

EUROPEAN SUBMARINE TELEGRAPHS.

CHAPTER XLIII.

The English and French Cables—Mode of Shipping and Submerging Cables—Holyhead and Howth Telegraph—The Irish Channel Cable of 1852—The English and Belgian Submarine Telegraph—Donaghadee and Port Patrick Submarine Line—English and Holland Submarine Cable—Prince Edward's Island Cable—Danish Baltic Sea Telegraph—The Gulf of St. Lawrence Telegraph—The Balize, Hudson and Zuyder Zee Cables—The Black Sea Telegraphs—The Mediterranean Submarine Telegraph Lines.

THE ENGLISH AND FRENCH CABLES.

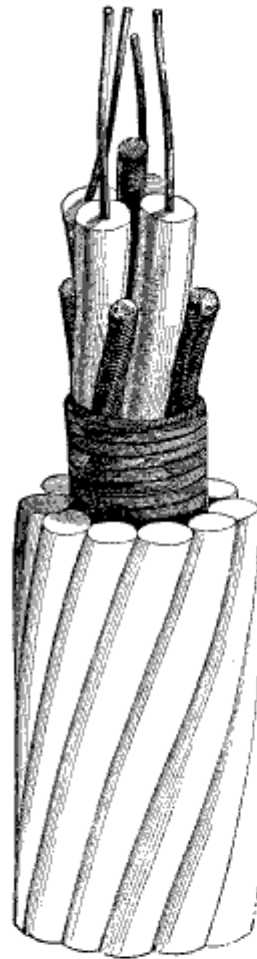
HAVING fully explained in another chapter the different submarine telegraph conductors as employed in America, I will in this refer to those of Europe, where that department of the telegraph enterprise has been carried out to a far more extended degree.

The first prominent undertaking was that for the connection of England with France by a subaqueous conductor across the channel between Dover and Calais. A concession was obtained for this purpose from the French government, but upon the condition that the connection by telegraph was to be effected before September, 1850. On the 27th of August, 1850, a cable was laid across the channel, and communication was made, telegraphically, through the wire. Unfortunately this grand enterprise was interrupted by the action of the waves, which produced a movement of the cable upon the rocks near the shore at Cape Grinez, by which the gutta-percha insulation was chafed entirely from the conducting wire. This cable was composed of an electric copper wire No. 14, and covered with three substantial coatings of gutta-percha. It was weighted to the bottom of the sea by lead sinkers. Its length was thirty miles, and the width of the channel was twenty-one miles. I have a piece of this cable taken from the sea after it had been submerged some five years. The gutta-

percha was then and is now in good condition and as solid as when first made; and notwithstanding it has been kept dry, it maintains its solidity and gives no evidence of decay. Barnacles and sea-weed had formed upon it; and from every indication there are reasons to believe that the gutta-percha as a substance would have remained a perfect insulation for all time to come.

The working of the cable was sufficient to maintain the integrity of the concession, and therefore it was respected in good faith.

Fig. 1.—Dover Cable.

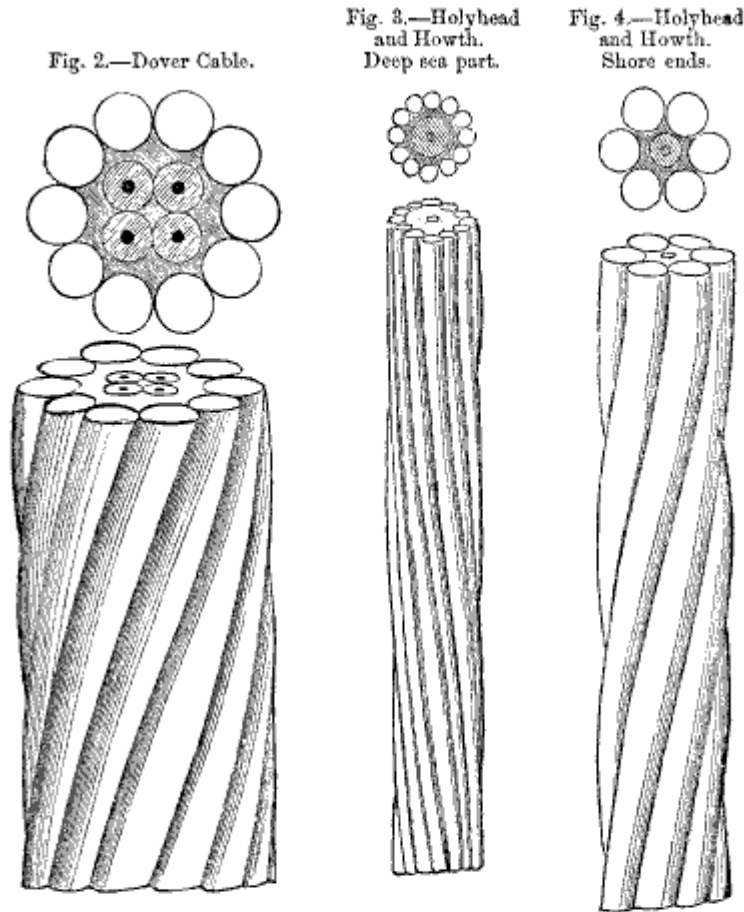


In the year 1851 another cable was prepared by Messrs. Newall & Co., of Gateshead. The energy and superior skill of these gentlemen were eminently successful in the production of a cable equal in every respect to the emergencies of the enterprise. It was a noble achievement in mechanics. The triumphant success in the invention of that cable was the grandest part of the enterprise. Fig. 1 represents the construction of the cable above referred to: *a* are four conducting wires, No. 16, copper; *b* is a cord of tarred hemp, slightly twisted; *c* represents the gutta-percha around the copper wires; *d* are hempen cords like *b*; *e* is a serving of tarred hemp spirally twisted around the core composed of *a*, *b*, *c* and *d*; and *f*, the iron wires, spirally laid, as seen in the figure.—These ten iron wires were galvanized with zinc and tightly laid around the interior combination with great care, by a perfect organization of machinery.

This cable was successfully laid on the 17th of October, 1851, from Dover to Calais. It was 25 miles long, and manufactured in the short space of three weeks. The cost of the cable was £360 per mile, and the total cost of the undertaking was estimated at £15,000. Its weight per mile was seven tons. On its completion, the four conducting wires were found to be per-

fectly insulated, and operated with the most complete success. The success of this enterprise opened a new era in telegraphing

I have a section of this cable after it had been submerged four years, and although a part of the galvanized surface of the exterior armor seems to have been eaten away or chafed off in the sea, it is, as a whole, perfect as it was the day it was laid. Fig. 2 is another representation of a section of this cable. The transverse section is the natural size.



MODE OF SHIPPING AND SUBMERGING TELEGRAPH CABLES.

Before entering into a detailed explanation of the respective cables adopted in Europe, I will briefly refer to the manner of submerging them from the vessel.

Fig. 5.

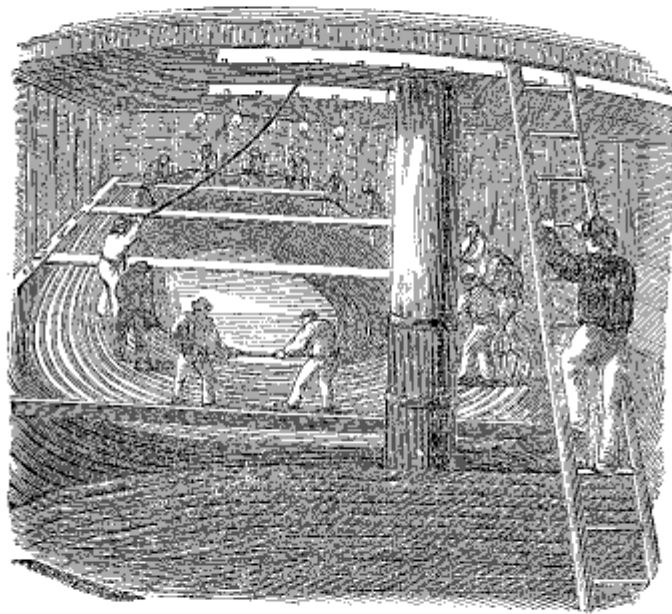


Fig. 6.

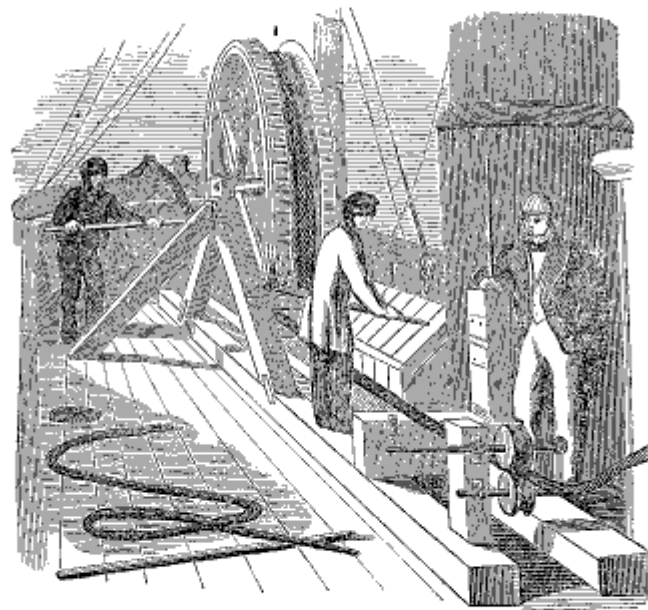


Fig 5 represents the coiling of the cable in the hold of the ship. This and the next figure have been copied from the London Illustrated News, and they are excellent representations of the subjects. I was present and witnessed the coiling of a section of the great Mediterranean cable in the vessel at Greenwich, near London, in 1854, and the scene represented by fig. 5 was taken on that occasion. In like manner other cables have been coiled in the vessel, proper care always being taken to prevent twists or kinks of any kind. When the cable is thus properly placed in the ship, it will pay out into the sea without hazard, except when interfered with by storm or unforeseen causes.

Fig. 6 represents the paying out of the cable from the deck of the vessel into the sea. The cable ascends from the hold of the ship and passing between guide rollers, as seen to the right in the figure, passes on to the break drum, and after encircling that some two, three or more times, as circumstances require, it is conducted over the stern of the vessel and dropped into the water, where it soon finds a resting-place upon the bottom, far below the influence of storm and tempest, and where it is supposed by philosophers there are no movements of the mighty waters nor a single element to disturb its quiet repose. The mechanism adopted for the paying out of cables is not always the same, though in general principle there is but little difference. Circumstances may require an occasional modification of certain parts, yet every plan contemplates the attainment of two essential considerations; first, the paying out of the cable to avoid kinks or any kind of entanglement; and second, to pay it out at a speed commensurate with that of the vessel.

HOLYHEAD AND HOWTH SUBMARINE TELEGRAPH.

The most remarkable feat ever performed in the laying of a cable was in connection with that from Holyhead on the Welsh coast, to Howth on the coast of Ireland, on June 1st, 1852, by Messrs. Newall & Co. Several companies had been projected to carry out the telegraphic connection between Ireland and England on the route above mentioned. Capital was being raised and great arrangements were being perfected to accomplish the gigantic undertaking. The distance across the channel was sixty miles, and it was estimated that at least ten miles plus would be required in submerging it. The length of wire was insulated with gutta-percha by Messrs. Statham & Co., at their extensive establishment in London. It was then shipped to Messrs. Newall & Co., at Gateshead on the

Tyne, where it was enveloped with its iron armor in the short space of four weeks. This cable was made for the deep and for the shoal water, as represented by figs. 3 and 4.

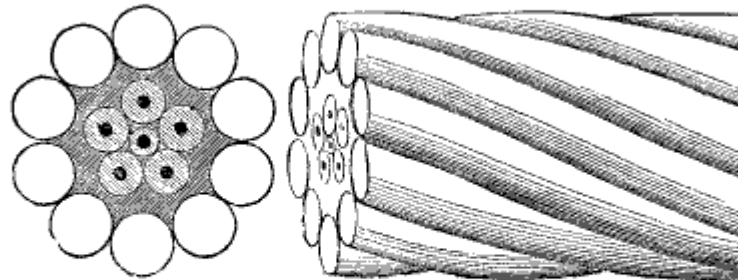
The former was for the deep water and made light, as will be seen from the figure, which represents the full size of the cable. Its weight was a little less than one ton per mile, making a total of about eighty tons. The shore ends will be seen by reference to fig. 4, being surrounded with larger wires, forming an armor capable of resisting the waves on the rocky coast.

The cable was completed and conveyed across England to Maryport on the railway. At Maryport it was placed on board the vessel and transported to Holyhead. One end was carried on shore and made fast, the vessel then proceeded to submerge it across the channel. The depth was seventy fathoms. Sixty-four miles of the cable were successfully laid and operated. After the third day it failed. It was supposed at the time that the anchor of a vessel had produced a separation of the wires, and on being taken up they were found broken and very badly stretched. This was near the Irish shore. About a year after the failure of this cable, a ship having made a cruise to South America, arrived at New-York with a piece of the cable which had been cut or broken off by the sailors. It was not until after the arrival of the vessel in America, that the sailors or any of the crew knew what the great and mysterious prize was that they had kept with such care.

THE IRISH CHANNEL CABLE OF 1852.

In the month of October, 1852, Messrs. Newall & Co. embarked with another cable across the Irish channel, connecting Scotland with Ireland, at the narrow part of the channel, between Donaghadee and Port Patrick. This cable is represented by fig. 7, the construction of which will be readily understood by the reader. The vessel while laying this cable and sixteen miles from shore encountered a severe gale, and it was impossible to steer it in the proper course. To hold out against the

Fig. 7.—Irish Channel Cable.



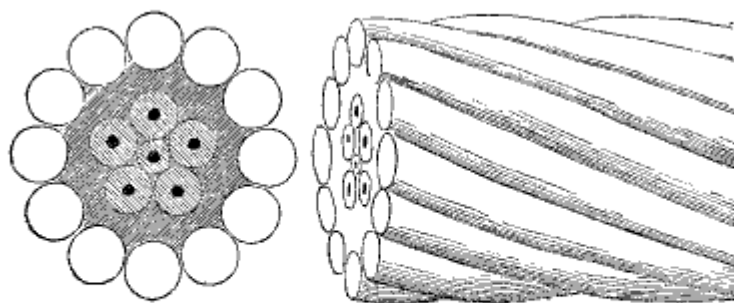
storm much of the cable would have been lost in the sea, and the remainder on board would not have been enough to have reached the opposite shore, although the vessel was within seven miles of the Irish coast, and had nine miles of cable on board. It was deemed necessary to cut the cable, which was promptly done, and the sixteen miles lay at the bottom as a treasure of the sea. In 1854, this cable was raised by Messrs. Newall & Co., and pieces of it were shown me by those gentlemen in London. It was found to be perfect and the wire but little decayed. A crust of barnacles was formed over it, and there can be no doubt but that it would have continued good for all time.

It was a vast undertaking to elevate that cable. The water was 150 fathoms deep. Some of the cable was buried in the sand, other parts covered with sea-weed, and other parts with barnacles or various kinds of shells. With the aid of a powerful engine the cable was recovered. On testing it after its recovery it was found to be perfect as to insulation.

THE DOVER AND OSTEND CABLE.

The cable between Dover and Ostend was laid on the 6th of May, 1853, twenty minutes before one p. m. It was constructed by Messrs. Newall & Co., and was seventy miles long. This was the greatest and most memorable accomplishment of that age. It was a triumph in art that will for ever do honor to those gentlemen. Fig. 8 represents this cable, containing six wires. The armor of the cable is composed of twelve iron wires, the whole capable of sustaining a strain of about fifty tons. The inner wire did not prove a success. It weighed seven tons per mile, making a total of nearly five hundred tons. It was manufactured in one hundred days, and cost £33,000. It required seventy hours to coil it in the ship, and it was submerged in the sea from Dover to Ostend in eighteen hours. Up

Fig. 8.—Dover and Ostend Cable.

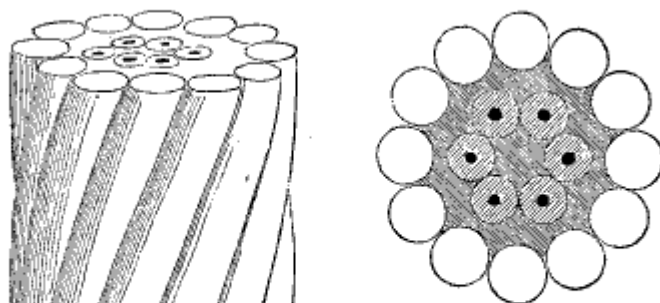


to that time there had been no achievement in telegraphing equalling that stupendous undertaking, and there never was an enterprise crowned with more signal success. The industry and enterprise of those gentlemen seem to have had no bounds; for wherever there has been an opening to extend the lightning flash they have always been foremost, and no obstacles, however great, have ever checked them in their career.

THE DONAGHADEE AND PORT PATRICK SUBMARINE LINE.

After the success in the submerging of the Dover and Ostend cable, Messrs. Newall & Co. renewed their efforts to lay a cable between Donaghadee (Ireland) and Port Patrick (Scotland), across the Irish channel. This cable was of the same size and

Fig. 9.—Donaghadee and Port Patrick Cable.

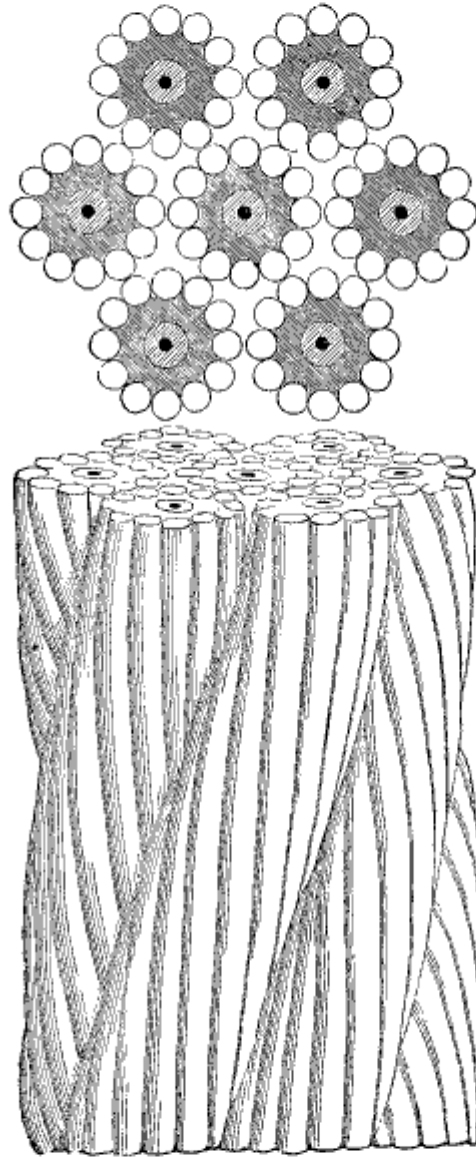


weight as fig. 8, but the conducting wires were differently arranged, as will be seen by reference to fig. 9, which is a representation of it in its proper size. The arrangement of the interior wires proved a complete success, each being perfectly insulated from the other so that each was capable of being serviceable for telegraphic purposes. This cable was manufactured in the short space of twenty-four days by Messrs. Newall & Co. The cost of it was about £13,000. It was laid for the Magnetic Telegraph Company. Another cable of the same make was laid across the channel at the same place for the British Telegraph Company.

ENGLAND AND HOLLAND SUBMARINE TELEGRAPH.

I have already described the cables connecting England with France and Belgium, and I now come to notice the telegraphic connection between England and Holland.

Fig. 10.—Orfordness and the Hague Cable.



The cable is laid between Orfordness on the Suffolk coast, and the Hague in Holland. There are now three cables laid between these places, each of which has one conducting wire, and covered with an armor of twelve iron wires. They are

laid some three miles apart across the channel, and near the shore they are connected together in one great cable as represented by fig. 10. The shore ends are made as seen in the figure, being composed of seven lesser cables, such as are laid in the sea, twisted together, forming one of great strength and size. It is intended to lay the other four across the sea whenever the business requires them.

PRINCE EDWARD'S ISLAND CABLE.

A submarine cable manufactured by Messrs. Newall & Co., as represented by fig. 11, was laid in 1852 between Prince Edward's Island and New Brunswick, a distance of ten miles. It worked successfully. This was intended as a part of the telegraph, designed to run from Prince Edward's Island to the island of St. Paul, or to the west coast of Newfoundland.

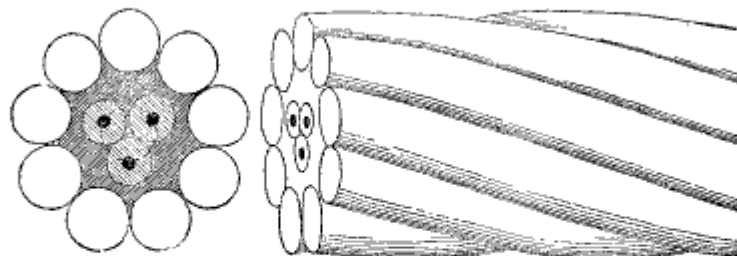
Fig. 11.—Prince Edward's Island Cable.



THE DANISH BALTIC SEA TELEGRAPH.

Fig. 12 represents the cable constructed for the Danish government and laid across the great belt of the Baltic sea. It runs from Nyborg to Korsøe on the Island of Zealand, connecting there with the line to Copenhagen. This cable has three electric wires well insulated and surrounded with an armor of nine large iron wires. The cable completed the telegraphic connection between Denmark and the other states of Europe, and by another cable laid across the Sound in 1854, a connection was formed between Denmark, Norway and Sweden. It was necessary that the cable laid across the belts of the Baltic should be very strong, because it was liable to be drawn

Fig. 12.—Great Belt Cable.



up frequently by the hundreds of vessels that annually pass through those narrow arms of the sea. The one adopted has proved to be a success in every particular.

THE GULF OF ST. LAWRENCE TELEGRAPH.

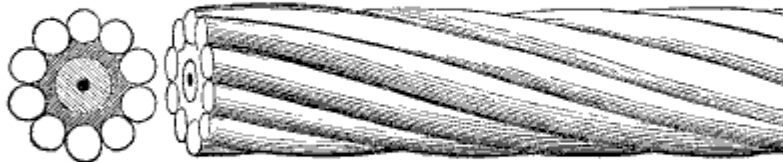
The New-York, Newfoundland, and London Telegraph Company, attempted to lay a cable similar in construction to fig. 12 across the Gulf of St. Lawrence, from the west coast of Newfoundland to the east coast of Nova Scotia in August, 1855, but owing to the violence of a storm encountered by the steamer during the submerging of it, when thirty-two miles from the Newfoundland coast, the cable had to be severed from the vessel. Forty miles of it had been paid out, and it was evident that the remainder on board could not have reached the opposite coast. Besides this lamentable misfortune, several kinks had been made, and two of the three conducting wires had failed. But one was left. The route of the vessel was then changed toward St. Paul's Island, but the sea was so high and the gale so violent, that the further laying of the cable was considered impossible without the most imminent hazard to the vessel and the lives on board. To save the vessel and those on board the cable was cut. The loss was serious and one deeply to be regretted.

In 1856, another cable was laid across the Gulf of St. Lawrence. This latter was not as heavy as the former one was, and it had a conducting cord made of four small copper wires twisted together. This electric cord was evidently an improvement on the former conductors. It gave to it additional strength and conductivity. It has worked successfully with some few slight interruptions.

THE BALIZE, HUDSON, AND ZUYDER-ZEE CABLES.

Fig. 13 represents a cable constructed by Messrs. Newall & Co. for the Balize telegraph at New-Orleans. It has been successfully submerged opposite the city and worked with entire satisfaction. A cable like fig. 13 has been made by the same gentlemen and laid across the Hudson river at New-York city. Several other cables have been made by Messrs Newall & Co., and submerged in different parts of America and worked with

Fig. 13.



perfect success. A cable similar to fig. 7 was laid across the Zuyder-Zee, a distance of five miles.

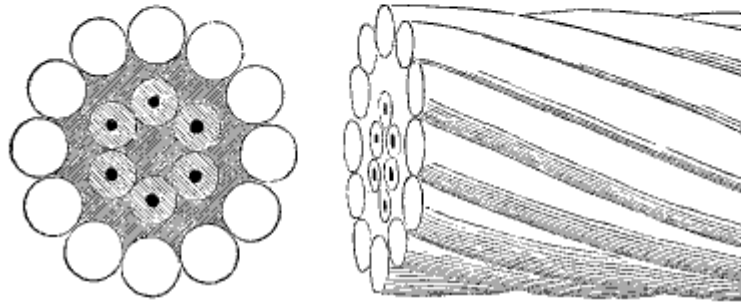
THE BLACK SEA SUBMARINE TELEGRAPHS.

The most remarkable submarine telegraph was that laid by Messrs. Newall & Co. between Varna and Balaclava, one hundred and fifty miles across the Black sea, during the late war, by which, with another two hundred miles long through the sea from Varna to Constantinople, the whole continent was placed in telegraphic communication with the Crimea and the capital of Turkey. These lines, however, were laid for government service. The line between Varna and Constantinople consisted of one copper wire thickly insulated with gutta-percha and covered with an armor of iron wires. Its weight was about two hundred tons. The line between Varna and Balaclava was a No. 16 copper wire, covered with three thin coatings of gutta-percha, being about the size of one of the insulated wires seen in fig. 1. Near the shore protecting wires were placed around it. This line was laid by Messrs. Newall & Co. for £22,000. It worked with the most complete success. This was certainly the boldest and yet most triumphant feat in submarine telegraphy. It has not its parallel in all history. It is wonderful to reflect upon this extraordinary enterprise, successfully submerged and practically worked across the most restless and turbulent sea upon the face of the earth. While above the storm raged, strewing the ocean's surface with wrecks, the tiny strand, unaffected by the tempest's blast, quietly lay in the depths below, traversed by the electric fluid, giving note of the progress of that war of empires upon the seagirt battle-field of the Crimea. Imagination pales before such achievements of daring and scientific effort.

THE MEDITERRANEAN SUBMARINE TELEGRAPH LINES.

Another very remarkable telegraphic feat is that of connecting Europe with Africa, for the consummation of which concessions were awarded by the French and Sardinian governments. The right was given to transmit intelligence in all languages. The concessions were to extend for fifty years from 1853. The line runs from Spezzia to Corsica. The submarine cable connecting these two places has six conducting wires, as seen by fig. 14. The length of the cable is one hundred and ten miles, of which twenty miles was estimated for slack in the sea. I was present at the embarkation of the cable in 1854, and saw some of it manufactured by Messrs. Kuper & Co., at Greenwich, near London. It is similar in construction to the cable

Fig. 14.—Mediterranean Cable.

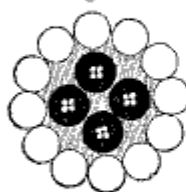


laid across the Irish channel from Donaghadee to Port Patrick. In the laying of this cable from Spezzia to Corsica the vessel encountered a very severe storm and for a while there were great apprehensions that the cable would be lost. Its great strength preserved it. From the termination of the cable on the Island of Corsica there is a land line one hundred and twenty-eight miles in length, extending to the Straits of Bonifacio, where a short submarine line of seven miles runs to the Island of Sardinia, across which there is a line two hundred and three miles long, terminating at Cape Spartivento. The consummation of telegraphic connection between the Island of Sardinia with Africa seems to have been surrounded with very great difficulties. Two attempts were made, under the direction of Mr. John W. Brett, to make the connection, but both failed. The first was in September, 1855, with a cable represented by fig. 14. The second was in August 1856, with a cable containing a four strand copper cord for the conducting wire, surrounded with an armor of iron wires similar in construction to the cable laid across the Gulf of St. Lawrence.

Fig. 15.



Fig. 16.



In September, 1857, Messrs. Newall & Co. contracted to lay the cable at their own risk. It was manufactured by them and was composed of an organization as seen by figs. 15 and 16; the former being the deep-sea cable and the latter the shore ends.

The iron armor of the deep-sea cable was composed of eighteen iron wires, and that of the shore end twelve iron wires. The distance between Bona on the African coast to Cape Spartivento, Sardinia, was one hundred and twenty-five miles. Length of cable on board, one hundred and sixty-two miles. Shore cable six miles.

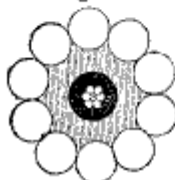
In the laying of the above cable there were many difficulties encountered. The length of cable was too short, and after splicing to it all the pieces at command, when the vessel was within ten miles of the shore, in eighty fathoms of water, it was lost. This lamentable occurrence, however, did not seem to daunt the heroic contractors. They immediately dispatched a vessel to England for more cable, which returned to Cagliari October 28th. Measures were taken to recover the end of the cable lost in the sea, and on the 30th it was found to be in perfect condition. On the same day the new cable was spliced to the end that had been lost in the sea. At 1 p. m. the cable was safely landed on shore. At 4 p. m. on the 30th of October, the first lightning flash from Europe to Africa was accomplished, adding new lustre to the wide-spread fame of Messrs. Newall & Co.

The next grand stride in the extension of submarine telegraphy was the connection of Malta and Corfu with the Island of Sardinia. This was also executed by Messrs. Newall & Co., as contractors under the Mediterranean company extended.

Fig. 17.



Fig. 18.



The cable which was laid on this route is represented by figs. 17 and 18, the former for the deep sea and the latter for the shore ends. The inside or electric cord is composed of seven small copper wires twisted together, forming a cord. The outside was an armor of eighteen small iron wires. The shore ends, as seen by fig. 18, were larger, and covered with ten iron wires. The weight of the deep-sea cable was 1,960 pounds.

The *Elba* arrived at Cagliari, Sardinia, on the 10th of November, 1857, having on board eight hundred miles of the cable. The *Desperate*, of Malta, had taken the soundings on the route, and the *Blazer* was the guide ship. On the 13th of November the vessels sailed to St. Eliza, some four miles south of Cagliari, where the cable was landed, and on the 14th the ships embarked on their great mission, leaving all things behind in perfect order. On the 15th a very severe storm arose, and at noon it was so violent that the waves ran a foot deep over the deck of the vessel. The ship labored in the turbulent sea, and at the time the paying out of the cable was very irregular. At eleven o'clock on the 16th, as the ship was contending against the waves, a heavy sea struck it with great violence and threw it upon its side, displacing the cable from its coil.

On the 17th the Island of Goro was in sight and soon there-

after the little fleet moored in St. George's Bay, north of La Valette, Island of Malta. The whole laying occupied seventy-two hours. Three hundred and seventy miles of cable were paid out. The electric flash was transmitted through the cable with perfect success.

On account of the unfavorable weather, the laying of the cable from Malta to Corfu was suspended, and it was determined to submerge it from Corfu to Malta to avoid head winds. To this end the vessels sailed to Corfu. The town of Corfu lies on the east side of the island. The St. Gordo Bay lies on the west side, where the cable was carried ashore. The end of the cable was connected with the land line which runs over the island to the town of Corfu.

At 11 A. M., on the 1st of December, 1857, the fleet sailed, the *Desperate* piloting the way and the *Blazer* serving as tender. The weather was very fine and prospect of success encouraging. December 3d, the greatest depth, eight thousand feet, had been passed, and on the 4th at noon the whole cable was submerged without accident. The vessel anchored in St. George's Bay, and the cable soon thereafter conducted on to the Malta shore. Amount paid out, four hundred miles, and the time occupied seventy-two hours. On the 5th the news of the great triumph was announced in London. The whole cost of the line was £125,000. In this enterprise the intrepid contractors won for themselves and their nation a renown more brilliant than deeds achieved at the cannon's mouth.