(*b*) The examination for magnesium of specimens of bones and organs from cows which died of grass staggers. It has been necessary to investigate healthy animals to establish normal magnesium contents and also to establish experimentally whether change in dietary magnesium will affect the magnesium content of bones and organs.

(*c*) The attempted production at Wallaceville of grass staggers in cows the magnesium-content of which was more restricted than that of affected cows.

Results :—

(*a*) The average magnesium-content of thirty-nine samples of pasture was 0·40 per cent. magnesium oxide. This was only slightly lower than the amount found in dairying pastures where grass staggers never occurs. Samples taken during July to September and those taken during outbreaks of grass staggers averaged 0·34 per cent. magnesium oxide. The difference, however, was not sufficient to justify the conclusion that a deficiency of magnesium is the cause of grass staggers. Hay and silage samples were not abnormally low in magnesium.

(*b*) The bones and other specimens of grass staggers cows (liver, spleen, lung, muscle, heart) had closely similar magnesium-contents to those found in normal slaughterhouse animals. Since other experimental work showed that bone magnesium drops with dietary deficiency of magnesium, it was concluded that no prolonged deficiency of magnesium had occurred.

(*c*) Unsuccessful attempts were made to produce grass staggers artificially by feeding two cows with a diet containing 0·25 per cent. magnesium oxide for three months before calving with a change to green oats on calving.

It was concluded from these three lines of work that grass staggers is not due to dietary deficiency of magnesium. The characteristic low blood-magnesium of affected cows, together with the response to magnesium therapy and the hopeful results in the preventive experiments referred to above, indicate still that some disturbance in magnesium metabolism is a factor. The nature and cause of this disturbance will be the subject of future work.

Dietary Protein and Sterility.

Work is proceeding in collaboration with Dr. Hopkirk.

It was reported previously that two types of sterility could now be produced in rats: (*a*) that due to excess dietary protein; and (*b*) that due to dietary protein of poor biological value.

Work on the second type of sterility has yielded hopeful results concerning the nutrition-requirements of the testis. It has indicated that certain of the amino-acids are essential to the production of normal and healthy spermatozoa. The work has opened up an entirely new field of investigation and progress is necessarily slow. Lack of funds for the purchase of amino-acids, moreover, greatly handicaps the progress.

An experiment with pigs, using a diet with biologically poor protein has given results, so far, which suggest that in this species as well as in rats, the nature of the protein may have an important bearing on the reproductive capacity.

Toxicity of Smuts.

Five samples of smut-infected grasses and cereals were received from Dr. G. H. Cunningham, and feeding experiments with rats carried out. In addition the toxicity to rats of ergot infecting paspalum and causing staggers in cows was investigated. No effect on rats could be demonstrated with the paspalum smut.

Of the other five materials four infected with *Ustilago bromivora*, *Tilletia tritici* and *Tilletic levis*, *Ustilago jensenii*, *Ustilago tritici*, proved acutely toxic to rats.

The work is still in its early stages and is to be continued and extended in the coming season.

General.

In collaboration with Dr. Hopkirk, tests have been carried out on rats of the physiological action of an alkaloid extracted from ragwort by Dr. J. R. Hosking of the Dominion Laboratory. This alkaloid was extremely toxic to rats but less so to guinea-pigs.

Various suspected poisonous materials have been tested for officers of the Dominion Laboratory.

Vitamins.

Further assays of the vitamin D content of New Zealand fish-liver oils have been completed by Dr. Marion M. Cunningham. The very high value of groper-liver oil (2,250 international units per gram), reported last year, has been confirmed on a separate sample and the probable commercial importance of this oil is therefore indicated. Results on other oils were as follows: Skate (completed assay), 15 international units pre gram; shark (preliminary assay), 8 international units per gram; kahawai (preliminary assay), 150 international units per gram; flounder (preliminary assay), 760 international units per gram; snapper (preliminary assay), 200 international units per gram.

The investigations of the vitamins A and D contents of milk, grass and hay, in relation to the vitamin supply of pigs, have been completed and the results published. Investigations of vitamin A content of other common pig foods—*e.g.*, meat-meal, pollard, &c., are under way.

BIOCHEMICAL WORK PERFORMED BY Mr. S. W. JOSLAND.

Mr. Josland supplies the following sub-report:—

It is pleasing to report that increasing use of biochemical facilities is being made by field officers in the investigation and control of stock diseases. At Wallaceville the fullest co-operation is maintained with the veterinary research officers and with the research officer in animal nutrition.

Through the courtesy of the Department I was able to spend four months in Australia visiting the biochemical laboratories and making contact with other workers. Three months of this period were spent working in the Animal Nutrition Laboratory of the Commonwealth Government at Adelaide. There I was privileged to form one of a team of workers investigating the factors governing the level of blood-phosphate in the ewe. I was able to confirm both in Adelaide and on my return to New Zealand the finding that marked irregular variation in the level of blood phosphorus occurs in the normal ewe under standardized pen-feeding conditions and at pasture. Experiments suggested that the variation might arise from the rate of secretion of phosphorus in the saliva (about 2·5 to 7·0 grammes of phosphorus enter the alimentary tract each day from the saliva), and its subsequent absorption from the intestine. The continual depositing and mobilization of phosphorus from the bony skeleton, may lag behind the rapid changes of secretion and absorption of the "floating phosphorus" in the intestinal tract. However, in spite of the fluctuations that do occur in the same aminal, the Adelaide