

PART 9.—PHYSICAL FEATURES OF DISTRICT AND NATURAL FORCES ARISING THEREFROM.

PHYSICAL FEATURES.

The district to be covered by our present survey is shown on Map C in Commission's Exhibit No. 3, and is bounded thereon on the north, west, and south by a red line, and on the east by the sea. We desire, firstly, to draw attention to the coast-line from Cape Kidnappers to Whakariri, marked with the red letters "K" and "W" respectively. At both these points the coast presents a high-cliff formation. Napier lies about half-way between the two points, and the shaded portion on the map, represents Scinde Island, a high eminence turning a cliff-face to the sea. Although Scinde Island is now a promontory rather than an island, it has undoubtedly been a true island in the past.

Running inland from a point a little west of Cape Kidnappers is a line of hills, and this line can be traced south-west for roughly 20 miles. Then with a turn of short radius they wheel to the north and can be traced to Whakariri. This line presents a rampart of hills enclosing the plain that lies between them and the sea, and in some places displaying a cliff-face on their seaward sides. This range of hills is shown on Map C by an irregular broken line in brown wash. The foot of the whole rampart undoubtedly marks what was the seashore at some time in the past. It is pierced by three rivers—firstly, the Tukituki, which merges a little to the west of where Havelock North now stands; secondly, the Ngaruroro, which comes through at a point marked "Fern Hill" on the map; and, thirdly, the Tutaekuri, emerging a little to the south-east of the present site of Taradale.

RIVER ACTION.

The Tukituki River came from the south-west; it was and is a carrier of sand and shingle from an inexhaustible supply. This river drains an area of 977 square miles, its present discharge being estimated at 140,000 cubic feet per second. Heavy flooding takes place periodically, and the watershed is composed largely of old river-gravel deposits. The Ngaruroro drains an area of about 940 square miles, and its present discharge is estimated at 112,000 cubic feet per second. Heavy periodical floods also take place in this river, and, its watershed being in steep rocky country liable to slips, the river has been and is a bearer of shingle and sand. The Tutaekuri has, generally, similar characteristics to the Tukituki and Ngaruroro, but at the present time any shingle carried down by it is apt to be lodged in the Ahuriri Lagoon, silt only being carried to the Inner Harbour. In any case, whether shingle or sediment be discharged on the foreshore by this river through the Inner Harbour, its bearing as a possible supply likely to cause interference at the channel is not important, as the bulk of any shingle or sand from this source that does reach the sea must travel in a northerly direction, and therefore away from the harbour entrance. These three rivers, their water charged in varying degrees with silt, sand, and shingle, have, during probably thousands of years, gradually formed a delta, which now lies between the rampart of hills and the sea, varying in nature from the first built, and therefore the oldest-established portion, now well-grassed land at the foot of the hills, to the shingle-bank on the sea-front, which marks the latest line of formation. The process still goes on. The rivers tend continually to throw their spoil into the sea, and the sea tends to bank it up on the coast-line. This tends to form a bank of shingle enclosing a lagoon into which the river discharges, bursting its way through the enclosing boulder-bank by means of a variable channel. The lagoon becomes a siltation bed, which in the course of centuries becomes filled up higher and higher till at length the river cuts a defined channel through it, and then repeats the process of forming another bank, another lagoon, and in consequence another tract of land—formation by siltation. This process is in one aspect a fight between the land-forming habits of the rivers and land-limiting habits of the sea. Man has come on the scene, and has built a city and a harbour on the battle-line, enlisting the combatants as his allies at times, whilst at other times they mercilessly buffet and injure him and his works with a marked impartiality. The present coast-line is therefore nothing more than the present limit of the delta formed by the rivers.

ARTESIAN WATER-SUPPLY.

An interesting feature of this delta is the presence of artesian water which is freely tapped in and around Napier. The delta which we describe above overlies the old river-gravel beds, which are some 200 ft. below low water at the foreshore, and this old river-gravel bed is the source of Napier's artesian water-supply.

LITTORAL FEATURES.

At the southern end of this coast-line stands Cape Kidnappers, the western extremity of a bold line of cliffs, from which erosion by the sea provides a source of the beach shingle and sand. A few miles north is the present mouth of the Tukituki, and there any supply of shingle and sand from the cliffs is augmented. Two miles farther north again is the mouth of the Ngaruroro, which carries its share of spoil to the sea, having at times to burst its way through the shingle-banks formed by the output of the Tukituki and the banking tendency of the sea. We have, therefore, from Kidnappers to Scinde Island a distance of about eighteen miles, a beach-line where the shingle is periodically being replenished, as it started on a northerly travel by wave-action and the northerly current in the sea which flows up this coast of the Island. The Tukituki and the Ngaruroro, to reach their present mouths, have to pass through many miles of comparatively flat land formed by their own delta of shingle and sand. On their journey over this delta to the sea they tend to build up their channels above the surrounding low areas, which in turn are continually being raised during flood periods by the deposit of silt.