

In common with most delta rivers, the Waimakariri has in the past scoured out various overflow-channels in the endeavour to discharge its pent-up flood-waters across the low-lying country to the sea. Of these the old north channel, the overflow-channel at Chaney's into the Styx, the diversion of the south branch (known as Stewart's Gully), and the well-defined channels which leave the river higher up and run down to Lake Ellesmere and the Avon and through Christchurch, are the most important.

It is probable that a portion at least of the river-discharge did at one time flow down through the low lands now occupied by Christchurch, and empty into Lake Ellesmere, but that a local elevation of the land—of which there is reported to be evidence at Banks Peninsula—diverted the waters to the north. Wind-borne sand deposited in these old channels may also have assisted in raising their beds somewhat, but nevertheless they still stand at such a low level as to be a source of danger to Christchurch during abnormal floods. The danger lies not so much in possible damage to property in the city and suburbs, through breaching of the present protective works, as in the possibility of an abnormal flood taking charge of these old channels and forming permanent branches of the river in this direction, or at least scouring out the channels to such an extent as to make further protective works both difficult and very costly.

REGIMEN, PAST AND PRESENT.

Past Regimen.—An old provincial map of uncertain date (plan No. 1) shows the Waimakariri River at a point about ten miles from the coast bifurcating into what is known as the old north branch—which, in our opinion, as already stated, is a flood-overflow channel only—flowing through Kaiapoi Township, and picking up on its way the drainage from the Eyre, Cust, and Cam swamp-outlets; the other, or south branch, flowing past Belfast and Chaney's, and rejoining the north branch just below Kaiapoi Township, the combined river then flowing down the estuary out to sea. The south branch was the shorter of the two, and from all appearances must have been the principal discharging branch of the river. At that time the south branch did not flow down Stewart's Gully. The map also indicates an overflow-channel from the south branch flowing into the Styx and discharging into the estuary near its outlet. At that time (probably 1860) Kaiapoi Island was bounded by these two branches, and the western extremity appears to have tailed out as a shingle-spit opposite the old north-branch intake. It may be noted that neither McLean's nor Templar's Islands, together with several smaller islands, are indicated on this map, although it is probable that they existed as shingle-banks at that time. In about the year 1863–64 the Provincial Government made two 12 ft. cuttings, half a chain apart, from the old north-branch overflow intake, following an easterly direction along the line of old flood-overflow channels down past Section 19907. At this time the flood-waters used to pond up at the old north-branch intake and flow over a portion of Kaiapoi Island into the south branch lower down; and it would appear as the most reasonable explanation—which is one also borne out by some of the evidence—that the object of the Provincial Government in making this cut was to prevent, or at least mitigate to some extent, the flooding of Kaiapoi Island. The result of this action, however, was finally, through the scouring action of successive floods, to divert the greater portion of the river-flow through this new channel and down into the south branch opposite Chaney's, thus cutting Kaiapoi Island in two, the western portion of which is now known as Coutt's Island. This new north branch rapidly became the main branch of the river, as it is in evidence that after the 1868 flood more water flowed in it than in the south branch. The old north overflow branch at its upper end is now silted up and overgrown with vegetation. About the year 1882 the main river—or, rather, what was then known as the south branch—took a new course through Stewart's Gully, rejoining the old north branch at a point farther down below Kaiapoi Township. Stewart's Gully has increased in width during the past twenty years, and is now the main-river channel.

Present Regimen.—From an engineering point of view the river need be considered only from below the Gorge. From a point eight miles below the Gorge down to the head of Templar's Island the fall in the river is fairly uniform, and