there must be very heavy depreciation in the quality of many shipments, and that a more detailed study of the behaviour of the variety is needed. Even in the best keeping line, that held at 38° F., there was as much as 12 per cent. of breakdown of sufficient severity to spoil the commercial value of the fruit. At the end of three weeks after removal from storage this figure had increased to 16. A picking taken just previous to the export closing date of the variety showed 16 per cent. of moderate to severe breakdown on removal from store and 37 per cent. at the end of three weeks. In addition to the damage directly attributable to breakdown, there was a very considerable depreciation in the quality and palatability of the variety. In the early picking a considerable percentage of bitter-pit developed, but there was practically none in the late picking.

Dunn's Favourite has so far showed little trouble at any temperature. As far as the work has gone, 35° F. seems to be the temperature which produces the most desirable apple at the termination of the storage period.

Breakdown has not proved serious in the Jonathan. The most striking fact so far brought to light with this variety is that deep scald—an irregular, sharply outlined browning of the skin of the apple, associated almost invariably with browning of the underlying tissue—is found to be almost entirely confined to apples stored at 32° F. It is evident that if this trouble is to be avoided the Jonathan must not have its temperature lowered below 35° F.

The Delicious, as may possibly have been anticipated, did not develop breakdown at any storage temperature. The deciding factor influencing the choice of storage temperature for this variety is the flavour and general eating-quality of the fruit. With the early picking, a temperature of 32° F. prevented any ripening process taking place and gave a much inferior result to that obtained at 35° F., while this in turn was not as good as at 38° F. No sign of mealiness was in evidence at any temperature.

The above notes cover only a few of the more striking points so far brought out, and until the examinations are completed it will not be possible to view the data in proper perspective and draw reliable conclusions as to the best treatment to be accorded to any one variety.

INVESTIGATIONS OF THE UTILIZATION OF PAKIHI LANDS.

The land known as pakihi covers a large area in the Nelson and Hokitika Survey Districts. Statistics supplied by Mr. A. F. Waters, Commissioner of Crown Lands, Nelson, and by Mr. W. T. Morpeth, Commissioner of Crown Lands, Hokitika, show that in the Takaka, Collingwood, Buller, Inangahua, Grey, and Westland Counties the area classed as pakihi covers approximately 200,000 acres.

The pakihi land consists largely of flat or gently sloping terraces, and is, in general, easy of access, and much of it consists of natural clearing. For the most part the land is unproductive, and large areas have been let on lease at 3d. per acre per annum. There is a widespread opinion that these lands can never be made productive except at prohibitive cost. The usual soil on the pakihis is a fine silt loam, well supplied with organic matter and waterlogged except in dry weather. As the rainfall in the pakihi areas is from 80 in. to 100 in. per annum, swamp conditions prevail, and this is reflected in the flora, which consists largely of dwarf umbrella-fern (*Gleichenia dicarpa*), a small rush (*Juncus planifolius*), a rush-like sedge (*Cladium teretefolium*), lycopodium, and sundews. The vegetation supports a few bullocks and dry cows for limited periods of the year. The general absence of bracken, gorse, blackberry, and phormium on the wet pakihi is very noticeable.

In general the pakihis are underlaid by very coarse gravels, often consisting almost entirely of granite boulders and detritus. The junction between the granite and the pakihi silt is usually cemented into a pan which varies greatly in thickness. In some areas the pan is met 9 in. or less below the surface; in others it may be more than 3 ft. underground. The presence of the pan has generally been regarded as an insuperable obstacle to drainage, and if the utilization of pakihi land presupposed the general breaking-up of the pan the cost would certainly be very great. The pan is brown in colour, and is usually supposed to be ferruginous; the colour is, however, largely due to organic matter, and in many cases the amount of iron oxide is negligible.

Another objectionable feature is the large number of tree-roots usually present in the soil; they mostly belong to the Westland pine (*Dacrydium Colensoi*), and show extraordinary durability. These roots add considerably to the expense of initial ploughing, though a stump-jump plough might get over the difficulty. The lack of fertility of the soil is sometimes attributed to the "poisonous" action of these tree-roots, but there is no evidence to support this contention.

Valuable laboratory-work upon the pakihi soil has been done in the past by Mr. B. C. Aston, Chief Chemist to the Department of Agriculture, and very useful field experiments have been carried out by Fields Instructor Mr. G. de S. Bayliss. Other field or plot experiments which have come under our notice were carried out by Messrs. Falla, Dixon, and Egan.

Work on the breaking-up of the pakihi pan by explosives was carried out by Mr. Leggo, representing the Nobel Explosive Co. An account of this work is recorded by Mr. McPherson in the *Journal of Agriculture*.

The officers of the Cawthron Institute have examined the field plots upon which these earlier experiments were carried out, and are able to report that, though nothing has been done to them since the initial treatments some twenty years ago, the land has in no case gone back into pakihi condition. When top-dressed with basic slag without any fresh seed the plots showed a most wonderful response.

In 1923 the Buller Progress League forwarded to the Cawthron Institute 1 ton of typical pakihi soil taken from an area selected by Mr. Rigg, Chief Agriculturist to the Institute. This was thoroughly mixed and used for pot and cylinder experiments, which showed (1) that the soil was very infertile, even when well drained; (2) that lime alone gave but little improvement; (3) that great improvement resulted from the employment of lime with superphosphate, with basic slag alone, and with Nauru phosphate alone. The experiments were carried out with oats, rye-grass, and with mixtures of grass and clover.