

1. INTRODUCTION.

Many difficulties of minor importance to dairy farming in the temperate regions of the world, appear as major problems in the tropics. Sterility and general breeding troubles, degeneration of European stock, (Bos taurus) and the greater difficulty in rearing of young animals, are a few of these exaggerated problems. In addition to these, there are certain other factors which, though they may not always prove greater obstacles than in the temperate countries, yet under tropical conditions there is a far greater possibility of them doing so. General hygiene and cold storage problems, the lack of succulent food in the dry season, relatively less efficient labour, and an inadequate water supply throughout the year, are examples of this type of possible problem. It is the latter, namely the water supply factor, which the writer has investigated for this thesis.

The climatic conditions in certain parts of the tropics, of high temperatures, hot direct sun, humidity ranging from very high to low, and a dry season of long duration, combine to place a great strain on a water supply. The strain is at its maximum in the dry season when there is probably a bigger demand for water without any replenishing supply in the form of rain. This bigger demand is caused, first, by the greater evaporation of water into the atmosphere, due to direct sunshine coupled with low humidity, and secondly, by the probable higher requirements of the animals for drinking purposes, on account of the less succulent food generally available in this season. The drier regions of the tropics, therefore, and those with a marked dry season, of which Trinidad is an example, are the more likely to experience water shortage problems.

That an adequate, clean, and regular supply of water is essential to dairying, both for consumption and hygienic purposes is a generally accepted fact and cannot be over-emphasised. There is yet, however, no real idea as to what quantity of water can be said to constitute an

adequate



adequate supply for dairying in the tropics. Dairy, and Animal Nutrition Research are in their infancy as compared with the better developed temperate countries. The present policy, however, of increasing mixed farming, and tendency towards more livestock generally, will need to be accompanied by this research for the policy to be successful in practice. The fact that in 1938 there were 8,958,528 lbs. of preserved milk of one kind or another imported into Trinidad (1) shows the scope for extension of dairying in the Colony. The position is very similar in the other tropical Colonies. It is in this expansion, such as the setting up of dairy farms in relatively new areas, that troubles due to water shortage are most likely to be encountered. It is therefore very necessary, before starting, to ensure that the available water supply is adequate to meet the all-in requirements of the dairy contemplated, and in order to do this effectively one must have some idea of the total quantity of water the project is likely to require.

The figures which have been worked out for dairying requirements in the temperate countries might be used as a rough guide in the present absence of data for the tropics. There is good reason to believe, however, that the consumption requirements of dairy animals in the tropics are different than when under temperate conditions, and there is also much evidence in support of the requirements for hygienic purposes not being the same. These figures therefore should only be used as a last resort, and then with certain allowances.

There are certain other aspects of the water requirements of dairy cattle in the tropics, perhaps not of such value to the practical dairy farmer, but more of academic interest. These figures have value in the part which they play in the accumulation of nutritional and other livestock data for the tropics. Comparisons between such figures and those for temperate dairy farming may be of much interest and value. A comparison, for instance, between the water requirements for maintenance of a tem-



perate breed of cattle, say Holstein, when under their natural conditions and when in the tropics, may provide some indication of the exacting effect of the tropical climate on these animals. Water, as is pointed out later, is an important agent in the elimination of excess heat from the animal's body.