

## THE FLATS.

The chief soils of the flats are the recent alluvial soils (130 square miles), the meadow clays (250 square miles), and the peaty soils (120 square miles).

The *recent alluvial soils* are mainly brown clay loams. They occupy the narrow valley bottoms and are well distributed throughout the area. They are probably the most fertile soils of the peninsula, but owing to their situation are subject to flooding.

The *meadow clays* are divided into four types, all of which are poorly drained types, and consequently a good system of drainage is essential for their successful development. The more fertile grey clay types occur extensively in Mangonui County (near Kaitaia), around the shores of the Kaipara Harbour (near Dargaville, Ruawai, and Helensville), and in Whangarei County, where a large area near Hikurangi is subject to heavy flooding. These soils are used mainly for dairying, but owing to the poor drainage and heavy texture they are not suited to heavy stocking in winter. A brown granular clay derived from basic alluvium covers about 17 square miles of the river terraces in Mangonui and Hobson counties. This type also supports good pastures, but responds less readily to fertilizers. The two remaining meadow types have low natural fertility coupled with poor drainage. These are the low flats formed from gumland wash and the grey granular clays covering the higher terraces of rivers draining from the basic volcanic hills. Each of these types covers about 20 square miles and is but little developed.

The *peaty soils* are of three main types—the peaty sandy loams, the peaty loams, and the peats. The peaty sandy loams cover about 70 square miles and lie mainly in Mangonui, Hobson, and Whangarei counties, where they occupy hollows and swampy valleys in the lightly consolidated coastal sandstone. Near Whangarei they have been recently developed for dairying, but elsewhere they are but little used. Many of the swampy valleys in Hobson and Mangonui counties are difficult to drain and contain much timber.

## THE EASY AND ROLLING LAND.

The soils of the easy and rolling land can be divided into two main groups, the soils derived from sedimentary rocks and the brown granular clays and brown loams derived from basic volcanic rocks. The first group embraces the soils derived from blown sand, the limestone soils, the brown clays, and clay loams from mudstone, sandstone, and greywacke (immature podsol), the more leached grey brown and grey clays (semimature podsols) and the gumlands (submature and mature podsols).

Sandhills fixed by weathering occupy some 130 square miles along the west coast of the peninsula and are covered with dark sandy loam and sand topsoils capable of supporting good pastures if top-dressed with phosphate. The subsoils are moderately heavy and do not dry out in summer as do the loose soils of the younger sandhills. This type should be further developed.

Fertile limestone soils cover some 48 square miles of the easy country. They are well developed in Otamatea County, and are used for dairying and sheep farming.

The brown clays and clay loams have developed under a mixed forest containing a high proportion of broad-leaved trees. These are moderately fertile soils and are used for dairying and grazing. They cover about 300 square miles, and are well distributed throughout the peninsula.

The grey-brown and grey clays have developed under kauri and podocarp forests, and in many places now support scrub. They are acid soils requiring heavy repeated dressings of lime for their successful development. The grey clays, which are locally referred to as the clay gumlands, are less fertile than the grey-brown types. These soils cover some 500 square miles, half of which is of the grey-brown type. The grey-brown clays lie mainly within Whangarei, Hokianga, and Rodney counties, where considerable areas are now being farmed. The grey clays lie mainly within Whangarei, Rodney, and Waitemata counties. Other than in Waitemata County, these soils are not farmed to any extent.

The gumland soils cover 600 square miles and are of three main types—sand gumland (200 square miles), sandy loam gumland (190 square miles), and silt loam gumland (210 square miles). The sand gumland, which is practically confined to Mangonui and Hobson counties, is generally not suited to present-day development and is mostly still in scrub. Areas developed are in poor pasture.

The sandy loam and silt loam gumlands occur extensively in Bay of Islands and Whangarei counties and are scattered elsewhere throughout the peninsula. They are being rapidly developed, but much still remains in stunted scrub.

On the easy country the brown granular clays derived from basic volcanic rocks are for the most part soils of low fertility requiring heavy dressings of lime, together with phosphate and potash. They cover about 70 square miles in northern Hokianga County and in adjoining parts of neighbouring counties. A related type in this area is the upland meadow soil of Tutamoe Plateau (40 square miles).

The brown loams derived from basic volcanic rocks are of three main types, locally known as the fertile volcanic loams (young and immature), the poor volcanic loams (semimature), and the ironstone soils (mature).

The fertile volcanic loams cover about 70 square miles and lie mainly in Whangarei and Bay of Islands counties, where they are used for dairying and sheep-farming. On 10 square miles of this type, however, the soils are thin and bouldery. The poorer volcanic loams (48 square miles) lie in Whangarei, Bay of Islands, and Hokianga counties, and with heavy dressings of lime and phosphates can be made to support good pastures. The ironstone soils cover some 100 square miles in the Bay of Islands and Whangarei counties. Most of the area is not farmed and development awaits further experimental work.