

erosion by wind and water. This, in conjunction with the removal of the vegetative cover and the exposure of bare soil for the longer time required by the pasture to establish, probably accounts for a considerable amount of the erosion of these soils in the area described.

(c) *Weakly developed Brown Loams*.—These are all derived from alluvium, consisting mainly of greywacke, gravels, silts, and sands, although they fall within the brown loam group with a very low content of exchangeable bases. The coarser texture and heterogeneous parent material has allowed mechanical and chemical differentiation within the profiles by processes comparable with, if not closely resembling, the podsol processes, so that there is a definite increase in exchangeable bases and base saturation in the lower horizons of the profile. This contrasts strongly with the decrease in base saturation and exchangeable bases in the lower portions of the soil profiles derived from young volcanic showers.

The greater part of the central plains from Tikokino south to beyond Dannevirke contains soils of this class which have been subdivided according to (1) age, (2) depth of soil, and (3) vegetation, and have been described in the last annual report. They were covered by forest in the Norsewood-Dannevirke district and temporarily have a good natural fertility.

In Southern Hawke's Bay, on either side of the plains between the Manawatu River and the Ranges, there are dissected rolling hills carved out of ancient alluvial deposits consisting mainly of greywacke silts and gravels on the west, and containing mudstone alluvium in addition on the east. Where the rainfall exceeded 50 in. forest formerly covered this soil class. Each of these soils had its own forest association, which can be recognized in the soil profile by the colour of the topsoil. Where this is dark chocolate-brown, totara-matai were the dominant trees, and where the topsoil is dark brown, matai-totara were dominant in that order. A greyish-brown colour indicates rimu, and other trees correspond with different shades of this colour. No doubt the colour of the particular kind of forest humus and the drainage of the soils preferred by each association affect these topsoil colours, and it is very noticeable that totara-dominant associations grow on light, free, sandy loam, or silt loam. Matai prefers somewhat heavier but otherwise similar well-drained soils, and Hinau heavy, well-drained, fairly fertile soils. Rimu tends to grow on heavy, poorly drained types, while rata follows very fertile country as a rule.

(d) *Moderately developed Brown Loams* include several soils derived from ancient greywacke fluvial deposits of coarse texture, on rolling country, and under a rainfall of 35 in. to 60 in. These soils occupy a relatively large area on the foothills of the western ranges and in the narrow strip north of the central plains.

SOIL EROSION.

Although slumping is particularly prominent in skeletal and immature soils, erosion is of greatest importance in the brown loam group. Greywacke soils are particularly liable to gullyng and shingle slides. In the immature brown loams, which are mainly derived from volcanic ash, blowing is important, and in the past has been regarded as the main cause of erosion. However, it has been explained that the present investigations indicate that harsh burning is of great, if not major, importance as a factor in erosion in these and perhaps in the skeletal greywacke soil, because it affects the chemical composition of the humus and the crumb-structure which it imparts to the soil. The disintegrating influence of frost, snow, and percolating waters, and of temporary streams and wind, is then able to start erosion, which once begun is difficult to stop. The soil map shows clearly the extent of erosion in this country, and, if required, would provide a basis for attacking the problem. The weakly developed brown loams are particularly liable to blowing, and caution must be exercised in their treatment.

HAWKE'S BAY : FARM MANAGEMENT SURVEY.

Progress Report by Mr. R. B. TENNENT, Director, Fields Division, Department of Agriculture.

The farm management survey which is being carried out under the direction of the Fields Division of the Department of Agriculture is making steady progress. Although this agricultural survey is far from complete certain important facts have already emerged relative to the farming of Central Hawke's Bay under normal price-level circumstances. Among these are :—

- (1) The production of many of the present dominantly fat-stock-production farms can profitably be increased substantially.
- (2) In many instances farms which at present produce both fat-stock and store stock could profitably be devoted to fat-stock production.
- (3) Mixed breeding and fattening of stock could more frequently be carried out profitably in the area in which the majority of the farms are now devoted to breeding exclusively.
- (4) The carrying capacity of a substantial portion of the area devoted exclusively to breeding could profitably be increased considerably.

HAWKE'S BAY : PASTURE SURVEY.

A progress report on the pasture survey in Hawke's Bay is contained in the report of the Plant Research Bureau (p. 23).

NORTH AUCKLAND SOIL SURVEY : PROGRESS REPORT.

By N. H. TAYLOR and C. F. SUTHERLAND.

During the 1936–37 season soils were mapped over 800 square miles lying between Russell and Waipu and 200 square miles surrounding Kaitaia. In addition, a detailed soil survey was made of the property acquired by the Plant Research Bureau at Mount Albert and, in conjunction with Dr. M. M. Burns, a survey was made of the tung groves in North Auckland.