.3	1,063.8	1,497.3	1,272.9	1,408.5 ± 163.8
10	85	26	262	276	1,349.6	1,620.8	1,392.8	1,594.2	1,795.6 ± 134.7
11	104	14	310	249	2,293.5	1,543.3	1,606.9	1,545.2	1,483.4 ± 119.2
12	269	29	298	261	1,617.4	1,243.2	1,532.2	1,267.6	1,003.0 ± 127.8
13	531	12	253	217	1,343.0	1,153.9	1,443.0	1,681.1	1,919.2 ± 309.0
14	391	14	293	224	1,362.0	1,213.3	1,214.9	1,450.2	1,685.6 ± 109.6
15	506	13	265	172	1,322.4	755.7	1,347.2	1,101.7	856.2 ± 113.3

## 14 Production of bulls at Hosur

It has already been said that the object of maintaining Kangayam breed of cattle is to produce bulls for distribution in the rural parts in order to grade up the village cattle which are mostly of non-descript origin. Bulls of age  $2\frac{1}{2}$  years and above are distributed under various Government schemes to recognised cattle breeders in the rural areas.

The following Table gives the number of bulls issued among Kangayam breed at the Livestock Research Station, Hosur since 1925-26.

Year	Number of bulls at stud in the farm	Number of bulls issued for breeding purposes
(1)	(2)	(3)
1925-26	2	...
1926-27	1	4
1927-28	6	3
1928-29	3	12
1929-30	4	3
1930-31	5	9
1931-32	4	5
1933-34	5	21
1934-35	5	18
1935-36	6	29
1936-37	4	23
1937-38	6	30
1938-39	7	16
1939-40	4	25
1940-41	4	42
1941-42	5	53
1942-43	4	33
1943-44	4	17
1944-45	4	25
1945-46	4	13
1946-47	9	29
1947-48	9	24
1948-49	9	17
1949-50	7	36
1950-51	8	9
1951-52	6	10
1952-53	13	7
1953-54	14	15
1954-55	5	42

From the above Table, it is seen that during the period from 1925-26 to 1954-55, 580 Kangayam bulls were issued from this Station for breeding purposes. The maximum number of 369 bulls were issued during the latter half, *i.e.*, from 1938-39 to 1954-55 and the average number during this period is 23.1 bulls each year, as compared with 14.1 in the previous half,



## PART I

The Kangayam breed of cattle owes its origin to the untiring and pioneering efforts of late "Uthamakaminda Sri Rai Bahadur Nallathambi Sarkarai Manradiar" Pattagar of Palayakottai. This breed is generally seen in the Southern and South Eastern taluks of Coimbatore District and is concentrated more in Dharapuram Taluk where the cattle farm is situated. The breed in its purest form and in large numbers is found only with the Pattagar of Palayakottai and at the Livestock Research Station, Hosur. This is a purely draught breed, very much suited for the agricultural operations prevailing at Coimbatore District. Since the Kangayam herd at the Government Livestock Farm, Hosur, showed a tendency for increased milk production, a scheme known as "Kangayam Cattle Improvement Scheme" was instituted at the Palayakottai Cattle Farm, with a view to improve the milch qualities of this breed, without impairing the draught qualities of this breed by the Indian Council of Agricultural Research in July 1942 and is being continued now.

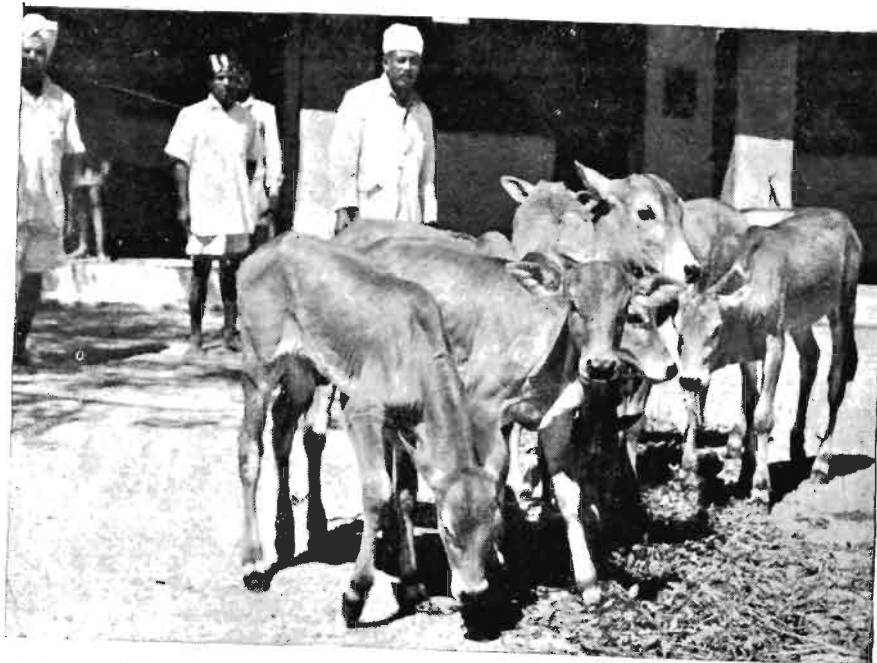
This breed of cattle is also maintained at the Government Livestock Farm at Hosur since the inception of the Farm in 1924-25. Pedigree records of this breed have been maintained since then, at this farm, while at the Palayakottai Farm records are maintained both for the scheme and non-scheme animals only from the year 1942, when the scheme commenced functioning at this farm. Prior to this scheme no pedigree records were maintained by the Pattagar. The present study of Kangayam breed is based on pedigree records of 30 years available at the Livestock Research Station, Hosur, and the records of 13 years available at the Palayakottai Farm both under the scheme and non-scheme.

The Palayakottai Cattle Farm is situated at an altitude of 600 ft. above sea level in Pudur village of Dharapuram Taluk of Coimbatore District and owned by the Pattagar of Palayakottai, who has set apart about 5000 acres of his land for pasture and 2000 acres for the cultivation of fodder crops. This area receives an average rainfall of 20 inches annually and the failure of monsoon rains with frequent famine conditions is a common feature in this area.

At the Palayakottai Cattle Farm, the cattle are maintained under semi-ranch conditions. The grazing area is divided into many paddocks by live fencing and the animals are divided into different age groups and left in different paddocks. The most predominant grass seen on pasture is "Kolukattai" grass. A system of rotational and priority grazing is being adopted at this farm. During grazing season, concentrates are not fed to any animal except breeding bulls, but during the off-season, when the grazing is scarce, some animals are fed with concentrates. The young stock, adult animals, animals in milk and intended for sale and breeding bulls are given special attention while feeding. Since the animals at this farm are thriving under ranch or semi-ranch conditions the environmental factors such as the soil, rainfall, and the quality of the flora deserve consideration. The climatic conditions in this area can be said as generally hot and the rainfall is low with varying distribution. The soil of the Kangayam tract is particularly suited for cattle rearing. The soil though red loam in type has a sub-soil rich in "Canker gravel," containing calcium and phosphorous compound which adds to the fertility of the soil, thereby promoting a better growth of grass in this area with a high nutritive value. In the pasture area "White Babul trees" are found in the intermittent spaces and the pods of these trees are extensively used as cattle feed. The babul pods are very rich in protein. Thus in general it can be said that the flora of the pasture area contributes almost all the nutrients that are required for the cattle and the feeding of concentrates becomes necessary only when the pasture is scanty.

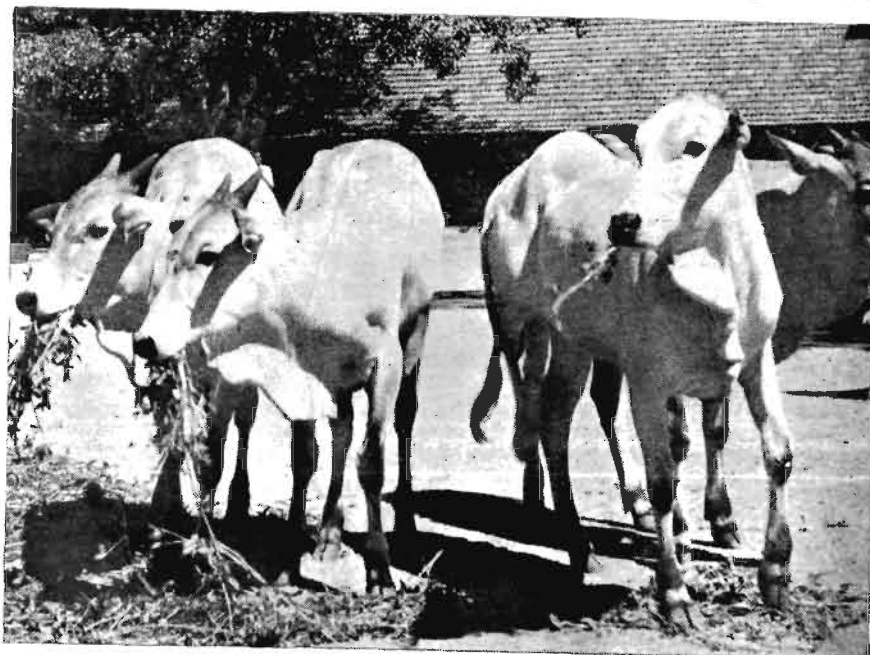
The Kangayam cattle is a purely draught breed, medium size, smart, active and brisk in appearance. This has a compact strong body. The colour of the bull is grey with dark grey to black markings on the head, neck, hump, shoulders and quarters. The colour of the cow is white or grey with black markings just in front of the fetlocks on all four legs and sometimes on the knees. The calves are generally red in colour at birth and change to white and grey at the age of three to four months. This breed is one of the recognised breeds in India and registered in the Central Herd Books maintained by the Indian Council of Agricultural Research, New Delhi.

After the advent of Kangayam Cattle Improvement scheme at the Palayakottai farm, the managerial practices have been changed with respect to breeding and feeding; as such controlled breeding and optimum plane of nutrition are maintained for the farm animals. The studies on the 1744 calvings

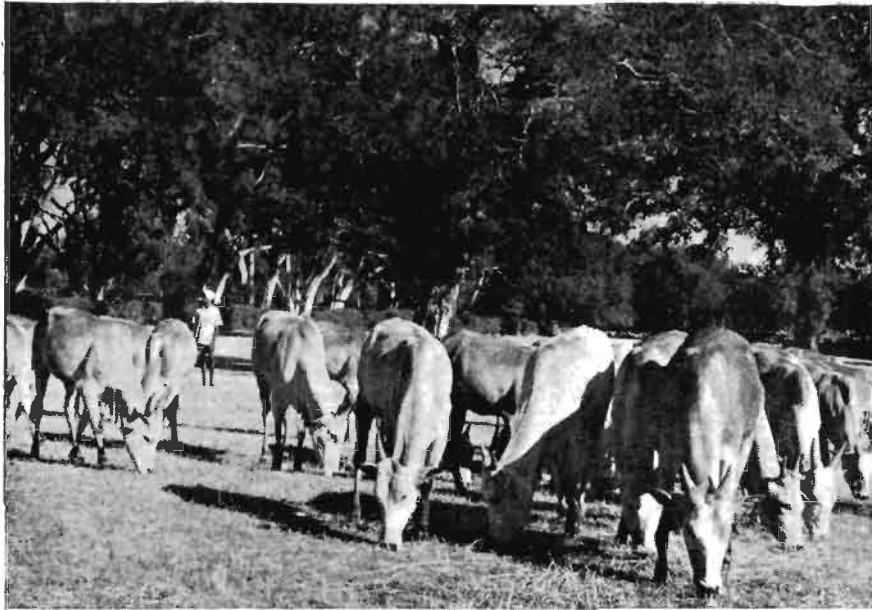


Kangayam Calves (Red colour) at Thirty

Kangayam Bull Calves 4 months (Note the change of colour)

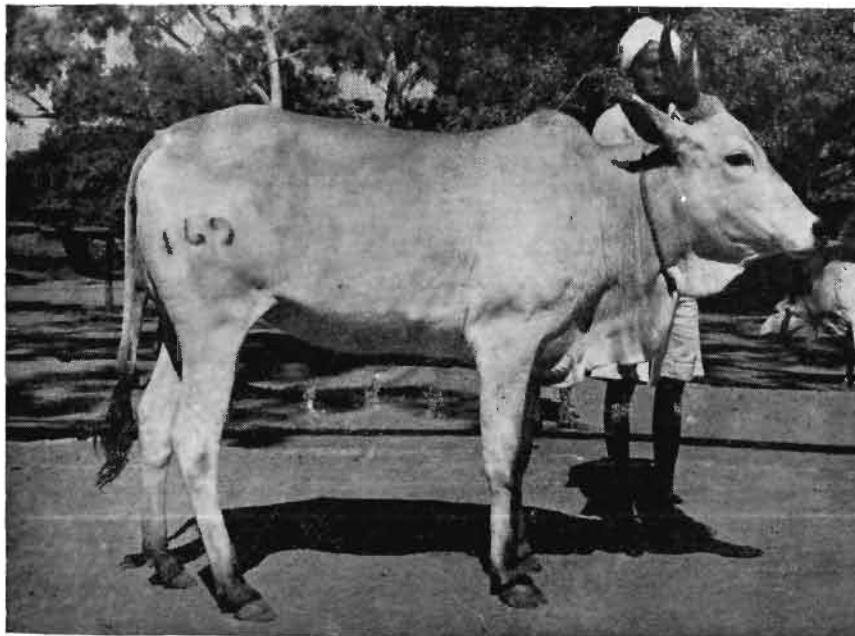




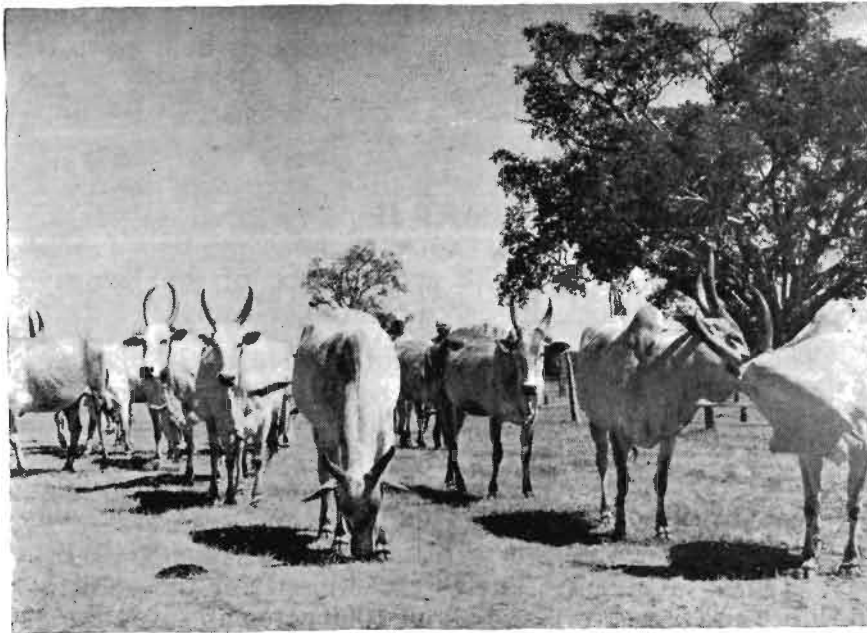


Kangayam Heifers—Grazing.

A Kangayam Heifer.



at this farm indicate that there is variation in the distribution of calvings during different months both under the scheme and non-scheme and is attributed to the tempering effect on the adversities of climate of supplemental feeding practice adopted for the scheme animals. The incidence of calvings of the scheme and non-scheme animals indicates, that there has been a steady increase in calvings in the scheme herd, as compared with the non-scheme herd, due to the rational feeding practices adopted in the scheme herd to overcome the draught conditions. The calving interval as observed in the findings between the scheme and non-scheme herd also shows that there is a progressive improvement in the scheme herd but the non-scheme herd shows greater fluctuations. Further the calving interval data of both the scheme and non-scheme herd do not suggest a possible genetical correlation descending from either the Sire's or the Dam's side. Though the climatic factors have influenced to some extent, yet the improvement can only be attributed to the managemental practices of the scheme herd.



Kangayam Cows—Grazing

As regards the maturity of heifers under the scheme and non-scheme herd, it is also observed that the scheme heifers have recorded a comparatively lower age at the time of first calving than the non-scheme heifers. The climatic factors

play a major part in influencing maturity, especially those animals under semi-ranch conditions. The age at first calving does not suggest any possible inheritance either from the dam or from the sire. Thus a heifer under optimum plane of nutrition is expected to show a greater rate of development.

While comparing the milk yield of the scheme and non-scheme cows in milk, it is seen that on an average 50.2% of cows remained in milk under the scheme with an average annual production of 2111.5 lbs. of milk, whereas in the non-scheme herd 34.6% of cows remained in milk with an average annual production of 1831.4 lbs. of milk. This is again attributed to the better managerial practices of the scheme herd. There is a large amount of variation in the milk yield performance of individual animals, giving a scope for further selection among the female stock to improve milch characters. The performance of the family of Manikederi in the scheme herd appears to be good. The sires used in the scheme herd do not appear to transmit milch characters and this is apparent in a breed of this type, which is purely a draught one.

At the Palayakottai Cattle Farm, during the period of 10 years from 1945-46 to 1954-55, 744 breeding bulls have been issued for breeding purposes.

## PART II

This part deals with the performance of the Kangayam breed at the Livestock Research Station, Hosur.

The Livestock Research Station at Hosur is maintained by the Madras State Government since 1924-25. Among the other descript breeds of cattle at this farm, Kangayam is one. This farm covers an area of 1646 acres and is situated at a height of 3000 ft. above sea-level. The total average rainfall recorded annually is 36.26 inches covering a period of 77.1 days. The soil condition varies from light loam to heavy clay. On an average 109 acres are utilised for the cultivation of fodder and food crops and about 1000 acres are used for pasture and grass annually. Various fodder crops such as, cholam, maize, teosinthe and other grasses are grown. The excess of grass and fodder is converted into silage and this is fed to animals in summer months, when there is scarcity of green fodder.

The cattle at this farm are fed on balanced rations as per the schedule and the calves are not weaned at birth, but allowed

to suckle the dams at the time of milking. Twice-a-day milking is practised at this farm. The chief object of maintaining Kangayam breed at this farm is to raise a pure bred herd of Kangayam and to produce good pedigree Kangayam bulls for distribution in the rural and urban parts. The foundation stock for the above purpose was purchased from the Pattagar of Palayakottai and there is a considerable improvement in the strength of the breeding stock from 1924-25 to 1954-55. During this period, 2442 calves were born at this farm with the sex ratio of 51.1 : 48.9 for male and female. The distribution of calvings in different seasons of the year does not differ significantly. The birth weight of 1397 calves has been studied. The average birth weight of a Kangayam calf is 44.9 lbs. and that of a bull and heifer calf is 46.3 lbs. and 43.5 lbs. respectively.

The disease position at this farm is well controlled and the average annual mortality is 4.6%.

The generation study of Kangayam breed includes seven generations of cows, with particulars of 591 cows whose 2244 records have been considered for this study. As regards the particulars of bulls used, there are 36 upto fourth generation when all the farm bred bulls have been eliminated and fresh stock purchased from the Pattagar of Palayakottai has been introduced.

The study of the age at first calving has been confined to 559 records of cows in different generations and in different periods. The average age at first calving is 1372 days, *i.e.*, 3 years, 9 months and 22 days. From the generations it is seen that the first generation heifers have matured earlier. The sires used at this farm do not seem to have any influence over the age at first calving.

The average calving interval based on the study of 1660 records, is 471 days *i.e.*, 1 year, 3 months and 16 days. The calving interval is the highest in the first lactation and subsequently a reduction has taken place the minimum being in the fourth and eighth lactations. There is no appreciable improvement in the calving from one generation to the succeeding generation and the minimum is in the first generation.

The milk yield of completed lactations in different years reveals a wide variation in the milk yield performance of cows and the number of cows is on the increase from year to year and on an average 74 cows remained in milk annually. The 2065 records of completed lactations for the thirteen lactations of the seven generations have been studied. The average milk yield of the completed lactation is 1605.9

lbs. There is an appreciable increase in milk yield from the first lactation to the sixth lactation which is the highest and then there is a decrease. Among the generations, the performance of the first generation cows is the highest. The average lactation period is 264 days with a daily average milk yield of 5.9 lbs. The maximum milk yield in a Kangayam cow has been recorded as 6254.0 lbs. and the maximum number of lactations is 13. The pedigree history sheets of 262 cows, which had the normal period of stay at this farm, show an average of 6.4 calvings for a Kangayam cow. The productive life of a Kangayam cow is 2.3 lactations.

The performance of the Kangayam bulls used for stud at this farm, in general, does not indicate much of the transmitting ability of milch characters. Bull No. 391 is considered to be the best of all the bulls used at this farm.

From this farm 580 Kangayam bulls have been distributed for breeding purposes since 1925-26 to 1954-55.

## *16 From the past Records*

### **THE PALAYAKOTTAI CATTLE FARM \***

'We mention the Pattagar of Palayakottai,' wrote the Linlithgow Commission, 'because his was almost the only herd which was brought to our notice as an outstanding example of careful cattle-breeding.' This careful breeding has resulted in the famous Kangayam cattle known all over Southern India. The breeder is Rai Bahadur Nallathambi Sarkarai Manradiar, popularly known as the Pattagar of Palayakottai. His farm is one of the biggest cattle-breeding stations in India and its activities have been publicly recognized for the last 40 years.

The Pattagar traces his ancestry to 1000 A.D. In recognition of the help given to the Pandya Kings by his forefathers, they were awarded the title of 'Uthama Kaminda' as well as powers to settle social and religious disputes in their community of Vellalas and their sub-castes. The Pattagar is the religious head of his community : the title is hereditary and passes on to the eldest son.

The present Pattagar's grandfather was the first to take an interest in cattle-breeding. His work was continued by his son, but he did not live long to enjoy the fruits of his labour. The present Pattagar, who was only seven when his father died, carried on the tradition, declining the advantages of an English education. So great was his concentration on cattle-breeding that he increased his herd from 100 to 2,000 head and established it as the Kangayam breed.

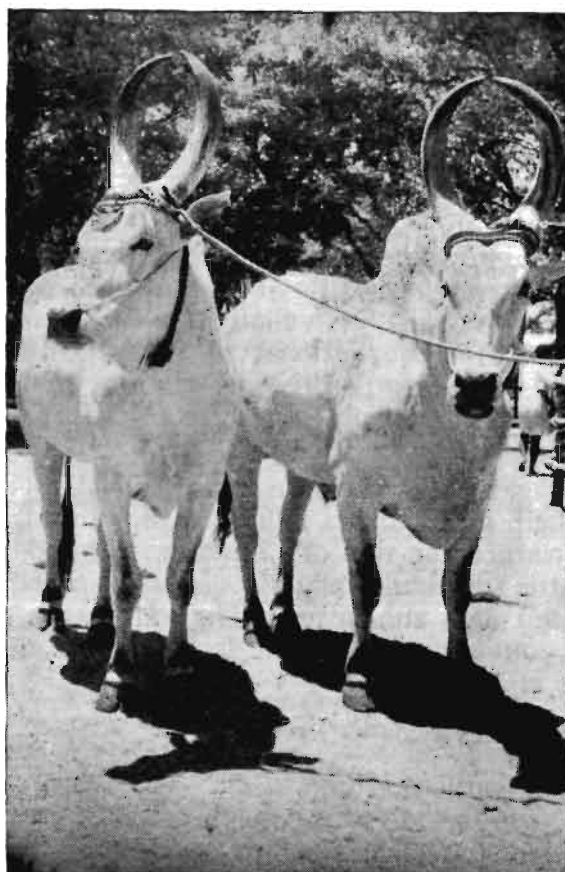
#### **Cattle-breeding country**

The farm is situated in Pudur village in the Dharapuram taluk of Coimbatore district. The area is well suited to cattle-breeding. The soil is red-loam, full of canker gravel known as 'odai jelly', and is supposed to be the best land for rearing cattle. Such soils are known to be cool and, though shallow,

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\*[Reprint from Indian Farming Volume IV No. 5, May 1943]. By Dr. D. Pattabiraman, G.M.V.C., Assoc. I.D.I. (Superintendent, Kangayam Cattle Improvement Scheme, Palayakottai, Coimbatore District).

are retentive of moisture sufficient for raising pasture. It is, however, a dry tract where the cultivator has to depend upon the monsoon. In some parts there are wells used for irrigating



Kangayam Bullocks

garden lands ; and to raise water from a depth of 30 to 60 ft. the farmers require strong and efficient bullocks. Moreover, on the break of the monsoon, large areas of land have to be prepared and sown before the soil dries up and for this quick work efficient bullocks are very necessary.

**Bullock power indispensable:**

Where small holdings are the rule and the use of machinery for agricultural operations uneconomic, bullock power is indispensable. Realizing this, the Pattagar took pains to develop his herd on a large scale and in a systematic and scientific manner.

The Pattagar is the largest landowner in the Coimbatore district, holding about 15,000 acres of which 5,000 acres are set apart for grazing the herd. To improve his land numerous wells were sunk at an enormous cost as the sub-soil is rocky. Thus large areas were brought under cultivation. The crops grown are paddy, cotton, ragi (*Eleusine Coracana*), Cholan (*Sorghum vulgare*), chillies and sugarcane, chiefly irrigated by well water. During the monsoon Nadam Cumbu (*Pennisetum Typhoideum*) and Cholan are grown. The rest of the estate is leased to tenants on condition that a member of the family works on the Pattagar's farm for Rs. 100 per year and the midday meal. The estate is divided into a number of fields which are thickly fenced with *Mullukiluvai*, a thorny shrub (*Balsamodendrum Berryi*) which is highly drought-resistant. This fencing is unique and is rarely seen outside the Coimbatore district. Each tenant is instructed to confine his animals within his own land, and at night they are kept in the fields for manure.

#### Grasses grown:

Though the rainfall may not be sufficient to grow a cereal crop, it is generally sufficient to raise a crop of grass. The chief grass is Kolukkattai. It is a thick, succulent grass which maintains its vitality during severe drought. It seeds freely and sheds seeds easily. Hence a few showers will make the pasture very green. Other varieties of grass found in the pasture are given below :

Local Name	Botanical Name
Kolukkattai	<i>Cenchrus ciliaris</i>
Vennampul .. ..	<i>Trachys muricata</i>
Ottanpul .. ..	<i>Setaria verticulata</i>
Kurutupul .. ..	<i>Chloris barbata</i>
Cholapul .. ..	<i>Chrysopogon montanus</i>
Naripayathankodi .. ..	<i>Phaseolus trilobus</i>
Seppunerinji .. ..	<i>Indigofera enneaphylla</i>
Savarikodi .. ..	<i>Merremia tridentata</i>
Poonapudukukodi .. ..	<i>Crotalaria globosa</i>
Dadara .. ..	<i>Borreria hispida</i>
Bariali .. ..	<i>Cynodon dactylon</i>



On the outbreak of the monsoon the cattle are sorted out according to age in three classes : below one year, one to two years, and two to three years. They are also segregated according to sex and put into the grazing areas in batches of 20 to 50 according to the availability and extent of pasturage. Bulls ready for sale are given preferential treatment ; so also weak animals that do not thrive in a large herd are put in smaller batches of 10 to 15. The grazing areas are provided with wells which are sloped in such a way that the cattle can get into them and drink water freely.

#### Uses of the Babul tree

An interesting feature of the grazing areas is the wide prevalence of white *Babul* trees (*Acacia Alba*). They provide shade for the animals at mid-day, and during the podding season supply pods for the cattle to eat. During the season the pods are collected and stored and used with concentrates much in the manner of sugar with coffee. The Pattagar believes that the feeding of the pods improves the coat and the milk yield of the animals. On analysis, it was found that they have good feeding value. The results of the analysis are interesting :

				(Per cent)
Moisture	..	..	..	7.33
Ash	..	..	..	6.84
Crude protein		..	..	14.86
Ether extract	..	..	..	1.67
Crude fibre	..	..	..	11.50
Carbohydrates		..	..	57.80
				<hr/> 100.00
Lime	..	..	..	1.61
Phosphates	..	..	..	0.44
Insolubles	..	..	..	0.23

Two varieties are found, one with purplish spikes and the other with whitish spikes ; the purplish variety is found to be more nutritious on analysis. It is known in North India as *Anjan*. The pods can be powdered and fed along with concentrates in quantities of 1 to 2 lbs. per animal.

The white Babul tree has numerous uses for the farmer. It can be made to grow easily in waste lands, catchment areas, lake and field bunds and in grazing areas. It grows wild and no care is necessary. It is highly drought-resistant. The trunk provides timber for building, furniture, agricultural implements and bullock-carts. Thorny twigs are useful for fencing the fields and small branches are used as pegs to tie up animals. The trunk is soaked in water for three months before being sawn into planks, and the longer it is under water the more durable it becomes. If the tree is not suitable for timber it can be used for firewood. The white Babul tree grows easily on a soil with plenty of calcium in it. The value of a tree after 10 or 15 years is Rs. 10 to 15 and the farmer gets this for nothing.

#### **Cattle left in the open**

Manure is not collected in the grazing area and the land is ploughed once in four or five years and brought under cultivation and the grazing area is changed. By leaving the cattle out day and night for months in the grazing area they become hardy and can endure all kinds of weather. Within the Pattagar's experience there has not been a single case of snake-bite or other accident.

The Pattagar breeds horses and sheep as well on a small scale. He had a large number of horses, but with the increasing popularity of motor transport he had to reduce his stock. At present he has only 30 mares but proposes to develop this side of his activities. He has 2,000 head of sheep of the hairy mutton variety kept mainly for manuring his garden land. He recently started to breed woolly sheep and has a foundation stock of 30 woolly ewes of the Coimbatore variety and one Bikanere ram given by the Livestock Department. There is also a small herd of Amrit Mahal cattle bred separately besides the Kangayam.

#### **The Kangayam breed**

It is with the Kangayam breed, however, that the Pattagar made his reputation. The breed derives its name from the Kangayam division of the Dharapuram taluk where this type of cattle has been in existence. In its purest form the breed can be seen on the estate of the Pattagar and at the Government Cattle Farm, Hosur. The Kangayam is a medium-sized animal although large specimens are sometimes seen.

## Measurements in inches of Kangayam Animals at the Palayakottai Farm

Particulars of measurements	Bulls			Cows		
	Maximum	Minimum	Average	Maximum	Minimum	Average
Height behind hump ... ..	54	51	52	48	45	46½
Length from point of shoulder to pinbone ... ..	63	55½	60	56	50	53
Length from angle of hip to pin-bone.	21	18	19½	18	16	17
Height at angle of hip ... ..	54	50½	52½	50½	46½	49
Width between angles of hips ...	20	17	19	18	16	17
Height at pinbone ... ..	49½	44	47½	46	41½	44
Length of tail ... ..	53	46	48	48½	37	43
Length of tail from end of switch to ground ... ..	8½	2	5	12	½	7
Girth ... ..	76	69	74	67	58½	12½
Height at point of elbow ... ..	30½	27	29½	29	27	28
Circumference of bone below knee ...	8	7	7½	6½	6	6
Length of face from occipital crest to upper edge of muzzle ... ..	20	18	19	18	17	17½
Width of face above eyes ... ..	9½	9	9	8	7½	7½
Length of lower surface of ear ... ..	8½	7½	8	8	7½	7½
Width of ear ... ..	6	5	5½	6	5½	5½
Slope of rump ... ..	6½	3	5	6½	3½	5
Length of horns ... ..	18	13	15½	21	8½	17½
Thickness of horn at base ... ..	14	10	12	10½	8½	9
Length of tail upto the switch end ...	34	29	32½	31	26	29
Weight of an animal (calculated) —Lbs.	1,213	874	964	838	570	723

It is purely a draught type and is smart, active and brisk in appearance. It is the best draught breed in South India. It is a hardy animal, an excellent breeder and thrives on scanty rations. It has a good constitution and a fiery temper.

The Pattagar has 300 cows, all selected from good lines. They are never sold outside the estate. The cows are said to calve every year, and if there is any irregular breeder, she is sold to a tenant who uses her for work. The calvings average

12 and the maximum is 17, but there are no authentic records to prove the statement. The colour of the cow is grey or white with black markings just above the fetlocks, on the forelegs and in front of the forelegs. Some cows have dark grey markings on the body and the face which are not desirable but do not constitute a disqualification. Mature cows weigh from 700 to 800 lb. Kangayam cows are poor milkers ; but good milkers are also to be found, giving 18 to 20 lb. at their peak. No milk recording is done for the Pattagar's herd ; but a scheme financed by the Imperial Council of Agricultural Research is in operation with a view to improving the milking qualities of the Kangayam breed without impairing the draught qualities of the male. Cows are tied in open yards and milked both morning and evening. Calves are allowed to suckle their dams for two months, and as the calf advances in age milk is drawn from the cow. If the cow is a poor milker all the milk is left for the calf. Concentrates are fed twice a day only when there is scarcity of grazing. The cow is taken to the bull when it comes into heat for the first time after calving, which is generally between 90 to 100 days. The price of a cow is from Rs. 250 to 500.



Kangayam calves.

The Pattagar does not sell milk to the public. The daily output is 300 to 400 lbs. of milk most of which is used in the household and some converted into ghee.

**Treatment of calves:**

Kangayam calves are generally red in colour at birth, with black markings over the coronet and fetlocks on all the four legs and sometimes on the knees. Inside the thighs and forelegs the colour is white. The red colour gradually changes into grey in three or four months. At birth male calves weigh 48 lbs. and female calves 46 lbs. on the average. No treatment is given to the umbilical cord of the calf and so far no cases of navel sepsis have occurred. For the first six to eight weeks the calf is allowed as much milk as it wants and is kept tied and muzzled. After that green grass is put before it, and when it has learned to eat, it is turned out to pasture along with other calves. The milk given to the calf is gradually reduced until it is weaned. In the case of promising calves and also when the calf does not get sufficient milk from its dam, milk drawn from other cows is fed to the calves by hand or it is allowed to suckle other cows. Calves do not get any concentrates until they are weaned. A male calf is worth Rs. 70 to 100 immediately after weaning.

The Pattagar keeps the herd pure by careful selection of sires from his own herd. He maintains four or five lines. Bulls fit to be issued for breeding are turned out in good pastures. Formerly only bullocks were sold. Now owing to the increased attention paid by the Government in grading up village cattle there is a good demand for bulls. The Pattagar issues nearly 100 breeding bulls every year to the Coimbatore District Board and the Provincial Government for grading up village cattle.

The bull is grey in colour, with dark grey to black markings on the legs, head, hump, shoulders and quarters. After castration the black markings gradually disappear in three or four months and change uniformly into grey. The weight of a mature bull is 1,000 to 1,200 lb. Bulls are ready for issue at three years and are at stud for four or five years afterwards. They are then castrated. The average price of a bull is from Rs. 250 to 500.

The heifers are mated only at three years of age. The Pattagar allows a bull to a batch of 30 heifers in the grazing area for three months : within that time it is presumed that all the heifers have been covered. The heifers are not sold, but the cost of a good heifer is from Rs. 200 to 400.

**Virtue of the bullock :**

Bulls that are not fit to be issued for breeding are castrated when they cut the first pair of incisors. At four teeth they are

trained for ploughing and at six teeth for *Mhote* work. The castration is generally done at the beginning of November every year, for the season is cold and plenty of grazing is available. In the past castration was by the country method-mulling—which is a painful operation. This has been replaced by the Burdizzo method and is carried out by the staff of the Veterinary Department. Soon after castration, the ears of the animals are trimmed by the Pattagar himself or by his trained assistants. His view is that short, trimmed ears give an alert appearance to the animals. The Pattagar maintains about 120 pairs of animals for operations on his farm such as ploughing, *Mhote* and cart work. About 100 pairs of work cattle are sold every year. The bullocks are grey in colour ; they are hardy and compact ; with thick neck, short and strong limbs and well-sprung barrel. They have a working life of 15 years. The bullocks are in demand in the south for black-cotton soil cultivation and for *Mhote* and road work. The Kangayam bullocks are sold at a premium, for they are good workers and thrive on scanty rations. They last 9 to 10 years at the *Mhote*, whereas other breeds do not last for more than six or seven years. The weight of a bullock is from 1,000 to 1,400 lb. and the price of a pair of bullocks ranges from Rs. 300 to 1,000.

The Pattagar raises fodder crops adarcholam, *i.e.*, close or crowded, as they are sown thickly so as to yield heavily and secure thin stalks. The fodder crops are raised in garden lands irrigated by wells. After harvest the straw of paddy, *cumbu*, *cholam*, *Ragi*, etc., is stored for feeding the animals. No silage is prepared, but it will be from this year. A beginning has been made with the cultivation of lucerne, guinea grass and maize. There have been frequent fodder famines in the area in which the Pattagar's farm is situated and large quantities of fodder have had to be imported from adjoining districts such as Salem and Tanjore and cattle have had to be sent for grazing to distant forests. Periodical famines have caused fluctuations in the size of his herds.

#### **Concentrates used :**

During the grazing season concentrates are not fed to any of the animals except the breeding bulls. During the summer months, when there is practically no grazing, concentrates are fed to cows in milk, bulls intended for sale and bullocks twice a day. The concentrates used are groundnut cake, rice bran, cotton seed, residue of grain crops such as *cholam*, *ragi* and *cumbu* soaked in water and white Babul pods. They are crushed and fed with plenty of water in tubs. The tubs are

made of stone and can hold feed for 60 animals at a time. There is one attendant in charge of two animals : he supervises them and sees to it that each gets its due share.

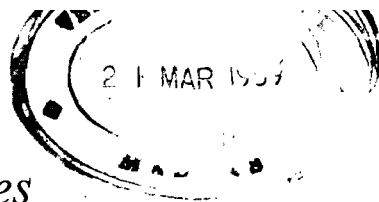
Blackgram, horsegram and fenugreek are soaked and ground into a paste and mixed with concentrates and fed to the animals intended for sale. Gingelly seed mixed with powdered jaggery is also given, a handful to each animal. This special feed is said to improve the coat.

### **Cups and Medals**

As the animals are accustomed to semi-ranch conditions until three years of age, great skill and patience are required in training them. First of all they have to be roped and nose-strung. There is a special enclosure of masonry walls, 10 ft. high, into which the animals are turned and then roped by an experienced attendant. They are then *nose-strung* and tied to a peg with a leading rope for a few minutes to start with as otherwise accidents are likely to happen since the animals resent tying up very much. Strong ropes are used and the pegs are firmly driven into the ground. In the course of a week the animals get accustomed to being tied up.

The Pattagar personally supervises the preparation of animals for cattle fairs. It is heartening to see all his animals tied up evenly in an open yard in straight lines in batches of 30, each 20 ft. apart and in rows of five to ten. The animals are washed daily, groomed and fed well. Even forced feeding is done to bring them into extra condition. There is a ready market for the animals at the Kannapuram and Tiruppur cattle fairs held in April and June, respectively. The preparation of the animals starts about two months in advance and by the time they are taken to the fairs the animals attain show condition. The Pattagar's cattle exhibited at shows and fairs have earned high praise year after year. Invariably he wins gold medals and breed championship cups.





## 17 Testimonies

*Extracts from the visitors' book at the Palayakottai Farm*

14th December, 1913.

Mr. Hemingway and the Hon'ble Mr. Carr and I have been very kindly shown round by the Pattagar. It is the best breeding establishment I have seen in India. His division of his stock by sexes, ages, both for grazing and in stall is of the greatest importance in successful cattle breeding. I hope he will be careful to keep his strain of Kangayam absolutely pure.

D. T. CHADWICK  
*Director of Agriculture*

24th October, 1916.

I wish to thank the Pattagar for his hospitable welcome and for the pleasure of seeing his fine cattle. He is doing splendid work for the farm stock of the Presidency and in this he has my cordial good wishes. His example may, I trust, be followed by others.

PENTLAND  
*Governor of Madras.*

27th November, 1919.

It is extremely agreeable to me to mention here the beautiful impression made on me by this visit to the establishment of the cattle farm of the Pattagar of Palayakottai, noble cavalier of advanced spirit, from which progress of Indian Cattle, especially cattle breeding in the Madras Presidency, should much expect.

Rearing and selecting the bovine race "Kangayam," one of the best known of the continent by beauty of form and qualities which are appreciable in work—this by itself constitutes a title of glory which most distinguished farmers of Nations where pure breed is appreciated would be proud.

If I could draw up in due form, a wish of mine would be that the well-known chief of Palayakottai should go on without disheartening in his role and that his magnificent example may benefit the progress of *agropastoral* of this admirable country.

ANTONINO NEVES  
(Translated from French) of Rio De Zenero, Brazil,  
*South America.*



2nd October, 1920.

I have much pleasure in recording this visit of mine to the Cattle Breeding Station of the famous Kangayam Cattle. It has been a great pleasure to me to see these cattle and the strain of horses that the Pattagar is breeding with so much success. And I am sure that the fact of the Pattagar breeding such strain on the right lines will have an incalculable effect on the agriculture and in particular on stock breeding in the Presidency.

And I am sure that the Pattagar is deserving of the success he has attained by the way in which he has worked and studied for the advancement of his cattle and horses.

Captain MARSHAL  
*Agricultural Department, Ceylon*

3rd October, 1920.

A few hours can be profitably and fully spent at the "Kangayam Cattle" Farm at Palayakottai. I regret that my visit was of such short duration. However, through the excellent arrangement made by the Pattagar of Palayakottai the time was full of interest. After the recent rains, the 'Kolukkattai' grass pastures looked fresh and green and the sight of the fine herd of Kangayam cattle grazing in the fields was one to gladden the heart of the serious stockman.

The improvement of the South Indian breed of cattle carried out in the Pattagar's own practical way is an object lesson to all who wish to see the Madras Livestock Industry prosper. What has been done and achieved should not be difficult to imitate. I have no doubt equal results will be gained by those who tackle the problem with the same energy and foresight shown by this owner. Personally I am much indebted to the Pattagar for the delightful hospitality extended during my visit.

R. C. BROADFOOT  
*Deputy Director of Agriculture*

3rd October, 1929.

Among the most interesting days of my life will stand out the visit to the Estate of the Pattagar of Palayakottai. One cannot raise fruit, nor grain nor cattle without giving close personal attention over a long period of years. In the west, our best breeds of cattle represent the long time careful work

of some English landlord. Evidently the Pattagar will perform that service for India. May he live and prosper in his work is the wish of

ARTHUR E. HOLT

JOHN B. HOLT

*Chicago, III. U.S.A.*

*(University Professors)*

8th October, 1930.

I have been most interested in seeing the Pattagar's famous herd and only wish I could spend more time studying these cattle. As one who has always taken great interest in cattle breeding I was much struck with healthy condition of all the stock and the excellent conditions under which they are maintained.

It is very evident to anyone with a knowledge of stock breeding that the correct principles of breeding are adhered to and I feel that every possible use should be made of this carefully bred herd to improve the cattle of this area, for which they are evidently very suitable.

COLONEL OLIVER

*Expert Adviser in Animal Husbandry*

*Imperial Council of Agricultural Research*

6th July, 1931.

Having already seen and admired the Pattagar's cattle at the Tiruppur Show, I was delighted to have an opportunity of seeing over his farm. I have been astounded at the excellent results he is obtaining under such difficult circumstances and my visit has profited me considerably.

P. R. GLANVILLIE

*Agricultural Department, West Africa*

15th May, 1931.

I have never seen anything in any country to equal what the Pattagar was kind enough to show me to-day. This herd of cattle is quite unique and repays him for the immense trouble he has taken to improve the breed. I was practically struck by the fine level of excellence he has attained and by the very healthy condition of the animals. It was altogether a most interesting experience and one that I shall not readily forget. I am grateful to the Pattagar for having given me such pleasure.

GEORGE STANLEY

*Governor of Madras*

17th October, 1935.

Although the very useful work which was being carried out by Mr. Pattagar in the way of cattle breeding was not unknown to me, this is the first time I visited his estate in the course of my duties to advise him on the scheme for starting a dairy farm in conjunction with his present cattle breeding activities. Every moment of my time spent here, since my arrival, has been one of great interest. All that I saw came up to my expectations which I had based on the accounts given to me. The work he does should certainly prove an object lesson to all interested in this important industry and would be a revelation to those who think that sound principles of cattle breeding are not understood and practised in this country. Every animal seen in the herd was a product of sound animal husbandry and the herd as a whole could compare very favourably with the best of herds seen in this country. Mr. Pattagar's skill as an expert stock-breeder is reflected not only in the first class herd he has built up but also in the grass land and pasture areas, the like of which are seldom to be seen in this country. Through his foresight he now realizes that with the advent of mechanical transport and electricity in rural areas, breeding cattle merely for draught requirements cannot be the best proposition and this work must therefore be associated with dairy farming. I fully concur with him in this view and I wish him all success, in the project under consideration and which I consider quite sound. I shall always be happy to be of further help and guidance to him in the matter.

J. A. P. R. KOTHAVALA  
*Imperial Dairy Expert, Bangalore.*

12th May, 1936.

I visited the Pattagar's establishment with a party of students from the Besant Memorial School, Adyar, and all of us were greatly impressed by the extraordinary efficiency of the place and the sincere, open-hearted hospitality of the Pattagar and his splendid staff.

The Lord SRI KRISHNA was a "cattle man" and the Pattagar follows his example in many ways, thus making his life a benefit to those around him even as SRI KRISHNA did.

YELIX LAYTON  
*Detroit, U.S.A.*

19th October, 1937.

I was delighted to have the opportunity of seeing the cattle this morning. They are a splendid herd and I only wish that more cattle breeding on this scale was being done in other parts of the Presidency. I sincerely congratulate the Pattagar on the great work that he is doing for the improvement of livestock in South India and I was most interested in everything that I saw.

ERSKINE

*Governor of Madras.*

14th December 1937.

After a two months' tour of India spent in the observation of agricultural methods, it is pleasing indeed to find one independent breeder whose attention is directed towards improvement of the country's cattle. I am greatly indebted to the Pattagar for his kind hospitality.

A. E. SEATHIE

*Senior Agricultural Officer, Nigeria*

27th March, 1938.

I am extremely pleased to have had the opportunity of visiting the cattle farm kept up by my friend, Rai Bahadur Nallathambi Sarkarai Manradiar, the Palayakottai Pattagar. So far as I know, this is the biggest cattle farm owned and successfully run by a non-official. Mr. Pattagar has developed a really successful cattle breeding science which will stand in good stead for many decades. He has been particularly successful with Kangayam breed of cattle. I heartily congratulate him for his great tact and ability in this particular science. I wish the farm every success as it meets an immediate need in the spread of a useful animal stock in our province.

I. MUNISWAMI PILLAI

*Minister for Agriculture and Rural Development*

24th April, 1938.

We spent a most interesting morning in going round the Cattle Farm. The business conducted by the Pattagar is undoubtedly to the benefit of the country and agriculturists. The cattle in spite of the season are in excellent condition.

The farm has had many visitors who seem to have been favourably impressed. The stud bulls available for sale at the Farm ought to be more widely purchased for the improvement of stock. We wish the enterprise continued success.

A. C. WOODHOUSE

F. G. STANES

*Coimbatore*

27th October, 1938.

I have visited this cattle farm this afternoon. It is a very big and unique service which the proprietor has been rendering to the country. Our visit is a surprise visit and we found the animals in best spirits and best condition. They constitute a type of their own. This business deserves every encouragement from the public as well as the Government.

T. PRAKASAM

*Revenue Minister*

*Government of Madras*

June, 1939.

I have had a most interesting visit to Palayakottai to see the Pattagar's herd, which is an education to inspect and most valuable asset to Madras. I have discussed with Mr. Littlewood and the Pattagar a scheme to evolve a "utility" animal from his Kangayam. I trust he will succeed in getting a much higher milk yield and so make the herd of still greater value to the Pattagar.

P. JOHN, I.V.S.

*(A.H.C. Government of India)*

7th February, 1941.

The Pattagar of Palayakottai maintains the best breeding herd of cattle in India that I came across during four months of official travelling in India. His work should be regarded not so much as a private business for personal gain but as a national service, for, in spite of modern scientific invention, the prosperity of Indian agriculture will continue to depend on its cattle and nothing is so important as the maintenance and the improvement of the more important breeding of draught cattle.

E. RODIGO

*Director of Agriculture, Ceylon*

19th December, 1942.

It is nearly 22 years since I first visited this estate and I have been visiting it on and off for the last 20 years and I very much regret that this is my last visit as I am due to retire very soon. It is always a pleasure to come here and see the excellent herds of cattle and the way they are maintained. I think the Pattagar has greatly improved his herd of cattle in the time I have known it and I sincerely hope that he will continue in these lines. The experiment which is being conducted under the I.C.A.R. to find out if it is possible to evolve a higher milking cow without impairing the draught qualities of the bullock should be closely watched and it is to be hoped that it will prove a success.

This must be one of the largest farms in India farmed by an individual and the reclamation which the Pattagar has done is a credit to him. He is an excellent farmer and devotes his life to agriculture and it is very much regretted that other large Zamindars do not copy him.

I wish the Pattagar further success and my best wishes.

It looks as if there will be a shortage of fodder in this District this year as the rains failed at the proper time and if this occurs I hope the Pattagar will be given some assistance to purchase fodder in the cheap markets as his excellent herd must be maintained.

Well. Good-bye, Pattagar. I thank you for your kindness. I hope I have been of assistance to you.

R. W. LITTLEWOOD  
*Livestock Development Officer*

2nd September, 1943.

It would have been a thousand pities to leave South India without seeing the Pattagar's splendid farm and having an opportunity of photographing his mild and magnificent bulls. When one sees these Kangayam bulls and cows, one understands very well the veneration accorded to these animals since time immemorial in India. I shall long remember my visit and the really delightful hospitality of the Pattagar and the long suffering help his representatives gave me in getting some photographs.

STAN HARDING

5th March, 1944.

It is a real pleasure to record my visit to Palayakottai and also to record my deepest appreciation for the kind hospitality extended by the Pattagar and his family and staff. It is obvious that the Pattagar has an "eye" for cattle, and that he has consistently selected and bred towards a definite ideal. This is the essence of success in any attempt at Livestock Improvement ; and the farm and its owner are to be commended for the success thus attained, and for the coincident service to the cultivators of Southern India by supplying improved working bullocks.

RALPH W. PHILLIPS

*Bureau of Animal Industry*

*U. S. Department of Agriculture*

*Washington, D.C., U.S.A.*

26th July, 1944.

As long as such cattle are reared in India as I have seen this morning on the Pattagar's farm there can be no question of the country's ability to lead the world in the production of draught cattle. It has been a great pleasure to see such a fine stock and to learn the views and opinion of such a master-breeder as the Pattagar of Palayakottai.

G. W. WILLIAMS

*Animal Husbandry Commissioner.*

22nd January, 1945.

It gives me great pleasure to place on record that I have just spent two most pleasant and profitable days here, going round the farm of Pattagar of Palayakottai. It has been a matter of great joy for me to see such a big uniform herd of cattle kept in such an excellent condition. To one whose chief interest lies in the science of breeding it has been a great experience to see what the 'craft' can do towards breed improvement. My only regret has been that I could not come here a few months earlier while the late Pattagar, that Master—breeder, who developed this excellent herd, all in his lifetime, was still alive. I feel that I have missed a real opportunity in life. I leave this place with the hope that the present Pattagar will continue to follow in the foot tracks of his late illustrious father. The heritage that has been left to him is a very valuable one indeed.

I have been charmed with the excellent hospitality extended to me by the Pattagar during my stay here.

P. BHATTACHARYA

*Officer-in-charge, Animal Genetics Section,  
Imperial Veterinary Research Institute,  
Izatnagar (U.P.)*

7th June, 1946.

I am thankful to the Pattagar who is following the great traditions of his illustrious father, for his having shown me round this interesting cattle farm. This is a great service which the Pattagar is rendering to the people of this land. He has been wonderfully carrying on in spite of the handicaps of the weather.

M. BHAKTHAVATSALAM

*Minister in charge of Public Works*

22nd April, 1947.

It is with satisfaction that I see the successful manner in which the new Pattagar is following the footsteps of his father. If to the natural gifts he has inherited he has a clear conception of his aim and the persistence and patience of his predecessors, the renowned herd of cattle must continue to flourish.

The Pattagar is wholeheartedly supporting the Indian Council of Agricultural Research in the work of investigating the potentialities of the Kangayam Breed, although that undoubtedly involves a considerable amount of inconvenience and a certain amount of expense on his part. The information already obtained however promises to be of use to him in indicating lines of advance in breeding and economy in management. What is more important, it affords the kind of valuable data upon which plans for the development of the cattle of the country can be based. I offer my congratulations on the success of his first year's work and I wish him very many years in which to repeat it.

G. W. WILLIAMS

*Animal Husbandry Commissioner,  
with the Government of India,*



15th June, 1947.

It is a great privilege to have seen Palayakottai Pattagar's cattle farm. Every Indian can be proud to see and learn from this farm what the cattle wealth of India can be if improved and worked properly. I hope every one who has any interest in our country's cattle wealth will be able to see this ideal farm. God help the family and bless them with all that is good so that they will be a help and source of strength to the poor villagers around.

A. V. KUTTIMALU AMMA, M.L.A.

19th June, 1947.

The whole farm is most impressive. It is run on progressive lines and has done excellent work in raising the standard of cattle in the district.

I thoroughly enjoyed my visit and congratulate all concerned.

ARCHIBALD NYE  
*Governor of Madras*

22nd June, 1947.

MY DEAR PATTAGAR SAHEB,

Their Excellencies' visit to Coimbatore District in June, 1947.

I should like to thank you very sincerely for the excellent arrangements you made for His Excellency's visit to Palayakottai on 19th June, 1947. His Excellency was much impressed and pleased with everything he saw there. I also take this opportunity of thanking Mr. Pattabhiraman for the extremely efficient way in which he conducted us round. You both made the visit a most successful and interesting one.

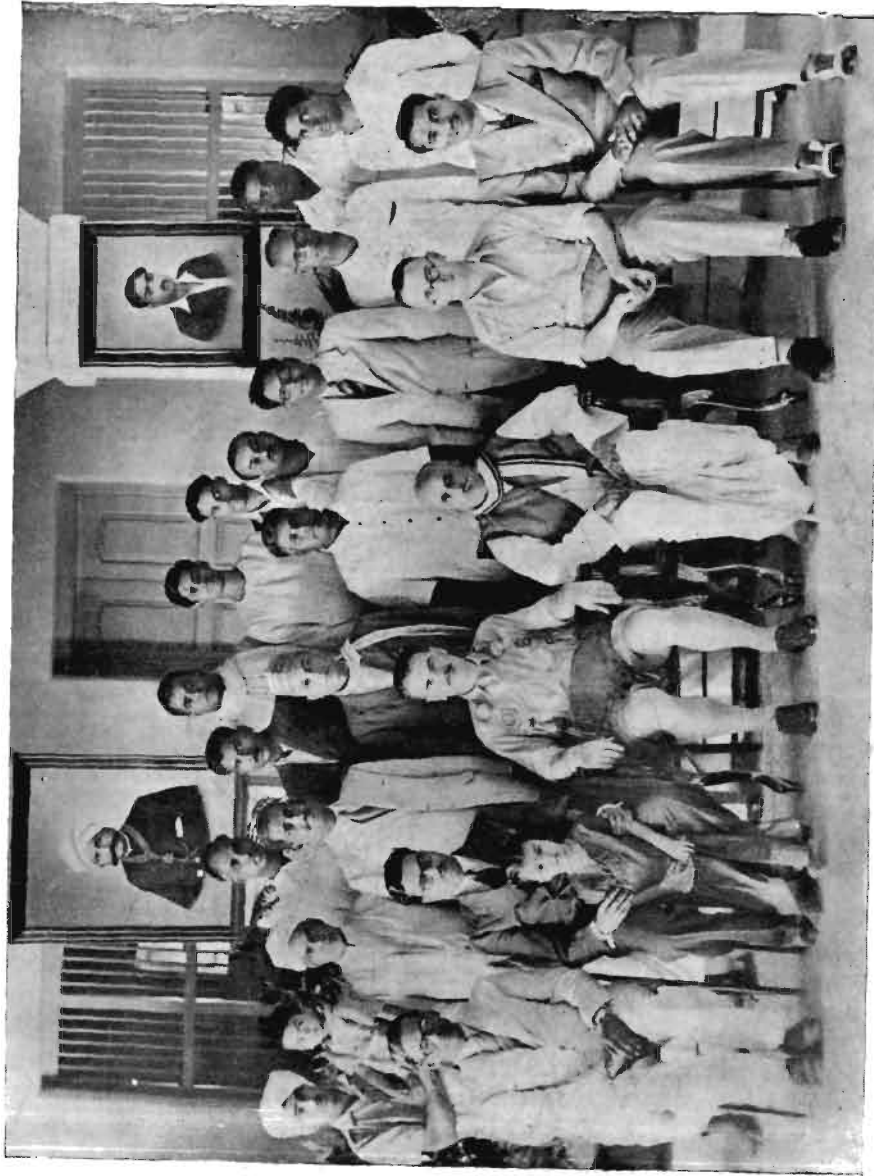
With best wishes,

Yours sincerely  
F. W. A. MORRIS  
*Collector of Coimbatore*

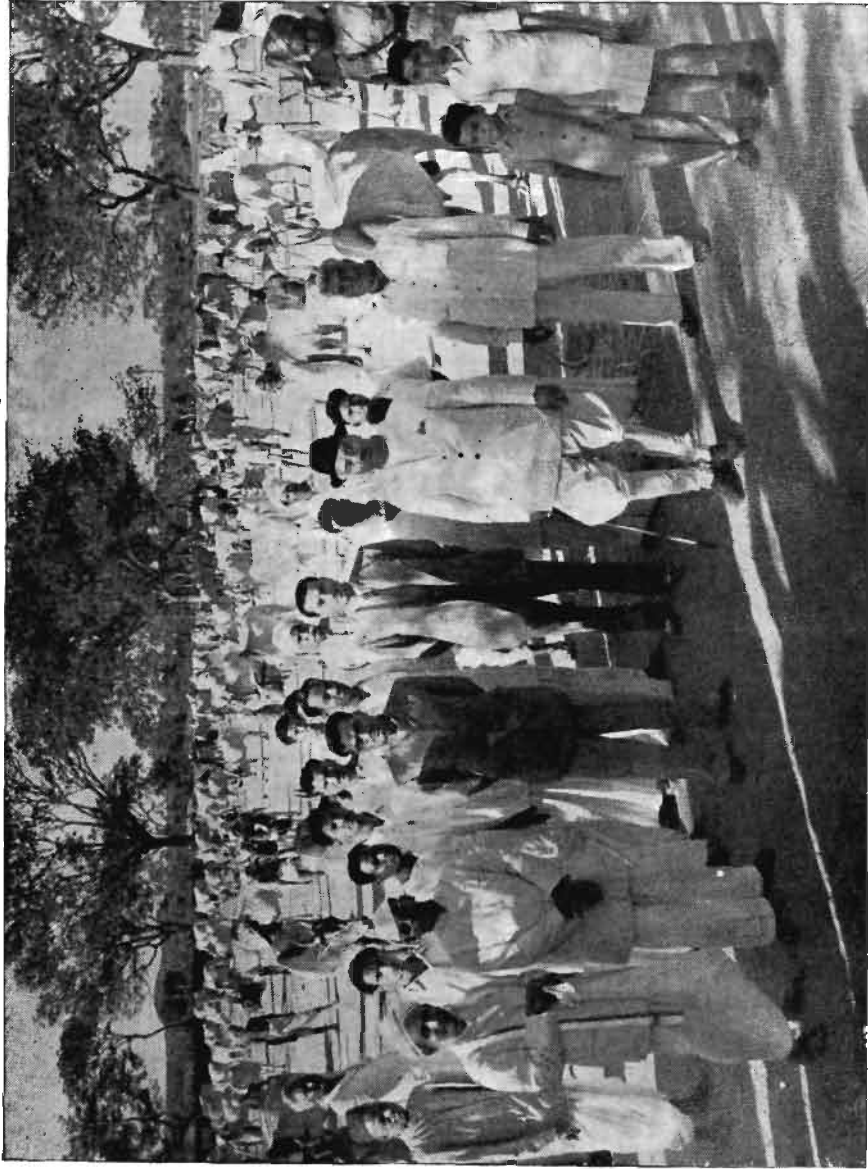
rd July, 1947.

It has been a great pleasure to not only visit the farm and witness the impressive development of this branch of Agriculture science, but also to enjoy the cordial hospitality of the host and staff. Mere words do not allow justice to be done to this experience.

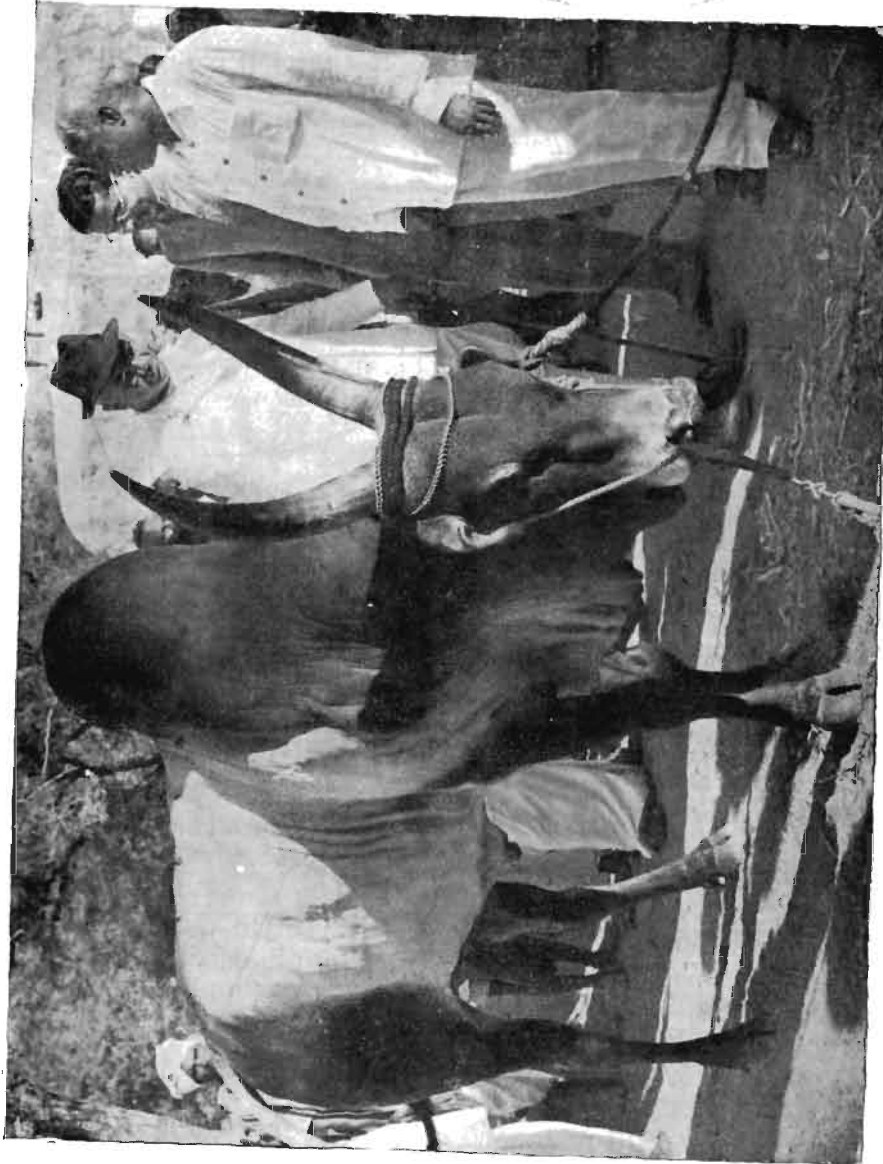
STANLEY R. C. BERTRAND  
*Public Affairs Officer  
American Consulate, Madras*



Sir Archibald Nye, Governor of Madras, at the Palayakottai Farm



Maharaja of Bhavanagar, Governor of Madras at Palayakottai Farm.



Maharaja of Bhavnagar, interested in the outstanding Kangayam Breeding Bull.  
(Loyathumattu Kallai)

4th April, 1948.

I was immensely pleased to see the cattle farm maintained by Pattagar here. The way in which the several types of cattle are kept and maintained and the excessive care taken in keeping the purity of the breed and maintaining a high standard is worth noting. The people in charge of the farm have kept it clean and tidy and also look after the cattle with proper care and love. It is a matter of joy to note that Pattagar himself takes personal interest with prompt supervision and attention and takes pride in his farm and the generations of breeds. My personal thanks are due to Pattagar who has shown me round with enthusiasm and presented me with the real picture of the farm. I wish all success and prosperity and also bright future to the farm which is the first of its kind in this Province.

K. CHANDRAMOULI

*Minister in charge of Local Administration,  
Government of Madras.*

12th April, 1948.

This is the second time that I visit this farm. All the members of the Livestock Improvement Board are delighted at seeing this farm. It is indeed creditable that the Pattagar is able to keep his cattle in such good condition, when there is such a terrible lack of fodder all over the place. All should thank the Pattagar and the energetic Superintendent of his farm for the very good work they are doing.

K. MADHAVA MENON

*Minister for Agriculture and  
Livestock Development,  
Government of Madras.*

I see that in 1923 I wrote after my visit to this farm that I was sure the Pattagar would have a big influence upon cattle breeding in India. The "best bull in the Show" given to a Kangayam bull bred in this place proves this to be true. I was proud at Delhi last month to see this honour go to South India.

I pray that God may send soon abundant rains to relieve present famine conditions here.

J. J. DEVALOIS

*Principal, American Arcot Mission, Katpadi  
Member, Provincial Livestock Improvement Board*

6th December, 1948.

I am very pleased to have had an opportunity of going round the farm. A first class national service is being done here. The good work must be continued and expanded. The founder of this farm deserves the gratitude of the public for the great service being done. I wish every success to the institution.

H. SITARAMA REDDY  
*Minister for Industries and Labour,  
Government of Madras.*

24th May, 1949.

I had the very great pleasure of seeing the cattle farm here. I had long wanted to do so, because the farm's fame had long ago reached even distant Chittoor District. The display of breeds, cows and calves was extremely impressive. I had not seen a more impressive sight. While there has been talk of improving the country's cattle-wealth, this gentleman in this remote corner has been carrying on this national service for nearly half a century. There can be no doubt about the usefulness of such a farm. Only, I wish the prices could be within the reach of a poor district like mine. I am very much surprised to learn that the farm is not even self-supporting. It would be national calamity if such an institution as this is not maintained and improved as it should be. I am glad to learn that the Government of India are taking interest in this enterprise and have appointed a technical man and staff to improve the stock. I hope that governmental help will be forthcoming even in a greater measure to this farm. Mr. Pattabhiraman, the Superintendent, was very helpful in taking us round and explaining the whole working of the farm. I wish it all success for all time.

A. RAMAKRISHNA RAJU  
*President, Legislative Council,  
Madras.*

31st July, 1949.

The Pattagar is carrying out a very valuable breeding of the Kangayam breed. This work not only helps Animal Husbandry but also crop husbandry, which is the backbone of the country.

I spent only a day on the farm and during the short stay gained valuable practical points in breeding work.

I enjoyed very much the hospitality of the Pattagar and I am very grateful to him.

I wish the Pattagar all success in his undertaking.

I. KANAKARATNAM

*Fed. Experiment Station,  
Department of Agriculture Surgery, Beri  
Malaya.*

6th January, 1950.

I esteem it a great privilege to be able to see the wonderful herd of cattle developed by the Pattagar and his family. Although I could not claim to be an expert, I may say that the uniformity and character of the herd is very impressive. So, I wish to congratulate the Pattagar and all his staff on the work they are doing. This will be one of the highlights of my visit to India.

ARTHUR W. ASHBY

*Agricultural Economic Research Institute,  
University of Oxford.*

17th February, 1950.

It is indeed a rare privilege to see a private landlord devoting his time and money for the upbreeding of cattle. His services to the country are immense. Even a Government farm of this magnitude has not yet been established. I have all the praise for the Pattagar who has so much of the cattle wealth at heart.

MARIAPPA

*Minister for Home and Agriculture,  
Mysore State.*

3rd June, 1950.

I had the pleasure of visiting the Palayakottai Cattle Farm maintained by the Pattagar. The cattle breeding done on scientific lines is remarkable. It speaks volumes about the innate bias for cattle breeding and the interest taken by the late Pattagar, which have developed intact in his worthy son, the present Pattagar. This cattle breeding centre is really one of national pride. I am sure it promotes the cattle wealth of our country.

P. S. KUMARASWAMI RAJA

*Chief Minister, Madras State.*

23rd June, 1950.

It was a real pleasure for me to visit this well-known Cattle Farm this forenoon. Probably there is no other private breeder who possesses such a large farm and maintains it so well in

any other part of the country. The breeding done here on scientific lines and the maintenance of pedigree and other registers can well serve as an object lesson to people who run Cattle Farms or those who are interested in the improvement of cattle. I trust that the experiment that is being carried on here in improving the milk yield of the Kangayam cattle will give sufficiently encouraging results very soon. The Farm must be an object of pride to the Government as well as the people and the work done here deserves all help and sympathy.

A. B. SHETTY

*Minister for Agriculture.*

31st December, 1950.

I have been hearing of this cattle farm since nearly two decades. Though I have been longing to see, I could get an opportunity now only. I thoroughly enjoyed my visit. No individual could do it better. It is a service to the Nation and I wish others would copy. Let me congratulate the Pattagar and wish him further success.

SANJIVA REDDY

*Minister for Prohibition,  
Housing and Forests, Madras.*

13th January, 1951.

My visit to this Cattle Farm run by the Pattagar of Palayakottai is one of interest and fine instruction. Without any aid from Government the Pattagar family have been working at cattle breeding in a manner worthy of emulation. I am sure the young Pattagar will expand his sphere of activity and perfect it. As Deputy Minister in charge of Agriculture, I feel such efficient non-official effort should receive all assistance which the State and the Central Government can give.

M. THIRUMALA RAO

*Deputy Minister for Food and Agriculture.  
Government of India, New Delhi.*

5th June, 1951.

Having heard so much about our Pattagar's Farm, I was longing to see it. To-day, I am happy to see for myself the great work done in this farm to improve the breeds and increase the wealth of our cattle. The Pattagar family deserves to be congratulated in maintaining the farm so ably started and established by the late Pattagar. I wish all success to this national enterprise.

ROCHE VICTORIA

*Minister for Food, Madras.*



27th January, 1952—

I have travelled over 9000 miles in India during a 3 month tour and this is the only farm I have visited where proper records are kept and a well-planned scheme for improvement of a breed is being carried out with energy and vision. Very much of the credit for the planning of the work is due to Mr. Pattabhiraman, whose intimate knowledge of the stock is most striking. I have greatly enjoyed my visit and am delighted to have had the opportunity of seeing this famous farm. Finally, I offer my thanks to the Pattagar, who is the driving force behind the work begun by his father.

J. P. MAULE

*Director of Commonwealth Bureau of  
Animal Breeding and Genetics, Edinburgh*

22nd May, 1952.

The Pattagar was kind enough to take me round and show me the famous herd of Kangayam cattle his family have been rearing. It is a fine herd of pure-bred animals of which any country could be proud of. The type is good to look at and has all the qualities required for a work animal. The pairs of bullocks that have been castrated and put to work have attained such magnificent size that would make any farmer glad to own.

The stud bulls are splendid in size, formation, hooves and legs and possess a velvety coat, which is the hall-mark of a good breed.

I am informed that work is now being carried on to develop a dual purpose type and from the figures of milk yield that were shown to me I am sure the attempts will be successful.

The Government are doing work here, with the willing and enthusiastic co-operation of the Pattagar to record the performances of the individual selected animals and of the whole herd which I am sure will help improve the breed further and what is more, serve as a model for work among other breeds of cattle in India.

All lovers of fine cattle in India should visit this herd.

NAGAN GOWDA

*Minister for Agriculture, Madras*

5th August, 1952.

It gave me much pleasure and also good education to have been able to visit the Palayakottai Cattle Farm of Shri Nallasenapathi Sarkarai Manradiar, M.L.C. Along with the members of his family and his colleagues and officers, he extended to me a very warm welcome and hospitality for which I am grateful.

He certainly runs a most wonderfully complete Cattle Farm, which it is a joy to see. The bulls and cows, calves and heifers, horses and buffaloes, are all very well kept and carefully looked after. Very useful statistics are maintained, and good breeds produced. There is complete co-operation between the Pattagar and Officers of Government, who extend their co-operation in the good work. Here is a genuine piece of constructive endeavour in nation-building, of which the persons concerned have every reason to be proud. They have my best wishes for happiness and success.

SRI PRAKASA  
(OF SEVASHRAMA, BANARAS, U.P.)  
*Governor of Madras.*

20th March, 1953.

I have spent a very interesting day in Kangayam and Vellakoil Key Villages and on this famous farm. I think you are on the right line when trying to create a good dual purpose animal. The co-operation with the villagers seems to be very good and I think they will share the fruits of the really good work here. I wish you and your country every success. Thank you very much,

BENGT LUNDGREN  
*Veterinary Officer,  
F.A.O. Mission to India,  
Kalmar, Sweden.*

19th May, 1953.

I am very grateful for the arrangements made by you and the hospitality shown to me and my party.

I particularly enjoyed seeing the cows and the bulls and the beautiful calves that made the whole world assume a new and pleasant appearance.

C. RAJAGOPALACHARIAR  
*Chief Minister,  
Government of Madras.*

11th July, 1953.

I have been most impressed not only by my visit to the place itself and the fine breeding results attained, but most perhaps by the integration of so many operatives that only generations of experience can produce. Now, I need only to film this as another example of what India has to show to the world.

KARL KAMB  
*Hollywood Film Technician.*

27th August, 1953.

This is a wonderful cattle farm indeed. It is the largest I have seen and the most efficiently run. The success achieved in producing a dual purpose breed is remarkable and of great value both to agriculture and animal husbandry. The Pattagar of Palayakottai is a charming person who combines the best traditions of an old aristocracy with modern scientific development. His farm is a monument of enterprise and service.

JAYAPRAKASH NARAYAN

8th October, 1953.

I am very glad indeed to have an opportunity of visiting the Pattagar's Farm once again, after a lapse of about 17 years. It was a pleasure to see that the Pattagar was maintaining the high traditions of his illustrious father. Even though young in years, he has an excellent "eye" for an animal, and has the same keenness and enthusiasm of his father.

I was shown round the whole herd. All animals were in good condition, and what struck one straightaway was the uniformity in type, which speaks volumes for the labour and care taken in laying down breeding plans. If we could have a few more breeders like the Pattagar, the problem of cattle development in the country could be greatly solved.

While at Palayakottai, I took the opportunity of inspecting in detail the working of the I.C.A.R. Scheme, which aims at putting in more milk in the herd without detriment to the draft qualities. In spite of the fact that the last few years have been "scarcity of fodder" years, the scheme on the whole has shown that the breed has considerable potentialities of a "Dual purpose" breed. The work, however, has to be continued before definite conclusions can be drawn. One step in the right direction is that all experimental animals will now have a balanced ration and will therefore be free from the vagaries of rainfall in the area.

I am very grateful to the Pattagar for having shown me round and for his generous hospitality. I hope he will continue to take special interest in this unique undertaking.

P. N. NANDA

*Animal Husbandry Commissioner.  
Government of India.*