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REPORT ON THE WORK CARRIED OUT ON CATTLE AT THE  
GOVERNMENT STOCK FARM AT VALSAYN, ST. JOSEPH, TRINIDAD,  
BETWEEN MARCH 22nd AND MAY 12th 1948.GENERAL:

The Government Stock Farm, Valsayn, St. Joseph, Trinidad is situated about 1-2 miles from the Imperial College of Tropical Agriculture, St. Augustine, in a rather south-westerly direction and about 6-7 miles from the Port of Spain <sup>Arma</sup> ~~Arma~~ Railways and about the same distance on the Port of Spain <sup>Arma</sup> ~~Arma~~ main road.

It is the main stock farm run by the Agriculture Department in co-operation with the veterinary services. Another stock farm is situated at Tobago but the St. Joseph Farm in addition to breeding work is principally concerned with dairying. A dairy unit is situated at Port of Spain and some others are at principal centres to meet up local supplies. The average daily milk production is <sup>about</sup> 1200 lbs (120 gallons) valued at \$1440.0 at 30 cents per quarter gallon.

STAFF:

The Staff consists of a Manager and an Assistant Manager, the Deputy Director of Agriculture (Veterinary) and a Veterinary Officer on part time duties.

EQUIPMENT:

The principal equipments are:

- (1) A pasturising and a bottling machine as well as a

refrigerating or cooling plant.

(2) A milking machine of 8 units.

(3) A "pump spraying" machine used against ticks etc.

#### SCOPE OF WORK AT THE STOCK FARM

Breeding work is carried out with the following classes of live-stock.

(1) Poultry - mainly R.I.R. and other lighter breeds and the total flock including ducks are said to number some 350 during the period under review.

(2) Goats about 68 in all consisting of mixtures of: Anglo Nubians, Toggenbugs, Saanens, British Alpines, Jumna Pari Goats.

(3) Horse kind about 35.

(4) Rabbits.

(5) Pigs - about 60 comprising Berkshires (black).

(6) Cattle - about 400 comprising: (a) Pure Zebu, (b) Grade Zebu - Holstein Friesian, (c) Pure Holstein Friesians, (d) Water buffaloes.

#### TYPE OF CATTLE REQUIRED:

Originally the idea was to breed pure Holstein Friesians because of their high milk yield. It was discovered, as in all other tropical countries, that a tropical climate has a marked debilitating effect on their performance, often resulting in a degeneration of the breed with consequent lowering of milk yield.

Therefore the type of cattle required will be one capable

of thriving under Trinidad conditions and at the same time yielding a profitable amount of milk with a reasonable butter fat content (3.5% - 4%) as well as meat. Such an animal should possess average longevity, be regular breeders and persistent milkers and at the same time capable of converting economically feeds into milk, meat or work.

a) Suitability of Climate:

The Zebu cattle - *Bos indicus* are suited and well adapted to a tropical climate and some breeds such as the Mysore, Guzerat, Nellore and Hisser all poor milkers were originally imported into Trinidad for work. Descendants from such animals were consequently poor milkers and produced milk high in butter fat content but was only sufficient for the rearing of calves only. Among the Zebu stock at the Government Farm however, were found a few fair milkers. Pure bred European dairy cattle have also been tried at the Farm e.g. Guernseys, Red Polls, Devon Ayrshire, short horn Jerseys and Friesian Jerseys, but none of them has thrived economically as thoroughbreds and crosses between them and the local Zebu have not quite proved successful, their progenies excepting those of Holstein Friesians have the tendency either to degenerate in size although yielding milk of high quality. The Holstein Friesian on crossing with Zebus have given offsprings of good dairy types with good size and conformation.

b) Description of a typical Friesian Holstein and typical characteristics of the Zebu.

HOLSTEIN FRIESIAN:



FIGURE I. A TYPICAL HOLSTEIN COW.



FIGURE 2 : A TYPICAL ~~HOLSTEIN~~ ZEBU BULL

This breed is said to have originated in the Dutch Province of Friesland by which the breed derived its name. The typical distinguishing colouration is black and white in clear and distinct patches although slight variations may also occur such as dun and white. There is usually a characteristic white patch on the forehead and feet and the switch is white also. The head is rather longish, horns short and small with a forward and inward curve. The neck is shorter than most breeds and the hind quarters are wide and carry a considerable amount of flesh when young or when out of milk.

Figure 1 shows a typical Holstein Friesian cow.

Merits as a breed:

The breed has great milking capacity and many individuals within the breed are capable of yielding from 2000 - 3000 gallons of milk per lactation, but the butter fat content is comparatively lower than most breeds, the average being at 3.4% but with selection 3.7 - 3.8% of butter fat content has been attained. It is also the best meat producer of the dairy herds although it may often be surpassed by the best recognised types of the dairy short horns. The Holstein Friesian thrives best on the better types of pastures and on "mixed" farms with adequate food supply.

THE ZEBU:

See enclosed picture Figure No. 2... of a typical Zebu Bull at the Government Farm.

Characteristics: The skin is thin and pigmented and very loose,

especially at the dew-lap and the shin. The hair is matted. The ears are long and somewhat drooping and pointed. The animal is generally horned. A cervical hump is present and is its most distinguishing characteristic, the size and shape of the hump is very variable and the hump increases with good nutrition such as adequate good grazing and decreases with poor grazing and nutrition. The hump therefore serves as a store of food and also seems to have been designed by nature for supporting yokes while in harness. The hip bones are usually lower than those of *B. taurus* and the ribs are less curved and therefore gives the Zebu the effect of being flat sided. *B. indus*<sup>ic</sup> are generally poor milkers and although figures of pure Zebu cows are not available for the Government Farm, Trinidad, the following figures culled from the Nigerian Agricultural Department Annual Report for 1945 for two strains of Zebu cows at the main Government Stock Farm at Shika, Zaria Province, Northern Nigeria, show the extent of milk yield normally expected of the Zebu cows.



FIGURE 3 . BELLE  $\frac{1}{2}$  bred Holstein Zebu cow

No. of stations	% 1st & 2nd lactation	% 4th and subsequent lactations	Lactation Average	Correlated lactation average	P.D.B.C. Average	Correlated P.D.B.C. Average
<u>White Fulani</u>						
45-80	47.50	38.70	2134.10	2553.83	5.51	6.74
44-74	50.00	17.60	2110.80	2569.00	5.49	6.69
43-48	64.60	6.20	2139.00	-	6.09	7.53
42-73	58.90	30.10	2414.00	-	6.70	8.09
37-47	51.00	33.30	2488.00	-	7.03	8.30
<u>Dali or Sokoto</u>						
45-18	27.80	33.30	2313.30	2634.91	5.58	6.45
44-18	77.70	11.10	2012.00	2541.50	5.41	6.84
43-16	75.00	6.20	2186.00	-	6.21	7.80
42-28	39.30	42.80	2276.00	-	6.37	7.61
37-24	37.50	37.50	2998.00	-	8.40	9.81

Comparative figures for Holstein Friesian - Zebu cows at Valsayn - Govt. Farm, Trinidad.

Name of Cow	Highest yield per day lbs.	Highest yield per month lbs.	per lactation lbs.	No. of days per lactation	Remarks
lle	60	-	13,000	360	$\frac{1}{2}$ bred
ph	65	-	11,000	317	
ly	-	2003	13,553	305	
rel	85	2619	15,724	362	$\frac{1}{2}$ bred ?
aria	30	-	-	-	



FIGURE 4  $\frac{3}{4}$  Holstein - Zebu in calf heifer.

NB. All the above cows are Zebu Holstein grade cows.

Fig..... shows  $\frac{1}{2}$  Zebu - Holstein cow Belle and  $\frac{3}{4}$  Zebu-Holstein in calf heifer.

METHOD OF GRADING:

The normal procedure in the Government Farm is to grade pure Holstein Friesians bulls to Zebu cows. The attached photographs and figures show pure Holstein bull, ~~Pure Zebu cow~~, pure Zebu bull (Fig 2)  ~~$\frac{3}{4}$  and  $\frac{1}{2}$  grade Holstein cows~~ <sup>(Fig 3)</sup> and  $\frac{3}{4}$  Holstein - Zebu in-calf heifer (Fig 4)



FIGURE 5 .. PEDIGREE HOLSTEIN BULL .

GENERAL MANAGEMENT OF THE DAIRY HERD

Under management will include:

- (a) Housing and cleanliness and milking.
- (b) Pastures
- (c) Fodder and stall feeding
- (d) Feeds and Feeding
- (e) Preparation of cows and heifers for heavy milk yield
- (f) Steaming up before calving
- (g) Calf rearing
- (h) Handling of stock
- (i) Care of dairy bulls
- (j) Breeding etc.

Housing, cleanliness & Milking at the Government Farm:

The main cattle shed is a big open house with a double row of stalls, corrugated iron roof and built so high as to permit the optimum amount of free circulation of air and with adequate ventilation. The stalls are provided with metal stanchions. The floor is of concrete with two manure channels, one for each stall and a wide cleaning and milking passage of about 6 feet. Each stall has built into it a concrete feeding trough and a suitable feeding passage.

Precautions in milking: Udders and teats are washed with clean water and dried with clean cloth before milking. The cloths and the pails used during milking are sterilised with boiling water to avoid getting the milk curdling and also to stop any infection being carried from cow to cow. Any dirt is enough to curdle a whole day's milk thus resulting in a financial loss to the farm and to those who buy the milk. Usually the first draw from the teats is rejected. As each cow is milked, the milk is removed, strained and weighed and bulked in a milk can. It is important that the milkers and the clothes they wear are clean, and for this reason all milkers are provided with overalls (white) and have to wash their hands before and after milking each cow. Adequate supply of drinking water is provided as this is essential for milch cows and it is estimated that a 2 gallon milch cow requires about 10 gallons daily. This figure may perhaps be greater in the tropics.

Two milkings are normally done at about 6.30 a.m. and 3 p.m.



FIGURE 6 : THE MILKING MACHINE AT THE GOVT.  
STOCK FARM.

daily and after each milking the pen is washed out with water. The milking intervals as a rule are spaced as nearly equal as possible and in this case the nearest is between 6.30 a.m. to 3.30 p.m. owing to labour problems. If there were no labour problems the ideal time would have been 6.30 a.m. and 6.30 p.m. i.e. 12 hour intervals. A long uneven interval always results in a drop in butter fat content in the morning to as low a figure as 3% or less, although the afternoon milk will be quite high and normal in the butter fat content.

It is also important that milking should be done quickly and thoroughly and a milking machine of eight units costing about \$10,000 has been erected. The animals are now passed through the machine although a certain proportion of the cows are still hand-milked in the shed. After a cow has been through the machine, the last of the milk is stripped by hand. This is because the vacuum gauge is not working at its maximum capacity (efficiency) owing to the capacity of the "plant" operating the unit. It is being hoped to remedy this by installing a larger plant. It normally takes a cow about one month to become used to the milking machine.

#### Care of Milking Machines;

After each milking, the machine is washed and the dirt removed from the outside of the units. After this, draw sufficient clean water say about 2 gallons through each teat cup cluster, then the clusters are washed and all the inside rubber surfaces in hot water, containing some soda or any other suitable detergents.

e.g. 4 ozs of soda per 10 gallons of water. After this rinse in hot water. Then the long milk tube is attached to a steam jet and sterilised with steam for about 3 minutes or more. The stall tubes are washed daily in steam jets. All the rest of the utensils are washed in cold water, then scrubbed in hot soda water or suitable detergent and then sterilized with steam in a closed chest at about 210°F for 10 minutes.

Milk Churns are also sterilized on a jet steaming block. After sterilising, the chest door is opened and the steam allowed to escape and the utensils dry off and then left in the chest till next milking. The teat clusters and rubber parts are hung up to dry and it is necessary to hang them away from bright light. Once a fortnight the milking machine is dismantled completely and cleaned.

The system adopted at the Government Farm is a modified open air dairying and is the system <sup>many</sup> ~~most~~ farmers now adopt in Britain.

As mentioned previously the average daily milk yield is about 120 gallons. This quantity is produced normally by about 90 milking cows. In as much as possible there are always 90 milking cows in order to meet up with the demand and all matings (services) are directed towards this end.

#### Milk Yield Recording

All cows are recorded by means of the "cardboard" system to determine each cow's performance, and this is the only way of determining whether a cow is economic to maintain, and also it forms a very useful index to breeding and selection and serves

as a record for pedigree breeds.

The milk after weighing is put into a pasteurising plant which takes it to a temperature of about  $140^{\circ}\text{F}$ , then cooled in a brine cooling plant, and then bottled and is then ready for distribution to the schools, hospitals, prisons etc. and to private individuals. Any surplus milk after meeting the above, is separated into cream and skim milk, the latter being used for the rearing of calves which is supplemented with tinned milk, as necessary.

(See feeds and feeding)

These simple rules may therefore be summarised as follows:

(a) Dung must be removed daily preferably at each milking.

(b) Brush the floor and gutters and swills with water. It is important that before or during milking, raising of dust in any form must be avoided.

(c) With dairy cows, long hair must be clipped from flanks and udders.

(d) Udders must be washed before each milking using cloth and any solution of approved disinfectant. e.g.  $2\frac{1}{2}$  ozs. of Sodium hypochlorite solution in 2 gallons of clean water, changing when dirty, dry udders with cloth well wrung out in the same solution.

(e) Milkers should always be on the look-out for udder trouble and in doubtful cases, milk should be collected in a cup and clots looked for. In any case a suspected cow should always be milked last.

(f) Milkers should wash their hands thoroughly in the disinfecting solution before milking and rinse after milking each cow.

(g) Milkers should be provided with clean overalls and if possible with caps which should be worn during milking and when not in use must be washed out and hung in a clean airy place.

(h) Milking stools when in use must be kept clean and milkers must dry their hands before milking.

(i) With the milking machine, when teat cups fall off, as they invariably do during milking, they must be washed in a pail of clean water and then dipped into a disinfecting solution and then allowed to drain, and if milk should by accident drain into an overhead pipe line, wash thoroughly the part of the vacuum system affected before next milking. The pipe line must be washed and steamed once a week.

#### PASTURES.

It is hardly necessary to stress the importance of pastures to the success of any dairy industry. Where cows are entirely grazed, the minimum requirement is one cow per acre, but in the Government Farm grazing is supplemented with feeding of cut fodder. The grazing areas or pastures are fenced in and water troughs provided in each field. Being a tropical climate, the fields have been planted with, at considerable spacings, the umbrella tree (*Pithecolobium saman*). *to provide shade.*

The main sward composition of the pastures is

(a) Bahamas grass (*Cynodon dactylo*)

(b) Carpet grass or Savannah grass (*Anoxopus compressus*)

They are both low as regards yield and nutrient quality

of the herbage and mixed up with rather low growing legumes such as *Desmodium* and *Dolichos* sp. (*Hosei*). Occasionally it is said the pastures are ploughed up and manured with phosphate of lime and other artificials to keep up the mineral content.

CULTIVATED FODDER:

There are roughly 97 acres of cultivated fodder consisting of:

- (1) suggr cane - *saccharum officiale*
- (2) uba cane - *S. sinensis*
- (3) Elephant grass - *Pennisetum purpurens*.

The tops of the commercial canes are fed at harvest and is very useful together with Uba cane in the dry season. Both are usually fed chaffed by passing through the chaff cutter. Both yield about 10-20 tons per acre of fodder. The elephant grass yields about 40-60 tons of fodder per acre in about three cuttings. The fertility of the fodder areas is maintained by direct application of the mixed fodder residues, i.e. left over fodder mixed with dung and urine together with artificials especially nitrogen and phosphate of lime.

FORAGE GENERALLY:

Forage whether supplied through grazing or by cut fodder is extremely important as a cow being a ruminant requires a lot of roughage in order to get a feeling of satisfaction, and quantities consumed daily may be as high as 120 lbs., but normally in the Stock Farm a maintenance ration consists of 2 lbs concentrate and about 60 lbs cut fodder plus grazing. The important thing is

that the grass must be young and tender when the protein content is highest in order that the animal can derive the utmost benefit from it. If old and too coarse, it rather starves the animal, because energy will be diverted from other directions for its digestion and consequent assimilation so that the net energy derived from such coarse fodders is negative and will result in a progressive loss in condition of the animals so fed because the energy will have to be provided from fat and or carbohydrates already stored in the body.

Stall feeding with grass is carried out with young stock principally and horse kind and milk cows receive fodder once a day at mid-day.

#### FEEDS AND FEEDING:

General: This is by far the most important aspect of management for on it depends the success or failure of any live-stock (dairying) industry. This aspect being very important will be discussed in various sub-sections.

##### (1) Regularity:

Regularity in feeding as in all other operations is extremely important, as the reverse will bring about with it considerable digestive troubles and general unthriftiness. The animals become upset, temperamentally, and the tendency is that the food the animal takes is not made proper use and often passes out undigested in the dung. It is hardly necessary to stress that this is sheer waste both to the animals and amounts in

considerable financial loss to the management on food which is neither used for growth or for work or in some other form of production such as milk. In the Stock Farm strict adherence is kept on the times the animals are fed for all the classes of live-stock.

(2) Palatability of Food:

This is also a very important aspect which great importance is attached to at the Stock Farm. A feed may be balanced for digestible carbohydrates, proteins etc. but if it is unpalatable through being old, dirty or evil smelling through contamination, or fermented, the stock will not relish it. This is equally important with fodder. It must not be soiled or <sup>v</sup>tampled before feeding.

In pastures, it is important that different animals such as goats, sheep, pigs and cattle should not be grazed together in the same field at the same time as there is a tendency for the smell of one to upset the other, but must be grazed separately and if the same field must of necessity be used, a sufficient time must elapse say from about a week to let out the smell of one or the other before use. This routine is strictly adhered to in the Stock Farm.

(3) Feeding:

All feeding whether with live-stock or man is done with three aims in view, that is (a) growth, (b) maintenance, (c) production.

(a) Growth: Young stock normally require good rich food in order

that they may grow quickly and reach the productive stage as early as possible and such a feed must of necessity contain a high proportion of protein, in other words must have a high nutritive ratio of as much as 1 in 4.

(b) Maintenance: This is a feed or rather ration that contains exactly the right amount of nutrients to balance up the metabolic processes of the body with no increase or loss in weight to the animal receiving such a feed.

(c) Production Ration: This is a feed given in addition to the maintenance ration and is always given to mature or nearly mature animals and is always intended to produce (i) Milk as in dairy cows, (ii) eggs - as in laying birds, (iii) meat - as in animals intended for the slaughter, (iv) work - as with work beasts, (v) Wool, feather etc. in case of sheep and birds valued for their wool and plumage etc.

#### FEEDS:

There are two groups of feed in use at the Government Stock Farm.

(a) Imported feed, which include oats, wheat, pollards, linseed oil cake, meat and bone meal, fish meal, soya bean meal, millets, sorghums, blood meal, corn or maize gluten meal, cotton seed meal, groundnut meal and palm kernel meal.

(b) Locally Produced feeds are: Corn, coconut meal, varied beans, rice and rice bran and husks mixed, adlay, blood meal in places, molasses, ~~Abbator~~ <sup>Abattoir</sup> waste and bone boiled into a broth and skimmed, fish waste boiled, sweet ~~cas~~ <sup>cassava</sup> raw and chipped, sweet

potatoes cooked, yams cooked, eddoes cooked, house and hotel waste boiled, tania cooked. Rubber seeds, <sup>ee</sup>suds from many trees including the umbrella tree (P.Saman) and Mo<sup>1</sup>sa tree, uba cane and sugar cane tops and sun dried sludge.

(c) Concentrates: As previously mentioned fodder usually supplies the maintenance ration and thus gives the animals the bulk required to fill the rumen, thus creating a feeling of satisfaction. But with dairy cows and young growing animals an extra ration in a concentrated form is required to make for production which in the dairy cows is milk and in young cattle for growth. All farm live-stock are rationed on a starch equivalent and digestible crude protein basis, the basis being 6 lbs of starch equivalent and 0.6 lbs protein per 1000 lbs. live weights for cattle for maintenance. These figures have been assessed in temperate countries of the world but there may be reason to believe that under tropical conditions perhaps this figure may be slightly less because of the high atmospheric heat, little energy is required to maintain the body temperature in the tropics as would otherwise be the case in the temperate countries with relatively low atmospheric heat, more so in the winter times. The protein requirement there is reason to believe also may be about the same or even slightly higher. <sup>for the tropics</sup> In the case of dairy cows, a production ration for 1 gallon of milk an additional <sup>S-E</sup> 2.5 lbs. ~~P.R.~~ and 0.6 lbs. protein is required. Mixtures of concentrates balanced for milk production are made up and fed to cows at the rates shown per day in water as a drink plus molasses diluted in water as an

appetiser. In addition to the above, other rations are balanced for other classes of live-stock as shown under:

(A) Dairy Cows:

Maintenance:

2 lbs mixture	}	Plus some grazing during the day on the pastures.
60 lbs fodder		

Production:

4 lbs per gallon of milk per day, and for every additional gallon 4 lbs per day.

Milk cows are fed 3 times daily - 6 a.m., 12 noon and 3 p.m.

Composition of feed for Dairy cows and goats.

40% coconut meal (by weight)	}	Plus Molasses
15% Rice bran		
10% Pollard		
10% Bran		
10% Crushed corn		
5% Oil meal		
7% Soya bean meal		
2% common salt		
1% bone meal		

Goats get 2 lbs of this mixture for maintenance and 2 lbs roughly for milk production.

Maintenance ration for all cows are composed as follows:

50% coconut meal	}	Fed at 2 lbs per head per day.
40% rice bran		
7% Pollard		
2% common salt		
1% bone meal		

Maiden Heifers:

30% coconut meal	5% bran	
7% oil meal	5% pollard	
5% soya bean meal	25% rice bran	
10% crushed corn	10% fish meal	
	2% salt	1% bone meal

6 lbs of mixture per head per day.

Bulls:

- 50% coconut meal
- 27% rice bran
- 10% Pollard
- 10% bran
- 2% common salt
- 1% bone meal

Corn is fed as grain.

Feed: 4 lbs of meal and 4 lbs grain per head per day.

Working animals and water buffaloes

Drink

- |                  |   |                            |
|------------------|---|----------------------------|
| 50% coconut meal | } | Working oxen - 5 lbs grain |
| 30% rice bran    |   |                            |
| 7% oat meal      |   |                            |
| 10% bran         |   |                            |
| 2% salt          |   |                            |
| 1% bone meal     |   |                            |
|                  |   | " male - 4 lbs "           |
|                  |   | Drink - 2 lbs.             |

Other dairy feeds in use at the Stock Farm are:-

A

- 50% ground corn
- 10% bran
- 38% oil meal
- 1% common salt
- 1% lime (ground limestone)

B

- 30% ground corn
- 10% Molasses
- 50% coconut meal
- 8% soya bean meal
- 1% salt (common)
- 1% ground lime stone

C

- 40% ground corn and cobs
- 25% bran
- 6% cotton seed
- 27% coconut meal
- 1% common salt
- 1% lime

D

30% ground corn  
25% rice bran  
32% coconut meal  
2% common salt  
1% lime  
10% molasses

E

30% corn (ground)  
10% molasses  
23% rice bran  
30% coconut meal  
5% soya bean  
1% salt (common)  
1% lime

F

40% coconut meal  
10% oil meal  
10% bran  
10% pollards  
15% rice bran  
7% soya bean meal  
5% crushed corn  
2% common salt  
1% ground limestone.

Calf Starters:

Corn meal	59%
Fish meal	5%
Linseed"	5%
Oat meal	15%
Wheat bran	10%
Salt	1%

This meal is fed as follows:

3-4 months old	-	4 lbs per head per day
4-5 "	"	5 lbs per head per day
5-6 "	"	6 lbs per head per day.

All calves above six months receive the basal ration, which consists of the following:

Bran	31%
Linseed meal	33%
Soya bean "	33%
Bone meal	2%
Salt	1%

and this mixture is fed at the rates shown according to the ages of the calves:

6 months old	g'corn	4 $\frac{1}{2}$ lbs	+	1 $\frac{1}{2}$ lbs	basal ration
7 "	"	4 lbs"	+	1 $\frac{1}{2}$ "	" " "
8 "	"	3 $\frac{1}{2}$ "	+	1 $\frac{1}{2}$ "	" " "
9 "	"	3 "	+	1 $\frac{1}{2}$ "	" " "
10 "	"	2 $\frac{1}{2}$ "	+	1 $\frac{1}{2}$ "	" " "

This feed is continued until near calving.

Often it is necessary to steam up cows before calving and the cows are changed from a purely maintenance ration to a production ration.

6th week before calving	3 lbs daily
5th " " "	4 " "
4th	5
3rd	6
2nd	7
1st	8

A good milking cow can receive up to 12 lbs increase daily.

Care of in calf cows and heifers:

All in-calf cows or heifers are removed to separate pens (calving boxes) about a week before calving, and brushed daily with water and the udder is washed and massaged at the same time.

About  $\frac{3}{4}$  lb Glauber salts and one tablespoonful of ground ginger in three parts tepid water. <sup>is given</sup> The drench is repeated after calving.

Any cow that comes to milk before milking is treated as if already calved.

CALVING

After calving, the dam is allowed to lick the calf dry, the

calf is then dried. The umbilical cord is saturated with a solution of copper sulphate solution or with tincture of iodine. The calf is weighed and the weight recorded. The cow is milked and the udder massaged. The colostrum or new milk is fed to the new calf. The colostrum is very rich in protein and minerals and vitamins and has a purgative effect on the new born calf and in addition renders the calf quite resistant to white scour and perhaps pneumonia. Colostrum is particularly rich in vitamin A and carotene. Any retention of after-birth is removed by the veterinary surgeon and the uterus douched with a solution of a suitable disinfectant in warm water. 1 gram of "Chinosol" in 1000 c.c. of warm water is used in such cases to prevent infection of the womb.

Baby calves are normally fed four times a day as follows: and it is important the milk fed must be at blood heat.

	6 a.m.	11 a.m.	2 p.m.	5.30 p.m.
1st week	2 pts.	2 pts.	2 pts.	2 pts. ( <i>pts = pints</i> )
	+ $\frac{1}{2}$ pint of lime water.			
2nd week	2 $\frac{1}{2}$ pts.	2 $\frac{1}{2}$ pts.	2 $\frac{1}{2}$ pts.	2 $\frac{1}{2}$ pts.
	+ $\frac{1}{2}$ pint lime water.			
3rd week	3 pts	2 $\frac{1}{2}$ pts	2 $\frac{1}{2}$ pts	2 $\frac{1}{2}$ pts
	+ $\frac{1}{2}$ pint lime water			
4th week	3 times a day			
	4 pints	3 pints	3 pints	

and this feed is carried on up to six months as necessary.

Importance of milk in calf rearing:

Milk is both an important food to man and livestock, particularly to young stock and young children. Future animals are therefore made or spoilt by the type and plane of nutrition provided and for any successful calf rearing. The following are important times in any animals life and an animal should receive additional care and feeds as necessary at these critical periods.

- (a) The first minute of birth
- (b) the first hour of birth
- (c) the first day
- (d) the first week
- (e) the first month
- (f) first year
- (g) the first calving and the first lactation.

The methods of rearing calves adopted on the Stock Farm are as follows:

(1) The natural method <sup>as with</sup> ~~in which~~ the purely Zebu cows which only produces sufficient milk to suckle their own calves.

(2) The artificial method in which the calf is bucket fed with whole milk at the early stages of the calf and then either with separated milk or milk substitute.

Adequate clean water in troughs or specially constructed pans and fresh succulent grass in racks are provided in the pens and changed at least daily. As from the fourth week the calves are put on calf ration starting from  $\frac{1}{2}$  lb of feed and increasing as required.

After the 10th day at the Stock Farm, only separated milk is fed to calves. No gruels were fed during the period of my practical work but such gruels fed in the past were said to have consisted of  $\frac{1}{4}$  lb each of oil meal, corn meal, flour and oatmeal all boiled and made up to a gallon with water and salted to taste.

The lime water used is made up by adding  $\frac{1}{2}$  (half) pailful of white lime to a 50 gallon drum of water and using the clean water after the lime has settled down.

#### Housing and Management of Calves

It is important that in addition to good feeding, quietness and kindness of handling, should be exercised. Calves should be made to get used to human beings by being frequently handled. The reverse of these produces very bad effects, in the temperament of the growing calves and there is the tendency that the food taken is not made proper use of and passes out unused in the dung. This of course is total waste, the calves make very unthrifty growths and consequently a lot of money is spent on feeding stuffs which is converted into no use either for growth, production or work.

The calves are housed singly in little pens in as much as possible and over crowding in all its aspects is avoided. The bigger calves (weaned) are housed together about 6-12 depending on the size of pens.

It is important that calves don't eat their litter or straw as this may result in losses. Suckling of hairs especially navel sucking should be avoided and mozzling of calves in a good

preventative where they cannot be housed singly. Suckling produces "balls" and produces considerable unthriftiness in calves. The pens must be cleaned out at least daily and bedded with fresh litter but in case of "scouring" calves two or three changes per day is often done. In cases of outbreak of scour or pneumonia the pens in which the infected calves are housed is washed out daily with suitable disinfectant, quick lime is very useful in this respect.

Any cases of digestive troubles or unaccounted rises in temperature are reported immediately to the Veterinary Officer.

It is important that the calves receive adequate exercise and for this reason an exercising yard is provided for all calves. It is fenced <sup>in</sup> and contains fresh and clean grass.

Weekly weighings are done for all calves as a check on the nutritive effect of the food and an average increase for the Stock Farm is about 12 lbs for calves on normal milk ration.

#### DRENCHING:

Drenching is done regularly with calves at monthly intervals to get rid of nematode infection which the calves may pick up while grazing in the yard or by eating litter. Calves with worms are extremely unthrifty. Copper sulphate solution of a strength of 1 in 4 is used. Dosage starts from the age of 4 weeks with about 1 dram of solution in about 3 ozs of water, the dosage being increased by  $\frac{1}{2}$  dram for each month. The drench is best given by means of a dosing syringe. Treatment is carried out up to seven months by which time a maximum dose of 4 drams or 60 grain of copper sulphate is given.

Capsules of ~~sulphathiazol~~<sup>phenothiazine</sup> is often given in milk according to the prescriptions of the veterinary officer for the same purpose.

Bull calves not intended for early sale or for breeding are castrated at about 4-6 weeks old.

### DAIRY BULLS

The Pedigree Holstein bulls are rather more difficult to manage and handle than the Zebu bulls and therefore are handled with the greatest care and attention. The Dairy bulls during the period under review were not allowed to run with the herd but were exercised singly in paddocks, the aim of this being to keep them fit and keep them down from getting too fat.

### Breeding

Young heifers intended for breeding are kept away from young bull calves and bulls as they have been known to take the bull as early an age as about 6 months. Heifers are put to the bull at about 18-24 months old depending on growth so that they calve down at about  $2\frac{1}{2}$  years - 3 years.

As mentioned previously the procedure is to grade pure Zebu-Holstein cows to pedigree Holstein bulls. Only  $\frac{1}{2}$  and  $\frac{3}{4}$  grade Holstein Zebu cows are desired as these stand up well to a tropical climate like that of Trinidad. The average duration of life of cattle is estimated at about 12-15 years but the average useful life of a milch cow is about 4-5 lactations. 60 cows are about the number <sup>for</sup> a mature bull of 2 years and over.

The <sup>average</sup> lactation period is about  $10\frac{1}{2}$  months and the period



FIGURES 8 and 9 showing the "spraying machine"  
and cattle being sprayed with Cooper's  
arsenical dip at the Government Stock Farm  
Trinidad.

between successive calvings is about 13 months.

With milch cows they are mated then to the bull at about 8-12 weeks although oestrus may occur at about 5-6 weeks after parturition.

The average gestation period of the cows is about 280 days and the period between two oestrus periods is 20 days, and the oestrous proper lasts from about 18-24 hours.

### DISEASE

Diseases are very few and any diseases such as Mastitis, contagious abortion etc., are the work of the veterinary officer. All the cattle are tested for tuberculosis and positive reactors are eliminated. Among calves the prevalent diseases are white scour and pneumonia, the latter now responds to penicillin injection and the former to appropriate mixtures made by the veterinary officer. All treatment of disease is therefore the responsibility of the veterinary officer.

Dip: The cattle are sprayed with Cooper's arsenical dip of about the strength of 1 in 200 at about fortnightly intervals against ticks to prevent tick borne diseases such as piroplasmiasis, Streptothricosis etc.

Figures 8 and 9. show cattle being passed through the sprayer at the Fort. Steele Farm.