Lime is applied to the cultivated land.

where there is risk of the development of club root the early application of lime is advocated. When swedes are sown the fertiliser used is either a mixture containing a percentage of lime, superphosphate and lime in equal quantities, or reverted superphosphate. Usually the next crop is grain; if, however, a second brassica crop is taken instead of grain or if brassicas follow grain, a further application of 1 ton of lime per acre may be made, and at sowing down almost all farmers apply 1 ton of carbonate of lime per acre.

Pastures

The introduction of improved strains of grasses and clovers has had a direct bearing on the increased use of lime on pasture land; and, conversely, the steadily increasing quantity of lime being applied is influencing the quantity of Certified seed being used. Southland farmers have learned that if the best results are to be obtained from the use of Certified grass seed for pasture mixtures, it is essential to have a vigorous white clover growth. The use of lime is a basic factor in obtaining this necessary clover growth and thereby starting the cycle of building up fertility and consequent high production per acre. Lime is therefore also applied in conjunction with topdressing (see Table 6).

TABLE 6—ACREAGE OF GRASSLANDS TOPDRESSED WITH LIME

Year	With lime only acres	With lime and fertilisers
*1928–29 ..	77,548	30,222 tons
1938–39 ..	46,534	194,067 acres
1948–49 ..	128,052	227,941 acres

* In 1928–29 agricultural and pastoral statistics enumerated only under the single heading of area topdressed with lime.

Lime Supplies

There are 13 lime quarries in Southland, and 11 of these are in western Southland. Until a works was opened in the Balfour district in 1935 all lime for eastern Southland (except that coming from Otago works) had to be railed from the west.

The opening of the Balfour works had the full support of the farmers in the district, and this handy source has had a very significant influence on the development of farms throughout eastern Southland. There is another small works in eastern Southland at Waimumu, near Gore.

To assist in maintaining the quality of the lime that is sent to farmers official samples are drawn from each works at regular intervals. These samples are analysed for lime content and tested for fineness of grinding. The present cost of lime in Southland is 19s. per ton ex works.

Transport and Distribution

Improved facilities for transport and distribution are other factors which have had a great influence on increased use of lime in Southland. Southland is well served with rail transport, but the fact that 8 of the limeworks are fairly close to one another tends to create a bottleneck, particularly at periods of peak demand.

Free railage on lime was abolished in 1947 and was replaced by a lime transport subsidy whereby the farmer was required to pay the full railage for the first 15 miles and was thereafter entitled to a 50 per cent. subsidy on railage. At the same time a subsidy on transport of lime by road was introduced under which the farmer received 4d. per ton per mile after the first 3 miles. A revision in 1949 increased the rail subsidy to 75 per cent. after the first 15 miles and that on road haulage from 4d. to 6d. per ton per mile for parts of long road hauls.

Because of the subsidy on road transport, the proportion of the total output of Southland limeworks that was conveyed by rail has dropped very substantially during the last few years; for example, in 1946 just over two-thirds went by rail, but for the first 5 months of 1950 under one third was railed.

With lorry transport and a heavy truck fitted with a lime-sowing attachment 70 acres per day can be limed, using bagged lime, at the rate of 1 ton per acre, if the supply of lime is kept up to the spreader. Even if both carting and spreading are done by one lorry, it is possible for 3 men to cart and spread 30 tons of lime per day where the distance from source to paddock is 7 miles and an 8-ton load is taken at each trip.

In recent years rapid progress has been made in Southland with bulk spreading. The use of specially designed vehicles eliminates the need for bagging and these units, which are loaded in a few minutes at the works, can each cart 20 miles and spread 40 tons per day; on short hauls 100 tons per day can be exceeded. There is no handling and only a lorry driver is required. The cost of spreading is between 3s. 6d. and 4s. per ton per acre on grassland and 5s. per ton per acre on ploughed land. These vehicles can handle dried and undried lime, but damp lime tends to pack down hard during a long haul.

Future Trends

The peak periods of demand for lime are between October and December, when most of the crop and pastures are sown, and in May when lime is required for pasture topdressing. Production at the works must be carried on throughout the year; bin storage at the limeworks is limited and it is necessary therefore to devise means of securing more uniform production and distribution, thus lowering per ton production costs and making better use of road and rail transport.

Stockpiling of lime has been tried successfully in parts of the North and South Islands, but has not been attempted on an extensive scale in Southland. Small stockpiles of dried lime have been made and the material has been spread successfully, a bulk-lime spreader with spinner distributor being used, even after being subjected to periods of wet weather. The development of stockpiling of undried lime in Southland depends on the suitability of the material for this purpose; a prerequisite for successful stockpiling is suitable lime and equipment. Most limes apparently can be stockpiled satisfactorily. The exception is material containing clay-like impurities, which become sticky and unmanageable when wet.

If stockpiling of Southland lime proves practicable, the cost of drying it (about 3s. per ton) would be eliminated and the problem of distribution throughout the year would be solved, but there are technical difficulties to overcome. Some of the works have been experimenting with stockpiling of undried lime; the chief difficulty is satisfactory pulverising and screening of this lime to conform with the fineness of grinding required. A further difficulty is that the organisation of most of the Southland works is such that the lime moves from the primary crusher to the drier and then in to the pulveriser, so that if the problems of pulverising and screening of undried lime are solved, extensive alterations will be required at these works to facilitate the production and loading of undried lime.

Though there have been great increases in the quantity of lime produced and used and though much of the flat and undulating country in Southland is now being adequately limed, there are still considerable areas to be brought up to the highest production. In these districts, generally the more hilly parts, there are areas with a high potential production. All Southland soils have benefited by liming in the past, and these "back-block" areas will also require adequate applications before their production can be raised substantially. The development of stockpiling and bulk sowing will probably play an important part in bringing this land up to the standard necessary for maximum production from it.

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