

and already two or three inches of the humus-bearing topsoil have been removed from certain soil types over widely scattered areas. The young and immature soil types derived from pumiceous sandstone and extending west and north of Napier are suffering severely in this way. So also are moderately steep soil types in the Wallingford district.

(2) *Slipping and Slumping*.—The recent torrential rain in Hawke's Bay has emphasized the seriousness of this problem. Sometimes the topsoil slips off a clay subsoil and at other times soil and subsoil slip, exposing the bare rock. In both kinds of slipping the scar is difficult to heal unless the rock exposed is shattered and is rich in plant nutrients. In by far the greater number of cases the slipping during the recent rains has been detrimental on the farms on which it occurred.

(3) *Gullying* in Hawke's Bay is not as severe as in other districts. It follows on erosion of type (2) when increased run-off cuts into loosely consolidated parent material and gouges out deep channels in the hillsides. If the problem of preventing the exposure of bare surfaces by slipping or other erosion—*e.g.*, wind—is not solved, gullying may in the future assume serious proportions.

Increased flooding is the obvious natural outcome of erosion, for erosion produces bare soil or rock surfaces from which run-off is greatly increased. An example is the flooding and havoc which recently took place in the Esk Valley, the Tutaekuri Valley, and in the valleys of other main streams of the area described. In Hawke's Bay a disaster of this sort occurs approximately every second decade, while in nearly every decade major floods are recorded. Rivers have built up their beds by many feet, and with increased erosion in the hill country the "old man" floods must inevitably increase in size and number. On the soil maps the soil types that are subject to increasing erosion have been delineated, and this information should be of value should any action on the problem be taken.

HERETAUNGA PLAINS.

By H. A. HUGHES and L. HODGSON.

The work of preparing a detailed soil map of the Heretaunga Plains is now nearing completion, and the following is a brief account of the soils and their characteristics.

The soils of the plains have been divided into ten series, which in turn have been divided into twenty-seven types. A description of the types will be given in the complete report on the plains.

The soils of the Twyford Series are derived from material deposited by the Ngaruroro River when following one of its earlier courses across the plain. They lie at a slightly higher elevation than the surrounding soils and are situated roughly in the western centre of the plains. The sub-types, which cover a fairly large range, vary from stony gravels to good silt and sandy loams. This series is generally very fertile, except where the stony gravel sub-types are encountered. The types have a very low moisture-holding capacity and dry out rapidly; the period of growth, which is governed by the amount of rainfall, is very short. The silt and sandy loam sub-types have a much higher moisture-holding capacity, and are generally very fertile and easily cultivated.

The available phosphate and potash figures indicate a high availability of plant nutrients. The phosphate status is maintained even into the subsoil, indicating a natural fertility. The pH values vary considerably and are worthy of further study. Soluble salts below 0.1 per cent. are not likely to be deleterious to plant growth.

TWYFORD SERIES.—TYPICAL ANALYSIS.

Sample No.	Depth.	Available		pH.	Soluble Salts.	Texture.
		Phosphate.	Potash.			
1965	In.				Per Cent.	
..	0-6	0.037	0.033	6.5	0.072	Fine sandy loam.
1966A	12-18	0.045	0.015	6.4	0.057	"

The Paki Paki Series, which bounds the Twyford Series on the southern margin, lies at a slightly lower elevation. Some of the sub-types are only moderately fertile and suffer severely from drought conditions. The subsoils consist mainly of fine pumice sand with occasional large lumps. In the lower-lying areas, where a heavy clay loam topsoil is found, the types become much more fertile.

The level of phosphate and potash is rather lower than in the Twyford Series. The pH values are just over 6.0, and soluble salts are important in the profile.

PAKI PAKI SERIES.—TYPICAL ANALYSIS.

Sample No.	Depth.	Available		pH.	Soluble Salts.	Texture.
		Phosphate.	Potash.			
1989	In.				Per Cent.	
..	0-6	0.018	0.017	6.0	0.145	Sandy loam.