AMERICAN SUBMARINE TELEGRAPHS

CHAPTER XLII.

Disasters to Mast Crossings over Rivers—Adoption of Submarine Cables—Submarine Cables Perfected—Submerging of the Cable—Bishop's Submarine Cables—Chester's Cable Manufactory—Leaden Covered Telegraph Wires.

DISASTERS TO MAST CROSSINGS OVER RIVERS.

The crossing of the rivers by the use of high masts, in America, proved to be unreliable and very expensive. Very often the wires would break and others would have to be substituted. High winds, sleet, snow-storms, and even frost, were severe enemies to the wires. The time required for the repair sometimes amounted to a day or more. Such fatalities bore heavily upon the prosperity of the telegraph. The public, ever restless to complain, could not appreciate the difficulties encountered. The people, however, was not so much incommoded as the treasury of the telegraph company.

Besides the breaking of the wire as above alluded to, the masts were often torn to pieces by the storms. I will give an example of the fatality of some of those masts constructed by me. Early after the completion of those on the Mississippi, a tornado swept over that part of the country, and levelled houses, trees, and the telegraphs. Large brick houses in the city of Cape Girardeau were torn to pieces. Frame buildings were scattered in different directions. Steamers at the river side were wrecked. Several hundred large trees, as much as four feet in diameter at base, were twisted to pieces. The breadth of the terrific tornado was about one mile. It included in its devastating power the telegraph masts; and they, too, were swept from their iron-bound fastenings, and parts of them carried in the wind several miles. A few lives were lost. In its course up the river it even checked the dashing current of the father of waters. The mighty storm came in an instant, and everything within its reach was demolished. It left behind

a calm, and the monuments of ruin were to be seen in every direction. This memorable event was on the 27th of November, 1850.

The mast constructed on the island at the crossing of the Ohio river was swept away by the great flood in January, 1851. Soon after that was repaired, some evil-disposed persons cut down the one at the Tennessee crossing. A few days thereafter the one on the Illinois side of the Ohio river was destroyed by a hurricane; and a few weeks thereafter the great mast on the Kentucky side, 307 feet high, was torn to pieces by a tornado. The five masts just mentioned were erected and destroyed within a space of six months.

ADOPTION OF SUBMARINE CABLES.

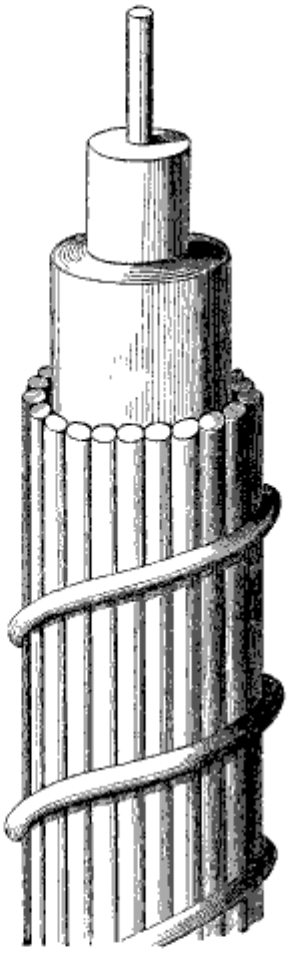
It was during these misfortunes that my attention was called to the practicability of submarine crossings. Gutta-percha insulated wire had been found to be successful in tide-water streams, but to meet the powerful currents of the Mississippi and Ohio rivers no plan had been devised commensurate with the circumstances. During low water I had submerged No. 10 iron wires covered with three coatings of gutta-percha, but they lasted but a short time. The sand that thickens the water of the Mississippi river would wear off the gutta-percha and leave the iron wire bare. I found many such interruptions. In order to protect the insulation from being thus worn off, I had it covered with three coatings of osnaburg well saturated with tar; and in order to hold the osnaburg on the insulated wire, I had six No. 10 wires lashed to it the whole length, laid laterally. These wires were then tied, by lashing around them a No. 16 iron wire about every twenty inches. When this cable was laid, like all the rest, it worked well for a few months and then failed for ever. Soon after this effort was made, Mr. J. H. Wade was completing his line from the east to St. Louis. The crossing of the river was under the direction of Mr. Andrew Wade. I informed him of my experiments, and he concluded to cover the insulated wire entire with lateral wires laid on to the gutta-percha. They were fastened with ties of small wire at every twelve inches. He constructed the cable in that manner, and it proved to be a success.

THE SUBMARINE CABLES PERFECTED.

After this I had made several cables, with some additions to the plan adopted by Mr. Wade. Fig. 1 represents the cable as finally improved by me, in the perfection of which, however, I

was aided by Mr. John B. Sleeth, an experienced mechanical engineer. Letter *a*, the electric conductor, is a No. 10 iron wire, made from the best Swedish bar, and drawn with great care, being capable of sustaining a strain of 1,300 pounds. *b* is the gutta percha insulation, being three coatings carefully manufactured. *c* the three coverings of osnaburg, saturated with a composition made of tar, rosin and tallow. *d* are the No. 10 lateral wires, and *e* the binding wire of No. 12 gauge, placed spirally around the whole cable. Several of these cables were laid in 1853, and some of them are being worked at the present time.

Fig. 1.

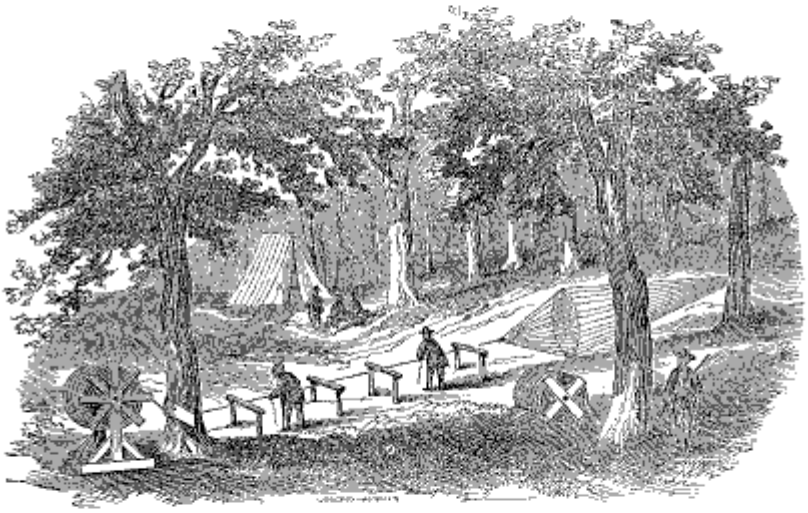


In manufacturing these cables we did not have the convenience of machinery and the variety of mechanical appliances common to populated countries. We were in the West, the great West, in the shades of the forest. The earth was our floor, the blue arched heaven our canopy, and the horizon the only limit of our saloon. Fig. 2 (overleaf) is a representation of the making of the cable. The reel is seen on the left. At the tree a wedge holds fast the finished cable. The men are engaged in putting on the binding wires. The circular board around which the lateral wires are spread is moved forward as the tie process requires. The board distributes the lateral wires around the electric conductor. The gutta-percha insulated wire, covered with the osnaburg, runs through a hole in the centre of the circular board. To avoid confusion, the insulated wire has been left out of the figure.

SUBMERGING OF THE CABLE.

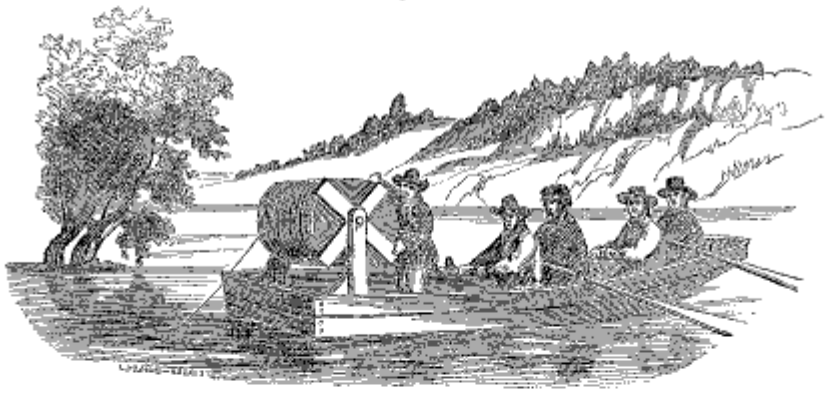
When the cable has been finished it is ready to be submerged. The frame is erected in a boat and the reel suspended, as seen in fig. 3. The oarsmen then perform their task,

Fig. 2.



and as fast as possible the boat is rowed across the stream. The cable is paid out as fast as necessary; but the faster the boat traverses the stream the better and more certain will be the success. Sometimes it was possible to get small steam ferry-boats to tow the cable-boat across the river, but this could not always be done.

Fig. 3.



When the Merrimac cable was laid, we toiled through the gloom of night. The sun had gone far behind the western horizon. The moon had come and gone, as though it was hurrying after the god of day that had just withdrawn its last ray; the stars remained, and from the blue depths of their

abode their glimmering beams added to make the scene sublime. In the stillness of night, surrounded by a deep and dismal forest, where the foot of man had seldom trod, we were busily engaged in preparing a pathway for a messenger, mantled in a flame, that was to be the first to greet the rising sun in the east and the last to bid it adieu in the far west—to carry tidings from the ice-bound north to the green palm and blooming magnolia regions of the south. Our couch was God's footstool, and we were sheltered from the dews of heaven by the forest foliage. We were lulled to sleep by the croaking of the frog, the chirping of the cricket, the whooping of the owl and the yell of the panther! Time can never erase from the mind the reminiscences of those scenes—eternity alone can pass them beyond the pale of memory.

Besides the cables constructed under my direction, many others were made and submerged in different parts of America, of which there was one at St. Louis for the O'Rielly line, one at Cincinnati for the House line, another at New Orleans for the Balize line, several across the Hudson at New-York, several on the seaboard line to New-Orleans, and many others across streams and narrow bays.

BISHOP'S SUBMARINE CABLES.

These cables have been constructed to meet their special cases. Among those thus employed may be mentioned some that have been laid by Mr. S. C. Bishop of New-York, the gutta-percha manufacturer of America. The first cables laid by this gentleman were those of iron wire, covered with three coatings of gutta-percha, to which were attached lead sinkers. After they had been submerged a few months the insulation was found to be chafed off at the sinkers, and then Mr. Bishop adopted the style and protective coverings represented by figs. 4 and 5.

Fig. 4 is a representation of a cable laid across the Hudson river for the Magnetic Telegraph Company, and successfully worked. Letter *a* is the electric wires of copper, *b* is the gutta-percha coverings around the copper wires singly, *c* is a gutta-percha covering around the insulated copper wires, and *d* is a spiral covering of tarred hempen yarn. Over this cover can be laid an armor of wires of any required size. Fig. 5 is another form successfully operated, which was also devised by Mr. Bishop. The three electric wires *a* are No. 10 Swedish iron, each of 1,300 pounds strength. The interior *b* and the covering *c* are gutta-percha, and *d* is the exterior protective covering of tarred hempen yarn, as in fig. 4.

Fig. 4.

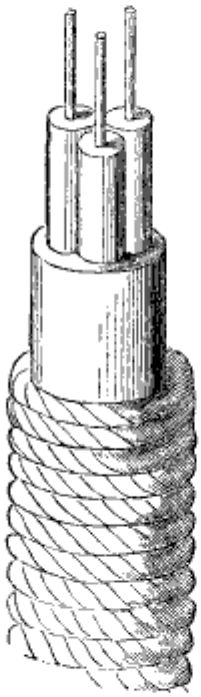
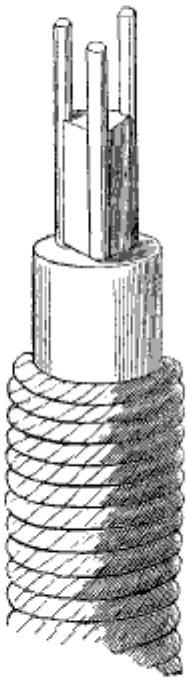


Fig. 5.



CHESTER'S CABLE MANUFACTORY.

As an auxiliary in the production of telegraph cables, Messrs. Charles T. and J. N. Chester of New-York, have constructed machinery for the covering of gutta-percha insulated wires with hempen yarn, and an iron armor, as seen in figs. 6, 7, 8, 9, 10, and 13. I have examined the machinery employed by these gentlemen, for the covering of cables, and its operation is as perfect as any other to be found on either continent. Fig. 6 is composed of five conducting wires of copper, each insulated with gutta-percha, the whole surrounded with tarred hempen yarn, and then with an armor of twelve No. 6 iron wires. Fig. 7 has one conducting copper wire, with an armor of twelve No. 10 iron wires. Fig. 8 has one conducting wire and an armor of twelve No. 12 iron wires. Fig. 9 has one conducting wire with an armor of nine No. 12 iron wires. Fig. 10 has three conducting wires, with an armor of twelve No. 6 iron wires; and fig. 13 has one conducting wire, with twelve No. 16 iron wires. These different kinds of cables are made to comply with the necessities of different lines or places, and have worked with the most complete success.

Fig. 6. Fig. 7. Fig. 8. Fig. 9.

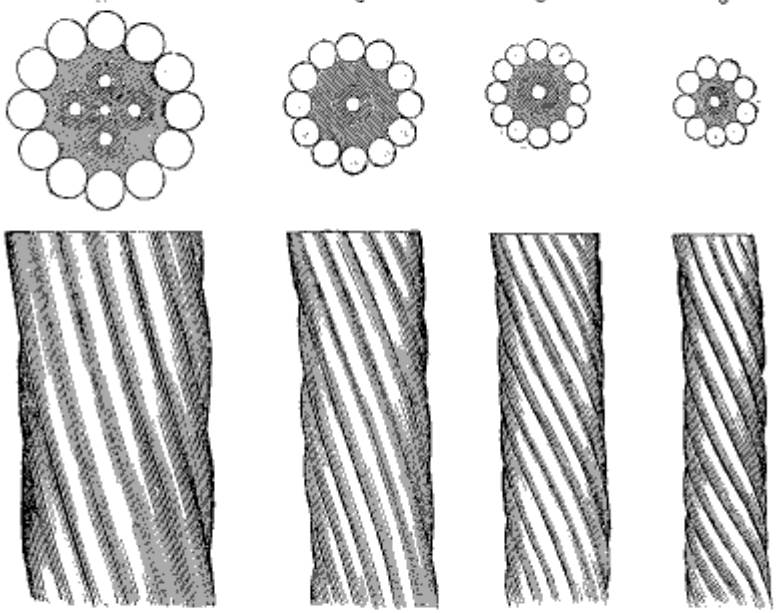
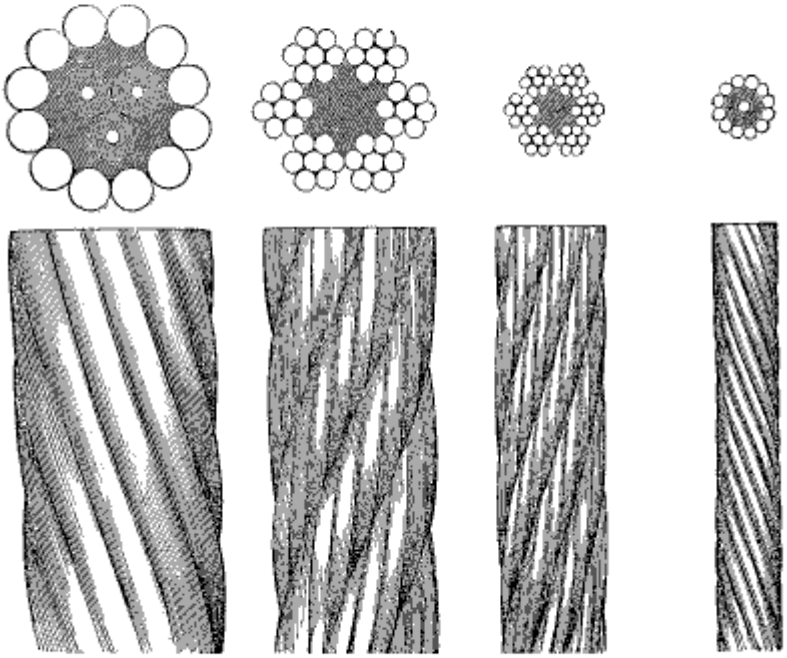


Fig. 10. Fig. 11. Fig. 12. Fig. 13.



In order to give increased strength to the cable, in resisting the great currents of the western streams, such, for example, as the Ohio, Mississippi, and Missouri rivers, the Messrs. Chester have devised the forms seen by figs. 11 and 12. Placing the conducting wire or wires in the interior of these iron cords, it is believed that they will more successfully resist the power of the currents in those streams. Fig. 11 will resist a strain of 14 tons. The reader may be surprised to learn that such powerful cables are necessary to be submerged in the western rivers, but it must be remembered that there are thousands of floating trees descending those rivers, and their roots drag on the bottom, catching into everything in their course. Suppose a tree is held by the cable, the whole current bearing upon that tree will be the strain against the cable; but, besides this, other trees descending are stopped by the one fastened to the cable, and they continue to gather, until they are released from their iron shackles and allowed to go on to the ocean free and unhindered.

LEADEN-COVERED TELEGRAPH WIRES.

In order to cross swamps and marshy countries, and to protect the insulation for subterranean and subaqueous purposes generally, Mr. Bishop has constructed extensive machinery for the covering of the insulated wire with lead of any required thickness. These leaden covered wires have been extensively employed, and have thus far proved to be durable and perfect as to insulation. Some of these wires have been buried in earth and water several years, and thus far show no signs of decay. One of these leaden covered wires extends from the central telegraph station in the city of Washington to the Capitol of the United States, connecting with the telegraph apparatus in the rear of the speaker's chair of the House of Representatives. From the Capitol the proceedings of Congress are transmitted to different parts of America. By this arrangement the President's message, on being read in Congress, can be transmitted on the radiating wires east, west, north, and south, and communicated simultaneously to millions of people.