

would in a comparatively short space of time render the cable extremely defective, if not wholly useless; while as to the prospects of repairing breaks or defects in such a position, I need scarcely remark that the chances would be extremely doubtful, if indeed the process would be practicable.

14. These considerations have led me to the conclusion that it would be injudicious to select a route for the proposed cable directly across any portion of Cook's Straits.

15. A northern route (*vide* chart), and from all the evidence I have been enabled to collect apparently a most favourable course for the purpose required, might be found by starting from the position marked on the chart as Waikanāe (latitude  $40^{\circ} 53'$  South, longitude  $175^{\circ}$  East), keeping to the northward of Kapiti Island, thence north-westerly until about fifteen miles due north of Cape Stephens, thence south-westerly to a landing place to be selected near Nelson anchorage.

16. The soundings on this route are comparatively even and regular, not exceeding seventy-five fathoms, and showing in the shallower portions traversing Blind Bay extensive plateaus, varying from twenty-five fathoms to thirty-five fathoms in depth, sand and mud bottom.

17. The bottom, over the whole distance, from abreast of Kapiti to Nelson anchorage, is shown to be composed of sand, sand and shell, sand and mud, and mud alone.

18. On the whole, the northern route thus indicated presents in its leading and most important essentials a much superior course to a direct (or semi-direct) line crossing the southern portion of Cook's Straits; the principal drawback, however, to this superiority of position would be the necessarily increased extent of ground to be traversed by the cable.

19. The length of cable requisite would probably amount to about one hundred and twenty-five miles. This, as compared with the relatively much shorter length of cable (say fifty-five miles) necessary for the route *via* Pencarrow Head and Port Underwood, would perhaps carry some weight in determining the question of route; but while allowing full force to every argument in favour of the more direct route, I am nevertheless of opinion, from the peculiar nature of the leading features in each case, *viz.*, on the one side marked abruptness in the soundings, evidencing great unevenness in bottom, the presence of shingle (usually shifting in position), stones, rock, &c., accompanied by powerful tides in narrow waters. On the other side, a nearly total absence of marked unevenness or irregularity in the bottom; a decided preponderance of soundings most favourable for the security of a submarine cable, and a considerably reduced force in tidal currents, that after impartially considering the respective merits of the question, the longer route will be found eventually to be the safest and best for the ultimate success of the work.

20. The northern route, if adopted, would necessitate the construction of a short land line from Wellington to Waikanāe, *via* Ohario Bay and Porirua Harbour, a distance not exceeding forty miles; a length of probably two or three miles of land line would also be required at the Nelson termini of the line.

21. Difficulties would, of course, require to be surmounted in extending a land line from Wellington to Waikanāe; but I apprehend that nothing more serious would present itself (assuming the Natives to be pacific) than has already been overcome in this Colony in extending telegraphic communication to Cape Otway, where the impracticable nature of the country compelled the adoption of manual transport for over fifteen tons weight of material along some sixty miles of line, the track being then too dangerous to admit of either bullocks or pack horses being employed.

22. The relative propositions as to distances, stand as follow:—

*Southern Route via Port Underwood.*

Cable	55	Miles.
Land line on Middle Island	50	"
Land line on Northern Island	3	"
Total	108	"

*Northern Route, via Waikanāe.*

Cable	125	"
Land line on Northern Island	40	"
Land line on Middle Island	3	"
Total	168	Miles.

23. Having thus, I hope, fully discussed the question of route for the proposed line of communication, I have now to deal with the proper description of cable to be recommended for the purpose, embracing also the cost of the work.

24. The forms and adaptation of submarine cable have undergone many most important and valuable modifications and improvements during the past five years; indeed it may be said that the form and mode of manufacturing telegraphic cables is constantly in a progressive state, as new conditions become gradually developed, either through scientific research or by the aid of practical experience, from the results already obtained in carrying out extensive submarine works for electro-telegraphic purposes in various parts of the world.

25. A valuable record of statistics recently (April, 1865,) published, concerning submarine cables, through a most authentic source in England, proves the following facts, selected from other matter in the same paper, as being specially applicable to the case under mention:—

That no *light* cables have proved very successful, even when laid in a moderate depth; they are subject to continual breakages by anchors and currents, when the outer wires have been rusted away by the chemical action of the salt water and of certain metals, such as copper, which occasionally enter into the composition of the sea bottom, the bare core soon becomes useless, and quite unable to exist deprived of its iron protection.

That all heavy cables laid in a moderate depth have proved permanently successful and efficient, and when broken occasionally by mechanical violence, such as anchors or currents, they are capable of being easily and speedily repaired. This is the only class of submarine telegraph that up to the present time has had permanent success. Cables laid in a moderate depth are such as lie in twenty to one hundred fathoms, a less depth than twenty fathoms is highly objectionable. A heavy cable may be taken as weighing two tons or more per statute mile; and a light cable is that whose weight is below that mark, though of course the weight of the iron casing must be adapted to the nature and depth of the bottom.