

#### TRIALS TO OBSERVE THE EFFECTS OF DIFFERENT FORMS OF NITROGEN.

These trials are being maintained at the present time, the chief feature is the inferiority of sulphate of ammonia on unlimed ground. It would appear that the continued heavy applications are increasing soil acidity to a marked extent.

#### (2) MEASUREMENT OF PASTURE-PRODUCTION THROUGHOUT THE YEAR BY MOWING WITH A LAWN-MOWER: RUAKURA FARM OF INSTRUCTION.

This trial was commenced in June, 1929, and is an extension of (1) above. It aims at a determination of the effect of winter, spring, summer, and autumn applications of superphosphate. Applications of nitrogen in autumn and winter are also included. In 1929 the spring nitrogen had a marked effect on production in this trial. The second and third applications of nitrogen in the autumn of 1930 and the spring of 1930 respectively had very small effects only. This trial will be reported on along with those being conducted at Marton.

#### (3) MOWING TRIAL IN CO-OPERATION WITH THE CHRISTCHURCH TECHNICAL COLLEGE.

On account of an unsatisfactory strike of the seed sown in this trial it has had to be abandoned. Work such as this must be under full control of the Department as it is too detailed and exacting to be worked on a co-operative basis.

### B. GRASSLAND INVESTIGATION AND DEMONSTRATIONS BEING CARRIED OUT BY FIELD OFFICERS OF THE FIELDS DIVISION.

#### (1) GRAZING TRIALS ON DAIRY-FARMS.

During the season under review these trials were reduced to forty-three. Of these, thirty-three were carried out in the North Island and ten in Otago-Southland district. The results of the second season were in fairly close agreement with those of the first season, and indicate that the use of nitrogen is profitable, generally speaking, on good pastures only. A full report covering the two seasons was published in the *Journal of Agriculture* for February, 1931.

#### (2) GRAZING TRIALS TO DETERMINE THE RELATIVE MERITS OF HAWKE'S BAY RYE-GRASS AND SO-CALLED PERENNIAL RYE-GRASS IN CANTERBURY.

Six trials on carefully selected farms were laid down during the past year. The management up to date has been satisfactory in the main. No marked differences occurred in the carrying-capacity of the two types of rye-grass up to the late summer. The superiority of the true perennial appears to be establishing itself at the present time.

Experiments of different types of rye-grass were laid down in conjunction with these trials by the Agrostologist. They are already providing convincing evidence in Canterbury of the superiority of the good perennial types.

#### (3) OBSERVATIONAL TOP-DRESSING EXPERIMENTS.

A series of reports on about two hundred of these experiments conducted in Canterbury were published in the *Journal of Agriculture* for October, November, and December last. These trials very clearly demonstrate the importance of lime in conjunction with superphosphate on grasslands in Canterbury. In 1929-30 80 per cent. more lime was used in Canterbury than in the previous year. In 1930-31 133 per cent. more lime was used than in 1928-29, in spite of a general reduction in the use of lime over the South Island as a whole. It is fairly certain that this increase is largely due to the demonstrations provided by the experiments mentioned.

The extension of this type of experiment, which aims at securing a fertilizer-response survey of New Zealand, has not been pushed ahead as rapidly as was hoped, on account of financial stringency. About one hundred new trials in other parts of New Zealand were laid down during the year. The total under way at the present time is about four hundred. Approximately one hundred of the Canterbury trials have been given up, as in most cases the fields on which they were laid down have been ploughed up. The desirability of extending these trials as rapidly as possible is evidenced by the fact that in quite a number of places potash is having a marked effect on production where its deficiency was hitherto unsuspected.

#### (4) HAYING TRIALS.

Most of these trials have served the purpose for which they were laid down, and, consequently, are no longer carried on. At the present time only ten of these trials are being proceeded with.

### C. EXPERIMENTS ON ANNUAL CROPS CARRIED OUT BY FIELD OFFICERS.

#### WHEAT MANURING.

A programme of wheat-manuring experiments was maintained during the past year. Twenty-four trials were laid down in the Canterbury-Marlborough district, and eight in North Otago. The experiments for the previous year were reported on in the *Journal of Agriculture* for July, 1930.

The 1930-31 season has not been as favourable to manure response as previous seasons. This applies particularly to nitrogen. The general average increase from 1 cwt. nitrate of soda was 2.6 bushels per acre. This represents the lowest seasonal average for some years, and shows a loss from the use of nitrogen, although superphosphate has maintained a good paying increase. Increasing the quantity of superphosphate to 2 cwt. per acre has not been productive of good results in the main, and it would appear as though 1 cwt. per acre just about meets the requirements of the wheat crop. The spring top-dressing of extra phosphate along with nitrogen was carried out by using ammonium phosphate. The results from this treatment were not as good as when nitrogen alone was used.

*Trial of Different Forms of Nitrogen at Different Times of Application.*—A report on this trial carried out in the season 1929-30 was published in the *Journal of Agriculture* for March, 1931. The results indicate that nitrate of soda gave best results when applied in September or October rather than in August. In the case of sulphate of ammonia better results were obtained from the dressing in August than from dressings in