

DEPARTMENTAL NOTES

ANIMAL HUSBANDRY IN CEYLON—PART II*

A SURVEY OF LIVESTOCK BREEDING IN CEYLON AT THE PRESENT TIME, WITH SUGGESTIONS FOR DEVELOPMENT

THERE is a tendency to consider that livestock plays a very small and unimportant part in the agricultural economy of Ceylon. It is therefore of value to endeavour to assess the annual income from livestock.

Livestock breeding is to a very large extent in the hands of the villagers and it is impossible to get anything like complete statistics.

The value of livestock in the country can be considered under the following heads :

(a) *For cultivation of fields and carting of produce.*—It is quite impossible to put a monetary value on this, but it is obvious that without cattle and buffaloes paddy cultivation would be impossible and the cultivation of every other crop including tea, rubber, and coconuts would be greatly handicapped. In spite of the great development of rail and motor transport, bullock transport still plays a very important part in all agricultural operations.

(b) *As a source of manure.*—Here again it is not possible to place a value. Cattle manure is but little used in paddy cultivation. In the coconut industry manuring by tying cattle round the palms is a general practice. It is little used on tea estates, although where it has been used, I believe, it is very satisfactory. It would appear to be a very suitable manure for soils which have lost their humus as a result of soil erosion. Goat manure is used to a fairly large extent in the Northern Province especially in tobacco cultivation.

(c) *Cash value of exports of animal products.*—Exports of animal products consist of hides and skins, tanned leather and meat. The value of these products as shown in the Customs returns are as follows :

	1929	1930	1931
	Rs.	Rs.	Rs.
Hides and skins ...	1,096,770	923,745	517,451
Leather (tanned) ...	676,579	470,460	125,465
Meat ...	103,408	128,242	115,082
Total ...	1,876,757	1,522,447	757,998

* Appendix to Sessional Paper XXVII—December 1933 by M. Crawford, Government Veterinary Surgeon, Ceylon.

The falling off from 1929 to 1931 is due to the slump in prices but it will be seen that in 1929 the value of exports was close on two millions. A glance down the list of Ceylon exports will show that there are comparatively few exports, beyond the major crops, which exceed the figure. It is nearly equal to the value of plumbago exported and in 1929 exceeded such items as cardamoms, citronella oil, papain, timber, or tobacco. That is, animal products are one of the most important of Ceylon's minor exports.

(d) *Cash value of animal and animal products produced and consumed locally.*—It is possible to arrive at an approximate valuation of meat and mutton produced and consumed locally, but it is quite impossible to obtain any estimate of the value of such items as milk, ghee, curd, butter, table poultry, eggs, bacon, and leather.

The following estimates of value of cattle, buffaloes, sheep, and goats produced and consumed locally are of interest. Local animals slaughtered in the licensed slaughter-houses in 1932:

	Number	Estimated Value per Head Rs. c.	Total Value Rs.
Sheep and goats ...	42,798	5 00	213,990
Buffaloes ...	8,806	40 00	352,240
Neat cattle ...	81,224	20 00	1,624,480
		Total ...	<u>2,190,710</u>

That is, a sum of 2 million rupees most of which finds its way into pocket of villagers, a figure which makes the sale of cattle, etc., for meat one of the most important of the minor money-earning village industries.

The value of fresh milk produced and consumed locally probably exceeds this figure, while poultry and eggs must reach a very high total.

The above figures incomplete as they suffice to show that the livestock industry is a more important source of income than is generally believed. It will be of value to consider the state of development of the livestock industry at present, taking each branch separately.

Cattle and Buffaloes may be considered under several sub-heads:—

(a) *Meat supply.*—The Island is largely self-supporting. Frozen, tinned and salted beef is imported, but the amount is not great and its use is largely confined to the wealthier classes. The total value of beef imported in 1931 was Rs. 148,779. The consumption of meat per head of population is low but is probably on the increase. The low level is accounted for by the fact that a large proportion of the population is Buddhist in religion. There would not appear to be much prospect of success in breeding cattle specially for the production of beef. The meat supply is largely obtained from the North-Western and the North-Central Provinces, especially from the Tamankaduwa area and to a smaller extent from the other Provinces,

Both neat cattle and buffaloes are slaughtered for food, but it is only in Colombo that any considerable number of buffaloes is slaughtered. For example, in 1931 out of a total of 10,431 buffaloes slaughtered in the whole Island, no less than 9,271 were slaughtered in Colombo town and Colombo District. The remainder of the Island depends almost entirely on neat cattle.

Facilities for selling cattle for slaughter are not good. One hears constant complaints in the villages that very poor prices are obtained from the itinerant cattle dealers. Attempts were made in 1929 and 1930 to start cattle fairs at Kurunegala, Polonnaruwa, and other places. They were a failure largely because of the trouble involved in bringing the cattle from the villages to the fairs and because dealers formed a ring to keep down prices.

The existence of rinderpest in recent years in the North-Central and the North-Western Provinces with the consequent restrictions on movement has interfered with the supply. The North-Western Province is now free of rinderpest and it is hoped that the North-Central Province will soon be in the same state.

(b) *Dairy supplies.*—The Island is very far from self-supporting and tinned milk to the value of over Rs. 1,000,000, butter to the value of about Rs. 500,000, ghee to the value of about Rs. 150,000, and cheese to the value of Rs. 105,000 were imported in 1931.

The warm climate, the perishable nature of milk and butter, and the lack of suitable methods of transport are difficulties which hinder development and which favour the use of tinned products. The high price of locally produced milk acts as a deterrent on the increased use of milk. It is difficult to see how the price can be reduced so long as we depend on dairies situated in or close to towns. Milk is cheaper in the up-country planting districts, in Tamankaduwa and a few other areas such as near Hambantota, but there are no facilities for transporting this cheaper milk to the towns.

The up-country planting districts are the chief source of supply of milking cows for the dairies in Colombo and other towns. These cows are descendants of cattle imported in the past by planters from Europe and Australia. They are bred chiefly by planters, kanganies, and Tamil labourers on the estates and are a most valuable asset to the country. Without them the town dairymen would have great difficulty in stocking their dairies.

In the past ten years very few cattle have been imported from Europe or Australia, high freight charges and the difficulty of disposing of surplus milk have deterred planters. Already evidence of deterioration can be seen in these cattle and fresh importations are needed if they are to maintain their present standard.

Given some means of transporting milk to Colombo and the other large towns, so that a remunerative outlet could be obtained for surplus milk, there appears to be every possibility that the number of such cattle kept on tea estates would be considerably increased. This would lead to a decrease in the importation of artificial manures,

In Colombo considerable quantities of buffalo milk are used and there are quite large dairies stocked with buffaloes. The buffaloes were formerly imported from India and were of a very high milk yielding breed. When importation of cattle from India was prohibited in 1930 the owners of these buffalo dairies found difficulty in maintaining their stocks and there was a tendency to replace the buffaloes by ordinary cows.

I understand that these dairymen have found that they can obtain buffalo cows of good milking capacity in the Tamankaduwa district. The Revenue Officer, Tamankaduwa, issues permits for the removal of such buffaloes by rail and he tells me that quite a regular trade has sprung up. The fact that buffaloes which give enough milk to make them suitable for the Colombo dairymen are to be found in Tamankaduwa is of the greatest interest and is an indication of the possibilities of this area.

Crossing of these good milking buffalo cows in the Tamankaduwa district with buffalo bulls of the high yielding Indian breeds should produce good results.

Ghee continues to be imported. In spite of this people who have made ghee locally experience great difficulty in disposing of it. Ghee is made in Tamankaduwa and other areas but the methods of manufacture are crude and wasteful and facilities for marketing it when prepared are practically non-existent.

The manufacture of butter is carried on to a very limited extent. Climate conditions are against it in most parts of the country but good butter can be made and is made to a small extent in the up-country districts.

(c) *Cattle for carting purposes.*—In most parts of the country the number of cart bulls available appears to be sufficient. The demand for the larger and heavier type of bull formerly imported from India has fallen very greatly with the increase in motor transport. These large heavy bulls were never popular with villagers for work on the smaller village roads. For such work bulls of the local type are preferred. A well-developed bull of the local breed by reason of his activity and gameness is very suitable for use on the village roads. In some parts of the country, as for example the Eastern Province, while cattle of the local breed are very numerous it is difficult to find among them sufficient animals well enough developed to make good cart bulls. This applies as a rule to all areas where paddy cultivation is extensive. In these areas the poor development of the cattle appears to be due to lack of sufficient food and the situation is often aggravated by over-stocking.

There would not appear to be any need to produce cattle of much larger size than the local breed for carting purposes, but there is need in most parts to provide sufficient food supply so that the cattle of the local breed may attain their best development. In many parts improvement would be produced could the numbers of useless cattle be reduced to a number more in keeping with the available food supplies. How this reduction is to be brought about is difficult to see. In Western countries useless animals would be disposed of to the butcher but the number which can be dealt with in this way in Ceylon is small, and religious prejudices

interfere. The same problem arose in East Africa and an attempt is being made to deal with it by the establishment of a meat-canning factory for the preparation of corned meat and meat extract for export. This method, however, is not likely to commend itself for use in Ceylon.

The cultivators of the Northern Province find cattle of the Kangayam type imported from South India necessary for their work, and to meet their needs a Quarantine Station at Kayts is maintained and importation of cattle permitted, although it has been prohibited at Colombo.

The need for larger bulls in this area is probably due to the fact that very few buffaloes are found in the Jaffna District and ploughing is done by bulls unlike other parts of Ceylon where ploughing or mudding of fields is generally done by buffaloes.

This would indicate that should the practice of ploughing dry land, for which buffaloes would not be so suitable, ever become common in other parts of Ceylon, there will be need for larger cattle than the local breed.

As regards cart cattle, therefore, with the exception of Jaffna District the local breed supplies the demand. No complaints of lack of numbers are heard but the animals are often smaller and weaker than they might be.

The number of cart bulls imported for Jaffna District is not very great, about 500 per annum at present. The Jaffna cultivators say they cannot breed bulls of this type but it should be possible to breed them at Tamankaduwa. If they could be bred at Tamankaduwa it would do away with the necessity for keeping the Kayts Quarantine Station open with its consequent expense, trouble, and risk of importation of disease, a risk which will become much more important if our hopes of freeing the Island from rinderpest within a few years are realized.

Sheep and goats.—In Ceylon they are kept largely for mutton. Very little use is made of goat's milk save for weakly children or invalids in which cases it is prized. Sheep and goat skins are exported. Comparatively few sheep are kept save in Jaffna and Batticaloa Districts. The bulk of the mutton consumed is from goats. The Island is dependent on India for a considerable proportion of its supplies of sheep and goats.

There has been a very marked falling off in the total number of sheep and goats slaughtered in Ceylon since 1929 apparently due to the economic depression. The decrease has been almost entirely in respect of the imported animals. So great has been the falling off in importation that while in 1927 local animals formed only 25 per cent. of the total slaughtered, in 1932 they were 45 per cent. and this without any marked increase in slaughter of local animals. The figures are of considerable interest; they are as follows:

Year	Total Number of Sheep and Goats slaughtered in licensed Slaughter- houses in Ceylon	Imported		Percentage of local to the total slaughtered
		Imported	Local	
1927	158,583	118,961	39,622	25
1928	163,300	124,276	39,024	24
1929	170,889	122,920	47,969	28
1930	147,775	90,471	57,304	38
1931	108,276	71,865	36,311	33
1932	93,842	51,044	42,798	45

Restrictions were imposed on the importation of sheep and goats in 1932 and a further decrease in the number imported may be expected in 1933. It is anticipated that the number of local animals slaughtered will show an increase in 1933.

The figures in the above table show only animals slaughtered in licensed slaughter-houses and do not include the large number of local animals slaughtered on private premises at the time of festivals etc.

It is in the drier parts of Ceylon that the largest numbers of sheep and goats are found. Neither sheep nor goats thrive in areas of heavy rainfall and no great increase in numbers can be anticipated in the wet zone.

In the Jaffna District goat manure is prized by tobacco cultivators who fold the animals on the fallow land at night time, the folds being moved from time to time until the whole area has been covered.

There does not appear to be any insuperable obstacle to prevent the total requirements of the Island being produced locally. It should be stressed, however, that goat breeding is essentially a side line. It is admirably suited for villagers in areas where grazing on scrub jungle is available.

Goat farming *per se* on a large scale is not likely to be a success and one would not be justified in advocating it. The restriction imposed on import has stimulated interest. This interest is being encouraged by the distribution of pamphlets and by demonstrations of castration by Veterinary officers.

The supply of good stud goats for breeding is not plentiful. Useful breeding animals are obtainable from time to time at the Colombo Quarantine Station and people interested have availed themselves of this source of supply.

Some of the larger landowners have flocks and it may be possible in the future to obtain breeding stock from these flocks. There is a small flock of goats at the Ambepussa Farm of the ordinary country breed which was started in 1931 with the object of obtaining knowledge of diseases and breeding problems. It is serving its purpose, but cannot be looked upon as yet as a source of good breeding stock. The climatic conditions at Ambepussa are not ideal and results up to the present have not been good. In the past month or two a considerable improvement is observable, which seems to have resulted from the use of a simple mineral mixture.

A corresponding flock kept under dry zone conditions should give valuable information.

A few goats of milking breeds are on order from England and it is proposed to try the effect of crossing these on the local type.

Marketing facilities are not good. The Colombo Municipal Council has recently provided a few enclosures at the Cattle Mart reserved for the purpose of exposing local goats for sale. Something more is needed. The most likely solution appears to be a Co-operative Society operating in the districts where sheep and goats are numerous and having its own mutton stall in Colombo which would be kept supplied by animals collected from the goat breeding areas. Such a stall could be hired in one of the Municipal markets.

It would advertise that only Ceylon mutton was sold. It would cut out the middleman's profit and should result in the breeders of the goats getting a better price. It would not be a costly experiment and, if a success, could be extended by taking further stalls in the other Municipal markets. Possibly the Municipal Council could be induced to let a stall to such a society on favourable terms.

The fact that the Colombo Cattle Mart and slaughter-house is not situated on the railway is very unfortunate and handicaps both cattle and goats. It means additional cost and trouble to take the animals from the railway stations to the Mart.

It would be a great convenience and would do much to popularize the use of locally bred animals if they could be unloaded straight from the trucks into the market. There would not appear to be much prospect of achieving this at present. The Colombo slaughter-house will however sooner or later have to be re-built and modernized, and when it is it should be on the railway or have a railway siding running into it.

Goat manure is of considerable value. It is used by cultivators in the Northern Province. Investigations might be made as to its value for different crops and the best methods of utilization.

Hides and skins.—There is a fairly considerable export trade in hides and skins which in a normal year approaches Rs. 1,000,000 in value. Very little information regarding this trade is available. Damage to hides from excessive branding is common. In some of the African Colonies steps have been taken to improve methods of skinning, preparation, and the grading of hides.

I have suggested to the Director of Commercial Intelligence that investigation of this trade might be carried out and if necessary the Imperial Institute, London, consulted regarding steps for improving the quality of grading the hides so that better prices might be obtained on the London market.

Poultry and eggs.—No figures are available to show the value of these. Both poultry and eggs are popular articles of diet and the annual consumption of these articles would reach a large figure.

Supplies of poultry, with the exception of small quantities of more or less luxury grades imported by cold storage companies, are all produced locally. Prior to 1930 live poultry were imported from India but importation was prohibited on account of the introduction of disease. Since then local supplies have proved ample to meet the demand. Prices have not risen and indeed show a tendency to fall. I have heard breeders complain lately that prices obtainable are too low to allow a margin of profit.

The figures for imports of these articles are of interest. They show that in 1929 live poultry to the value of Rs. 316,351 were imported and now none are imported. That is local supplies have proved able to supply the market without any increase in price, an illustration of what can be done when supplies are cut off.

Eggs still continue to be imported in large numbers. The numbers for 1931 show a decrease, but the value shows a much larger decrease probably due to the fall in prices of all foodstuffs. The figures taken from the Customs returns are as follows:

<i>Eggs</i>				
Year		Number	Value Rs.	Value per Egg Cents (approx)
1928	...	10,698,136	345,182	3½
1929	...	15,143,881	502,301	3½
1930	...	14,898,681	879,806	6
1931	...	10,620,084	422,581	4
1932	...	9,444,862	314,374	3½

The number imported shows a tendency to decrease since 1929. A feature is the low value per egg each year except 1930. Values so low that it is difficult to see how they can be produced, collected, and shipped in Ceylon at a profit. It is difficult or impossible to produce eggs on poultry farms at a price which could compete. It may be possible for village producers to compete at these prices, provided they had an organization for putting their eggs on the market.

No doubt if importation were prohibited, as in the case of live poultry, the demand would be met from local sources without any marked increase in price. It is of course a question of policy whether such prohibition could be imposed or not. In the case of live poultry the reason for prohibition was to prevent introduction of disease, but no such reason could be advanced for prohibiting imports of eggs.

Pigs.—No accurate statistics are available to show either the number of pigs in the Island or the number slaughtered. The number in the Island is about 45,000. They occupy a comparatively unimportant place in Ceylon. They are only found in any considerable numbers in a few places, as for example along the sea coast from Negombo to Kalutara, that is, an area where a fairly large Roman Catholic population is found. In this area the pigs are of the small country type and are utilized as fresh pork. Many appear to be slaughtered privately on Sundays and at festivals and holiday times. On some up-country estates pigs of English breeds are kept and appear to thrive well.

The only figures which I have been able to obtain are from the Colombo slaughter-house where the average number slaughtered is nearly 10 per day, that is about 3,500 per year in an average year.

There is a certain amount of prejudice against the use of locally reared pork on account of the way in which the animals are kept and their scavenging habits.

Bacon and ham is not prepared in Ceylon, all supplies being imported. Some years ago on an estate in Matale District pigs were bred in fairly large numbers as a source of manure for the estate. Bacon, which I am told, was of quite good quality was prepared on this estate on a small scale. The experiment failed, as the company concerned had not sufficient capital to build and equip a suitable plant for the regular production of

bacon on a large scale. The plant they had was small and of a make-shift nature. With it good bacon could be produced so long as they did not attempt to make more than a very small amount. When they attempted to increase production without increasing their equipment the quality of the bacon suffered greatly. I am also told that the manure produced gave excellent results on the estate which was planted in rubber and had suffered greatly from soil erosion. The imports of bacon, ham, and pork are as follows :

Imports of Bacon, Ham, and Pork

Year	Amount Cwt.	Value Rs.
1928	4,070	445,748
1929	4,226	465,671
1930	3,263	341,748
1931	3,575	290,245

The market appears to be limited. The Matale experiment appears to indicate that good bacon and pork could be produced in Ceylon but the plant is expensive as refrigerating machinery is required for the cooling and hanging room, etc. Captain J. E. Barnes, M.R.C.V.S., now of the Turf Club, was in charge of the work at Matale and would be in a position to give further information.

POSSIBILITIES OF DEVELOPMENT AND METHODS OF ASSISTING DEVELOPMENT

Beef cattle.—Beef consumption per head of population is very low and as the reason for this is religious there would not appear to be much possibility of any marked increase. As regards the small part of the population which have no objection on religious grounds to eating meat, e.g., the Christian and Muslim sections, increased consumption would probably result from improvement of the quality of the beef.

The type of cattle slaughtered is from the butchers' point of view definitely poor. After slaughter the usual practice, more or less necessitated by the warm climate, is for the meat to be eaten on the same day. There is no period of hanging to allow "ripening" to take place. Meat from the very highest quality butchers' cattle would be tough if used after this fashion. An adequate interval between killing and eating is regarded as of the greatest importance in such countries as England and America if the meat is to be at its best as regards tenderness, digestibility, and palatability.

Improvement in this respect could be brought about only by the provision of hanging rooms at the slaughter-houses which would require to be artificially cooled. Very low temperatures are not required and the development of cheap electrical power in the future may make such rooms a practical proposition. This is a matter which should be considered by the various local authorities in charge of slaughter-houses.

There would not appear to be much chance of success in regard to developing a type of cattle peculiarly suited for the butcher. The directions in which improvement are required are quicker maturity and better feeding.

Beef cattle in Ceylon at present and, as far as one can see, for a long time in the future are simple by-products of other cattle breeding activities, such as breeding of cart and dairy cattle.

The great majority of the surplus village cattle found in many parts of Ceylon would furnish only the poorest quality of beef even if a demand sufficient to absorb them existed. The only method of utilization that I can see is slaughter for hides, preparation of meat extract, glue, and fertilizer. A method which would require capital for the erection of suitable plant and is extremely unlikely to be adopted on account of religious prejudices.

It is a problem which is likely to become more acute as time goes on if our hopes of eradicating rinderpest in the near future are realized. Periodical epizootics of rinderpest have served to keep numbers down and the removal of such a potent natural check on the increase of numbers is bound to give rise to new problems. An example of the effects of rinderpest can be seen from the returns for numbers of cattle in the Eastern Province. This is a Province which has had long periods of freedom from rinderpest.

In 1908 the returns show a total of 153,531 cattle and buffaloes in the Eastern Province. In 1909 rinderpest gained entrance to this Province and spread very rapidly during 1909, 1910, and 1911. By 1911 the numbers had been reduced to 75,721, that is, less than half. The disease decreased after 1911, but was not finally eradicated until 1915. In 1915 the number of cattle had increased to 94,029, since then the Province has been free from rinderpest and, with minor fluctuations, the number has steadily increased until the return for 1932 showed a total of 210,198, the highest total recorded in the returns available in this office dating back to 1907. That is, since rinderpest was eradicated from this Province in 1915 the numbers of cattle and buffaloes have more than doubled themselves without any coincident increase in food supplies. It is hardly to be wondered at that the cattle to be seen to-day in the Eastern Province are among the poorest in the Island. In such a Province it would be of little value to distribute stud bulls of larger and better types.

Cart cattle.—A diminishing rather than an increasing demand for cart cattle is to be expected in the future. Numbers are generally sufficient, in some places excessive, but an improvement in size and strength is desirable. The chief factor limiting size and strength appears to be food supply rather than the nature of the breed available. A well-fed and developed bull of the local breed is a very efficient cart bull and very different from the ill-fed undersized specimens too commonly seen.

The only place where a real demand exists for bulls of a larger size than the local breed is in the Northern Province and it is of interest to note that is the only Province in the Island where the number of cattle shows a definite tendency to decrease. The Northern Province has been free from rinderpest from 1914 until 1932. In 1914 the number of cattle and buffaloes was 205,958, and in 1931 171,891. This is the only Province in the Island where any definite tendency towards a decrease in numbers can be observed.

In all other Provinces the numbers during the past 10 years show a tendency to increase. During a period of 10 years the total number of cattle and buffaloes in the Island has increased from 1,428,710 in 1922 to 1,678,684 in 1930, since when there has been a decrease to 1,615,920, largely accounted for by the epizootic of rinderpest in the North-Western, North-Central, and the Northern Provinces. The total in 1930 was the highest recorded since 1908, that is, the year when the last great epizootic of rinderpest started.

What is required, therefore, first of all is an increase in the food supply. This would automatically be brought about by a decrease in numbers. Failing such a decrease in numbers the only way appears to be to induce the cattle owners to take up a practice which is entirely foreign to their custom and ideas, that is, to grow fodder crops for the use of their cattle. Without this, to my mind, any attempts to improve cattle by introducing larger breeds are foredoomed to failure. This opinion is indeed borne out by the failure of attempts made from time to time during the past 30 years to put stud bulls in the villages for mating to village cows.

While this is true of the villagers examples are not wanting to prove that bigger and better cattle can be bred in Ceylon where steps are taken to feed and care for them, as can be seen on estates belonging to some of the larger landowners, especially in the North-Western Province.

Castration is sometimes advocated as a method of improving the breed. Efforts have been made for years past to popularize this and to train men to carry out the operation. The annual reports of the Veterinary Department show that very widespread demonstrations were given and a large number of men in the villages trained, for example, from 1905, 1908 demonstrations were given on 5,913 cattle, as a result of which 237 men were trained to carry out the operation and given certificates.

Demonstrations have been continued each year, of late years with the Burdizzo instrument in addition to the method of "tapping the cord" introduced by Mr. G. W. Sturgess. In spite of these efforts extending over 20 years castration has not become popular nor had any influence in improving the type of cattle.

A possible explanation of the failure of these attempts, both in respect of castration and in the case of stud bulls, is that efforts have been too scattered and made on too widespread a scale so that any effect produced quickly disappears. Probably more intensive efforts restricted to small selected areas and persistently followed up would have a greater chance of success. It is obvious that to attempt to improve the one-and-a-half million head of cattle and buffaloes in Ceylon by the distribution of stud bulls and castration of all other bulls unsuitable for breeding will require an enormous number of stud bulls and castrators. The limited funds available or likely to be available in the future would produce much better results if concentrated on fixed and definite areas, preferably such areas where natural conditions appear more favourable for the purpose.

Milk cattle.—As regards milk cattle the position is different. The diet of the great majority of people in Ceylon is largely composed of Cereals (rice) and vegetables. It has been shown definitely that milk forms a

valuable adjunct to any diet, but particularly to a diet restricted largely to cereals and vegetables. This is on account of the high physiological value of its fats, proteins, minerals, and vitamins. Large scale experiments have clearly shown the benefits which follow the addition of milk to the diet of school-going children. There is no doubt that marked benefit both in respect of better physique and increased resistance to disease would follow a greatly extended use of milk and other dairy products by the people of Ceylon.

There is thus a potential demand for increasing quantities of milk, even the existing demand is not being met by the local supply and is being supplemented by considerable importations of tinned milk.

The problem of the milk supply is not the same in all parts of Ceylon and may conveniently be dealt with as (a) milk supply in rural areas, (b) milk supply in towns.

In the rural areas most of the families own cattle but the cows are not milked as a rule, probably because they give so little that is not thought worth while.

The solution in this area would be along the lines of each family keeping a cow or two sufficient for their own needs. The type of cow required is not a very heavy milking cow, in most cases a cow giving 5 or 6 bottles per day would meet the needs of a family. A cow of delicate breed requiring skilled care and heavy feeding is not suitable.

While it is true that the average cow of the local breed does not give more than half to one bottle of milk per day, yet there are some specimens which give more. I have seen cows of the local breed which gave 7 bottles. The fact that such cows do occur in the native breed indicates that there are possibilities and that the proportion of good cows could be increased by selective breeding and additional care and attention in the calf stages.

The question of crossing the local cow with a better milking breed would require careful consideration. Crossing with cattle of European breeds should not be encouraged. The furthest one would feel any confidence in going in this direction would be crossing with the Sind breed. Even that would only be justified in cases where there was some guarantee that the food supply would be adequate to support the larger cattle which would result from the cross.

The most permanent result would be from selective breeding from among the local breed, a slow process requiring considerable patience, but which is probably the only method likely to produce a cow suitable for the conditions as found in the average Ceylon village.

As regards the milk supply of towns, at present this is almost entirely from dairies actually in the towns or very close to them. Comparatively little milk is brought to towns from distances over 5 miles and practically none from distances over 20 miles.

These town dairies do not breed their own cows, they are dependent largely on cows bred on up-country estates. A few, following the example of the Government Dairy, breed crosses between the Sind and European

breeds, the younger stock being reared on coconut estates in the low-country. The great majority prefer the up-country cows. These dairies fulfil a very useful function, the chief objection which can be raised to them is that they are expensive to run, and milk from them is bound to be high in price. They are also wasteful of cattle as very few indeed of the calves born in such dairies are reared to maturity.

They do not require any special encouragement. Their chief need is an ample supply of good milking cows at a reasonable price. These they have so far been able to obtain up-country, but as mentioned earlier the quality of the cows up-country show signs of falling off from lack of fresh blood.

Some of the town dairies are stocked with buffaloes. Formerly the buffaloes were obtained from India, but since 1930 they have had to depend on local sources and have had difficulty in obtaining buffalo cows giving enough milk to make them profitable. They are to some extent obtaining their requirements from Tamankaduwa. They would be helped by the provision of stud buffaloes of good milking strain for use in the Tamankaduwa area. No very great increase in the amount of milk produced by town dairies can be looked for and certainly no marked reduction in the price of milk. If increased consumption of milk in the towns is to be brought about, then the present prices of milk will have to be greatly reduced. So far as I can see this can only be effected by the provision of cheap transport from areas where milk is more plentiful and cheaper. The areas where milk is fairly plentiful are the up-country tea planting districts and such areas as Tamankaduwa. If milk is to be brought from these areas the following would be required:

- (a) A distributing centre in the towns to receive and retail the milk.
- (b) Safe transport by rail by means of refrigerating cars.
- (c) Organization of the producers so that they could arrange to deliver this milk regularly at the railway station in a clean condition, preferably cooled down to 50 or 60°F as soon as drawn from the cows.

Preliminary steps would include experiments as to feasibility of transport and the length of time the milk would keep good. In connection with the examination of milk I have frequently brought samples of milk drawn in the afternoon at such places as Badulla and Nuwara Eliya to Colombo by night train and have found them quite sweet and fresh on arrival in Colombo next morning. This without any special method beyond cooling the sample after drawing, by immersing the bottle for half to one hour in cold water.

To bring milk from such places as Tamankaduwa, which are much warmer than up-country and where a supply of water cold enough to be used for milk cooling would not be available, would be more difficult and would probably mean that a collecting centre or centres would require to be established to treat the milk either by cooling or pasteurizing before putting on the railway.

Considerable difficulty would probably be met in educating the producers in clean methods of milking and handling the milk, both of which are very important if the milk is to have good keeping qualities. For these reasons the possibilities of obtaining milk from Tamankaduwa would appear to be more remote than from the up-country areas.

To my mind the Tamankaduwa and similar areas have distinct possibilities, but a beginning will have to be made on a very modest scale. A method which suggests itself is the establishment of a ghee making depôt. Nothing expensive in the way of buildings or equipment would be required. A clean shed with a cream separator, a churn and pans for heating the butter or cream would be sufficient. The milk would be brought to such a centre by cattle owners in the vicinity and converted into ghee and sold. Payment would be made to the milk producers either at a fixed rate per gallon of milk or on the actual sum realized by the sale of the ghee. The advantage of such a scheme would be—

- (1) It would not be costly to start.
- (2) It would demonstrate what quantity of milk could be obtained in such areas.
- (3) It would demonstrate whether villagers could be induced to undertake the work of milking their cows and bringing the milk in a clean condition to the depôt, and what price would be needed to make it worth the villagers' while.
- (4) It would be a centre from which instructions regarding clean milking and handling would be disseminated, and if successful with ghee would lead on to the sending of fresh milk to the towns.

Such small ghee depôts in cattle rearing districts have been operated successfully in East Africa.

Sheep and goats.—There is room for a considerable increase in goat breeding. The scheme for restriction of imports has not yet had its full effect, on account of the falling off in consumption of mutton caused by the financial situation. Any improvement in the financial situation will result in an increased demand for local sheep and goats, and if they are not available there will be agitation to increase the quota of imported animals.

So far as I can gather the factor more than any other which is hindering the development of goat breeding is the difficulty breeders experience in getting a fair price for their animals or indeed of knowing where to find a purchaser. The chief market is in the towns but a connecting link between the breeder in the rural areas, often at a considerable distance from a town, and the town butcher is lacking. The town butchers are not interested in the local animals so long as they can get their requirements more conveniently from the importers of Indian and Aden animals.

Regular livestock markets in the rural areas remedy the situation, but butchers will not patronize markets unless they are held regularly and the number of animals available is sufficient to make it worth the butchers' trouble attending them. So far attempts to establish markets have failed. A co-operative scheme as I have suggested earlier in this report would appear to be the best method.

Improvement of stock is also required, especially as regards the size. This can be brought about by avoiding breeding from immature females, early castration of males not required for stud, and the use of better stud goats.

Poultry.—Development of poultry breeding in the past few years has been fairly rapid and has now reached a stage where signs are not wanting that production is catching up with the demand and complaints are heard from breeders that prices obtained are poor. The chief difficulties appear to be the high cost of feeding because most of the foods used are imported, and the small size of eggs.

Investigation of the value of local foodstuffs is required and it is hoped to carry this out at Ambepussa Farm. If an efficient diet can be developed using the cheaper foodstuffs available locally it will be very useful.

Small egg size is a general failing and the underlying reasons are not well known. Recent experiments in America appear to show that as atmospheric temperature rises the size of eggs decreases. Should these experiments be proved correct we are up against a difficult problem. This is a matter which is already forcing itself upon our attention at Ambepussa Farm and which requires study.

The possibilities of poultry breeding in Ceylon are not yet known. Coconut estates seem to provide very favourable conditions and poultry breeding under coconuts appears to have a very beneficial effect on the palms. This has been particularly well demonstrated at Wester Seaton estate in Negombo. The two activities seem to go very well together and should the example of Wester Seaton estate be followed in any considerable scale the stage would soon be reached when an export market would have to be found.

Of all Ceylon's livestock products eggs would appear to be the only one save hides and skins which has prospects of developing an export trade. The English market is being supplied with eggs from places as far away as China and Australia. Recently India has entered this market. This stage is not reached yet but should a surplus become available the English market offers possibilities.

Pigs.—The prospects of development are poor. The market for fresh pork is limited and the supply is apparently sufficient to meet it. Whether Ceylon could produce its own bacon and ham is problematic. It is a business which would require considerable capital for plant. In the absence of a visible supply of pigs of a type suitable for bacon manufacture it would be difficult to raise capital for this purpose.

To sum up it may be said that Ceylon's livestock problems are bound up with the following basic factors:

- (1) The small consumption of foodstuffs of animal origin consequent on the religious beliefs of a large proportion of the population. This results in a very restricted market with low prices.
- (2) In many parts of the country over-stocking with cattle as a direct result of No. 1.
- (3) Poor quality pasture due to lack of attention because the returns would not justify the expenditure of time and money, fencing and caring for them, and also due to over-stocking in many parts.

The solution is difficult. Without the urge of an adequate return it is difficult to stimulate interest,