Science and Art.

New Transatlantic Telegraph.

The accompanying engraving is a view of a new plan for an Ocean Telegraph Line between New York and Liverpool, Eng. It is the invention of Professor A. Hall, No. 335 Broadway, this city, the inventor of the Telegraph Clock illustrated on pages 233 and 236, Vol. 9, SCIENTIFIC AMERICAN.

The particular feature of the plan of telegraph here presented is the Floating Stations, located and anchored securely at proper intervals to receive the ends of sections of the cable, and thus by shortening the circuits make the action of the current strong and quick. This is, unquestionably, a plan that can be made to work *effectively*, if at all, and demands at least, from the grandeur of the idea, the attention of the scientific public. The only question is as to firmly securing the Floating Stations, which does not seem impossible when we reflect upon the enterprise and genius of the present age. In the article annexed, communicated by Professor Hall, the subject is elaborately discussed, and he gives plausible reasons at least for the practability of his plan.

The only question of doubt as to its practicability is the securing of the Floating Stations represented, to prevent them drifting during storms; if this can be done, the project is practicable.

The telegraph cable, A, is represented attached to floating buoys, but it may be laid on the bottom of the ocean.

Professor Hall has alluded to the length of time required in signalizing through a long line of submarine cable, extending from New York to Ireland, amounting to six seconds from the period one signal is transmitted until the the wire is capable of being operated to send a second signal. From data in our possession, we make the period of time between two signals, seven seconds, and conclude that he is correct in his deductions respecting the small amount of work which can be accomplished by such a long submarine circuit. His plan, therefore, of making a series of short circuits is founded on scientific principles, for quick and economical working.

The reason why electric signals are so much retarded in wires encased in gutta percha, and laid under water, is owing to *lateral induction*. The insulated wire assumes the character of a vast Leyden jar, the copper wire representing the inner coating, and the water outside of the gutta percha, the outer coating. This *lateral induction* of the electric fluid in the cable, not only retards the current passing through it, but when one electric wave is sent through the wire, another wave or signal cannot be sent until the reflex, or return wave has escaped; and the time required for this is twice as long as for the direct wave.

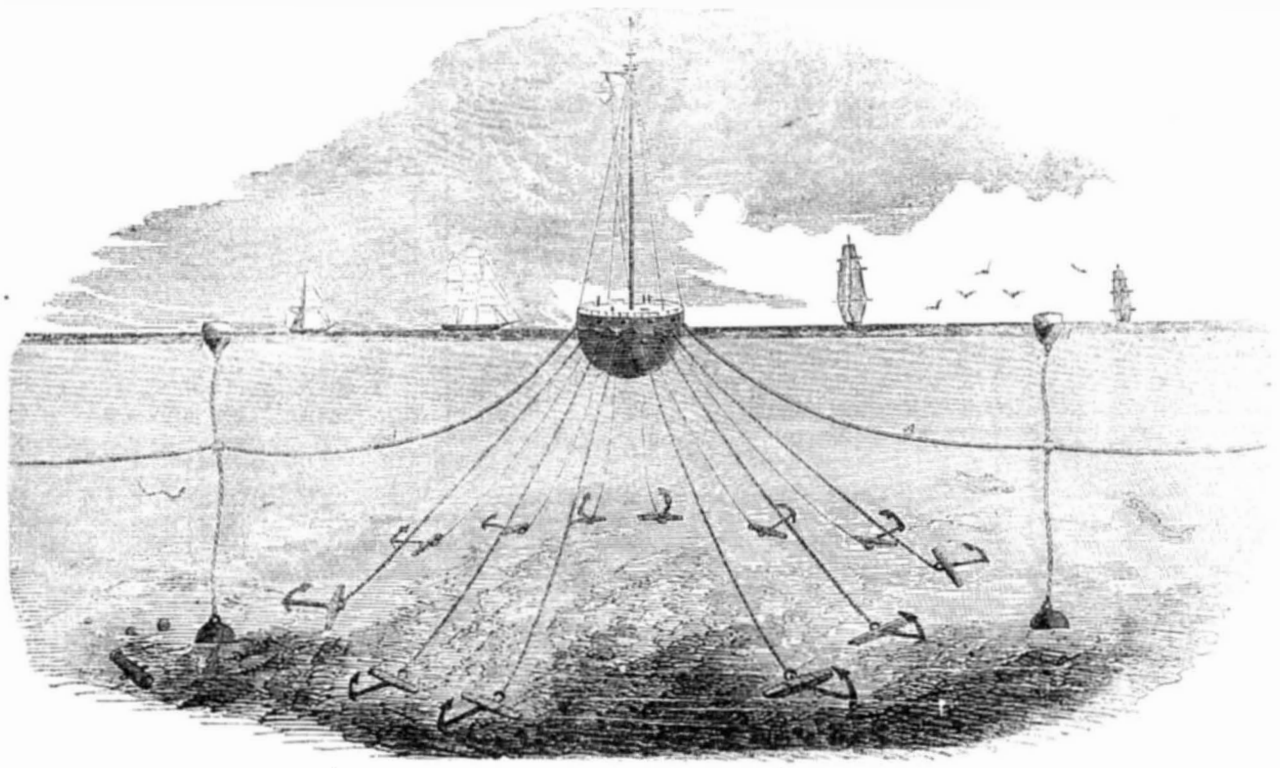
MESSRS. EDITORS—As a practical experimenter in Electricity I cannot agree with the general opinion as to the feasibility of the plan of a telegraph across the ocean, now in progress under the patronage of England and the United States, though I fully concur in the grandeur and magnitude of the enterprise.

My reasons for predicting its failure are as follows:—

1. There has never yet been transmitted a communication through a continuous wire the length of this cable—twenty-four hundred miles—so far as my information extends. But even had this experiment been successfully made on land, the managers of this enterprise are very much deceived if they assume a similar result with a submerged wire. It can be easily demonstrated that a coil of wire, ever so well insulated, if immersed in water, will not effect an electro-magnet with the same power as if tested out of water.—The proximity of so antagonistic an element produces a sensible effect upon the electric current, and would, in the length of cable proposed, entirely absorb the subtile fluid, especially all that could be forced through so small a wire as the one contemplated. But even admitting a communication possible, it is known to Electricians that in submerged wires a perceptible period of time elapses in the passage of the current, and that this period increases with the length of cable, and that it requires some seconds of time before the wire is uncharged after each signal. In the length of cable proposed, according to recent experiments, it would require over six seconds for each signal, making less than half a column in the New York *Herald* for 24 hours' work as its possible capacity—not one-twentieth the probable demand.

2. In the next place, leaving out of the question these radical and insurmountable

HALL'S OCEAN TELEGRAPH LINE.



obstacles in the way of the present plan of a Telegraph, the improbability, to use no stronger term, of securing a perfect insulation with so thin a coating of gutta percha for so many hundred miles of wire, when the slightest particle of damp—even the prick of a pin—through its delicate covering, would destroy the whole work, is of itself an important item in making up the chances of success.

3. Then the almost impossibility of laying down so long and delicate a cord without an accident, from ships surging, perhaps, against heavy seas, when the slightest strain would damage either the central wire or its covering, and I can see but little margin for a successful result.

Now, supposing these objections well-founded, is there any plan to avoid these difficulties, and thereby achieve the greatest work that the enterprise and genius of man ever contemplated? I beg leave to submit to the public the outlines of a plan which I have submitted to the inspection of competent parties with a favorable report, the leading feature of which is to shorten the telegraphic circuit, by constructing Floating Telegraph Stations, to be located and permanently anchored at suitable distances apart, directly on the line of vessels traveling between New York and Liverpool. These Stations would be constructed in a peculiar and substantial manner, with but a single story above the water, so as to meet any emergency of wind or weather, and to be secured to the bottom of the ocean by wire cables, such as suspension bridges are made of, radiating in every direction, attached to heavy anchors sunk in a circle around the Station.

It need not be here said hastily, as it doubtless will be, that it is impossible to locate permanently a Floating Station to receive the ends of telegraph cables, with suitable apparatus, material, and operators to transmit messages, &c. Whatever the apparent difficulty may seem at first, the thing is nevertheless entirely practicable, and is only a question as to the strength of the vessel, the number of cables, and the weight of anchors. If fifty cables and anchors of one tun weight will not secure it, let there be five hundred cables and anchors of ten tuns each. What would that be to the accomplishment of so great a work? A Floating Station of this kind every five hundred miles, with suitable force and material, would make the electric circuits so short as to render them perfectly reliable, besides answering purposes of infinite importance to the shipping interests of the two great countries they connect. When located they would have their fixed places on ocean charts, and should any accident befall a ship in mid-ocean, it would, of course, make for the nearest station, when aid could be instantly telegraphed and sent from the nearest port. Besides answering the purpose of light-houses and ocean marks to the commerce of the world, they could report the progress of vessels plying between the two ports, to the great interest and satisfaction of friends, whereas now, the fate of thousands of lives and millions of property is hid in weeks and months of anxious suspense.

The Telegraph cable connecting these stations should contain at least *four* separate conducting wires, not only to provide against the chance of a single wire becoming damaged, but to allow a number of operators to transmit messages at the same time, as the amount of business will no doubt require it. There will be no difficulty in making the cable of any required size to insure perfect insulation, as the short sections can be conveyed to their respective localities in separate vessels.

In addition to Floating Stations, I propose suspending the cable below the surface of the water, a sufficient depth to be out of the way of ships, icebergs, etc., say eighty or one hundred feet, by means of buoys or floats. The cable should be made of such a specific gravity as to barely sink, so that there would be no difficulty in floating it with buoys, say one mile apart. Directly under the buoy would be attached an anchor or weight to prevent the cable from swinging from its direct line These buoys painted white and numbered would mark out a highway across the trackless deep, and would many times prove of great utility in determining the exact location of vessels, as well as prevent collisions, by each ship keeping its own side of the buoys. The most important object contemplated in the use of buoys, however, is the facility it would afford in case of a defect in the cable at any point, for finding and repairing it, as the cable could be lifted out of the water by aid of the buoys, and tested with the same facility as an operator will hunt for a defect in a wire along a line of poles, whereas, a single defect in the cable, according to the plan now progressing, would be equivalent to its destruction.

I do not regard the buoy feature of my plan essential to its success, as the cable can be sunk to the bottom between the Stations, and thereby lessen the first cost of a Telegraph; but short circuits being, as I conceive, and as I think the scientific world will yet be forced to admit, a practical necessity in Submerged Telegraphs, I submit the plan of Floating Stations as the only practical system of connecting the two continents. ALEX. HALL.

New York, Feb., 1857.

Measures have been taken to secure patents in the United States and England.

American Life Boats.

W. B. Davis, of Brooklyn, the inventor of the life rafts before noticed in our columns, has just received an order for two cedar boats for the *City of Manchester*, to be made life boats on the same principle.