(7) Animal Nutrition.

SHEEP.

The following work has been in progress :—

(1) *Winter Feeding Trials of Sheep.*—Four mobs of ewes have been wintered on grass, straw, and hay, plus the following supplements : (*a*) ½ lb. oat-sheaf chaff ; (*b*) ¼ lb. oat-sheaf chaff and 2 oz. of meat-meal ; (*c*) ¼ lb. oat-sheaf chaff and ½ oz. of Cystinos ; (*d*) ¼ lb. wheat, ¼ lb. peas, ¼ lb. oat-sheaf chaff, and 2 oz. meat-meal. Hay replaced straw late in the season, and ensilage was used for three weeks before lambing. No turnips or green feed were used.

(2) *Effect of Winter Feeding on Lamb and Wool Production.*—The lambs from the above ewes were weighed at birth and subsequently at intervals till disposed of, in order to discover the effects (if any) of different winter feeds. Wool-weights were also taken.

(3) *Production from Intensively Grazed Grass.*—Records were kept of live-weight production per acre of differently manured paddocks intensively grazed.

(4) *Fattening of Lambs on Grain and Grass.*—The lambs referred to above were fattened on grass and grain, and records of the value of such feeding kept.

(5) *Effect of Bluestone Administration (for Worms) on Growth-rate of Lambs.*—Some of the lambs above were dosed periodically with bluestone, and records of growth-rates were kept.

(6) *Effect of Iodine on Growth-rates.*—A mob of ewes, half of which are dosed weekly with potassium iodide, have been kept under observation since November, 1929. Lamb and wool production and general health as influenced by iodine are being recorded.

PIGS.

Work under this heading has been directed mainly towards an investigation of the relative efficiencies of pigs as pork or as bacon. Twenty-five sows have been kept and the progeny used for the above purpose. Costs of keeping sows and producing weaners have also been worked out. Feeding trials with a meat-meal containing finely ground bone have been carried out.

(8) Plant-breeding—Herbage Plants.

All selections and progeny lines of cocksfoot, rye-grass, and red clover are now being grazed by sheep. The plots have been fenced to allow the different lots to be grazed when necessary. By this means the reaction to sheep-grazing is determined. That it is an important factor is clear, in that, out of 334 cocksfoot selections tested under grazed and ungrazed conditions, seven were grouped as grade 1 under both methods ; on being grazed, six have come up from grade 2 to grade 1, four have come up from grade 3 to grade 1, while twenty have gone down from grade 1 to lower grades. The remainder were no good under either method.

Cocksfoot.—The offspring of twenty-one selections, shelter-pollinated, have been tested as spaced plants and their reactions to grazing noted. There are marked differences between the offspring of different selections, some selections producing over 50 per cent. of grade 1 plants, others not producing any.

An additional 70 selections from different soil formations in the South Island have been shelter-pollinated and the seed sown, the plants to be transplanted in the spring. The best offspring producers have been self-pollinated for further selection and inbreeding.

Yields from pure sowings of different lots of cocksfoot have been obtained (nine four periodical cuttings), and show distinct differences in yielding-capacity :—

	Air-dry Matter per Plot (Average of Three Plots). Grm.
Commercial, Canterbury Plains	330
Old pasture, Canterbury Plains	460
Canterbury roadside	566
Commercial, Southland	515
College pedigree strain C 233	625
College pedigree strain C 13	403
Commercial, Akaroa	497
Y 100	322
Y 101	500

Two hundred and fifty pounds of College pedigree strain C 23 was harvested, and four small trial plots put down in four localities. In addition, 10 acres has been sown pure for seed-production.

Rye-grass.—Work on rye-grass has been continued along the same lines as with cocksfoot. The offspring of seventeen selections have been tested. An additional thirty-one selections from different parts of the South Island have been shelter-pollinated and the plants transplanted as spaced plants.

Nineteen plants of Italian perennial were grown last year, and selfed, sib back-crossed, and often pollinated seed obtained. The plants have been planted out as spaced plants. Yield trials with different lots of perennial rye-grass demonstrated the existence of good and bad lines of commercial seed. In general, seed from old pastures, whether from Southland, Canterbury, Hawke's Bay, or Poverty Bay, was good, and there was no difference between any of them. On the other hand, many lines from yearling stands were badly mixed with Italian rye-grass, one line being pure Italian.

Red Clover.—The work with this species has consisted in testing out progeny lines produced by crossing different pairs of parents. Twenty offspring lines have been so tested and ten new crosses have been made.