"Bloat."

Analyses of the gases from the rumen of bloated and normal cows have been made. The results show wide variations for both bloated and normal cows; carbon dioxide, oxygen, methane, nitrogen, and hydrogen being present in variable amounts.

Toxicity of Smuts.

Samples of certain smuts which occur commonly in New Zealand forage plants have been supplied by Dr. G. H. Cunningham of the Plant Research Station. These are being fed to animals, and observations of their toxic effect are being made.

Vitamins.

Assay of several New Zealand fish oils for Vitamin D has been completed by Dr. M. M. MacOwan. The Vitamins A and D content of fresh grass and of hay have been assayed biologically as the petroleum ether extracts of the grass and hay. The results are given in the accompanying report of Dr. Hopkirk.

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

Mr. Josland supplies the following sub-report:—

Liver-function Test.—The Rose Bengal excretion test was carried out on six healthy pregnant ewes. In five cases more than 50 per cent. and in one case a 40 per cent. elimination of dye from the blood stream was obtained in ten minutes.

Bloat in Cattle.—Electrometric pH determinations were made on rumen contents and grass extracts under varying conditions.

Grass Staggers.—A further series of blood analyses and urinalyses were carried out, the main feature being the low serum magnesium-content. Albumen and acetone were generally present in the urine. Values for creatin and creatinine in the urine were fairly constant and within normal limits.

Mairoa Disease in Sheep.—Blood analyses and bone-ash determinations were made on several affected animals. In blood, values for calcium, magnesium, and non-protein nitrogen were within normal limits. The hæmoglobin and red-cell count were markedly lowered. In one case under examination ash-values of 54·3 per cent. and 56·1 per cent. were obtained from head of femur and proximal epiphysis of the humerus.

Leukæmia.—Serial blood counts were made on healthy and affected birds. A constant feature in affected birds was a high polymorph differential percentage count.

Morton Mains Disease in Lambs.—Analyses of the blood of affected lambs showed a slight anæmia with a normal colour index. Compared with those obtained from healthy normal lambs, values for blood calcium, magnesium, non-protein nitrogen, leucocyte count, and differential leucocyte count were normal. Values for inorganic phosphorus and total solids were slightly lower. Lowered ash-content of the head of the femur and proximal end of the humerus suggested a mild degree of imperfect calcification.

Facial Eczema in Sheep.—The serum contained a large amount of bile pigment. The Rose Bengal test gave results indicating impairment of liver function.

Mineral Metabolic Experiment.—Analyses on rat and sheep bloods have been made in co-operation with Dr. Cunningham's experiments.

Total Number of Specimens.—Sheep blood, 254; cattle blood, 70; rat blood, 174; fowl blood, 284; rabbit blood, 45; pig blood, 8; urine, 15; bones, 128; pH electrometric, 44; cerebral spinal fluid, 5; miscellaneous, 10: total, 1,037.