



A Cover Crop of Clover in the Orchard of S. Carruthers, Oakville, Ont.

in with surface earth, and when the soil is hard with a hardpan. I think that a person would be well repaid for the extra expense in planting.

The holes are made with an augur made for the purpose or with a well sharpened crowbar. A hole can be put

down thirty inches in a very few minutes. The dynamite that is used for this purpose costs thirteen cents a pound and one-quarter of a pound is sufficient for one hole. Caps cost one cent and fuse about one cent, making a total cost of about six cents a tree.

## Cover Crops for the Orchard

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**D**URING the past twenty years, a large amount of experimental work has been conducted in the different uses of farm crops. This is particularly true in the uses which have been made of farm crops other than the production of grain or of fodder in the regular way. The terms "cover crop," "green manure crop," and "catch crop," have become quite familiar in our regular agricultural operations. The term "green manure" is used when a crop is plowed under for the object of enriching the soil. That of "catch crop" is used when a crop is grown between the regular periods of two ordinary crops so as to make the best possible use of the land, and the term "cover crop" is used to apply to those crops which are sown in mid-summer to cover the land during the latter part of summer and the autumn, and frequently during the winter and the early spring.

### LOSS OF PLANT FOOD

A few years ago the use of the bare summer fallow was general throughout Ontario. It was thought by many farmers that the bare fallow was absolutely necessary in order to kill the weeds, to liberate plant food in the soil, to preserve soil moisture, and to thus furnish a proper seed bed to the following crop, especially winter wheat. Investigations carried on at our Agricultural College at Guelph and at other institutions show that there is a danger of a considerable loss of soluble plant food by means of

the drainage water from the bare summer fallow.

The writer made determinations at the Ontario Agricultural College several years ago, in which the drainage water was collected, measured, and analysed monthly from each of six different soils in each of three or four years. The soils were divided into three groups, each group consisting of three samples. In one group, the soils were sand, clay, and loam, which were cropped continually. In the other group, the soils were all loam, one being cropped constantly and the other two were bare fallow and winter wheat alternately. Careful determinations were made of the amount of rainfall each month and of the drainage water passing through the different soils.

### THE RESULTS

It was found that the loam soil which was used as a bare summer fallow furnished a greater amount of drainage water than the combined amount produced by the other five lots of soil. It was also found that the drainage water from the summer fallow was richer in soluble plant food than the drainage water from any of the other soils. It was found, moreover, that the percentage of plant food in the drainage water from the bare summer fallow increased from month to month during the summer and the autumn, or in fact until the ground became frozen.

These results were both interesting and suggestive. The present practice of

Ontario farmers in discarding, to a great extent, bare summer fallow and instead cultivating the land in the early part of the season, and sowing a cover crop in the middle of summer, has many advantages on the ordinary farm, and especially on the fruit farm.

### COVER CROPS FOR THE ORCHARD

It has become the practice by a number of our best growers to cultivate the soil during the early part of the season and to sow a cover crop in the orchard about the middle of summer, usually in the month of July. This system has many advantages. From what has already been said, it will be seen that there is likely to be very much less waste in soluble plant food especially the nitrates in leaching through the soils and being wasted in the drainage water.

If leguminous crops are used, the soil is likely to be considerably enriched in nitrogen through the influence of the nitrogen gathering plants. These advantages would prove almost equally true, whether in connection with ordinary farming or with fruit growing. In connection with fruit farming, however, there are several other advantages, such as the checking of the growth of the trees so that the wood can become ripened and somewhat hardened before the winter season, the protection of the roots of the trees during the winter, and the better control of soil moisture.

By means of the cover crops, the amount of humus in the soil is considerably increased, which not only increases the amount of the plant food in the soil, but also greatly increases the power of the land to retain moisture and makes the soil more friable and less liable to bake and form cracks on the surface in the hot, dry weather. The humus content of the soil has also a marked influence in giving the proper environment for bacterial development and in the promotion of nitrification. It might safely be stated that the proper use of cover crops improves the chemical, the bacterial, and the physical properties of the soil, each of which has its own value.

### KINDS OF COVER CROPS

No cover crops will prove the best under all circumstances. The kinds which are selected for the best results on any farm will depend considerably on the particular requirements, and on the local conditions.

In some instances, it may be desirable to have a cover crop which can be sown in July and which can be plowed under in the autumn. In such cases, buckwheat, rape, common field peas, or soy beans might be mentioned as likely to be amongst the best. Of these, the peas and the soy beans are leguminous crops and would be of the most value in enriching the soil. In an experiment which was conducted at Guelph on four differ-