Observations on a Telegraph Line between Europe and America.

By L. Turnbull, M.D.*

The magnificent idea of connecting Great Britain and the United States by telegraph, which has long been a favourite one with me, has been again revived in this country, and received much strength and encouragement from the investigations of the depths and condition of the bottom of the ocean, along the route of the merchantmen between Europe and the United States. According to a recent letter of Lieut. Maury's to the Secretary of the Navy, dated February 22, 1854, Lieut. Berryman availed himself of this opportunity to carry a line of deep sea soundings from the shores of Newfoundland to those of the Irish coast.

The result is highly interesting, as it bears directly, in so far as the bottom of the sea is concerned, upon the question of a submarine telegraph across the Atlantic, and I therefore beg leave to make it the subject of a special report.

This line of deep-sea soundings seems to be decisive of the question as to the practicability of a submarine telegraph between the two continents, in so far as the bottom of the sea is concerned.

From Newfoundland to Ireland, the distance between the nearest point is about 1600 miles;† and the bottom of the sea between the two places is a plateau, which seems to have been placed there especially for the purpose of holding the wires of a submarine telegraph, and of keeping them out of harm's way. It is neither too deep nor too shallow; yet it is so deep that the wires, but once laid, will remain for ever beyond the reach of vessels' anchors, icebergs, and drifts of any kind; and so shallow, that the wires may be readily lodged upon the bottom.

The depth of this plateau is quite regular, gradually increasing from the shores of Newfoundland to the depth of from 1500 to 2000 fathoms, as you approach the other side.

The distance between Ireland and Cape St. Charles, or Cape St. Lewis, in Labrador, is somewhat less than the distance from any point of Ireland to the nearest point of Newfoundland.

But whether it would be better to lead the wires from Newfoundland or Labrador, is not now the question; nor do I pretend to consider the question as to the possibility of finding a time calm enough, the sea smooth enough, a wire long enough, a ship big enough, to lay a coil of wire 1600 miles in length; though I have no fear but that the enterprise and ingenuity of the age, whenever called on with these problems, will be ready with satisfactory and practical solutions of them.

I simply address myself at this time to the question in so far as the bottom of the sea is concerned, and as far as that, the greatest practical difficulties will, I apprehend, be found after reaching soundings at either end of the line, and not in the deep sea.

I submit herewith, a chart showing the depth of the Atlantic, according to the deep-sea soundings, made from time to time, on board of vessels of the navy, by authority of the Department, and according to instructions issued by the Chief of the Bureau of Ordnance and Hydrography. This chart is plate XIV. of the sixth edition of Maury's Sailing Directions.

By an examination of it, it will be perceived that we have acquired, by these simple means, a pretty good idea as to the depression below the sea-level of that portion of the solid crust of our planet which underlies the Atlantic Ocean, and constitutes the basin that holds its waters.

A wire laid across from either of the above-named places on this side, will pass to the north of the Grand Banks, and rest on that beautiful plateau to which I have alluded, and where the waters of the sea appear to be as quiet and as completely at rest as it is at the bottom of a mill-pond.

It is proper that the reasons should be stated for the inference that there are no perceptible currents, and no abrading agents at work at the bottom of the sea upon this telegraphic plateau.

I derive this inference from a study of physical fact, which I little deemed, when I sought it, had any such bearings.

It is unnecessary to speak on this occasion of the germs which physical facts, even apparently the most trifling, are often found to contain.

Lieut. Berryman brought up with Brook's deep-sea sounding apparatus specimens of the bottom from this plateau.

I sent them to Professor Baily, of West Point, for examination under his microscope. This he kindly gave, and that eminent microscopist was quite as much surprised to find, as I was to learn, that all these specimens of deep-sea soundings are filled with microscopic shells; to use his own words, "not a particle of sand or gravel exists in them!"

These little shells, therefore, suggest the fact that there are no currents at the bottom of the sea whence they came—that Brook's lead found them where they were deposited in their burial place after they had lived and died on the surface, and by gradually sinking were lodged on the bottom.

Had there been currents at the bottom, these would have swept and abraded and mingled with these microscopic remains, the debris of the bottom of the sea, such as ooze, sand, gravel, and other matter; but not a particle of sand or gravel was found among them. Hence the inference that these depths of the sea are not disturbed either by waves or currents.

Consequently, a telegraphic wire once laid there, there it would remain as completely beyond the reach of accident, as it would be if buried in air-tight cases. Therefore, so far as the bottom of the deep sea between Newfoundland or the North Cape, at the mouth of the St. Lawrence, and Ireland is concerned, the practicability of a submarine telegraph across the Atlantic is proved.

The present state of Europe invests the subject of a line of telegraph wires across the Atlantic with a high degree of interest to the government and people of the United States. A general European war seems now almost inevitable; the attitude which this government will assume with regard to all the belligerent powers that may be involved in that war, is that of strict impartial neutrality.

The better to enable this government to maintain this position, and the people of the United States to avail themselves of all the advantages of such a position, a line of daily telegraph communication with Europe would be of incalculable service.

In this view of the subject, and for the purpose of hastening the completion of such a line, I take the liberty of suggesting for your consideration the propriety of an offer, from the proper source, of a prize to the company through whose telegraphic wire the first message shall be passed across the Atlantic.

From the above interesting and instructive letter, the following points are to be decided by the telegraphic engineer:—

1st. "To find a time calm enough, and a sea smooth enough to lay down a telegraphic cable." In my own mind, this first difficulty can be overcome as easily as the observations of Lieut. Berryman were made, if times of calm are found for such careful observations as he has made, by means of a twine string so as to let down a cannon ball of sixty-four pounds, and then raise a tube filled with the shells and earth of the depths of the ocean, we are almost certain a time calm enough and a smooth sea can be found to stretch a wire cable from land to land.

The second difficulty is, "a wire long enough." On this point we have accurate data to follow. The cable from Calais to Dover is 24 miles long, and consists of four copper wires, through which the electric currents pass, insulated by coverings of gutta percha. These are formed into a strand, and bound round with spun yarn, forming a core or centre, around which are laid ten iron galvanized wires of 5-16ths of an inch in diameter, each welded into one length of 24½ miles, and weighing about 15 tons per mile. The rope weighs altogether about 180 tons. It formed a coil of 30 feet diameter outside, 15 feet inside, and 5 feet high, and was made in the short space of 20 days, by a machine invented by Mr. George Fenwick, an engineer of the Lealam Harbour Iron Works in Durham.

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* See Journal of the Franklin Institute.

† From Cape Freels, Newfoundland, to Erris Head, Ireland, the distance is 1611 miles; from Cape Charles, or Cape St. Lewis, Labrador, to ditto, the distance is 1601 miles.