OCEAN TELEGRAPHY.

CHAPTER XLV.

The Depths of the Ocean—Description of the Brooks Lead—The Elements of the Ocean—Maury's View of a Deep Sea Cable—Atlantic Telegraphs Projected.

THE DEPTHS OF THE OCEAN.

The submerging of a telegraph cable in the deep sea, is an affair of no ordinary magnitude. Ever since the American government so triumphantly, reached the bottom of the ocean with a lead, and brought to the surface the treasures that have laid there undisturbed, perhaps, since the world began, I have been satisfied, that a cable might be laid upon the bottom of the mighty deep, in most any direction, from hemisphere to hemisphere.

Since then, cables have been laid across the British channel, the gulf of St. Lawrence, the Mediterranean sea, the Black sea, and lastly, the great Atlantic ocean, from Ireland to Newfoundland. The experience the world has in relation to the submerging of a cable in the deep seas, gives confidence in the feasibility of laying a cable across any ocean, however deep, or in whatever latitude.

From time immemorial, the world has tried to fathom the depths of the sea. Various contrivances have been invented and experimented upon, but without success. The ocean bed remained as a sealed volume—an unsolved problem.

Nations, and men of science, of all ages, have endeavored to interpret the mysteries of the sea. Book after book has been written upon the probable contour of the bottom; but all these were mere speculations, based upon comparisons with developed nature. Finally, the long desired light burst forth, and spread its rays, diffusing fresh knowledge throughout the world. The honor had been reserved to America, to conquer the wave, and descend to the blue depths of the restless ocean

Fig. 1.

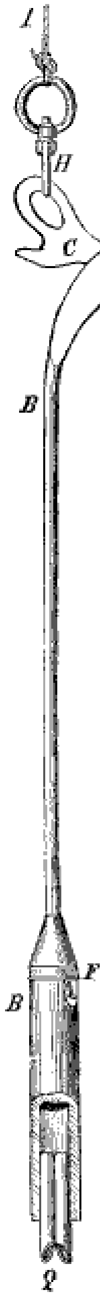


Fig. 2.

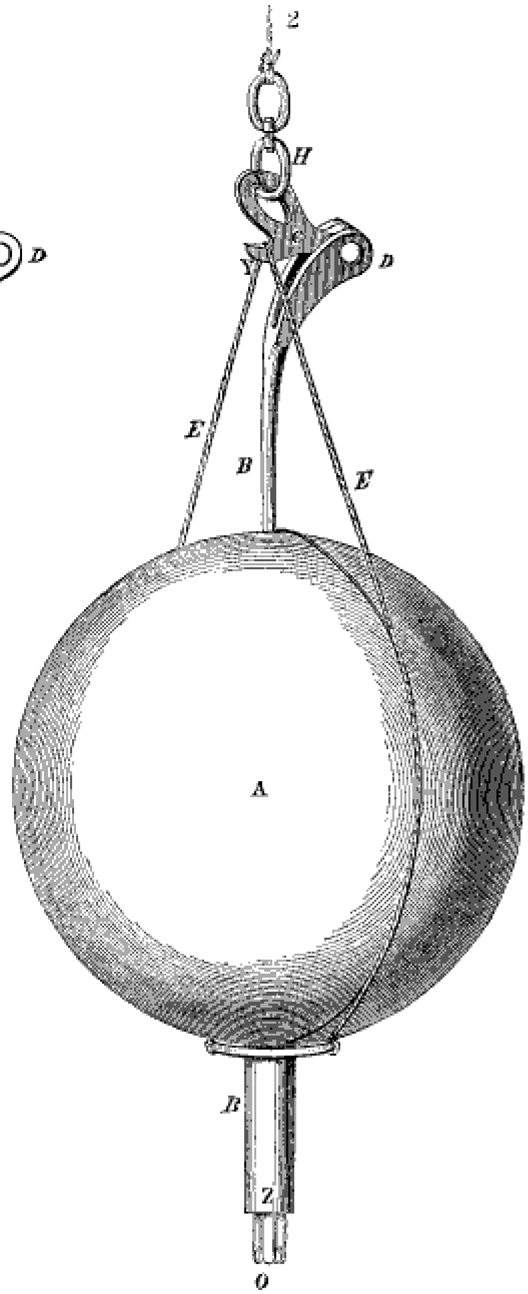
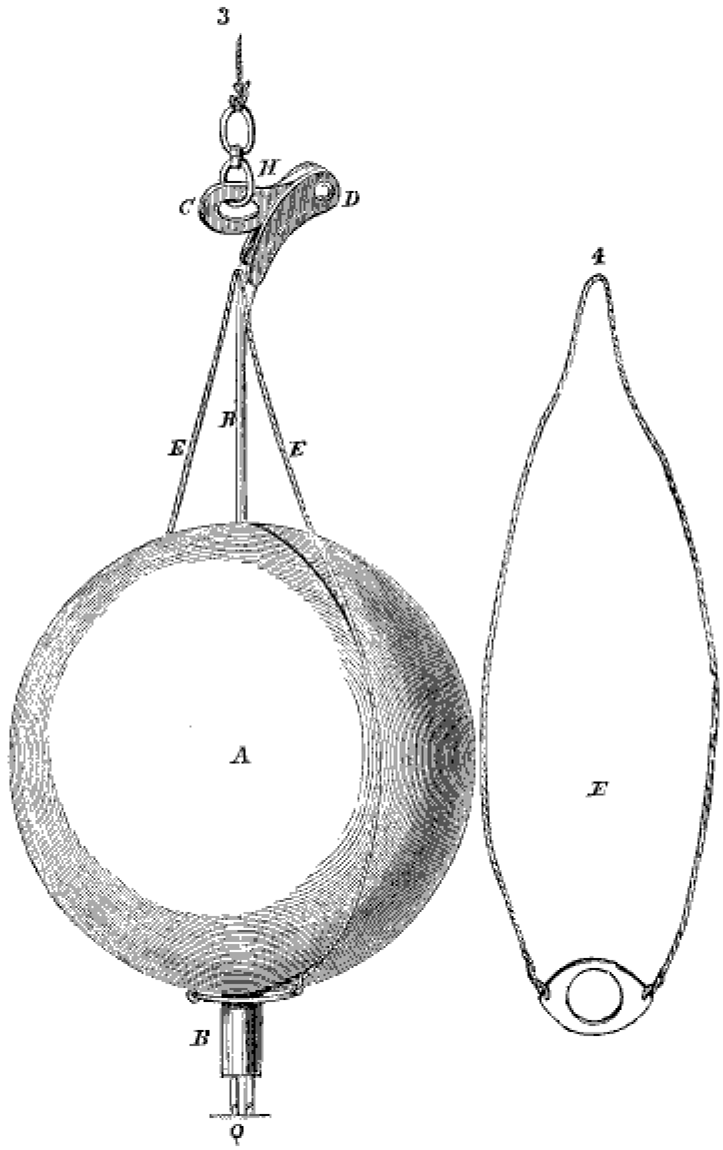


Fig. 3.



and grasp its bottom for the most minute inspection. To the energetic labors of Lieut. M. F. Maury, Superintendent of the National Observatory, and to Passed Midshipman J. M. Brooks, the inventor of the deep sea lead, both of the United States Navy, great honor is due for the success attained in fathoming the great depths.

By an act of Congress, approved March 3, 1849, the Secretary of the Navy is directed to assist Lieut. Maury in his researches concerning the physics of the sea, by detailing the vessels of the navy to make soundings, and other investigations, relative to the winds and currents of the ocean.

Conformably to this act of Congress, Lieut. Maury has, unceasingly and with singular power of discrimination, persevered in the investigation of the various seas, but particularly, the greater part of the Atlantic ocean. Soundings have been taken from the equator, and north to Newfoundland and Ireland. The contour of the bottom of the Atlantic can be calculated upon with a great degree of certainty, and its hills and valleys, its plains and deep caverns, are beginning to be as correctly located as the face of the trodden earth.

DESCRIPTION OF THE BROOKS LEAD.

The lead employed for the sounding of the ocean, was invented by Lieut Brooks, some ten years ago, and from time to time improved. Its present combination is regarded as perfect for the purposes in view. Figs. 1 and 2 represent the lead as now used, for taking soundings, described by Lieut. Maury, as follows: "Numeral 1, fig. 1, represents the rod, with the detaching apparatus; and figure 2 represents the lead ready for sounding. A is a shot, cast with a hole through it, and slight grooves on its side, to receive and steady the slings, E E. B is a rod, to which is attached an arm, C; C is an arm moving vertically about the pin D, and from which the shot A is suspended by slings E. E E are the slings and washer which are thrown off with the shot. The lower end of the rod is tubular, receiving the barrels of several goose quills, open at both ends, retaining their places by their elasticity. F is a valve of thin leather opening outward; it permits the water to flow through the quills 2, as the rod descends; but, closing as it is drawn up, preserves the specimen intact. This provision for the escape of the water permits the entrance of the specimen, and guards against the capture of infusoria, or substances suspended in the water which would depreciate the value of the specimens by leading to false conclusions.

The proportions of this instrument are such, that when the shot is suspended from the arm C, the point of contact X, the point of suspension Y, and the point of resistance Z, all lie in the same vertical line; the weight of the rod, B, will then give the arm, C, a slight inclination, which, with the friction of the water on the line, holding it back, guards against premature detachment.

It is obvious that the sensitiveness of this detaching apparatus, will depend upon the relative positions of those three points; for the arm, C, may be regarded as a lever of the second order with its fulcrum at D; the gravity of the shot as the power acting upon the resistance of the line. So that, by increasing or diminishing the distance of the ring, H, from the pin, D, the detachment is rendered more or less difficult.

In order that change of position in the arm, C, as it yields to the pull of the shot in the act of detaching, may not interfere, it is so made as to permit the ring to slip back as the arm inclines, as shown by fig. 3.

On soft bottom it should work as well as on hard, for it is only necessary that there shall be a retardation of the descent of the rod, while the heavier shot continues to descend into the mud, to cause the turning of the arm and discharge the shot.

Before using the instrument, the operator may test its sensitiveness and adapt it to the depth of the water; in deep sounding, it should be so delicately adjusted, as to act upon the slightest touch, and should be eased down for the first fifty fathoms, or more.

The quills, Q Q, are cut as per figure, and are placed with the cut ends downward, and then several of them are wedged into the cell or holder. The advantages of this arrangement are, we have more abundant specimens than an ordinary arming will bring up, and then we have the gratification of having them properly examined by the microscope."

With this lead the deep sea has been fathomed, and its bottom exposed to man, and upon its examination by the microscope the supposed earth has been found to be the remains of the minute inhabitants, or the organisms of the sea.

THE ELEMENTS OF THE OCEAN.

On the subject of Ocean telegraphy, Lieut. Maury thus writes: "It is an established fact that there is no running water at the bottom of the *deep* sea. The agents which disturb the equilibrium of the sea, giving violence to its waves and force to its currents, all reside near or above its surface; none of them have their home in its depths. These agents are its inhabitants, the moon, the winds, evaporation and precipitation, with changes of temperature—such as heating here, and cooling there.

The rays of the sun cannot penetrate into the depths of the ocean, and radiation cannot take place thence; consequently, the change of the temperature in the depths of the sea, from summer to winter, and winter to summer, must be almost, if not entirely, inappreciable. This is a generally admitted fact.

The winds take up water from the surface, and not from the depths, and in so doing, they disturb the equilibrium of the water at the top, not the equilibrium of the water at the bottom; by evaporation, the water becomes salter and heavier than it was before, the vapor thus taken up is condensed into rain and precipitated on other parts of the sea—thus both raising the sea level, and making the water lighter and less salt than it was before. Thus we have the genesis of horizontal circulation, or an interchange of water called currents. If by the process of evaporation, the surface water becomes so salt as to be heavier than the water at the bottom, the water at the bottom and water at the top will change places. This may give rise to a vertical circulation, but one so feeble that it cannot be felt, by even the tiny little shells which strew the bed of the ocean, and which lie there as lightly as gossamers under the dew of the morning; practically, therefore, the water at the bottom is still.

It is also generally admitted that the waves, even in their most angry moods, are incapable of reaching far down in the sea, or of disturbing the quiet and repose which reign in its depths.

In short, there is reason to believe, that the bottom of the *deep* sea is everywhere protected from the violence of its waves, the abrading action of its currents, and the rage of the forces which are ever at play on its surface, by a cushion of still water.

The grounds for this belief are afforded by these circumstances: everywhere, whencesoever specimens of bottom have been obtained by the deep sea plummet, they have been found to consist of the untriturated remains of the microscopic organisms of the sea. Some of these have the flesh of the little creatures still in them. Now these feculences of the sea, as the remains of its microscopic inhabitants may be called, are relatively as light in the water, as motes in the air; and, if the bottom of the sea were scoured by its currents, those *sea motes* would be swept away into drifts like snow or into dunes like sand, they would be scratched, their sharp corners and the edges would be broken off and rounded. Moreover, were they drifted about, then sand and other scourings of the ocean would be found mixed with them. But not so, the specimens brought up from the deep sea show no such mixture, and the infusoria thence bear no marks of abrasion upon even their most delicate parts."

MAURY'S VIEWS OF A DEEP SEA CABLE.

He further states, that between Newfoundland and Ireland, the pressure varies from 200 to 300 atmospheres, that is, from 430,000 to 650,000 pounds the square foot. "Chemical forces may be measured, and consequently overcome by pressure, for the gases generated by chemical decomposition are themselves capable, so the chemists tell us, of exerting in the process of that decomposition, only so much pressure; hence, if we subject them to a greater pressure they cannot separate, and decomposition cannot take place.

In proof of this, I refer you to a recent discovery of Ehrenberg. In the specimens obtained at a great depth from the Mediterranean, that celebrated microscopist has distinctly recognized fresh water shells with meat in them. From this beautiful little fact we may infer that the very volatile gases, which enter into composition for the formation of the fleshy parts of marine animalculæ, are subjected to such a pressure upon the deep bed of the ocean, that they cannot separate. If this inference be correct, and it doubtless is, may we not proceed a step further, and conclude with reason, that with the pressure of the deep sea upon it, the gutta-percha used for insulating sub-marine wires becomes impervious to decay?"

It is his opinion, that there is no need of an iron armor around the cable, but on the contrary, the iron coat-of-mail is a great injury to the success of the enterprise. Mr. Henry J. Rogers, a telegraphic engineer, of many years' experience and of great ability, has invented a novel cable for the deep sea. The gutta-percha is covered with one or more coatings of hempen thread, whip-cord fashion, and then he protects the whole with a gum which shields the gutta-percha, securing against chafes, &c.

ATLANTIC TELEGRAPHS PROJECTED.

There are several routes across the ocean, proposed to be occupied by Atlantic Telegraphs. The most prominent are:

1st. The line from Norway and Scotland, respectively, to the Faroe Isles, Iceland, Greenland, and Labrador, the longest section of cable required being about six hundred miles. Greatest depth of water about 1,400 fathoms.

2d. The route of the late Atlantic Telegraph, from Ireland to Newfoundland, requiring a cable in one section, exceeding two thousand miles. Greatest depth of water, about 2,100 fathoms.

3d. From some point in Europe to the Azore Isles, and from thence to America, for which the longest stretch of cable required, will exceed fourteen hundred miles. The greatest depth of water, about 2,600 fathoms.

4th. And, the next route, is in the extreme south, running along the European and African coast, in the sea, touching at the Madeira, Canary, and Cape Verde Isles, and thence to the Isles of Don Pedro and Fernando Noronha, to South America. The line then to follow the coast north to the Isle of Trinidad, thence to the West Indies, across St. Thomas, Porto Rico, Cuba, and thence to the United States. The longest stretch of cable required for the route, will be about one thousand miles. The greatest depth of water, about 3,500 fathoms.

With the Rogers deep sea telegraph cord, Lieut. Maury thinks a line can be successfully laid from one continent to the other. In regard to ocean telegraphy, it is due to the distinguished Superintendent of the National Observatory to say that he only discusses the Neptunian obstacles to the laying of an Atlantic cable, and he very correctly and fairly says:

"*The real question for future projectors of lines of submarine Telegraph, is not how deep, or how boisterous, or how wide the sea is, but what are the electric limits to the length of submarine lines.*"