

NUTRITION SECTION.

Report of I. J. CUNNINGHAM, M.Sc., Ph.D., Research Officer in Animal Nutrition.

The writer has again been absent on leave during the greater part of the year, and Dr. Marion M. Cunningham has been responsible for the activities of the section. Work has been continued on the relation between dietary protein and sterility, on magnesium metabolism, and on vitamins A and D. A considerable amount of work of a general nature has been carried out, including the testing of materials for toxicity to animals, while amongst the new lines of work commenced is an investigation of the physiology of cobalt metabolism.

DIETARY PROTEIN AND STERILITY.

Males.—It was previously reported that evidence in support of the contention that certain specific amino acids were necessary for spermatogenesis had been obtained from experiments on rats in which protein supplements were made to diets known to produce sterility. This aspect of the work is being continued, employing a large variety of proteins. So far the protein of bull testes has been found to be the best protein to prevent testicular degeneration, while casein is intermediate and meat-meal and blood-meal are much less effective. The work is being continued with other proteins.

Experiments have also been made to determine whether the degenerated testis is capable of regeneration after the animal is transferred to a diet known to produce fertile animals. The evidence is that no regeneration occurs.

Pig-feeding Experiment at Wallaceville.—In this experiment five groups of boars are being fed diets similar to those shown to produce sterility in rats. The first diet is composed mainly of wheat, the second mainly of peas, the third mainly of maize, the fourth mainly of hulled oats, while the fifth is mainly peas and meat-meal. The object is to find whether the effects of these rations will be the same in pigs as they are in rats—viz., sterility with the maize and oats and with the high-protein rations.

Bull-feeding Experiment at Ruakura.—The aim of this experiment is to test the effect of high-protein rations on bulls. The experiment has been commenced and comprises four groups of six animals. The effects of high-protein rations, low-protein rations, the normal Ruakura Farm ration, and a ration similar to that in use to stall-fed animals in Britain are being compared.

Females.—The influence of dietary protein on the œstrus cycle of females is being investigated. Proteins of different biological value and in different proportion of the ration are being fed and the vaginal smear technique is being employed to study the œstrus cycle. The work so far is in its preliminary stages.

MAGNESIUM METABOLISM.

The first stage of the experimental work on the relation between dietary magnesium and urinary calculi has been concluded. A detailed account has been published in the February number of the *Journal of Science and Technology*, but the main conclusions were as follows: High blood calcium and high urinary calcium were the first essentials to stone formation. Such a state could exist, however, without pathological result, provided the blood magnesium was kept normal by an adequate dietary supply of magnesium. When magnesium was withdrawn from the ration while the urinary excretion of calcium was high, stones were formed in the kidneys or bladders. Magnesium, therefore, exerted a determining influence on the formation of stone. The stones were largely calcium hydroxide with traces of calcium carbonate.

GRASS STAGGERS.

Active work on grass staggers has been temporarily suspended. However, the prophylactic treatment first suggested in 1934 and subsequently experimented with annually in the Waikato district has achieved a considerable measure of success. The method is to include finely ground dolomite in ensilage while it is being made, or to supply dolomite as licks or by other means. Mr. D. Marshall, who has been supervising the practical work in the Waikato, is of the opinion that the method is of considerable value when properly adhered to. The measure is largely empirical, and it is intended to reopen the investigation later.

Samples of grasses and hays have been analysed periodically from certain plots for some years now, and this work is continuing.

An experiment has been arranged, in co-operation with the Dairy Research Institute in Palmerston North, in which the effect on the blood magnesium of milking-cows is to be determined when such cows are fed perennial rye-grass, Italian rye-grass, or clover. The blood calcium and phosphate in addition will also be determined. Such an experiment will yield information on the possible part played by rye-grass in the etiology of grass staggers.

VITAMINS.

The work on vitamins has had to be curtailed somewhat owing to the demands of other work in the section. Further assays have, however, been made on some New Zealand fish-liver oils and on one sample of commercial oil.

COBALT.

Experiments have been commenced to determine the physiological action of cobalt. It is proposed to test first the effect of feeding to rats a diet deficient in cobalt. A ration has been devised which is extremely low in cobalt, and it is now necessary to test whether the deficiency is sufficient to produce pathological effects. A comprehensive scheme of work has been drawn up, but progress will be slow owing to limitations of staff and accommodation.