

the initial cost of establishment, when spread over so many years of good production, represents but a slight overhead charge on the gross returns.

*Capacity to improve Soils.*—The fact that lucerne, being a legume, has the power of utilizing the nitrogen of the atmosphere is a feature which commends it. This fact means that usually lucerne, instead of calling for the use of expensive nitrogenous manures, actually builds up the content of nitrogen in the soil. This, together with its deeply penetrating root-system, means that lucerne tends to built up rather than to exhaust soil-fertility.

#### SELECTION OF SOIL AND SITUATION.

Deep fertile, open, well-drained loams are undoubtedly best for lucerne. On account of the deep habit of its root-system lucerne does not thrive on a soil which because of bad drainage or impervious subsoil does not allow of deep root-penetration. Good surface drainage and under-drainage are both necessary. Land selected for lucerne should be either of high productivity naturally, or made so artificially by the application of suitable dressings. The marked success which characterizes lucerne in Central Otago may definitely be linked with the fertility of the soils.

In selecting land for lucerne it should be remembered, also, that lucerne is not well fitted to battle against weeds in its early life. Hence it is not advisable to select land which is known to be infested with seeds of annual weeds, or with parts of twitchy perennial weeds, unless these have been weakened by previous cultivation or cropping.

Because of the injury weeds may cause lucerne in its early delicate stages, it is at times good practice to select for a new area land which has been down in grass for many years, and to plough it deeply once only. A preliminary skim ploughing to secure disintegration of the turf may often with advantage precede the deep ploughing, but a second deep ploughing is inadvisable, because it would bring to the surface again the numerous weed-seed population which was buried by the first ploughing and which will remain dormant and harmless provided it is not brought back to the surface. Apart from weed considerations, the establishment of lucerne on a soil freshly broken up from old pasture is at times of advantage because such a soil possesses a certain amount of accumulated fertility likely to be of value to the lucerne. A pasture infested with twitchy weeds should as a rule be avoided when it is intended to sow lucerne immediately after grass.

It is almost courting disaster to sow lucerne on land which recently has been under the plough unless the crops preceding the lucerne were kept free from weeds, or unless some way of freeing the land of weeds, such as suitable cultivation, has been adopted.

Provided lucerne can become reasonably well established it will frequently battle successfully even against persistent vigorous weeds. For instance, at times lucerne successfully combats Californian thistle, but for this to happen the thistle must have been weakened sufficiently by previous cultivation to allow of the satisfactory establishment of the lucerne.