

NEW ZEALAND SUBMARINE CABLES.

COOK STRAIT CABLES.

For many years there had been a perceptible weakness in one of the Cook Strait telegraph-cables (No. 3 Oteronga Bay), but it was so slight that it did not seriously affect the traffic-carrying capacity of the cable. Towards the end of 1927, however, the fault developed to such an extent that it was deemed advisable to take preliminary action with a view to effecting repairs. Electrical tests from the shore located the fault at a point approximately two and a quarter nautical miles from the White Bay cable-hut (White Bay is the landing-point on the South Island for five of the Cook Strait telegraph-cables). The work of repairing this cable presented unusual difficulties. It was not practicable to grapple in the locality of the fault, owing to the proximity of the four other cables entering the bay; nor was it possible to underrun the cable from the beach, owing to the fact that other cables crossed over the faulty one at several points between the fault and the beach, and it was known that all cables were buried deeply in sand for some distance from the shore. In November–December, 1926, when the Pacific Cable Board's steamer "Iris" spent a considerable amount of time searching for a faulty cable in the locality situated about eight nautical miles from White Bay, it was found that the cables were so deeply buried that they were beyond the reach of any grapnel. The only alternative, therefore, to prolonged grappling in the hope of hooking the cable at a spot where it might chance to be within reach of the grapnels (which might have proved a very costly undertaking) was to hook the cable at a point twelve to fourteen nautical miles out to sea, to pick up as much of it as practicable, and to relay it after cutting out the faulty section. This procedure, however, appeared to involve serious risk of damage to other working-cables, because it was known to the Department that one cable at least was incorrectly charted for a distance of some ten nautical miles from White Bay, and it was feared that some of the others also might have been incorrectly plotted. In the circumstances, it was essential that a means be devised of tracing out the routes followed by the respective cables in the Cloudy Bay area, so that they could be correctly charted before an attempt to repair the faulty cable was made. It was considered that the "trailing electrode" method would prove effective for this purpose, and in April, 1928, it was decided to charter the Government steamer "Janie Seddon" to undertake the work and to endeavour to effect repairs to the faulty cable. The vessel, suitably fitted up for cable-repair work and provided with the necessary electrical equipment, left Wellington for Port Underwood on the 11th April, with Captain Whiteford, of the Marine Department, in command.

In tracing the cables by means of the "trailing electrode" gear excellent results were obtained. The positions of all working-cables were definitely located to about twelve miles out from the White Bay beach, thus permitting the Department to place absolute reliance on the accuracy of its records covering the routes followed by the cables on the southern side of Cook Strait. The survey disclosed that No. 1 O.B. cable was from one and a half to two and a half miles to the south of its charted position over a distance of nine miles; that No. 3 O.B. cable was over a mile out of position in the same direction over a distance of six miles; and that cables Nos. 2 O.B., 4 L.B., and 5 L.B. were appreciably out of position over distances varying up to three and a half miles, but not to the same extent as were Nos. 1 O.B. and 3 O.B.

A few days were spent in grappling for No. 3 O.B. cable where the survey showed it to be lying clear of the other cables, but all attempts to hook the faulty cable proved unsuccessful, showing that the cables were deeply buried in silt in localities which had not previously been explored.

The *modus operandi* in tracing the cable by the "trailing electrode" may be stated in the following few words: An alternating current of audible frequency was passed through the cable which was to be traced. A twisted pair of insulated wires, suitably weighted, with each wire terminated in a suitable electrode so as to make good electrical contact with the water, and with one of the conductors cut about 30 ft. shorter than the other, was dropped over the stern of the ship and towed obliquely across the cable. The electrode system trailing across the cable was acted upon by the alternating cable field. The signals sent into the cable were thus detected on the ship, the trailer wires being connected through a suitable transformer to a three-valve amplifier so that the signals might be recorded with suitable volume. By towing the electrodes obliquely across the track of the cable and changing course each time the signals reached maximum intensity, the ship could tack along the cable and record its location as it proceeded.

In February, 1929, the Pacific Cable Board's cable-steamer "Iris" was chartered for the purpose of repairing No. 3 Oteronga Bay – White Bay cable and No. 4 Lyall Bay – White Bay cable.

The survey work undertaken by the "Janie Seddon" had shown that if No. 3 cable were hooked at a point about twelve nautical miles from White Bay no risk of damage to other cables would be incurred in attempting to pick up No. 3 cable to a point about four miles from the beach, where it crossed underneath another working-cable. It was, therefore, hooked at the twelve-mile point, and the ship heaved in towards shore until seven and a quarter nautical miles had been recovered. The lifting proved to be a very difficult undertaking. The strain on the cable while it was being picked up proved conclusively that it was buried several feet in the silt, and demonstrated finally that in Cloudy Bay, within about ten miles of the White Bay beach, it was not practicable to pick up with the grapnels any cables which had been lying undisturbed over a long period of years. It is worthy of note that the cable picked up, although laid thirty-one years ago, was in such excellent condition that it was relaid on the following day about two miles to the northward of the original track. The relaying of this section of cable and the laying of a new shore end into White Bay completed the repairs to No. 3 cable. This cable has for many years past been the weakest of all the Cook Strait telegraph-cables, but since the recent repairs its insulation resistance has increased considerably above that of any of the other cables.