disease. On the whole, the results were distinctly encouraging. In one case a farmer's milk-yield had shown a substantial increase on manuring with superphosphate, while a further increase had followed the addition of sulphate of iron to the superphosphate. Carbonate of iron as a lick also was favourably reported on.

The occurrence of bush sickness in cattle recently reported at Kopaki confirms the opinion previously expressed that the trouble affecting sheep in this area is similar to that experienced on the pumice soils of the Rotorua district.

Poverty Bay Back Country.—Experiments have now given indications of the nature of the deficiency disease experienced in sheep in parts of this area. Animals depastured on affected paddocks well top-dressed with superphosphate and basic slag became sick equally with those on untreated areas, thus indicating that deficiency of phosphate could not be responsible, and adding proof that lack of iron is the principal factor. The pastures have an iron content abnormally low.

Two other instances of iron-deficiency disease in sheep on stations between Napier and Gisborne have been investigated. In both cases the trouble has occurred on easy country with a surface-covering of pumice, and soil and pasture analyses and the symptoms point to it being "bush sickness." The soils are "sandy silts" similar to those near Rotorua; steep country from which the surface-covering of pumice had been denuded was not affected.

Wairarapa Pastures, and Waihi Disease.

The completion of the analyses of the series of pastures, taken over a term of years from soils typical of different areas in this large inland district, has produced results of considerable interest. The demonstration of the important effect on the pasture of seasonal drought in summer and autumn has been made more striking by comparing the effect of varying rainfall in the summers of three consecutive years. The areas sampled comprised sheep and cattle pastures, and the altitude aspect, class of pasture, and history were as diverse in the areas chosen as circumstances would permit. The same officer sampled the same paddocks over a term of three and sometimes four years. The results of soils and pastures analysis have been published from time to time; but the culminating paper was printed in the *Journal of Science and Technology* (April, 1931, Vol. 12, No. 5, pp. 304–20), an abstract being given in the *New Zealand Journal of Agriculture* (No. 4, Vol. 42, p. 226).

It may be briefly reported that the outstanding deficiency in this district is phosphoric acid, "Waihi disease," a malnutrition of the bones in cattle having been recorded from several farms. Broadly speaking, however, the district is a very fertile one, and the troubles in stock due to deficiency in the pastures, from a study of the local meteorology, would seem to be due to the unevenly distributed rainfall resulting in droughty summers and autumns rather than to any inherent defect in the soil or the pasture. The following is an extract from the *New Zealand Journal of Agriculture* for April, 1931, p. 229:—

> "It was found in each case of four different localities, sampled regularly in three different consecutive summers, that the summer (1927–28) with the lowest rainfall (between 6 in. and 9 in.) produced pasture in which the phosphoric acid was lowest (average, 0·33 per cent.), and that the summer (1929–30) in which the rainfall was highest (18 in. to 31 in.) produced pasture in which the phosphoric acid was highest (average, 0·63 per cent.), while the intervening summer (1928–29) with an intermediate rainfall (10 in. to 17 in.) produced pasture in which the phosphoric acid was also intermediate (average, 0·49 per cent.) between those figures afforded by the two exceptional seasons. This generalizeration was found to be true in every one of the four localities—Atea, Hamua (two localities), and Mauriceville."

The nitrogen content of the pastures was found to vary with the phosphoric-acid content. During a wet summer in the Wairarapa the percentage of phosphorus in the pasture is not only itself higher, but the amount of protein, the most expensive food constituent of the animal, is also increased in the same direction. The effect of rainfall on the lime content of the pasture was found usually to vary in the opposite direction to that of the phosphoric acid and the nitrogen, the percentage of lime decreasing with the increase of rainfall.

> "*Effect of Season.*—The general trend of the phosphoric-acid and nitrogen content of the Wairarapa pastures is to rapidly increase to the maximum in the spring, falling with the summer, and reaching the lowest figure in the autumn. Calcium (lime), on the other hand, is the lowest in the winter and increases with the progress of the seasons, giving the maximum figures in the autumn.
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> "The most exceptional result of the maximum nutritive value of the pasture occurring in the winter quarter in the case of the South Wairarapa (Martinborough) sheep-pastures is no doubt due to the rainfall being heaviest in that quarter and causing a quick response in a warm droughty soil.
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> "*Farm Treatment recommended as a Result of the Investigation.*—Generally speaking, phosphate (especially superphosphate) applications may be expected to give remunerative returns on all Wairarapa lands, rich or poor. The necessity for lime would not appear to be nearly so widespread. Some districts, however, are notably deficient in both of these important aids to fertility and health.
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> "If top-dressing pastures with phosphates cannot be immediately resorted to as a cure for deficiency diseases in stock—and sometimes it cannot be availed of as a remedy, for rain is essential to the success of phosphates with pasture—and will not effect improvement until rain comes, the use for ruminants of salt licks containing a large proportion of bonedust or finely ground Nauru phosphate all through the year will prove an efficient remedy for the sudden drop in the phosphate content in the summer and autumn pastures." (*New Zealand Journal of Agriculture*, April, 1931, pp. 229–30.).

It is satisfactory to learn that the results obtained from the Wairarapa investigation are borne out by other workers.