

SIRS,—

Marua, 7th May, 1914.

When your Commission were passing through Marua you viewed a paddock of grass near the road and expressed a desire to know how good grass came to be growing on such poor pipeclay soil, and at your request I furnish the information.

The soil is average pipeclay similar to that on the neighbouring gumfield, and is heavy, cold, and sour; the top being grey pipeclay with patches of hard white cement, so hard that the plough would not enter or touch, and the subsoil a light-coloured yellow clay; and the surface was covered with stunted tea-tree, very short fern, and moss.

Kauri gum was dug out of it, and each time of ploughing more gum was exposed, and from a farmer's point of view was a very uninviting piece of land.

Two crops of oats were taken off it, and then laid down in grass, about ten years ago. The tea-tree was cut and burnt, the mounds and hollows all levelled, and the land ploughed shallow, say 3 in., then well disc- and tine-harrowed, then cross-ploughed a little deeper, which brought a thin layer of under-soil to the surface, then disc- and tine-harrowed. Between each of these four workings the land was left for a spell exposed to the sun and weather according to the season, and probably four or six months elapsed from clearing the land till the last working, and in this way all fern and tea-tree were checked and not allowed to grow. If there had been only one ploughing and deeply, and the land left for a longer time, then the fern would start and get a fresh lease of life, and the disc harrows not penetrate to the bottom, and there would remain underneath a mat of roots or surface rubbish through which the oat or grass roots seem unable to penetrate. All working of this land should be done only when dry, and never when at all wet, or the soil will become clayey and lumpy.

The first oats were sown in winter, choosing a dry time, and gave a good crop. The manure used was chiefly bonedust; trial plots of potash and nitrogen did not give satisfactory returns. The land lay in stubble with stock grazing thereon during the summer, and then it was again ploughed and another sowing of oats; but this crop was a poor one. Very little or no manure was used, and the oats sown late, and the land worked when too moist, and a bad job was made of it all.

All fern and tea-tree were by this time thoroughly eradicated. It was then laid down in grass, being ploughed to about 6 in. by this time, and two lands of the paddock, where most of the hard cement patches were, were subsoiled about 3 in. or 4 in. by using one pair of horses and two ploughs, the team doing one round with the first plough and then hitched to the second plough, which had the mouldboard removed; but this plough was old and bent, and did not do satisfactory work. Still, the grass showed a difference between the subsoiled part and the remainder of the paddock, and also after a heavy rain that part did not sour so much when the land was in fallow. The manure used was chiefly bonedust and basic slag, and one part was sown with extra slag, and the resulting grass showed extra well there for years after. Also, on another patch two or three sacks of lime in the calcium-oxide state were put in with spade and rake and well mixed up into the soil, slaking it at the time with buckets of water. That was about ten years ago, and that patch shows up greener even now, and stock keep it always closely eaten down. About a year after the grass was sown a stock auctioneer remarked that the paddock would easily carry three sheep per acre. The grass is *Paspalum dilatatum*, *Agrostis stolonifera*, and *Triodia decumbens*. A few weeks ago the paddock was given a dressing of basic slag, which should show its effect later on.

Such soil, unlike the lighter lands, requires little or no rolling, as if worked when dry into a fine tilth it will be nice and loose and no lumps, and the first rain will set it down quite compact enough for any seed sown; but if it is ploughed up wet, rough, and lumpy, then a heavy roller would be used to press these lumps down into the soil and present a better appearance on top.

The method of treating this paddock is no secret. It only goes to prove that these clays require suitable treatment, as is advocated by agricultural scientists now, to be made highly reproductive; and though there are different classes of gum soils, varying in texture, colour, and depth, yet all can be profitably worked or planted. Some that are near the coast or receive sea-air influence have grasses growing naturally, and this seems to suggest that salt should be tried as a manure on other fields, but they are all non-calcareous and by analysis deficient in lime, and lime properly applied is very beneficial.

I have found that this clay, if hollow-drained, trenched, or subsoiled, and green crops and rubbish worked in, that the top soil, which was only 3 in. deep, became a good dark colour for a full spade-depth, and remained dry and workable all winter, and would grow abundance of garden crops; and as for subsoiling, it would probably be cheaper to do that with explosives.

Tea-tree cutting is slow and tedious, but better methods will yet be employed. A settler is experimenting with a motor cutter, and I think another cheaper way would be to fire the standing tea-tree in the height of summer—first taking precautions against the fire spreading—at the time the sap is up, and then the charred plant and its stump will rot so much quicker than if cut in winter, and afterwards use a Cambridge roller over it and reburn.

These gumfield lands have been despised and allowed to be waste land, but such can, generally speaking, be made into good farming land, and that at a low cost. Even the roughest and untillable will grow *Pinus* and other trees for fruit- and butter-box making, and what else would better conduce to the material progress of Auckland City and Province than to have all these large areas covered with farms and sending away tons of produce?

Yours truly,

H. HAWKINS.

The Chairman and Members Kauri-gum Commission, Auckland.