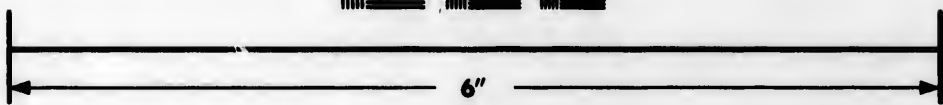
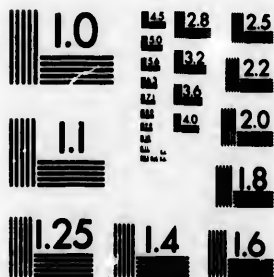


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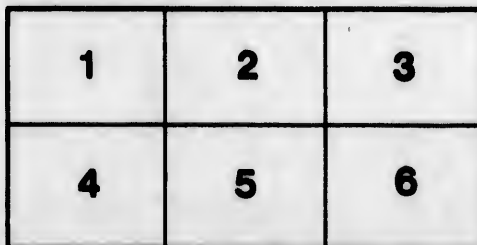
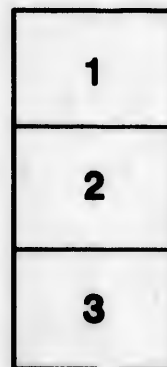
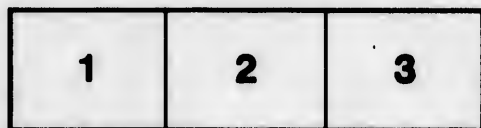
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Macmillan's 440 Magazine
Sept 1865

NARRATIVE OF THE ATLANTIC TELEGRAPH EXPEDITION, 1865.

Irish Inquis with 15th re
BY JOHN C. DEANE.

THE following narrative of the events which took place in the *Great Eastern* in her voyage with the Atlantic Telegraph Cable is as nearly as possible a transcript from my diary written on board.

I did not join the ship until Sunday, 23d of July, when the splice was made between the main cable and the shore end, twenty-seven miles off the Irish land. I was at Valentia for a week before her arrival at Berehaven, where she anchored on Wednesday morning, the 19th of July. She left her anchorage off the Maplin Sands at the Nore on Saturday, the 15th. She took the screw-steamer *Caroline* in tow on Monday, the 17th, off Falmouth, with the shore-end of the cable, and encountered a strong gale, with heavy sea, off the Irish coast, during which the tow-rope broke, and the *Caroline* was obliged to find her way to Valentia, the *Great Eastern* bearing up for Berehaven. On Thursday evening, July 20th, the *Caroline* went round from Valentia Harbour to Port Magee to be in readiness the following day, if the weather was fine, first to lay the "earth cable," and as soon as possible afterwards to attach the shore-end of the cable to the cliff of Foilhammurum, on the south side of Valentia. Foilhammurum Bay, about a mile in length at its widest part, is protected on the north side by the bold projecting headland of Bray, on the south by ledges of rock forming the northern entrance to Port Magee Channel. The bay becomes gradually narrower towards the cliffs, which rise to a height of about 300 feet. No better place could be well imagined for landing and maintaining a shore-end cable in safety. The bay was carefully surveyed and dredged by Lieut. White, in charge of the coast-guard of the district; and, outside a

small line of rocks, about 60 feet from high-water mark, the cable will rest upon a bed of sand. The cable of 1858 was landed near the Castle of Ballycarberry, on the mainland opposite Knightstown, in a position where it was subjected to chafing from the force of sea sent in by the westerly gales, while at Foilhammurum the sea from the westward is broken by the islands which guard its entrance.

On Friday, July 21st, the officials connected with the Telegraph Construction and Maintenance Company, stationed at the Telegraph House, which has been built on the plateau over the cliffs of Foilhammurum, astir very early, were actually engaged in making the necessary preparations for laying the cable called the "earth cable," on Mr. Varley's plan, which consists of a wire rope about two miles long, with a piece of zinc attached to the end—the object of this cable being to obtain what electricians call a "good earth," or, in other words, to get the current as far away as possible from local controlling influences, such as lightning, &c. The *Caroline* accordingly was towed into the bay, and anchored about two cables' length from the shore, and a dge of boats was made, the rope passed from the stern of the ship across the boats until it reached the shore, where it was hauled up the cliffs to the instrument house. The *Caroline* then proceeded out in a south-westerly direction, and dropped the earth-cable to the eastward of the little islet which is at the entrance of Port Magee.

This service having been effected, the next step, and one of the most important in the telegraph expedition, was to lay the twenty-seven miles of shore-end cable. This was commenced the next day at about nine o'clock, and

65.

the bridge of boats already referred to was used to land the end. The scene was one which cannot be easily forgotten by those who witnessed it. It was a lovely day, and the top of the cliff was lined by the inhabitants of the island, who, in their own simple and natural way, had improvised a demonstration in the way of flags by hanging their brilliant-coloured shawls on the tops of masts, oars, poles, or anything else which was available for that purpose. Tents made of old sails, supported by oars and boat-hooks, lined the road at the summit of the cliff; and their proprietors did a thriving trade not only during the day, but for many days previously, crowds of the islanders, as well as visitors from the mainland, having made up their minds that the *Great Eastern* would come into the bay. Pipers and fiddlers gathered round them groups of dancers, and the jig and reel were merrily footed during the day. Itinerant gamblers did their stroke of business too, and "Spoil five" was the favourite game. While these amusements were going on on the top of the cliff, underneath it were engaged one hundred or more of the peasants hauling the rope ashore, passed, as I have before described, over the bridge of boats, in each of which, on an average, there might have been eight or ten men. These boats formed a graceful curve across the bay from the stern of the ship to the shore. The end, being landed, was passed up the crevice in the cliff prepared for it; and, a large number of men being sent to the top, it was finally passed into the trench dug for it, conveyed to the Telegraph House, and put in connexion with the electric instruments. The house itself is a long wooden building, about seventy feet long by thirty feet wide, containing ample accommodation for the staff. As soon as the electricians announced that they had got a message from the *Caroline* that all was right, the Knight of Kerry, standing among his family and visitors, addressed the large assemblage in a few appropriate and earnest words. The Chief Secretary for Ireland, Sir Robert

Peel, M.P., made an admirable speech, alluding to the fact that everything that science could do had been done to make the laying of the cable a success, and commenting upon the great political importance of establishing telegraphic communication with America. He then called on the people to give "Three Cheers for Her Majesty," and asked them to pay a similar compliment to the President of the United States, which was done with great heartiness.

It was now time for the *Caroline* to start on her mission; and, just about 2.15, P.M. she was taken in tow by the *Hawk*, a screw steamer of 700 tons, belonging to the Telegraph Construction and Maintenance Company, Sir Robert Peel, the Knight of Kerry, Lord John Hay, Mr. Glass (managing director), Mr. Charles Edwards, and one or two others going out a short distance in her, and returning by the *Princess Alexandra*, the steam yacht of the Irish Lighthouse Board. The weather was most favourable for laying the shore cable, which was done about 10.30 P.M.

The *Hawk* returned to Valentia, where she arrived at 3 A.M. of the 23d. She started again at 7.30 A.M., with the Knight of Kerry, Sir Robert Peel, and a distinguished party of ladies and gentlemen, who were determined to brave any amount of sea-sickness to see the *Great Eastern* make the splice with the shore end. The *Hawk* arrived at the rendezvous 51°50' N., Long. 11°2'20" W. at a quarter to 1 P.M., and found the *Great Eastern* with the *Caroline* close aside her stern making the splice. The *Sphinx* sloop-of-war, one of the convoy sent by Her Majesty's Government, was on the *Caroline's* weather, and the *Terrible* frigate about a mile astern of her. The Big Ship was gaily decked with flags; on her main was flying, at the instance of Mr. Cyrus Field, the identical burgee which flew from the mast of the *Agamemnon* in the Atlantic Telegraph expedition of 1858. Many boats, as well as those of the *Great Eastern*, as of the men-of-war, were plying to and fro in the heavy swell which prevailed, and it was a

service of no ordinary kind to get those who would visit the *Great Eastern* on board her. The Secretary of Ireland got his share of wetting, as well as others. Of course there was a little eating and drinking to be done, and Captain Anderson dispensed the hospitalities of the ship in his kind and genial way. It was now time to be off; and, after hearty leave-taking and cheers for the ship from those who left her, preparations were made for the final start. The *Terrible* and *Sphinx* now appeared, the one on our starboard and the other on our port quarter. Their respective commanders gave the order to man the rigging, and three tremendous cheers were given by the crews for the *Great Eastern*, which were returned from the monster ship with enthusiasm.

At length all was declared to be in readiness. The huge paddles began to revolve slowly, the screw was set in motion, and precisely at sixteen minutes after 7 P.M. Greenwich time, (Sunday, July 23d), we commenced paying out the cable, which looked like a thread as it discharged itself over the wheel at the stern of the ship.

All went on well during the night; those in charge of the paying-out apparatus and of the electric testing instruments taking their prescribed positions in watches. The weather was all that could be desired, and everything was going on most favourably, when at 3.14 A.M. on Monday, 24th, it was intimated by Mr. de Santy, the chief of the electric staff, that the insulation of the cable showed evident symptoms of being imperfect. Mr. Clifford, in charge of the cable paying-out machinery, at once reported to the chief engineer, Mr. Samuel Canning; and before long almost all of us left our berths and came on deck to learn the cause of the ship being stopped and of the firing of a signal gun. We soon saw by the grave faces of those employed that there was something unusually wrong; and, though it was scarcely a time to ask questions, one had little difficulty in getting information. There was no doubt of it now. The

cable was injured somewhere between us and the shore. Could it be that an imperfect splice had been made between the thicker or shore end and the main cable? or was the fault between that and the ship? and again, might it not be between the position where the splice was made and the Bay of Foilhammurrum? These and other speculations were advanced and discussed for many subsequent hours. Mr. Canning and his assistants looked thoughtful and grave. Captain Anderson's expression indicated that he saw the critical position in which we were placed. In fact, one and all of us on board felt that the success of the expedition was greatly imperilled. All this time signals were being received very faintly from the shore, though the electricians thought that our signals to Foilhammurrum might probably be stronger than theirs to us. Mr. Canning at length resolved upon the practical step to take. He gave instructions to pass the cable from the stern to the bow, and to pick it up with the machinery placed there until the fault should be discovered. This was an operation requiring great skill and care, not only from the cable-laying staff, but from Captain Anderson in the handling of the ship. It was admirably done by all; and, at 25 minutes to 12, the cable was on the bow-wheel, and, passing over a drum, it was put in connexion with a small steam-engine placed on the port side of the deck, near the foremast. It was soon discovered that this engine had not sufficient boiler-power, and the rate at which the cable came on board never exceeded one mile and a quarter an hour, and sometimes even less. We were making up our minds now that we should have to get back to Valentia, and were in anything but good spirits. Fresh boiler-power was put on to the picking-up engine, by getting a small locomotive near the donkey, with connecting bands; but this did not very materially increase the speed of hauling in the cable. Mr. de Santy, in the meantime, putting on the Morse instruments in connexion with the shore, sent a message to Mr.

Glass, the managing director, to request that he would order the *Caroline* to the ground where the splice was made, and the *Hawk* to the *Great Eastern*, with all possible speed. A reply came back that the *Caroline* should be sent as soon as she coaled. The gentlemen in the test-room were, as can be easily imagined, continuing their test experiments with great anxiety, and various opinions were expressed as to the locality of the "fault." Mr. Saunders, Mr. de Santy's first assistant, steadily maintained throughout the day that he felt satisfied the cable was injured not more than eleven or twelve miles from the ship.

Before dinner we had a visit from Mr. Prowse, first lieutenant of the *Terrible*, sent by Captain Gerard Napier, to ascertain whether he could be of any use; for of course we had signalled to both ships, informing them of the mishap which had befallen us. Mr. Saunders's opinion became stronger and stronger as to the locality of the injury; and almost the last thing he said to me on my bidding him "good-night" was "that we should find that the faulty bit of the cable would be on deck early next day."

Puff! puff! went the little "pick-up" engine, and, as the rope came up, it was coiled on the deck just forward of the starboard paddle-box. At 5.30 in the morning (25th July) the *Hawk* came alongside. At 9 a.m., while we were all at breakfast, to our intense joy and gratification, one of the electricians came in to announce that Mr. Saunders's tests had proved accurate, and that, on getting the tenth mile on board, the cause of all our trouble and anxiety was discovered. A wretched bit of iron, not longer than two inches, had by some unaccountable means been pushed through the exterior covering of the cable, and, passing through the gutta-percha, had done all the mischief. Mr. Saunders was cheered loudly as he came into the saloon to breakfast, and everybody was pleased with everything and everybody. How different the expression of faces from yesterday—then all gloom and disappointment, now all radiance and hope! "Pass the cable aft now" was the word,

and it required great skill to do it. Of course the splicings had to be made and the tests to be carried on, and it was some time after two o'clock before we all had the pleasure of seeing the rope discharged again over the wheel at the stern into the sea. Our pleasure, however, was not destined to be of long continuance, for at 3 p.m. an alarm was given that not a signal was received from shore. Here, indeed, was a source of deep annoyance and mortification. Faces again became long, and we all began to think the chances of laying the cable were becoming more remote. "Pass the cable forward to the 'pick-up'" was the order now given, and we had anything but a pleasant prospect before us. But what is that excitement outside the test-house? Has any fresh trouble arisen? Listen again! All is right. "We have got the signals from the shore!" It was true; and ere long men who an hour previously had nearly given up the chance of laying the Atlantic Cable were now grasping hands and congratulating each other. Signals announcing that all was "right again" were sent to the *Terrible* and *Sphinx*, and in a very short time we were paying out the cable, and receiving the most satisfactory signals from shore.

July 26th.—During the whole of the night the cable was paid out without a mistake, the paying-out apparatus working to perfection. By morning, we were distant 150 miles from Valentia, and had paid out 161½ miles. The day broke thick and hazy, and the Big Ship began to show the *Terrible* and *Sphinx* what she can do in the way of steaming. The sea was rather rough, and the wind was blowing what one would designate a double-reefed-topsail breeze; and yet we were as steady and upright in the water as if we had been alongside a wharf. The *Terrible* sent down her top-gallant masts, and signalled to us that we were going too fast for the *Sphinx*. We replied that we could not slacken our speed.—The insulation of the cable improves as we get into deep water. We are now in 1,750 fathoms. The *Sphinx* is barely visible on the horizon.

July 27th.—There is but one opinion on board in reference to the singular adaptability of the *Great Eastern* for a telegraphic cable-laying ship. There is quite enough of head-sea to enable us to judge of what sort of weather smaller vessels would make. The *Terrible* plunged her bow into it, while we were as upright as a house. At 8.30 A.M. we had run 302 miles, 235 from the last splice, being an average of 5.87 miles an hour of paying out. The average depth to-day, according to the chart, was 2,000 fathoms. The cable first reaches the water at a distance of about 213 feet from the paying-out wheel astern. The paddle-engines were making $6\frac{1}{2}$ revolutions, the screw 26, and the average speed was 6 knots. Observations at noon gun, lat. $52^{\circ} 34' N.$, long. $19^{\circ} W.$ Distance run since yesterday, 142 miles. *Terrible* on our port-beam, *Sphinx* not visible.

The electricians report the signals as being most satisfactory between the ship and the shore. Assuming all to go on well, between this and Sunday at noon the after-tank will be emptied of its contents. There are three iron tanks which contain the cable—one near the stern, from which it is going now; another situated in the middle; and a third in the fore part of the ship. The after-tank is 58 feet in diameter and 26 in height, the main-tank is 58 feet 6 inches by 26, and the fore is 51 feet 6 in. by 26 feet. In the main-tank there are 798 miles; in the fore, 633.75. The after-tank, now happily so near exhaustion, contained 837 miles. There are 3 miles of shore-end in the main-tank. The *Caroline* laid 27; and thus the total amount of cable in miles and bound, when the ship left the Nore, was 2,300, weighing 4,100 tons. To this must be added 1,198 tons of water put in the tanks, which made the total weight 5,600 tons.

We next pay out from the fore-tank, and the passing of the cable from there to the stern will be a nice operation. It is hoped that this may happen in the early part of Sunday; for, though the cable staff are quite prepared to do it at

night, yet it is far better that they should have daylight for their work.

July 28th. Our course has been N.W. $\frac{1}{2}$ W.; wind, N.N.W. All night every thing worked as smoothly as possible. At 7 P.M. 119 miles of distance had been gone over. The index of the paying-out wheel showed 152,905 revolutions, equal to 476.6 miles distance; so that we had payed out 176.78 miles of cable. It is calculated that, during our voyage (the distance between Valentia and Heart's Content being 1,663 miles), the revolutions of the paying-out machine will amount to about 600,000, and each of these revolutions represents a cost of rather more than a pound sterling.

The paying-out machinery for the Atlantic Telegraph cable on board the *Great Eastern* differs in many material respects from that used in the former expeditions. I shall endeavour to describe it. Over the hold is a light wrought-iron V wheel, the speed of which is regulated by a friction-wheel on the same shaft. This is connected with the paying-out machinery by a wrought-iron trough, in which at intervals are smaller iron V wheels, and, at the angles, vertical guide-wheels. The paying-out machinery consists of a series of V wheels, and jockey or riding-wheels (six in number). Upon the shafts of the V wheels are friction-wheels, with break-straps weighted by levers and running on tanks filled with water, and upon the shafts of the jockey-wheels and also friction-straps, with weights, to hold the cable and keep it taut round the drum. Immediately before the drum is a small guide-wheel, placed under an apparatus called the knife, for keeping the first turn of the cable on the drum from riding, or getting over another turn. The knives, of which there are two, can be removed and adjusted with the greatest ease by slides similar to a slide-rest of an ordinary turning-lathe. One knife only is in use, the other being kept ready to replace it if necessary. The drum round which the cable passes is six feet in diameter and one foot broad, and upon the same

shaft are fixed two Appold's breaks, running in tanks filled with water. There is also a duplicate drum and pair of Appold's breaks fitted for position, and ready for use in case of accident. Upon the overhanging ends of the shafts of the drums, driving-pulleys are fitted, which can be connected by leather belts for the purpose of bringing into use the duplicate breaks if the working breaks should be out of order. Between the duplicate-drum and the stern-wheel are placed the dynamometer and intermediate wheels for indicating the strain upon the cable. The dynamometer-wheel is placed midway between the two intermediate wheels, and the strain is indicated by the rising or falling of the dynamometer-wheel on a graduated scale of cuts attached to the guide-rods of the dynamometer slide. The stern-wheel over which the cable passes when leaving the ship is a strong V wheel, supported on wrought-iron girders overhanging the stern; and the cable is protected from injury by the flanges of the wheel by a bell-mouthed cast-iron shield surrounding half its circumference. Close to the dynamometer is placed an apparatus similar to a double-purchase crab or winch, fitted with two steering wheels for lifting the jockey or riding-wheels with their weights, and the main weights of the drum, as indications are thrown on the dynamometer scale. All the break-wheels are running in tanks supplied with water by pipes from the paddle-box tanks of the ship. The cable passes over the wrought-iron V wheels, over the tank, along the trough, between the V wheels and jockey-wheels in a straight line, four turns round the drum, when the knife comes into action, over the first intermediate wheel, and over the other intermediate and stern wheel, out into the sea.

This beautiful and ingenious machinery has been invented by Messrs. Canning and Clifford, and has worked up to this time with admirable regularity and precision. At noon yesterday, 531.57 nautical miles had been paid out, between 1,529 to 1,950 fathoms. Distance from

Valentia 476 miles. We asked the *Terrible* to prevent any ships from crossing the cable astern, and she replied, "Yes, if possible."

July 29th.—The observations at noon placed the ship in $52^{\circ} 38' 3''$ N. long. 27.40 hrs. Distance from Valentia 634, and from Heart's Content 1,028. The night passed over very favourably, in respect to the ship's progress, the amount of cable paid out, and the satisfactory manner in which the machinery worked. We were all in the highest spirits; and, though the morning opened with a misty sort of fog, and it continued drizzling during the day, we walked the deck, inspecting the machinery by which the cable was discharged from the ship, and looked down occasionally into the tank, which every moment was lessening its contents. We heard from the electricians that there was an undeviating accuracy in the transmission of the signals; and, turning our eyes to the western horizon, we speculated as to the day, if not the hour, we should arrive at Heart's Content. At ten minutes after 1 p.m., ship's time (Greenwich time $3, 3' 30''$ p.m.), one of the electricians was seen to come hastily out of the test-room and to run towards the stern of the ship. I was standing looking down at the paddle-engines at the time. He returned hastily, and it was quite clear that something was wrong. The order was at once given to stop, and it seemed wonderful how the huge engines ceased to move by the simple turning of a wheel. The whole population of this floating town were soon made aware that another mishap had occurred. A very serious one it turned out to be. All communication was stopped between us and the shore, the instantaneous expression of the fairy light on Professor Thomson's marine galvanometer indicating this mortifying fact. It was not a "fault," as it was on the morning of the 24th, but infinitely worse—a "dead earth," as the electricians call it, showing that there existed a serious injury to the cable. Mr. Canning, the chief engineer, at once conferred with Mr. de Santy, and it was determined again to "pick up." Mean-

time, the tests showed that the injury was not more than three miles from the ship, and we had now to ascertain practically whether the "pick-up" machinery would perform its duty as well in the deep water (we were now in 2,000 fathoms) as it did when we were in 600. The word was passed to get up steam for the donkey engines forward, and very speedily they were declared ready. Then came the passing of the rope from the stern, along the huge wallsides of the ship, to the bow; and, notwithstanding the very great difficulties of this operation, owing to the projections of the paddle-box, the boats, &c., it was effected at 9.45 ship's time. The engines worked away very satisfactorily. The three miles of cable were got on board; and, the injured portion having been cut out, and connexion made with the instruments, immediate communication was established between us and the shore, signals having been sent and received before half-past 11 p.m. Captain Anderson never left the bridge for a moment, and it was owing to his admirable management of the ship at this trying juncture that the cable was successfully got to the bows of the *Great Eastern*. The slightest inaccuracy in handling the ship would have been fatal, and he had to watch her to prevent her from breaking the cable, on which, at times, there was a strain of over 2½ tons. Mr. Halpin, his able chief officer, was of the greatest assistance to him in this emergency. We of course signalled to the *Terrible* to let her know what occurred; and, stopping her engines, she remained close by us on the starboard quarter during the night, Mr. Canning resolving to wait for daylight before he passed the cable aft to the stern wheel.

Altogether this is the most trying day we have had; and, while we rejoice that the mischief has been repaired, yet none of us, however sanguine, dare speak with too much confidence as to the final result. These "ups and downs" in Ocean Telegraph Cable-laying life keep out in a perpetual state of excitement. Our next essay, possibly, will be with

the Buoys; and, if we bring them into use practically, we shall have then tested all the machinery and appliances so thoughtfully devised for the expedition by Mr. Canning. I hope it may not come to the buoying.

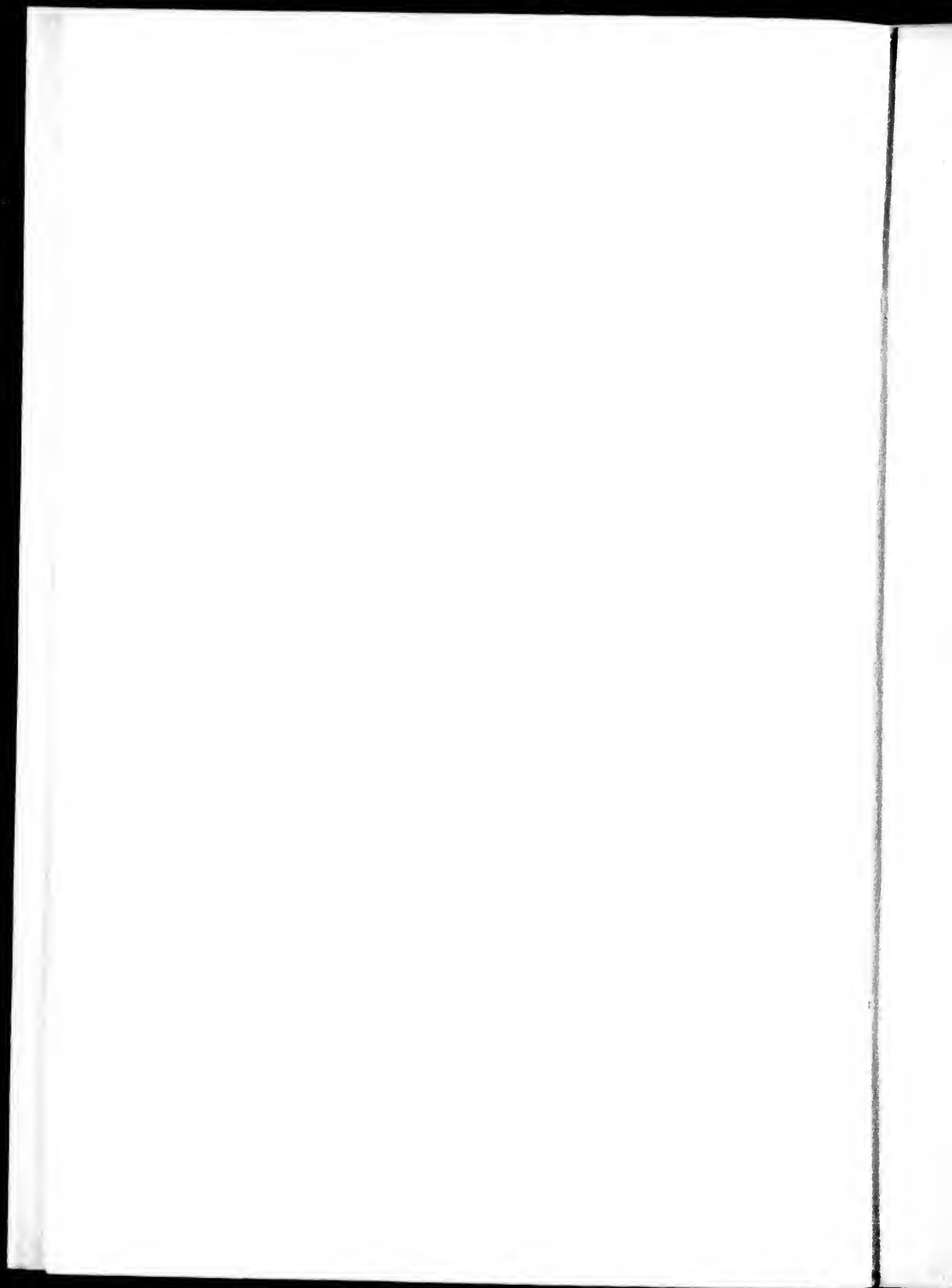
Sunday, July 30th.—Mr. Canning and his staff commenced transferring the cable from the bow to the stern as soon as day broke, but unfortunately it got off the drum, and fastened in the axle. There it received such chafing that it was resolved to cut and splice again. This involved a delay of several hours, and it was not until 10.8 a.m. Greenwich time, or 8.10 by our ship's time, that the cable was passed to the stern-wheel again, and once more payed out. By this time but 133 miles remained in the after-tank. Staff-Commander Moriarty, R.N., who was in the former Atlantic Telegraph Cable expedition, has been permitted by the Admiralty to join the *Great Eastern* to assist in scientific navigation. His observations, which agree with those taken by Captain Anderson independently, place the ship at noon, lat. 52° 30', long. 28° 17', distance from Valentia, 650 miles; cable paid out, 745 miles. We had divine service performed in the dining-saloon. Our course still N.W. by W. *Terrible* on our starboard quarter. The *Sphinx* must have passed us in the night. Our delay of 19 hours has given her a fair chance.

Monday, July 31st.—The 133 miles of cable which remained in the after-tank being nearly run out by 2.30 a.m., the chief engineer and his staff made the necessary arrangements to connect the cable in the fore-tank with the paying-out machinery. At 3 a.m. the screw-engines were stopped, at 3.30 the paddle-engines were slowed, and in about an hour the *Great Eastern* was steaming ahead again. By noon we had run 753 miles, and had paid out 903 miles of cable; lat. 52° 9', long. 31° 53'. After breakfast, Mr. Canning and Mr. De Santy proceeded to make an examination of the piece of cable in which the 'dead earth' was found, and in the course of a short time the electricians disco-

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vered it. That wonderful instrument designed by Professor Thomson gave its significant jump across the graduated paper, and told us the position of the injury. We all clustered around Mr. Canning to examine the cable, and the conclusion, I may say, then unanimously arrived at, was that the injury was the deed of an assassin's hand—some demon in human form, who had deliberately driven into the external hemp a piece of the wire used in the manufacture of the cable, having made an incision right through the gutta percha. One end of the piece of iron was sharp, as if it had been cut with a nippers; the end coming out at the other side was broken off abruptly. One may easily imagine the indignation which this dreadful act created. Mr. Canning conferred with his assistants as to what was the best course to be taken. It was ultimately decided that the cablemen should be asked to examine the injury, and to give their opinion to the chief engineer. A meeting was held, and they arrived at the unanimous conclusion that it was done by wicked design. Mr. Canning then appealed to the gentlemen on board acting in various capacities in connexion with the expedition, and they formed themselves into a volunteer guard, each agreeing to take a watch of six hours daily, and remain in the tank during the paying-out of the cable. Mr. Cyrus Field took the first watch.

The Atlantic has been literally like a mill-pond all day. Up to this moment, save in the delay occasioned by the unfortunate incidents I have described, we have been singularly favoured.

Tuesday, August 1st.—A charming day of monotonous paying out. The ship's position at noon, lat. $51^{\circ} 52' 30''$, long. $36^{\circ} 3' 30''$. Distance from Valentia, 946; to Heart's Content, 717. Cable paid out, 1081 miles. We passed the burial-place of three Atlantic cables to-day, and are approaching the deepest soundings—that is, between 1,975 and 2,250 fathoms. The weather has been a little hazy; wind from N.W. to S.W. Ship's course, N.W. by W. $\frac{3}{4}$ W. *Terrible* on our starboard quarter, quite close. We

have only seen two sail since we left. One ran down quite close to have a look at us. At night we must present a strange sight to a ship unacquainted with the service in which we are engaged. Between the fore tank and the paying-out gear, there is erected a wooden trough for the cable to run in, and powerful lamps are placed at intervals of about twenty feet all along its length—two-thirds of the upper deck. Looking at it from the bridge, it is not unlike a street at night.

Wednesday, August 2nd.—A day never to be forgotten. The wind rose shortly after midnight, increasing to a strong gale from the S.W. Our grand ship, however, received little, if any, impression from its force. Away went the cable over the paying-out wheel at seven miles an hour, and all on board were in great spirits at the prospect of soon seeing the Atlantic cable at its American terminus. At 5.45 A.M. (ship's time) the ship was stopped, a report having been made by the electricians that the galvanometer indicated a fault, and, as far as they could then form an opinion, not very far astern. They could make signals to and receive them from Valentia; but, as there could be no deceiving the instrument, the fault was overboard, and therefore the sooner it was on board the better. Shortly before the engines were stopped, a grating noise was heard in the tank from which the cable was being paid out. Mr. Cyrus Field, whose watch it was, stated that one of the hands called out to the man on duty immediately over the tank, "There is a piece of wire;" but this intimation does not appear to have been passed aft. Subsequently a wire was found in the tank, projecting out of the cable in one of the flakes being then paid out, and evidently that in which the fault was supposed to exist. It was brought by the foreman to Mr. Canning for examination. It was about three inches in length; and, when it was broken off, which it was very easily, it appeared to be of ill-tempered steel. Here, then, was a fair reason for arriving at the conclusion that

the recent fault may have arisen from accident, and not from design; but there was the singular fact staring us in the face that, whether by accident or whether by design, the "fault" was discovered overboard during the same watch. Mr. de Saunty reported to Mr. Canning that the fault was of such a kind as could not be well passed over; and so the pick-up apparatus was put into requisition again—previously to which, tests were applied to the cable in the tank, and it was pronounced all right.

Another experiment showed the fault to be overboard about six miles. The chief engineer set his men to work, and, with much more smartness than they showed upon the former fault being found, the cable was passed from the stern and hauled in over the bow of the ship. This was at 10.30 a.m. We were then in about 2,000 fathoms soundings. The engine being set going, the rope passed over the drum very slowly, only one mile being hauled in after the expiration of an hour and forty-five minutes. Just at this time the eccentric gear of the engine got adrift, and in addition to this mishap steam failed, owing to a want of a supply of water to the boilers; and so the picking-up ceased altogether. Eight bells (12 o'clock) had been made some time, and we had all gone down to lunch. There we were discussing the locality of the fault, and it was a great consolation to find that the electricians agreed that it lay only about six miles overboard. Two miles had already been got in, and so we looked forward to a few more hours' work to get in the rest, make the splice, and again resume paying out. Suddenly Mr. Canning rushed into the saloon, and, with an expression on his face which told how deeply he was moved, exclaimed, "It is all over; the cable has parted!" Mr. Cyrus Field also came down, and with admirable composure and fortitude conveyed to us the sad intelligence. We were all on deck in a moment, and I shall never forget the scene as long as I live. The men who were engaged in the bows of the ship had wandered listlessly aft after the accident, and in their sad countenances you at once saw the

effect which the disaster had on their minds. A deep silence prevailed. The ship was drifting away over the course of the cable. The Atlantic was as calm and as placid as a lake, its very stillness adding to the melancholy which pervaded all. Groups stood about in various positions on the vast deck of the great ship, condoling with each other on the great misfortune which had occurred. "I have put into the enterprise my all," said one to me; "but with God's blessing, I shall live to see the Atlantic cable laid. In spite of what has occurred, I am more than ever satisfied of the practicability of laying it." "Let us not despair," said Cyrus Field. "I have seen worse disasters than this in Atlantic telegraphy, and I know we must eventually succeed." From one no less sincere, with whom I conversed shortly after Mr. Field had thus expressed himself, I heard a quiet remark which struck me forcibly. "I have but a small stake in this undertaking," said he, "as compared with others; but I am more than ever satisfied that the cable can be successfully laid, and there are men in England who will not fail to give us the means to do so when they know the truth."

But there is Mr. Canning hurrying along to the bow of the ship: he has never for a moment lost his self-possession. He soon returns midships and is accompanied by Mr. Clifford, his able assistant, and a staff of workmen. A brief consultation is held. He mounts the bridge and confers with Captain Anderson, and soon we learn what they resolve to do—to grapple for the cable! What, at 2500 fathoms deep? Such a thing has never been heard of before. Cables have been grappled for in the shallow waters in the Mediterranean and elsewhere at from 400 to 600 fathoms; but at 2500 fathoms it is simply absurd! The experienced chief, however, had issued his orders, and immediate preparations were made to grapple. Then it was that the functions of the navigator were called into active request; for what use would there be in attempting to hook up the cable unless we knew

the line in which it lay? Captain Anderson and Staff Commander Moriarty immediately conferred, and it was determined that the ship should be steamed in an easterly direction, and to windward, and drift down with the grapnel across the track in which the cable was lying.

But I ought to go back a little before I describe the grapnel operations, and dwell on the circumstances connected with the parting of the cable. Those who visited the ship before she left the Nore will recollect a large V-wheel at the bow, similar in construction to that over which the cable is paid out a-stern. This wheel, overhanging the bow, is supported on wrought iron girders. On each side of it are smaller V-wheels moving on the same axis. Over the larger V-wheel the rope was passed leading aft to a large drum on which it was coiled and kept in position by a knife, precisely in the same manner as in the paying-out machinery, which I have already described. The cable, with the wire rope by which it was brought from the stern to the bow, was coming in the groove of the larger V-wheel. The cable going to the drum, the wire-rope to the capstan, the strain was very great; the cable being out at an angle in the sea at the starboard bow, to which side it was hauled over, after having received some chafing from one of the ship's hawse-holes over which it passed, having previously been under the *Great Eastern's* forefoot. The wind had shifted, and Captain Anderson found it almost impossible to keep the ship's head so as to give a chance to the cable to keep up and down. Up, however, came the cable, and the wire-rope over the wheel, together; and those engaged in directing its movements saw that it had been considerably damaged, and were congratulating themselves that the injured part was on board, when suddenly a jerk was given to the dynamometer, which indicated a strain of something like sixty cwt. Away the cable, wire-rope, and chain-shackling flew off the larger V-wheel on to one of the smaller V-wheels; and, just as it passed the in-

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strument which had measured the severe test to which it had been subjected, snapped with a booming sound, and dashed into the sea, leaving a curl of eccentric foam after it. I have already very faintly attempted to describe the sensation produced on board our ship by this sad and untoward event, lacking words to convey the dismay which it occasioned. It was indeed a day of mourning. But there was a quiet settled purpose and determination upon the face of Mr. Canning which showed that he would leave nothing undone; and, as I have already told you, he resolved, with thorough English pluck, to sweep the track in which the cable lay in the hope of bringing it up from a depth exceeding two nautical miles.

The observations at noon place the ship in lat. $51^{\circ} 25'$, long. $39^{\circ} 6'$, course 765 S, 25 W. We had run $1,062$ miles from Valentia, were just 606 from Heart's Content, and had paid out since yesterday 116.4 miles of cable. Nothing could be more beautiful than the weather or more favourable for carrying out what appeared to all a forlorn hope. However, the grapnel—a sort of anchor weighing about three cwt., with five very strong flukes in it—was soon brought up from the stores, and bent on to the wire rope, of which we had a supply of five miles on board. We steamed away some fourteen miles from the place where the cable parted, and in the smoothest of water. The *Terrible*, to whom we called the disaster, was quite close to us at the time. The grapnel was let go at 3.20 ship's time on its deep-sea-fishing errand. The small engine was set going, and its wheels and drums revolved at a terrific pace as the wire rope went down, buckets of water being constantly thrown on them to keep them cool. Yet hissing clouds of steam arose.

Down, down went the rope, and one began to realize at every turn of the drum asking for fresh supply, what a grandeur there is in the depth of this mighty ocean. At 5 p.m. intimation was given that the strain was becoming gradually less; and, in a few minutes more, the grapnel had arrived below in

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just 2,500 fathoms, having occupied, with the intervals of stopping the machinery, over two hours in its wondrous journey to the caverns of the deep. From 5 until quite dark the cablemen, as well as the ship's crew, were actively engaged in getting one of the huge buoys over the port bow with the aid of the shears. When it hung over the side, all had been then done for the day that was deemed necessary; and the *Great Eastern*, broadside on to the track of the cable, trawled the grapnel over the ground in search of a prize worth, with all its belongings, not less than a million sterling. We had a mournful party in the grand saloon at night; and one by one dropped away from the table to the privacy of his cabin, to reflect on the events of a day ever memorable in the annals of ocean telegraphy.

Thursday, August 3d.—Broadside on to the line in which the cable lay, the *Great Eastern* tugged the grapnel during the night. There were indications now and then, towards break of day, that it had hold of something, and one bite which was given induced the fishermen to haul up and see what had been caught. About $\frac{1}{4}$ before 7 (Greenwich time) the pick-up engine was put in motion, and, to aid its feeble efforts, the rope was passed round the capstan close by. It came up kindly at first, and by 8 o'clock A.M. three hundred fathoms were on board. The dynamometer, which had been registering as high a strain as 70 cwt., suddenly indicated an increase to 75 cwt., and it was clear to every one that the flukes of the grapnel had laid hold of something. Even the most sceptical admitted that, if it was anything, it must be the cable. About 8 o'clock one of the wheels of the picking-up gear began to complain; and very shortly afterwards it broke. This disaster threw a very dangerous sort of work on the cable-staff in hauling in the rope, which sprung occasionally with such force as to imperil the lives of those who were near it. As it was, two men received rather serious injuries, and were taken to hospital to receive the tender and efficient care of our excellent Doctor

Ward. It now became very thick and hazy. The engine worked on, and our spirits rose as each fathom of the rope coiled over the drum. But, alas! all of a sudden, with one bound, the rope, springing into the air with a ringing noise, left the rapidly revolving drum; and, before it could be stopped with the hempen stops which men were preparing to roll round it near the wheel at the bow, it slipped away from them and darted down to the mysterious Atlantic waters again.

Another blow to our hopes! But still we reasoned upon what had occurred, and the probability of grappling the prize did not seem so distant as it was yesterday. To persevere while we had a foot of the buoy rope left was the resolve which those in command at once arrived at; and it was agreed to get to westward of where the grapnel and cable lay, and drift across its line again. The wind, hitherto favourable for this operation, now somewhat changed, and there was a very thick fog. At 1.30 P.M. (ship's time), and just before we started, we fired guns and blew the steam-whistle, to let the *Terrible* know we had moved; and it was some time before we heard one of her 100-pounders boom a reply. We soon steamed the fifteen miles—the distance Captain Anderson determined upon; and we lay to during the night, the weather being very fine, and the sea as smooth as glass.

Friday, August 4th.—There is very little to record to-day. We were drifting still away, to get at the desired place—to reach which was rendered more difficult by the fact of our not being able to get observations. An attempt to sound was made and became fruitless, so far as learning the nature of the bottom was concerned, by the line having broken. It was said that the lead touched the bottom at 2,300 fathoms. Early in the morning, the *Terrible* appeared to leeward of us quite close, and her first lieutenant, Mr. Prowse, came on board to ascertain what we proposed to do. He saw preparations made for lowering one of the smaller buoys—which was placed on a raft composed of planks and

casks, so as to keep it as nearly as possible in an upright position. The observations were not very good, owing to a bad horizon, and placed the ship in lat. $51^{\circ} 3' 30''$, long. $27^{\circ} 54'$. Shortly before 10 a.m. (Greenwich time) we had reached a position calculated to be as nearly as possible where we parted with the grapnel. The buoy was hove overboard, and floated on the sea, but not as high as could have been wished. On the top was a flagstaff bearing a red and white flag, and in large letters on the red painted surface of the buoy itself were printed the words "Atlantic Telegraph." It is in lat. $51^{\circ} 28'$, long. $38^{\circ} 42' 40''$. Again we steamed away, intending, if the wind favoured us, to let the ship drift across the line of the cable the first thing in the morning.

Saturday, August 5th.—Drifting, drifting again all night. In the morning we had very hazy and foggy sky, but smooth water. Towards noon we saw our companion, the *Terrible*, the curtain of fog having lifted just to make her visible. She signalled to us at 2:30, giving us the bearings of the buoy at three miles distant, which we came up to at 3:45. We asked her to remain by it during the night. Course N.W. by N. for six miles, and then, if the wind suited, to drift down and try our grapnel.

Sunday, August 6th.—Thick weather still. We saw the *Terrible* very early, but afterwards lost sight of her, the fog increasing in thickness. Divine service was performed in the dining saloon by Captain Anderson. No observations. It was said that we must have the buoy on our north-west some fifteen or sixteen miles. Fog increasing, fog horns and steam whistles went during the night.

Monday, August 7th.—The weather continued "dirty" all night. We made out the *Terrible* shortly after the day broke, and informed her, in answer to her question, that we were about to grapple for the cable. We also gave her our lat. and long. About half-past 8 we came up with the buoy, then steamed N.W. for twelve miles. At 11.10, being then

1.47 by Greenwich, the grapnel went over for the second time. It was much quicker in its voyage to the bottom than on the former occasion. At 12.5 we concluded that it reached the ground, the dynamometer showing a great diminution of strain. The northerly wind we wished for blew steadily all day, and we drifted on the course of the cable with every possible favourable circumstance. Shortly after six the dynamometer marked 48 cwt. and the head of the Big Ship answered slightly to the strain and came up to the wind. Still the grapnel asked her to do more, and by-and-by she replied by altering her head from E. and by S. $\frac{1}{2}$ south to E. $\frac{3}{4}$ N. Even the sailors, hitherto unbelievers in the success of the deep-sea fishing we were engaged in, admitted that we must have caught hold of the prize now, and joined the cable-crew in hope that we might yet have it on board. All went on well until 8.10 p.m., when the machinery again showed its utter inadequacy. The chief engineer called on the capstan to aid it, and 150 fathoms an hour came up steadily, and, to all appearances, with a better chance of ultimate success than had yet presented itself. We told the *Terrible* that we were "going on hopefully."

Tuesday, August 8th.—All night the greatest care was devoted to watching the strain on the cable, and Captain Anderson never left the bows of the ship, conning her course, signalling to "stop," "ease," and "reverse" the engines, according to the angle and position which the rope—now coming in smoothly over the wheel and round the capstan—made to the ship. About 5.30 a.m. the dynamometer went up as high as 87 cwt., indicating a fair amount of probability that the grapnel with the cable had left the bottom. In a couple of hours afterwards the one mile mark on the rope hauled in showed what good ground of hope there was for getting the rest on board, and it was felt that, if we succeeded in doing so, we should have accomplished a feat unparalleled in ocean telegraph-laying. In fact, the landing of the line in Trinity Bay was felt to be

secondary in point of interest. No one entertained a doubt as to the practicability of the one; but to bring up a cable from a depth of over two miles was to overcome difficulties scarcely to be estimated.

Our hopes are again destroyed. At 17 minutes to 8 A.M. away went the cable again. A shackle had passed in apparent safety over the V wheel at the bow, thence to the drum, and so on to the capstan, where, after three turns had been taken, the swivel came out, and, with a force which those who saw it can never forget, whizzed into the air like a ship's rocket, and, after lashing its tail with fury, dived down under the frowning bows of the ship. We came to the breakfast-table almost broken-hearted; and Captain Anderson, Mr. Gooch, and Mr. Canning intimated that we should soon know the decision as to what course should be pursued.

The indomitable Canning, it was understood, had urged another "try;" and, as enough rope was on board of the five miles, to enable him to try the experiment, it was resolved to look once more for the cable. Lieutenant Prowse, of the *Terrible*, had by this time come on board, and learned what we intended to do. He told us that on the Sunday they came up with the first buoy we threw in, and close alongside of it a small schooner called the *First Fruits*, of Bridport, out twenty days from Cardiff, and bound to Harbour Grace. The captain of the *Terrible* sent Lieutenant Prowse on board of the little vessel, and learned from her captain that he had seen the buoy, and, on making out what it was, had determined to remain near it for a while, in the hope of being enabled to give information to any ship in the telegraph expedition which happened to be near. He expressed the greatest sorrow on learning that the cable had parted. We all hope that the conduct of this warm-hearted and excellent sailor, whose name we did not learn, may be rewarded by those who have it in their power to do so.

At 9.50 another buoy was hove overboard, of the same size as the former

one, painted red, with the word "Telegraph." On the top of the flag-staff there was a canvass-ball painted black, and the flag itself was red, white, and red, horizontal. The Buoy is in lat. 51° 25' 30", lon. 38° 56'. Mr. Canning and Mr. Gooch now conferred with respect to the coming attempt to get at the cable; and it was resolved to trust to the capstan, which has not only shown what it can do, with the engine to which it has been attached, in getting up the huge anchors of the *Great Eastern*, but has proved itself an excellent auxiliary to the machinery which was too credulously supposed to be able to do the work of picking up. Round the capstan a casing of wood is to be placed, so as to increase its diameter for the coiling of the rope. The dynamometer and its two wheels are to be shifted nearer the capstan; and it is believed that the strain will be by these means made more even, and that sudden jerks can be more readily controlled. The swivels, too, will all be taken out, and either new ones made at one of the forges on deck (for we have two) or the old ones strengthened. All this work will take over forty-eight hours to get through.

Up to 5 P.M. we kept company with the *Terrible*, but the wind was freshening every moment to what Captain Anderson called a summer gale. We steered W.N.W. up to midnight, and congratulated ourselves that the increasing sea had so little effect on our great ship.

Wednesday, August 9th.—We had a gentle intimation last night that the *Great Eastern* could be induced to roll like other ships if she only had a chance. There was a heavy beam sea on. It rained in the early part of the morning; but afterwards the weather cleared, and by noon the wind changed from N.W. to N.N.E., and we went along in search of Buoy No. 2 at half-speed screw and paddle, with a heavy following sea, the result of last night's wind. Our navigators have an idea that they ought not to err more than a quarter of a mile or so in any of their "placings," and we were told to look out for Buoy No. 3 on

the port beam. The *Terrible* was in sight right ahead on our starboard bow, and we thought she was close to it. She came down on us, and signalled that she had not seen the Buoy. She told us that the Buoy bore S.S.E. of her. We steered S. by E. half E., and at 4.40 p.m. were abreast of it. Just as we made it from the bridge the *Terrible* signalled that she also had seen it. Thus, Captain Anderson and Staff-Commander Moriarty were right to a nicety in their calculations—a special chart of the tracks in searching for the Buoy has been drawn by Staff-Commander Moriarty, and will be lithographed on board.¹ Buoy No. 1 is distant as nearly as possible 9 miles from the second Buoy we placed; and between where the cable parted and the first Buoy is about $2\frac{1}{2}$ miles. Our lat. to-day was $51^{\circ} 19' W.$; our lon. $3\frac{1}{2}^{\circ} 6'$. The fore part of the deck is alive with artificers of all kinds. The capstan is nearly cased with wood nine inches thick, and is ready to receive its iron-clad covering, which will be finished before daylight. The night was perfectly calm; and, as the sparks flew aloft from the seething iron, hammered by the brawny Vulcans, we were all impressed with the picturesqueness of the scene—a picture that Rembrandt would have painted.

Thursday, August 10th.—A calm night. Towards 3 a.m. a slight breeze. The ship was taken by a current to the eastward some 6 or 7 miles between 9 p.m. last night and 4 this morning. Shortly before this we made out Buoy No. 1, and then steered away for Buoy No. 2. As on former occasions, we bore away to get the ship broadside on and drift on over the cable, steering N.W. The grapnel left the bows at 10.30 a.m. Greenwich time with 2,460 fathoms of wire rope and cable attached, and found bottom at 11.18 a.m. We then set the fore and aft sail and also our topsails to assist our drifting. Strain varying from 40 to 45 cwt. still drifting. At 1 p.m. strain on the index of the dynamometer 60 cwt. beyond which point

it did not show any inclination to go; and Mr. Canning and Captain Anderson arrived at the conclusion that we had moved the cable this time. Orders were then given to haul the grapnel in, and the machinery was set in motion. By 11.30 over 1,400 fathoms had been got in, the capstan working very satisfactorily.

Friday, August 11th.—At 5.20 a.m., the whole staff having remained faithful to their respective posts during the night, the grapnel made its appearance under the V wheel at the bow. We were dismayed to find that the chain which fastened the shank had taken an ugly half hitch round one of the flukes, so that it was impossible to hook the cable effectually. Captain Anderson said that he was pretty sure we had caught hold of it at one o'clock yesterday; but the discovery which was now made showed that, even if he had, the grapnel never could have got a proper hold. It was calculated from the length of the rope covered with ooze, that we were in 1,950 fathoms, though we sent down 2,460. There was a great desire among all on board to get some of the stuff from the bottom which adhered to the grapnel and the rope; and all of us collected specimens. Dr. Ward showed me some small shells, which were examined in a microscope. Sir Roderick Murchison will have an opportunity of seeing the ooze, as a bottle of it will be sent to the Geographical Society.

"What! Another trial, Mr. Canning?" "Yes," said he, "as long as I have enough rope—but I fear it has been sadly tried in the last work it had to do." Such were the chief engineer's conclusions, and his staff were set at once to work to patch it up. On examination it was found that the strands had been unlaidd; so it was resolved that the defective pieces should be replaced. When complete, it was made up of 1,600 fathoms of wire rope, 220 fathoms of hemp rope, and 510 fathoms of Manila. A new grapnel was bent on. At 7.25 a.m. we were abreast of Buoy No. 2, and at 11.30 we signalled our

¹ A fac-simile of this Chart, as well as one showing the track of the *Great Eastern*, accompanies this article.

companion, the *Terrible*, "We are going to make a final effort," and "We are sorry you have had such uncomfortable waiting."

When the ship's head was W. by S. and the buoy bore E. by N. about two miles, the grapnel was let go. This was at 1:56 Greenwich time. We again set the canvas on the ship to regulate our drift. At 3:50 p.m. ship's time strain was marked to be 60 cwt. and the cable came in with the utmost ease and regularity round the capstan. The strain now became greater, the dynamometer indicating 80 cwt., and shortly afterwards, in a jerk which the shackle made in coming in, it marked 105 cwt. There was only one opinion now on board as to our having the cable on the grapnel, and at no period of the trying time which we had gone through was there more real hope; for, though men openly said, "We dare not hope," yet there was confidence inspired in us from Mr. Canning's and Captain Anderson's manner, which made us, spite of all, believe that we should pick up the cable. We all sat down to dinner in better spirits than we had been in for some days.

About a quarter to 7 I strolled up to the bows, and stood at the barrier, separating the capstan and machinery from the fore part of the deck, put there in order to leave the cable men ample space to work, and to prevent them being interfered with. The capstan was bringing in the manilla rope very steadily, which was being passed aft by the cable crew for coiling. A dozen or more hands were on the elevated grating on deck, at the bow, watching the progress of the rope after it had come over the V wheel, and standing by with hempen stops to stop its progress on getting the signal. Captain Anderson stood at the port side of the bow, watching the strain of the rope, and occasionally speaking through the tube which leads aft to the bridge, and giving instructions to "stop her," "reverse," or "go on," as occasion might demand. All of a sudden a whistling noise was heard, and all was over! The rope broke like a carrot, and

dived into the Atlantic to join the mute cable which lay below.

Now then for home! What more could be done? Thought, zeal, energy, labour, had all been honestly and faithfully applied; every available resource at the Engineer's command had been used to recover the cable; but, these having failed, there was only one course to pursue. After a short conference with Mr. Gooch and Mr. Canning, Captain Anderson gave the necessary instructions to prepare for our return. Lieutenant Prowse, of the *Terrible*, had come on board as soon as we signalled our failure, and informed us that the frigate would at once proceed to St. John's, and would take dispatches for us. She came up quite close to our stern. Her captain, becoming impatient at the delay of the pinnace—the sea beginning to rise rapidly with the increasing wind—fired a recall gun; and soon afterwards Mr. Prowse put off from the ship, lighting a blue light in the boat to show the *Terrible* where he was. He soon got on board, and Colomb's signal-lights, which have been used in both ships during the expedition, flashed the word "Farewell" from the frigate, to which we replied, "Good-bye, thank you." Captain Anderson then said, "Full speed, and keep her head east," and the *Great Eastern* pointed her obedient bow towards England.

The Fastnet Lighthouse, off Crookhaven, was made early on Thursday, the 17th of August, and despatches were sent ashore by a small steamer. The following statement, having been unanimously agreed to on board, was telegraphed to London. It is a summary of the facts connected with the discovery of the faults and of the parting of the cable; and it is impossible for any one who, like myself, witnessed the events of this memorable expedition to disagree with the conclusion at which the practical men have arrived.

"ATLANTIC TELEGRAPH EXPEDITION,
"Great Eastern, August 16th, 1865.

"The *Great Eastern* sailed from Valentia, after making the splice with the shore-end, on

23d July, and continued on her voyage to Lat. 51° 25', Long. 39° 6', being 1063 miles from Valentia and 600 miles from Heart's Content, Trinity Bay, having paid out 1,212 miles of cable, when the cable parted on the 2d August, at 12.35 p.m. in soundings 3,900 yds. under the following circumstances:—

"A partial loss of insulation having been discovered, the ship was stopped to recover that portion of the cable in which the fault lay—electrical tests placing it probably within 6 miles. The cable was passed from the stern to the bow of the ship for this purpose; and, after getting in two miles of cable, the fault being still overboard, the cable broke about 10 yds. inboard of the wheel at the bow, having been injured by chafing on the stern of the ship.

"Two previous faults had been discovered—the first in soundings of about 1,000 yds. and the second in about 4,100 yds.—and had been successfully recovered and made good. In the first case 10 miles, and in the second 2½ miles of cable, were hauled in.

"After the cable parted, a grapnel with 2½ nautical miles of rope was lowered down, the ship being so placed as to drift over the line of cable. The cable was hooked on the 3d; and, when 2,200 yds. of the rope had been hauled in, a swivel in the latter gave way, and 2,800 yds. of rope were lost—the cable having been lifted 1,200 yds. from the bottom.

"On the 4th a buoy with flag and ball was moored with 5,000 yds. of rope to mark the place. It is in lat. 51° 25', long. 38° 42' 30'.

"From the 4th, fogs and adverse winds prevented a further attempt until the 7th, which was then made nearer the end of the cable, and was unsuccessful from the same cause when the cable had been lifted about 1,000 yds. Another buoy was then placed in lat. 51° 28' 30', long. 38° 56'.

"A third attempt was made on the 10th, which failed on account of the grapnel chain having fouled the flukes of the grapnel. The grapnel and last 800 yds. of rope came up covered with ooze.

"A fourth attempt was made on the 11th, at 3 p.m., which also failed through the breaking of the grapnel rope when the cable had been raised 600 yds. from the bottom. Having now exhausted the stock of rope, it became absolutely necessary to proceed to England for more and stronger tackle."

Practical conclusions unanimously arrived at by those engaged in various capacities in the expedition.

"1st. That the steam-ship *Great Eastern*, from her size and consequent steadiness, together with the better control obtained over her by having both the paddles and screw, render it possible and safe to lay an Atlantic Telegraph in any weather.

"2d. That the paying-out machinery, constructed for the purpose by Messrs. Canning and Clifford, worked perfectly, and can be confidently relied on.

"3d. That the insulation of the gutta-percha-covered conductor improved when submerged to more than double what it had been before starting, and has proved itself to be the best insulated cable ever manufactured, and many times higher than the standard required by the contract. The cause of the two faults which were recovered was, in each case, a perforation of the gutta percha through to the copper conductor, by a piece of iron wire found sticking in the cable. Electrically the third fault was analogous to the first. The difficulty may be provided against in future.

"4th. That nothing has occurred to create the least doubt in the minds of all those engaged in the expedition of the practicability of successfully laying and working an Atlantic Telegraph cable; but, on the contrary, their confidence has been largely increased by the experience obtained on this voyage.

"5th. That, the *Great Eastern* steam-ship supplied with sufficiently strong tackle and hauling in machinery for depths of 4,000 to 5,000 yds., there is little or no doubt of the possibility of recovering the lost end of the cable, and completing the line already about two-thirds laid.

"S. CANNING, Chief Engineer.

"JAMES ANDERSON, Comdr.

"DANL. GOOCH, Chairman of the Gt. Ship Co. and Director of the Telegraph C. & M. Co.

"HENRY CLIFFORD, Engineer, T. C. & M. Co.

"CROMWELL F. VARLEY, Electrician of the Electric & International Tel. Co. and Atlantic Tel. Co.

"WILLIAM THOMSON, L.L.D. F.R.S. Professor of Natural Philosophy in the University of Glasgow.

"C. V. DE SANTY, Chief Electrician, Telegraph Constn. Compy.

"HENRY A. MORIARTY, Staff Commander, R.N."

The expedition of 1865 has proved, not only the practicability of laying a cable, but a fact of very great importance to all interested in ocean telegraphy—namely, that it can be picked up from a depth of two nautical miles. Already there has been expended, up to the present moment, in Atlantic Telegraph expeditions, a sum not less than 1,162,820*l.* of which, in round numbers, England has contributed the million, and America has found the rest. The present cable, which cost 700,000*l.* has been two-thirds laid, and that it can be recovered and taken to its destination in Heart's Content, is the conclusion at which the practical men engaged in the expedition have arrived. But

this is not all that is required. Another cable should be constructed at once; but whether the external protector of the conductor and insulator is to be of a different kind will have yet to be determined. Beyond all doubt the protector¹ was pierced through, and the core was wounded; but still the cable has so many other admirable qualities, particularly in its flexibility for paying out, and its general strength, that those interested may hesitate before they abandon the form which has been approved

¹ *Conductor*—Copper strand consisting of 7 wires (6 laid round one), and weighing 300 lbs. per nautical mile, embedded for solidity in Chatterton's Compound. Gauge of single wire '048 = ordinary 18 gauge. Gauge of strand '144 = ordinary No. 10 gauge.

Insulation—Gutta percha, 4 layers of which are laid on alternately with four thin layers of Chatterton's Compound. The weight of the entire insulation 400 lbs. per nautical mile. Diameter of core '464, circumference of core 1'392.

External protection—Ten solid wires of the gauge '095 No. 13 gauge), drawn from Webster and Horsfall's Homogeneous Iron, each wire surrounded separately with five strands of Manilla yarn, saturated with a preservative compound, and the whole laid spirally round the core, which latter is padded with ordinary hemp, saturated with preservative mixture.

Weight in air 35 cwt. 3 qrs. per nautical mile.

Weight in water 14 cwt. per nautical mile, or equal to eleven times its weight in water per knot; that is to say, it will bear its own weight in eleven miles depth of water.

Breaking strain 7 tons 15 cwt.

Deepest water to be encountered 2,400 fathoms, or less than 2½ nautical miles in depth.

The contract strain is equal to eleven times its weight per nautical mile in water.

of by the scientific committee.² Possibly it may be thought desirable to strand the solid wires and thus give additional protection.

Captain Anderson is of opinion—and no one is more competent now than he is to form a correct one—that the *Great Eastern* is the ship of all others best calculated to pick up the cable. By the early part of the month of May, next year, proper and efficient machinery and gear could be got ready; a new cable could be manufactured by the Telegraph Construction and Maintenance Company, and the *Great Eastern*, having laid it at Heart's Content, could then return to the spot where the cable of 1865 parted, raise it and bring it to the American terminus. By these means the lines (if the expedition be successful) will be brought into commercial operation.

Englishmen, at all events, are not accustomed to be beaten in any enterprise they take up, and nothing has occurred in the Atlantic Telegraph expedition of 1865 to create doubt as to ultimate success.

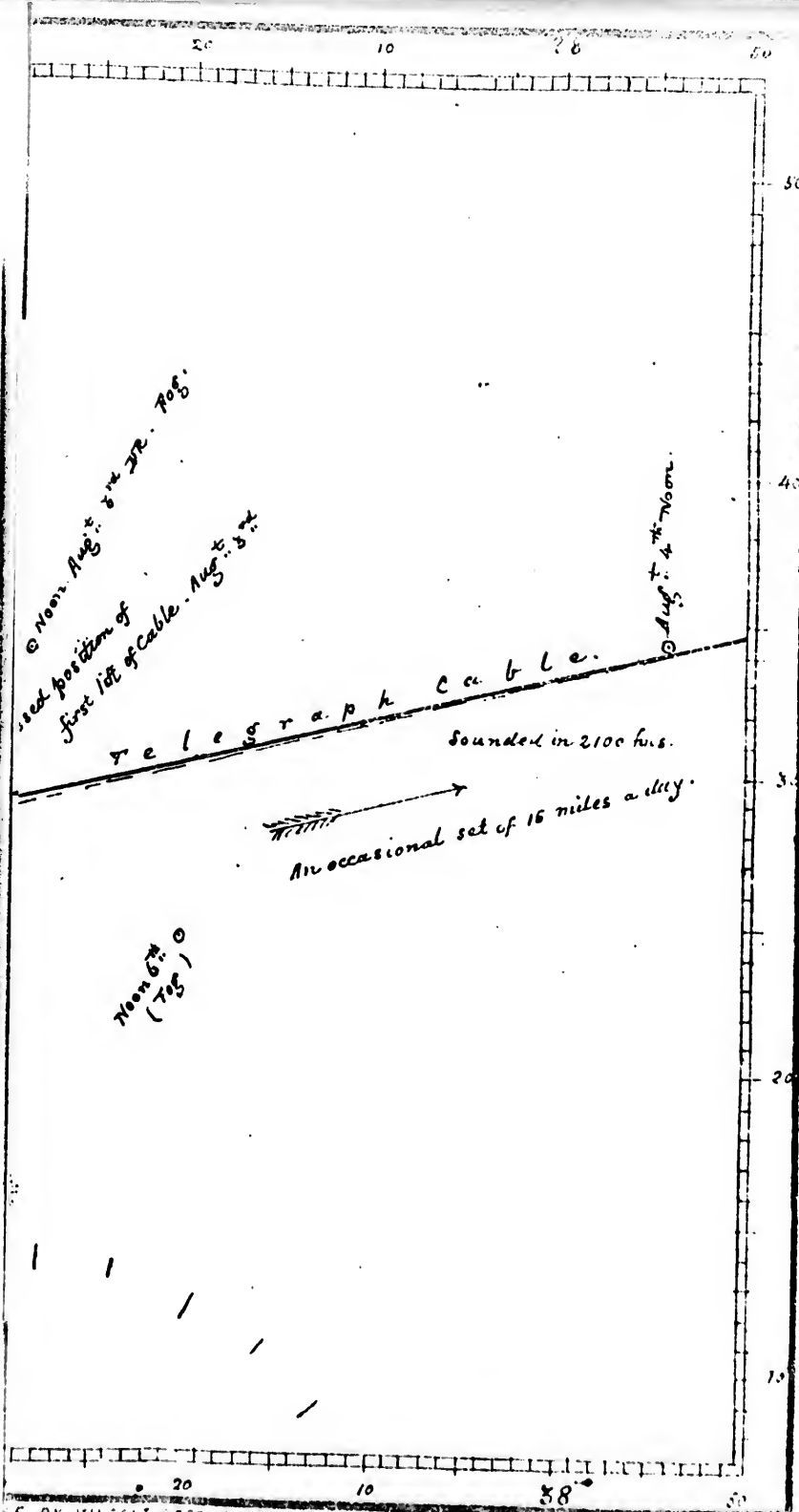
² Captain Douglas Galton, R.E., F.R.C.S., F.G.S., F.R.S., William Fairbairn, Esq., C.E., F.R.S., Charles Wheatstone, Esq., F.R.S., William Thomson, Esq., LL.D., F.R.S., and Joseph Whitworth, Esq., C.E., F.R.S.—who formed the Scientific Committee, appointed by the Directors of the Atlantic Telegraph Company to examine all specimens and tenders submitted to the Company—*unanimously* recommended that Messrs. Glass, Elliot, and Co.'s specimen be adopted, and that their tender for making and laying the cable be accepted.

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BY VINCENT ERRORS FROM THE ORIGINAL PRINTED ON BOARD THE GREAT EASTERN

A sketch showing the positions of the "Great Eastern",
when trying to recover the end of
THE ATLANTIC TELEGRAPH CABLE,

August 2nd to 9th

Extreme of Cable laid.

Aug² 2nd 51. 24. 10 N

39. 4. 30 W.

End of broken Cable

51. 25.

39. 1.

1st Buoy. Aug⁴ 4th

51. 28. -

38. 42. 30

2nd lift of cable. Aug⁶ 7th

51. 25. 30

38. 57. 30

2nd Buoy. Placed Aug⁸ 3rd

51. 25. 20

38. 56. -

3rd lift of Cable. Aug¹¹ 11th

51. 25. 15

38. 59. -

1/4 miles from end of Cable

Also Aug¹⁰ 10th and 11th
1865

August 11th indicated in the Original in Blue
but now thus ○○○ with the lettering in Roman
End of Cable in the Original a red line now thus —

Aug³ 3rd Hazy. Grappling and lifting cable

4th Placed 7th Buoy.

5th Fog

6th Fog. Sunday

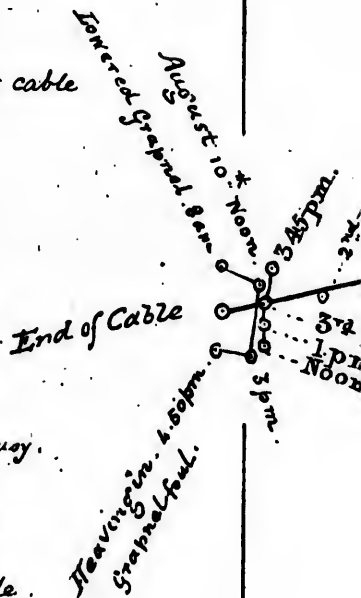
7th Grappling.

8th Lifting cable. Placed 2nd Buoy.

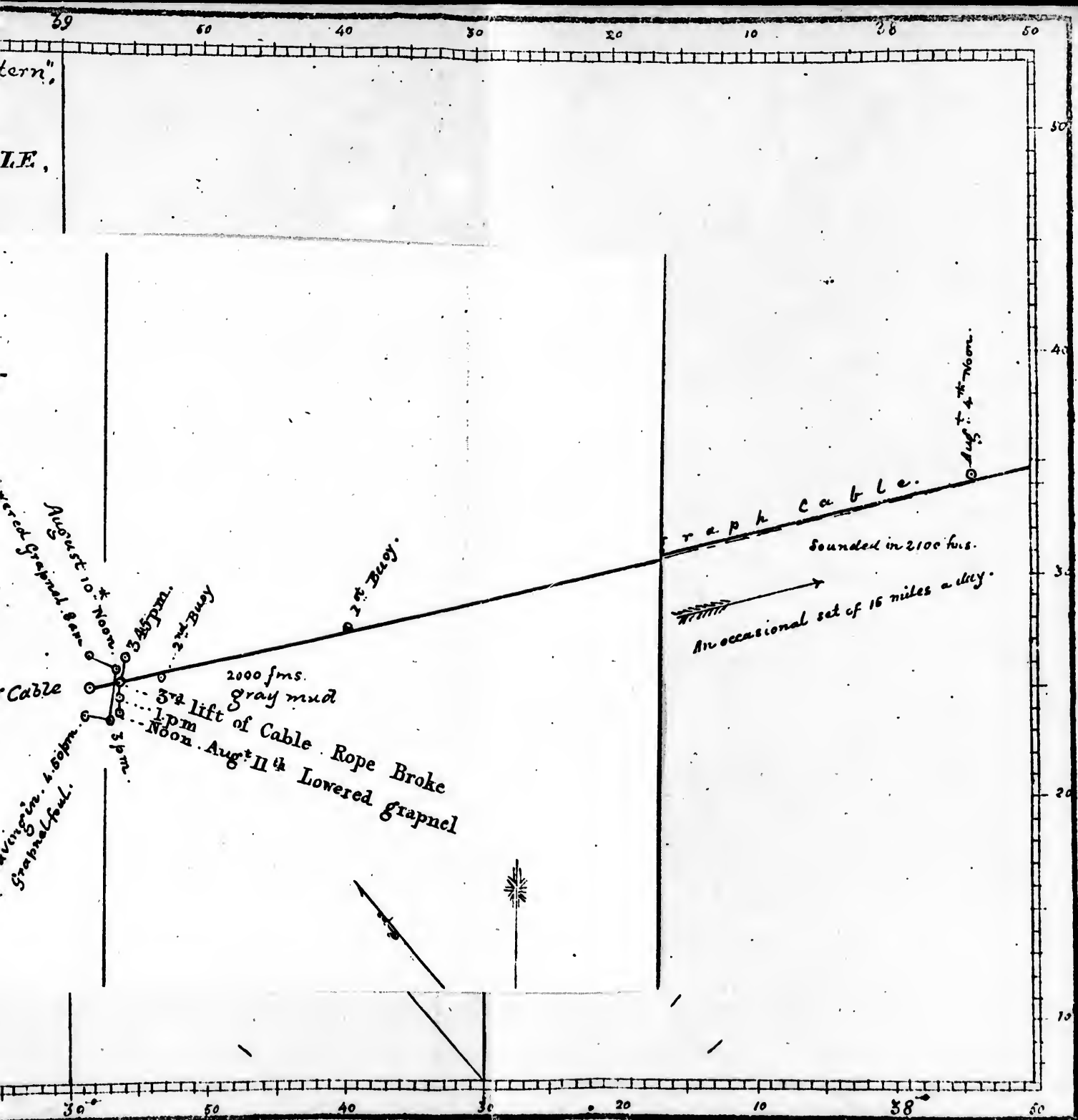
9th Preparing grappling rope.

10th Grappling and lifting cable.

11th D. . . . D.



Henry S. Morarty, Staff-Commander R.N.



70 60 50 40 30 20 10 0

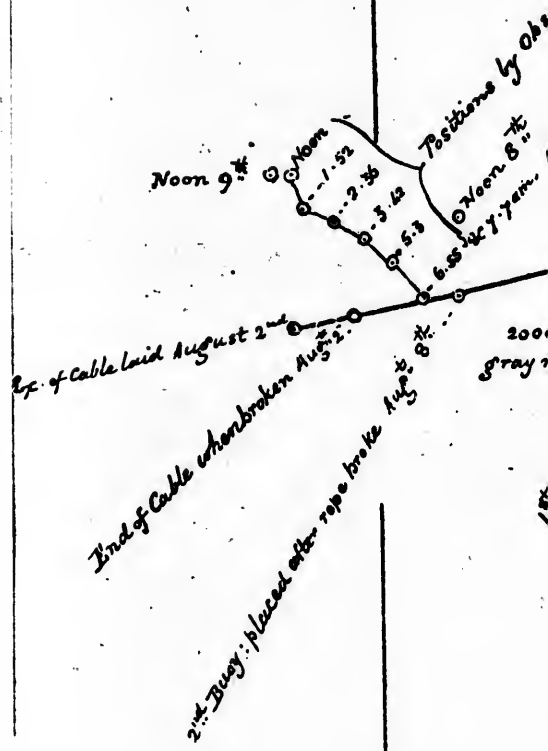
A sketch showing the positions of the "Great Eastern",
when trying to recover the end of

THE ATLANTIC TELEGRAPH CABLE,

August 2nd to 9th

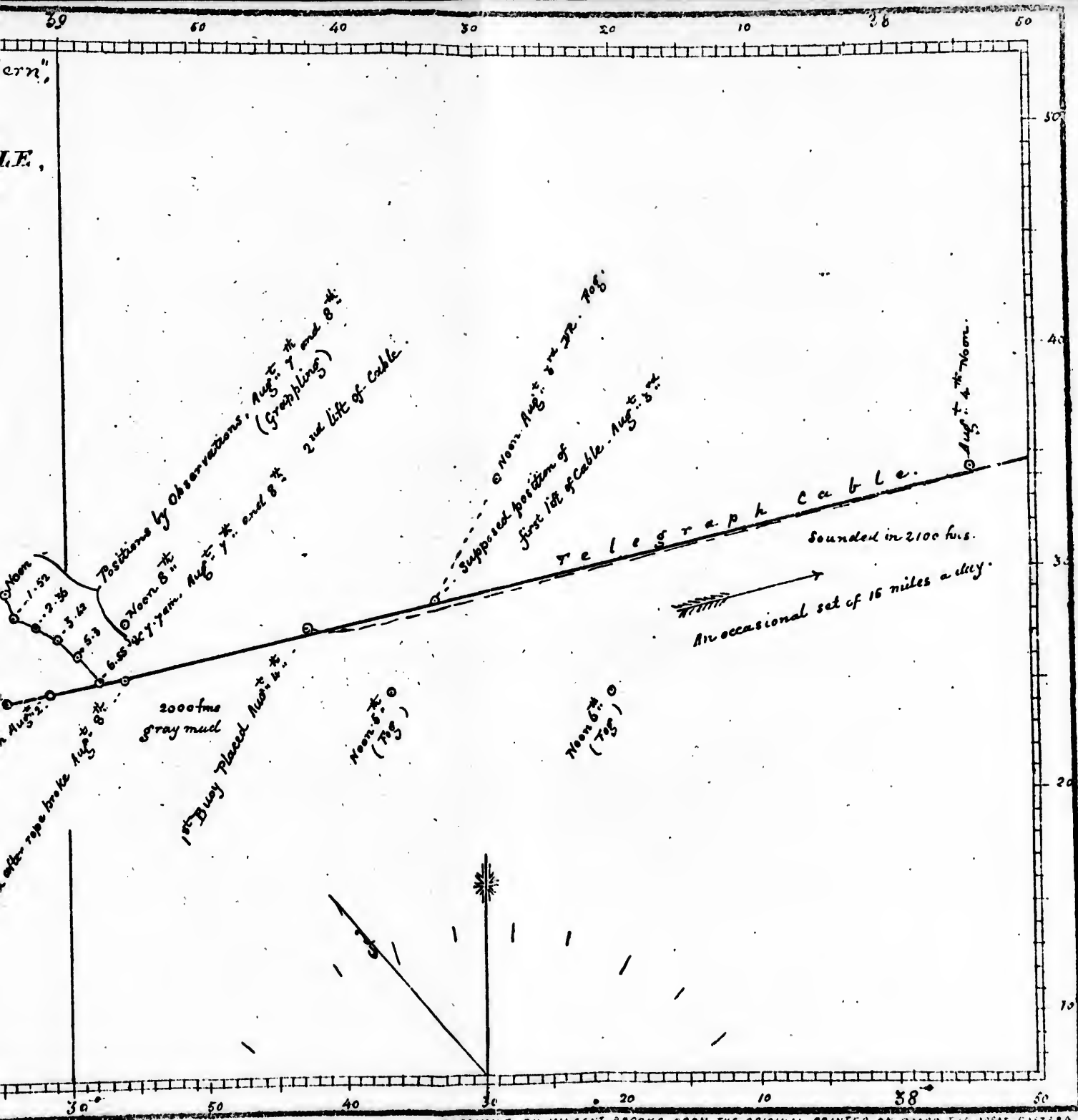
Extreme of Cable laid

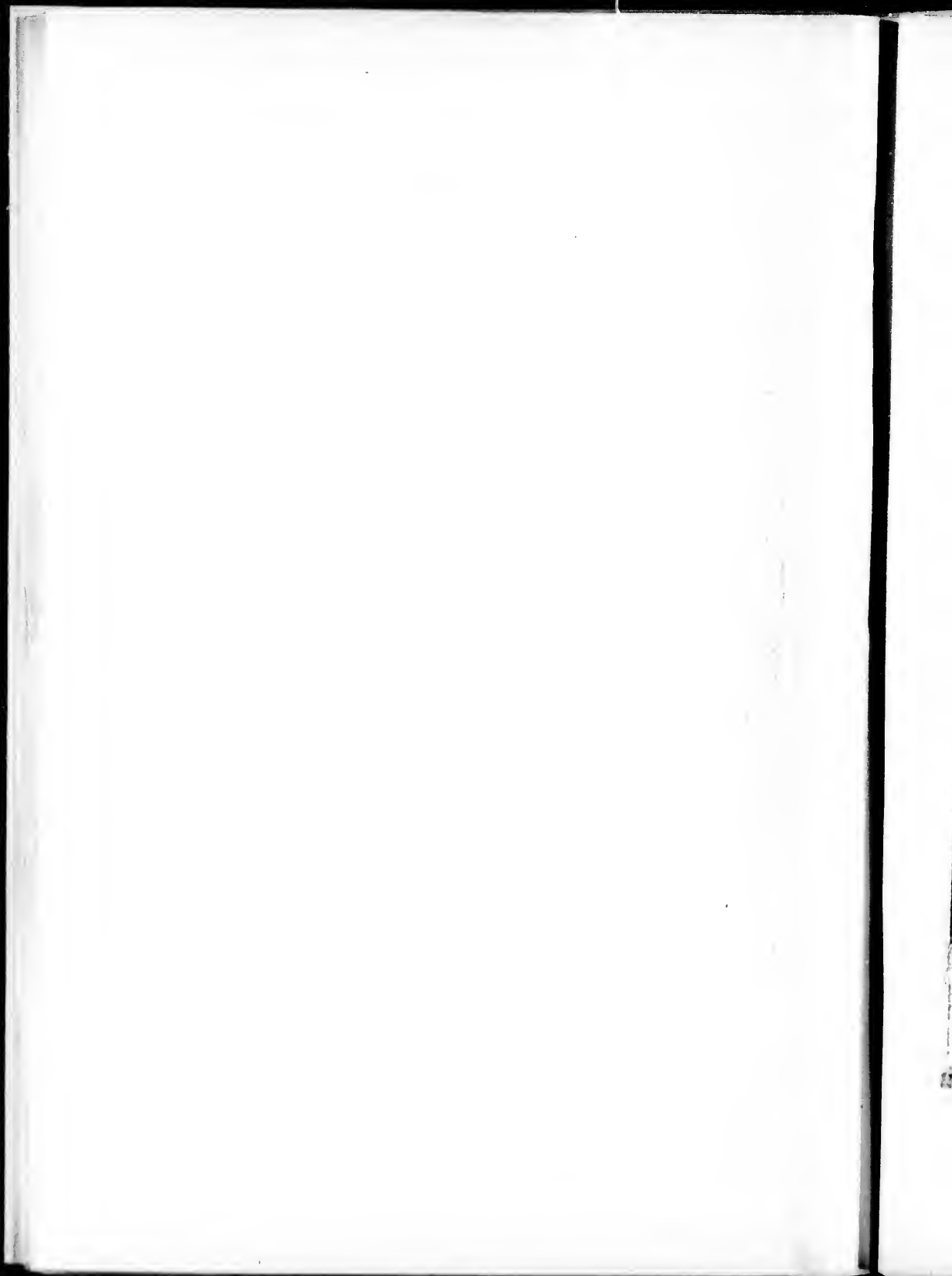
and.



Henry A. Mowbray Staff Commander R.N.

10 20 30 40 50 60 70 80 90





Cable
No 58157 mch

0

1000
2000
3000
4000
5000
6000
7000
8000
9000
10000

depth

1950

50° 45°

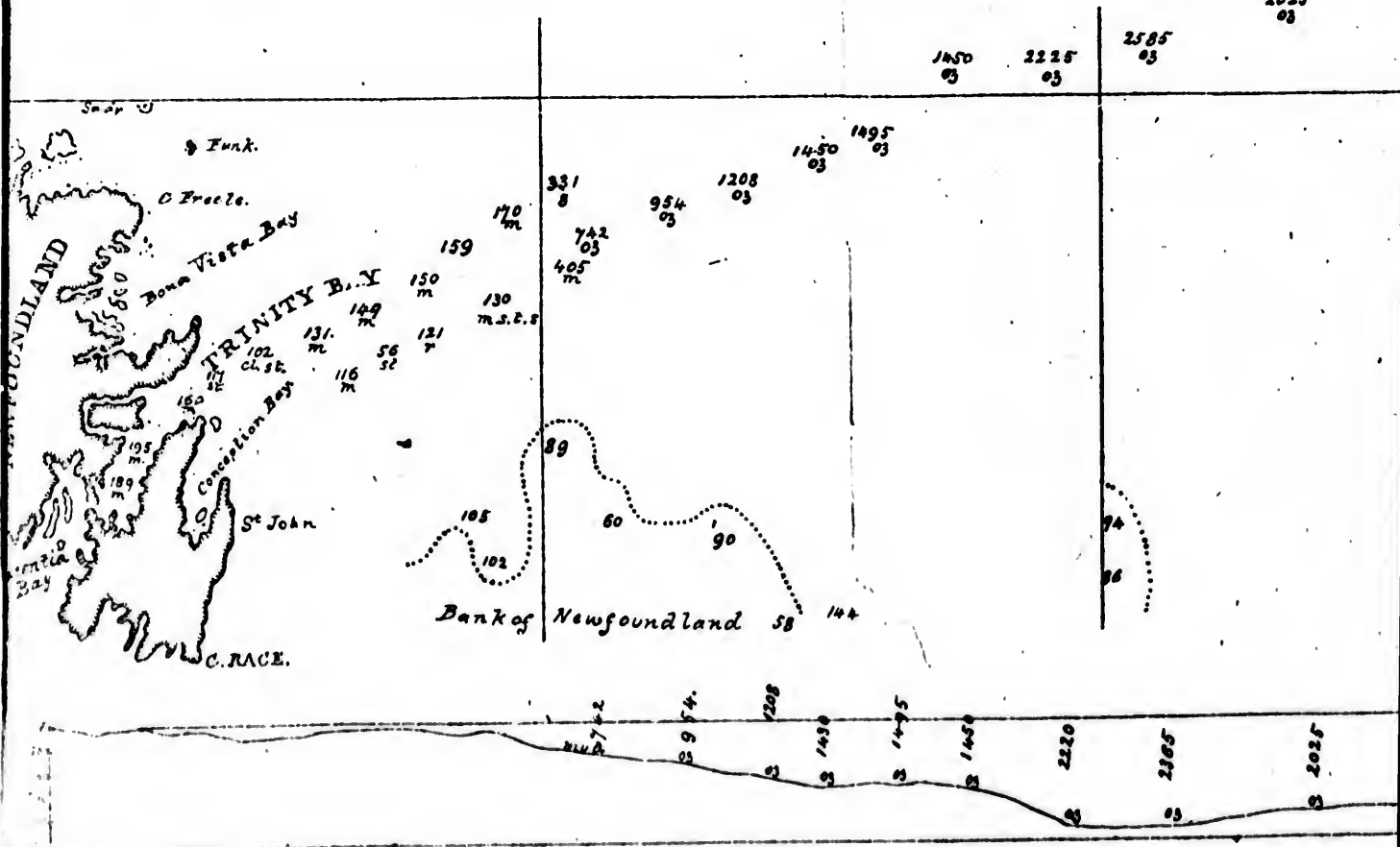
ATLANTIC TELEGRAPH CABLE · 1865

Chart

SHOWING · THE · TRACK · OF · THE · STEAM · SHIP · GREAT · EASTERN ·
ON · HER · VOYAGE · FROM · VALENTIA · TO · NEWFOLNDLAND · - WITH · THE
SOUNDINGS · - THE · DAILY · LATITUDE · AND · LONGITUDE · - THE · DISTANCE
RUN · - AND · THE · NUMBER · OF · MILES · OF · CABLE · PAID · OUT ·

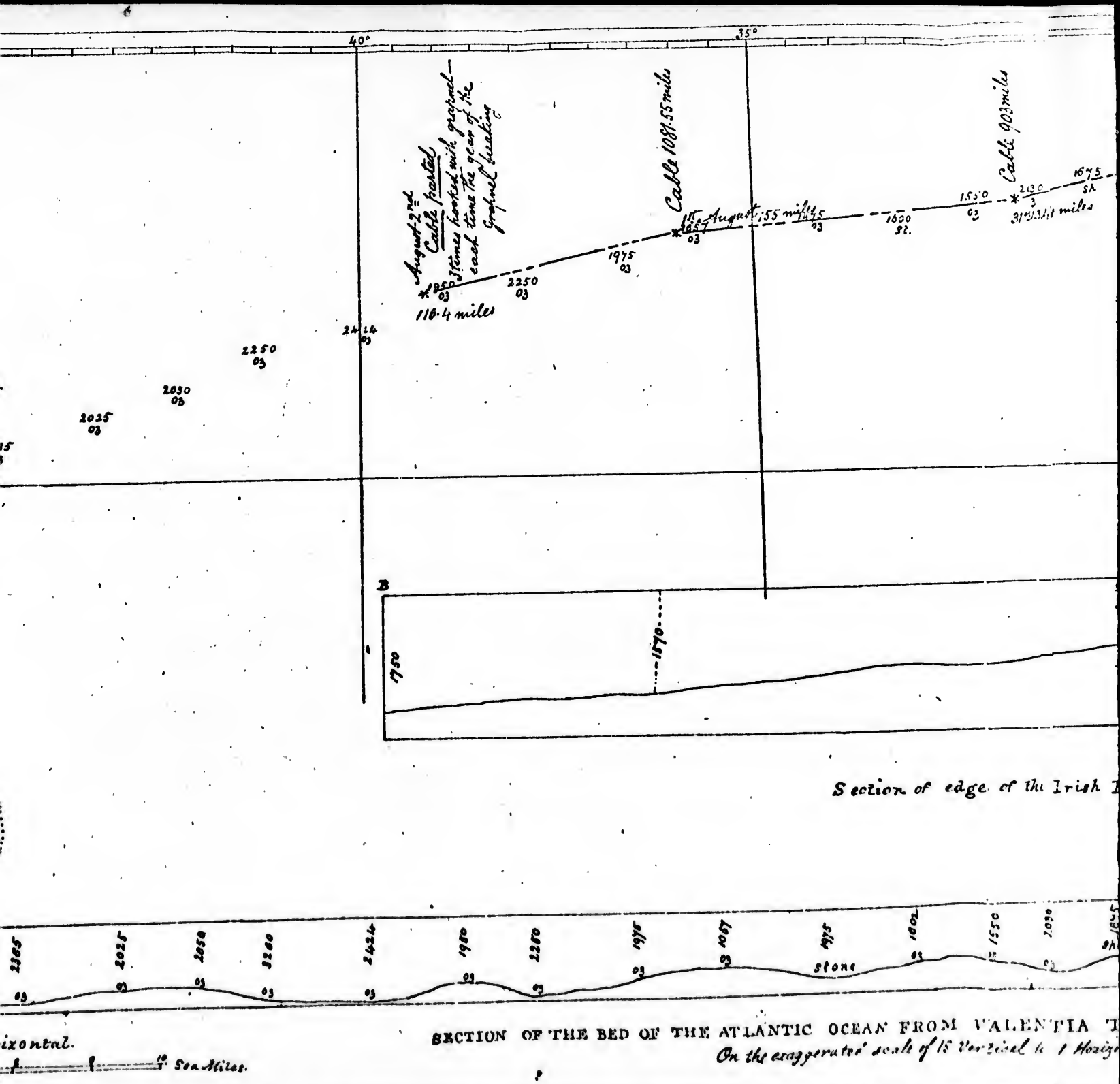
LITHOGRAPHED AND PRINTED ON BOARD
THE "GREAT EASTERN" — AUGUST 1865.

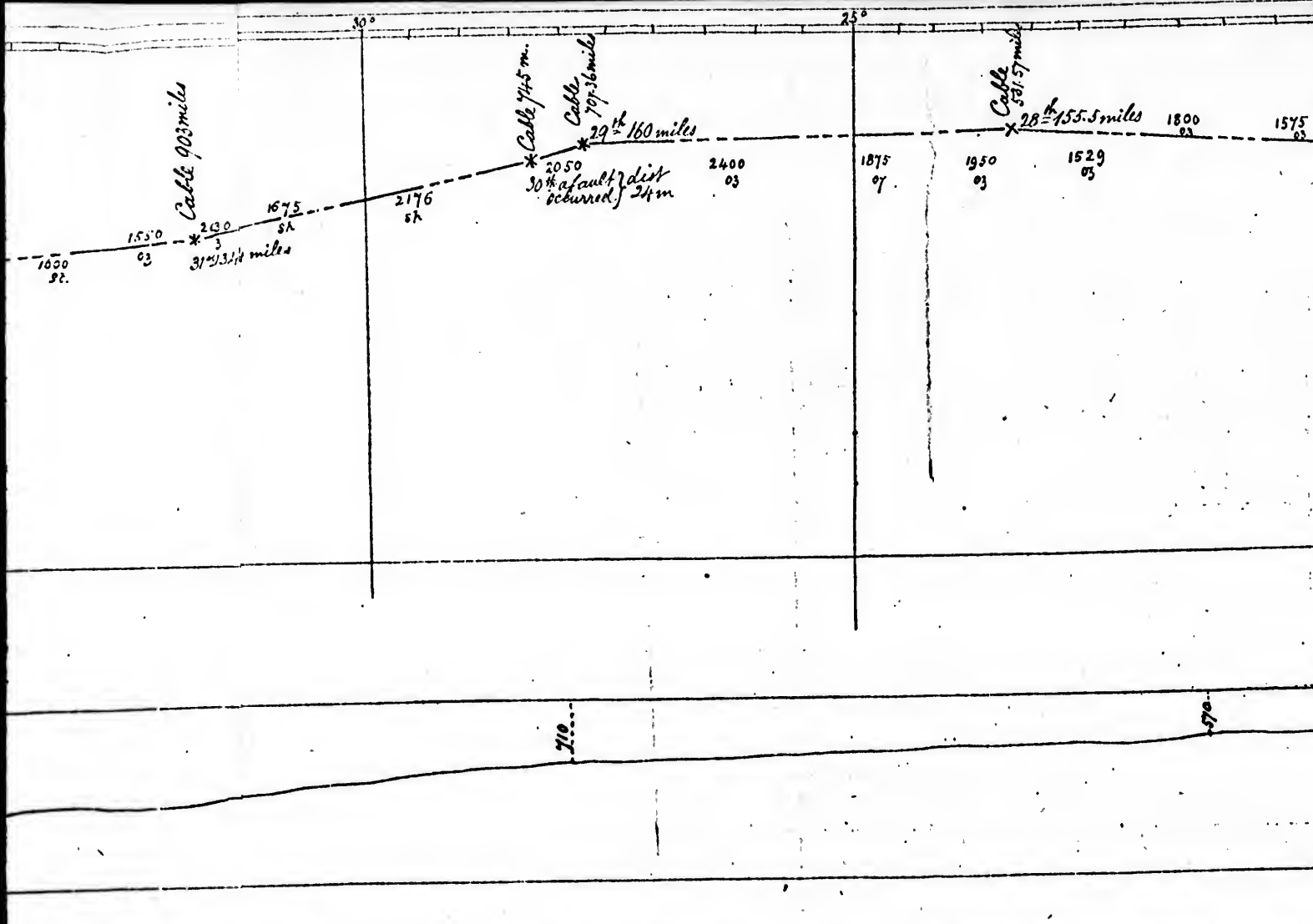
James Anderson
COMMANDER.



On the Natural Scale of 1 foot Vertical to 1/2 Horizontal.



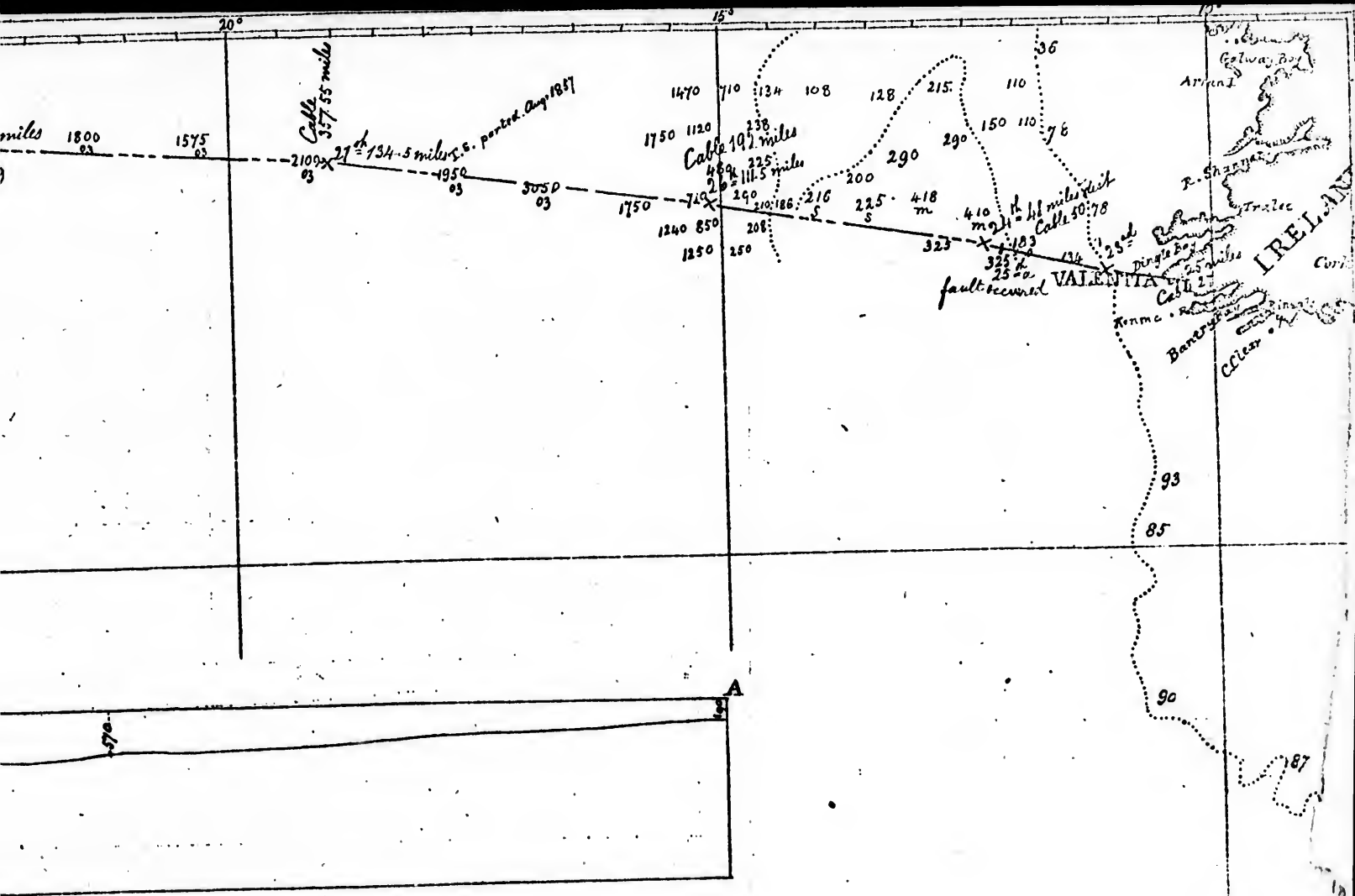




tion of edge of the Irish Bank; from A to B on the Plan. Shewing the incline from the depth of 290 fms: to the bed o



AN FROM VALENTIA TO TRINITY BAY NEWFOUNDLAND.
 scale of 15 Vertical to 1 Horizontal.



90 fms: to the bed of the Ocean in 1750 fms:

FIG. SIMILE BY VINCENT BROOKS,
FROM THE ORIGINAL ON BOARD THE GREAT EASTERN.

