

*Deficiencies in the Pasture or Diet.*—With regard to the question of a functional derangement, either pathological or physiological, resulting from a deficiency in the pasture or drinking-water, many facts would appear to point in this direction. Firstly, in most cases, beyond perhaps a slight cervicitis or even cystic condition of the ovaries, which do not lead to any interference with the normal sexual cycle, no real evidence of any serious pathological changes have been demonstrated. Secondly, after several unsuccessful matings the cow eventually conceives too late in the season and carries her calf to the end of a normal gestation. Finally, a period of sexual rest, as when a cow is held over till the next season, will suffice to lead to a successful first service. These facts suggest a temporary derangement resulting from possibly a temporary deficiency of some sort, which under New Zealand conditions can only be taken as a deficiency in the pasture or drinking-water.

A deficiency in the soil would of necessity be a permanent one, and a deficiency of the pasture would result, and sooner or later this would be reflected in the grazing animals unless remedied, where the conditions permitted, by the application of suitable soil-dressings. Such conditions exist in various parts of the world, and in others a depletion of the soil is going on, under conditions of grassland farming, where milk, wool, hides, beef, and mutton have been produced and removed for generations without any attempt being made to make good the loss of the essential minerals for plant-growth and therefore animal husbandry. Under such conditions malnutrition and sterility are known to have occurred amongst dairy stock. The possibility of such an occurrence—a progressive depletion of the soil, as apart from an actual soil deficiency—must not be neglected, even in New Zealand, which is a comparatively new country.

This soil depletion and soil deficiency would of necessity lead to more permanent ill effects, but temporary sterility cannot be so classified, since most cows which fail to conceive in the early summer are found to be in calf by February or March. This suggests possibly only a temporary deficiency in the diet of the cow in the spring months, either just before calving or during the months which immediately follow. The normal diet of the dairy cow—that is, grass (and, of course, water), must come under suspicion.

The chemical composition of the pasture varies throughout the year, depending upon the variety of plant species and the stage of growth. The animal grazing freely will instinctively select the herbage to meet its particular requirements, at least as regards the proximate principles, carbohydrates, fats, and proteins, together with palatability; but as regards the mineral elements for ordinary metabolism the supply would possibly not meet the seasonal demand, and systemic depletion would of necessity result. Calcium, phosphorus, and perhaps iodine, as already mentioned, are generally considered of the greatest moment in animal nutrition, or at any rate are the elements which have received the most consideration in connection with the problem of sterility. It is interesting to note from the few figures to hand of pasture-analyses—from one dairying district at least—that there appears to be a sufficiency of lime, but a reduction in the phosphorus content. More extended work in this direction is needed, however, before anything