

Investigations into the movement of lime in the soil as affected by rates of application have shown that after two years less than one-fourth of a 2-ton-per-acre dressing remains as calcium carbonate. The remainder has reacted with the soil and is present in an exchangeable form. During this period there has been some movement of this exchangeable lime down below 6 in. in the soil. The effect of two ground limestones widely separated in chemical reactivity is being studied, both samples being applied in three grades of fineness.

(2) *Reversion of Superphosphate by Carbonate of Lime*.—As a result of conflicting reports on the ability of a super-lime mixture to eliminate the bad effects of super alone on the germination of turnip-seed an investigation into the ability of ground limestones to revert the water-soluble phosphate into water-insoluble phosphate, but still leaving the phosphate in a form available to plants, has been carried out. The presence of sufficient moisture is one of the main essentials to efficient reversion. In a dry condition very little reversion takes place in spite of several months in intimate mixture. In this case reversion cannot take place until the mixture is applied to the soil. If the soil is dry and the dry super-lime mixture is sown with turnip-seed considerable germination injury may take place. If, however, water is added to the mixture prior to sowing rapid reversion takes place, and if not too large amounts of water are added the mixture, after reversion, will be in a dry state suitable for drilling. Fineness of grinding of the lime considerably affects the rate of reversion, but differences inherent in the original limestone are responsible for the greatest differences. For example, Waikari and Cheviot ground limestones when used with super will correct the harmful effect of the super much more effectively than ground limestone from certain other districts, although the fineness of grinding and the total CaCO_3 may be practically the same.

(3) *HCN in White Clover*.—Determinations of the potential HCN-content of approximately one thousand two hundred samples of white clover have been carried out. This work has been done mainly in connection with the certification of white clover. Investigation has shown that, while the season-to-season variation in HCN-content may be fairly large, the day-to-day variation and the variation at different times of the day is not very great. There is a slight tendency towards higher HCN-content during the evening, but the results are not very conclusive.

FIELD EXPERIMENTAL WORK.

(By J. WOODCOCK.)

(1) *Experimental Farm, Marton*.—Eleven trials are now being carried out under the “alternate mowing and grazing technique.” Four investigate the relative merits of different kinds and methods of applying phosphatic or nitrogenous fertilizers. One of these, which has served its purpose, is shortly to be discontinued. Two experiments are concerned with an investigation into the liming of grassland, one being a trial of different methods of applying ground limestone while the other, which has only recently been established, aims at a determination of the relative merits of the coarse and fine fractions, respectively, of ground limestones from two sources. A further trial is designed to investigate the effect of pasture-cultivation with a penetrating harrow. The remainder of these trials are being carried out in collaboration with the Agrostologist to compare the production of various strains of grasses and clovers.

(2) *Ruakura Farm of Instruction*.—An experiment is being carried out here under the “mowing and grazing” technique which has for its object a comparison of no manure with super and with super plus lime, the latter being applied by two different methods. Lime is giving quite a marked response.

(3) *Observational Top-dressing Experiments*.—There are at present in existence throughout New Zealand 430 observational top-dressing experiments with the object of surveying grasslands from point of view of their response to lime, phosphate, and potash.

Responses to phosphate occur on most of the soil types on which trials have been laid down. Nevertheless, in some districts it has become evident that the effect from phosphate is only slight unless either lime or potash is applied in addition. In parts of Westland, Canterbury, and Southland the marked effect of lime has been recognized for many years. Trials in North Auckland now indicate that lime is a major limiting factor on the clay and the ironstone soils in that region. There are also some of the volcanic soils of South Auckland which respond quite well to lime.

Potash has been effective in experiments laid down in North Taranaki and in parts of South Taranaki. In the former region about a hundred small plots were laid down last spring to define, if possible, the limits of the potash responsive areas. Unfortunately, the subsequent abnormal dry summer conditions mitigated against securing on these the same marked results from potash as have occurred in previous experiments. In the Waihi district of the Auckland Province a number of trials recently laid down have indicated that good results from potash might be expected in that region. Various forms of phosphate are being compared in many trials. Slag is generally quite effective, but is not superior to super or to super and lime except in isolated cases. Rock phosphates have been invariably less beneficial than the above.

(4) *Demonstrations and Trials of Grass and Clover Strains* (in collaboration with the Agrostologist).—There has been an increase in the number of these demonstrations during the year. They are proving of great value not only for purposes of testing strains of grasses and clovers in different localities, but also for demonstrating to the farming community the importance of sowing approved strains and grass-seed mixtures. Such areas are almost ideal for field days, and in that respect are of great help to the instructional staff in furthering knowledge gained at research centres and in emphasizing the importance of sowing better strains of herbage plants. Alongside these demonstrational areas top-dressing experiments have been laid down.