

INTRODUCTION.

As agricultural production throughout the world is increased and large areas of undeveloped land in the tropics are brought into use, it becomes more and more imperative for those concerned with livestock production in such areas to appreciate the various important factors which limit output. Of these, disease is usually of primary importance, and has to be tackled at the beginning of any improvement programme. Amongst the other relevant factors, by no means the least important in the tropics is climatic stress, especially in the case of temperate breeds of cattle, and their crosses with indigenous tropical breeds.

Research into the effects of climate on cattle is conducted along two main lines; these are respectively studies of animals under laboratory conditions and direct observations of the animals' behaviour under natural conditions in the field. The former method suffers from the disadvantage that only small numbers of animals can be studied, and there are great individual variations in responses to similar conditions, while the latter method uses larger numbers of animals, but encounters difficulties due to the natural variations in field conditions.

Grazing behaviour studies have been utilised along with direct measurements of production in attempts to assess the effects of different systems of management on cattle, and while it is difficult to establish exact relationships, efforts have been and are being made to find the connection between grazing times, dry matter intake and production.

Many observers of cattle behaviour in the tropics have noted in the course of other investigations that productive activities such as grazing/

grazing are curtailed during the hottest hours of the day, and it is a widely-held belief that the provision of shade, natural or artificial, alleviates the heat stress to which the animals are subjected, and thus enables them to maintain higher levels of productivity.

The provision or maintenance of shade however is an added production cost and it is reasonable to consider whether the animals really need it or whether they can adapt themselves successfully to living without it.