# Naval Communication

# in the 19th Century

**Introduction:**

“Naval communication in the nineteenth century” is quite a broadsheet. There is short distance verbal communication between crew members, with elements of naval slang, and speaking tubes to direct messages. The Boatswain’s call was used to communicate with the whole of ship’s crew. For slightly longer distances, as between ships, or a ship and land, there were signal flags, signal lamps, semaphore, and even cannon fire to give messages with.

This presentation will focus on more long distance communication, and we will start in 1805 at the Battle of Trafalgar.

**Vice Admiral Collingwood’s dispatch from Trafalgar:**

An account of the Battle of Trafalgar was written by Vice Admiral Collingwood aboard HMS Euryalus on 22nd October 1805, the day after the battle. There was a great storm just after the battle, and it was five days after the battle that Collingwood ordered Lieutenant Lapénotière to deliver his dispatch to the Secretary of the Navy, William Marsden, at the Admiralty in London.

Vice Admiral Collingwood

Captain Lapénotière

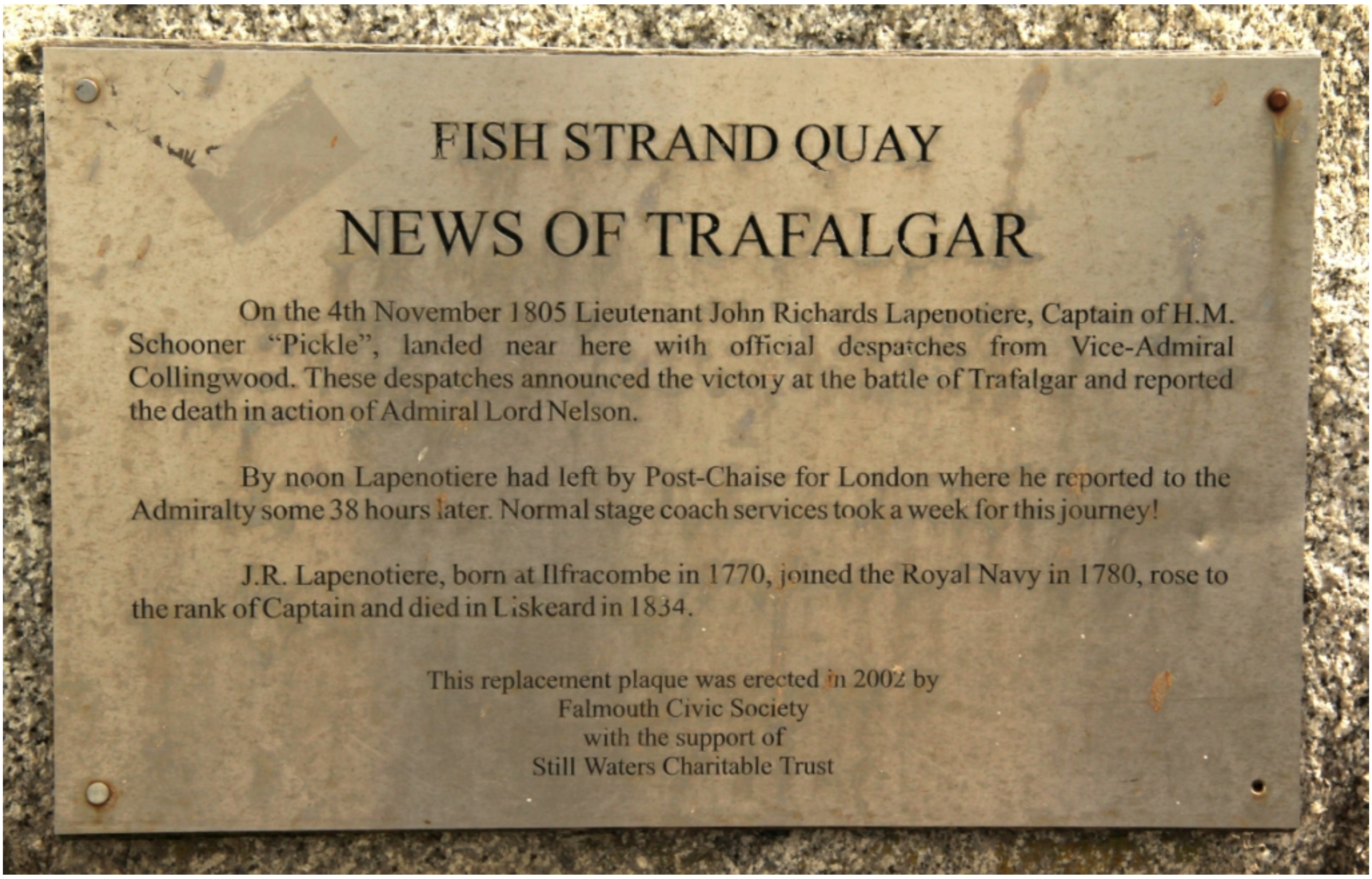
Lapénotière was told to travel “using every exertion, that a moment’s time may not be lost in their delivery”. Collingwood also instructed Lapénotière to use his discretion as to how far up the English Channel he sailed his fast schooner, HMS Pickle, before continuing the journey by land.

HMS Pickle had a rough voyage through the Bay of Biscay, during which she sprung a leak. In order to make the ship lighter some of her guns were jettisoned. The next day the sea was calm, and this required the crew to man the oars in order to continue their journey to England.

On 2nd November 1805, HMS Pickle reached the western approaches to the English Channel, at around 2am the lighthouse at Lizard Point was seen from the ship.

Due to adverse light easterly winds and the long beat to reach Plymouth, Lapénotière decided to head for Falmouth in Cornwall. He knew that Falmouth had a well-established coaching connection to London, and there was the advantage that the risk of attack from hostile French vessels further along the Channel would be reduced.

Two weeks after the Battle of Trafalgar, on Monday 4th November at around 10am, HMS Pickle dropped anchor some two miles south of Pendennis Head. Lapénotière was taken by boat and was landed at the Fish Strand Quay in Falmouth about an hour later. It is likely that he left Falmouth within an hour of landing by post-chaise.




Plaque at Fish Strand Quay, Falmouth

The present-day Admiralty archive holds the original expense account for Lapénotière's trip from Falmouth to the Admiralty. This shows that he followed one of the well known routes to London, changing horses every 10 to 15 miles.

In total he made at least 21 stops to change horses at coaching inns on the way, including at Truro, Bodmin, Exeter, Dorchester, Basingstoke and Bagshot. At some of the stops he would have transferred to other post-chaises due to different coach operators covering certain sections of the route.

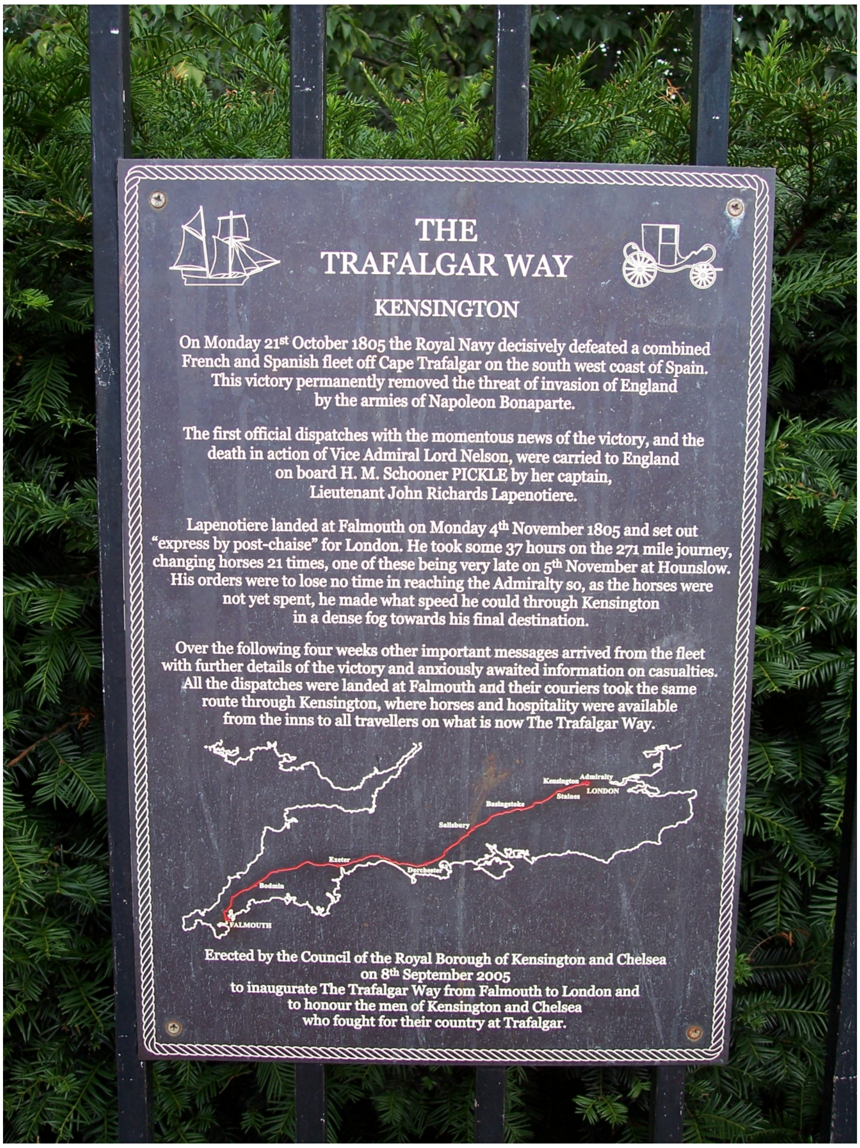
Not much is known about his actual experiences on the trip, however we do know that a stop was made at Bridport to send on correspondence to the family of Thomas Hardy, the Captain of HMS Victory. There is also a surviving account from an eye witness of Lapénotière and another naval officer coming through Dorchester, each in a post-chaise with four horses, at around noon on 5th November.

Lapénotière arrived at the Admiralty at 1.00am on 6th November, more than two weeks after the battle. He had travelled 271 miles from Falmouth in under 38 hours at a cost of £46 19s 1d, equivalent today to more than £4,500. His average speed of travel from Falmouth to London was just over 7 mph.

In 2005, The Trafalgar Way was inaugurated 200 years after the news of the battle had been brought to the Admiralty, and it was a plaque associated with this that Ruth and I had spotted in Kensington. Thanks to the expenses return the route is quite clear.

Plaques are sited along the route, the base of each showing the route followed by Lapénotière.

Travelling with Collingwood's Dispatch




Plaque in Kensington about the Trafalgar Way

## Account of Expenses of Lieutenant Lapénotière
## Travelling with Dispatches from Falmouth to the Admiralty

| | £ | s | d |
|---|---|---|---|
| Falmouth to Truro | 1 | 2 | 6 |
| To the Blue Anchor | 2 | 17 | - |
| To Bodmin | 1 | 19 | - |
| To Launceston | 3 | 6 | 6 |
| To Oakhampton | 3 | 4 | - |
| To Crockenwell | 1 | 16 | 6 |
| To Exeter | 1 | 17 | 6 |
| To Honiton | 2 | 14 | - |
| To Axminster | 1 | 11 | 7 |
| To Bridport | 1 | 16 | 6 |
| To Dorchester | 2 | 14 | 6 |
| To Blandford | 2 | 10 | 6 |
| To Woodyates | 2 | 5 | - |
| To Salisbury | 1 | 17 | 6 |
| To Andover | 2 | 15 | - |
| To Overton | 1 | 13 | - |
| To Basingstoke | 1 | 14 | - |
| To Hartford-bridge | 1 | 15 | 6 |
| To Bagshot | 1 | 12 | - |
| To Staines | 1 | 17 | 6 |
| To Hounslow | 1 | 14 | 6 |
| To the Admiralty | 2 | 5 | - |
| TOTAL | 46 | 19 | 1 |

The First Secretary of the Board of the Admiralty, William Marsden, was just preparing to retire for the night when Lapénotière arrived at 1am. The Lieutenant was shown to the board room, and, without further introduction, announced "Sir, we have gained a great victory, but we have lost Lord Nelson."

Lapénotière was promoted to Commander the same day.

The dispatches were published in the London Gazette on Wednesday 6th November, two weeks after the Battle of Trafalgar.

*Admiralty-Office, November 6, 1805.*

DISPATCHES, of which the following are Copies, were received at the Admiralty this Day, at One o'Clock, A. M. from Vice-Admiral Collingwood, Commander in Chief of His Majeſty's Ships and Veſſels off Cadiz.

*Euryalus, off Cape Trafalgar,*
*October 22, 1805.*

SIR,

THE ever to be lamented Death of Vice-Admiral Lord Viſcount Nelſon, who, in the late Conflict with the Enemy, fell in the Hour of Victory, leaves to me the Duty of informing my Lords Commiſſioners of the Admiralty, that on the 19th Inſtant, it was communicated to the Commander in Chief from the Ships watching the Motions of the Enemy in Cadiz, that the Combined Fleet had put to Sea; as they ſailed with light Winds weſterly,

The sending of handwritten dispatches by land and sea remained the quickest way of getting information over long distances, from a ship to the Admiralty until the latter half of the nineteenth century.

**Captain Houstoun's dispatch from San Francisco:**

**NEWS OF THE "PLOVER," ARCTIC DISCOVERY SHIP. —The Admiralty has issued the following document :—**

**H.M.S. *Trincomalee*, San Francisco, September 20, 1854.**

**Sir,—I have the honour to inform you that in obedience to the orders of the Lords Commissioners of the Admiralty, directing the Commander in Chief of the Pacific to detach a ship of his squadron to reach Port Clarence "at the opening of the season, viz. the 25th of June," her Majesty's ship under my command arrived in that port on that day. We found the *Rattlesnake* there all well. Commander Trollope's arrangements for wintering in Port Clarence, instead of Grantley Harbour, had been most successful.**

**The four live cattle and twenty-five pigs, with vegetables (potatoes, onions, and pumpkins), which we got at Honolulu, reached in the best condition, the fodder for the cattle being nearly expended. I recommended Commander Trollope to use them for his ship, reserving the pigs for the *Plover*,—this was attended to.**

An important dispatch was sent from HMS Trincomalee with information about the search for Franklin in the Arctic, during her second commission. The document, dated 20th September 1854, was written by Captain Wallace Houstoun aboard HMS Trincomalee at San Francisco. Near the end of the dispatch he wrote:

"Lieutenant Moore, invalided from [HMS] Rattlesnake, and Mr. Gordon, mate, returning home from the Plover, being desirous of getting to England with all despatch, I have given them permission to go via Panama, and take advantage of their doing so to forward in their charge this letter, and all the Arctic despatches we have...”

The Admiralty report of the dispatch was not until 11th November 1854, 52 days after it was written.

Let’s now look at some quicker ways to communicate over long distances.

**Shutter Telegraphs:**

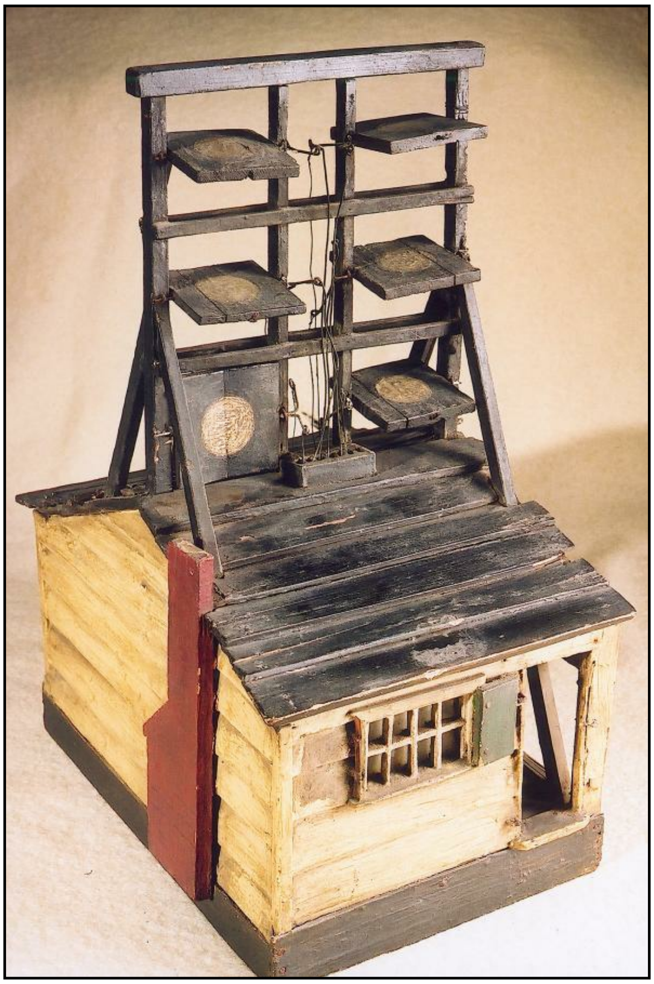
At the beginning of the nineteenth century shutter telegraphs were already in use in England to convey messages long distances. In 1795 the Chaplain to the Duke of York, Revd. John Gamble, proposed a method of signalling using four shutters held in a large frame. This machine’s four shutters were all 7 feet by 16 feet in size, with the top and bottom shutters being vertical and the middle two horizontal. Each shutter consisted of sections, 1 foot by 7 feet in size for the vertical shutters and 1 foot by 16 feet for the horizontal, and the opening and closing of the shutters was like as in the case of Venetian blinds.

A trial of the system was agreed upon by the Admiralty and the apparatus was set up on Portsdown Hill, about five miles from the ramparts of Portsmouth. The Revd. Gamble reported that when the telegraph was tested on 16th August 1795:

“From the ramparts of Portsmouth, a distance of about five miles, the telegraph was easily read, even in a slight degree of haze; and with a very indifferent glass [telescope] it was perfectly distinct from Spithead, and even from the Isle of Wight, a distance of 14 to 15 miles.”

However, eleven days after this trial, the Admiralty informed Gamble that they had adopted another telegraph system in preference to his own.

This second system was invented by another Reverend Gentleman, Lord George Murray, who later became Bishop of St. Davids. Murray used six shutters rather than Gamble’s four, and thus many more combinations of opened and closed shutters were possible.



A model of Murray’s six shutter signal station

Trials of this six shutter system had been made on Wimbledon Common and the Admiralty immediately adopted it.

Lord Murray engaged the surveyor George Roebuck to handle the project, and two lines of telegraph stations were constructed. One line from London to Deal and Sheerness consisted of fifteen stations, and the second line from London to Portsmouth had ten stations, the first being at the Admiralty, London, the second at Chelsea Hospital. These shutter telegraphs were in use from the end of 1796 until when the Peace of Paris was signed on 30th May 1814, apart from a short period of disuse between the signing of the Peace of Amiens in 1802 and the outbreak of war again in 1803.

When these Shutter Stations were closed down in 1814 the telescopes used were returned to the Admiralty. In 1815 the Admiralty issued the following statement:

“There can be no question that, in time of Peace, the Telegraphs will be of little or no use; but it does not from thence follow that they ought not to be kept up for the same reason that batteries and other works of defence are maintained during Peace … There is no period of War at which communication by telegraph is more useful than at its commencement.”

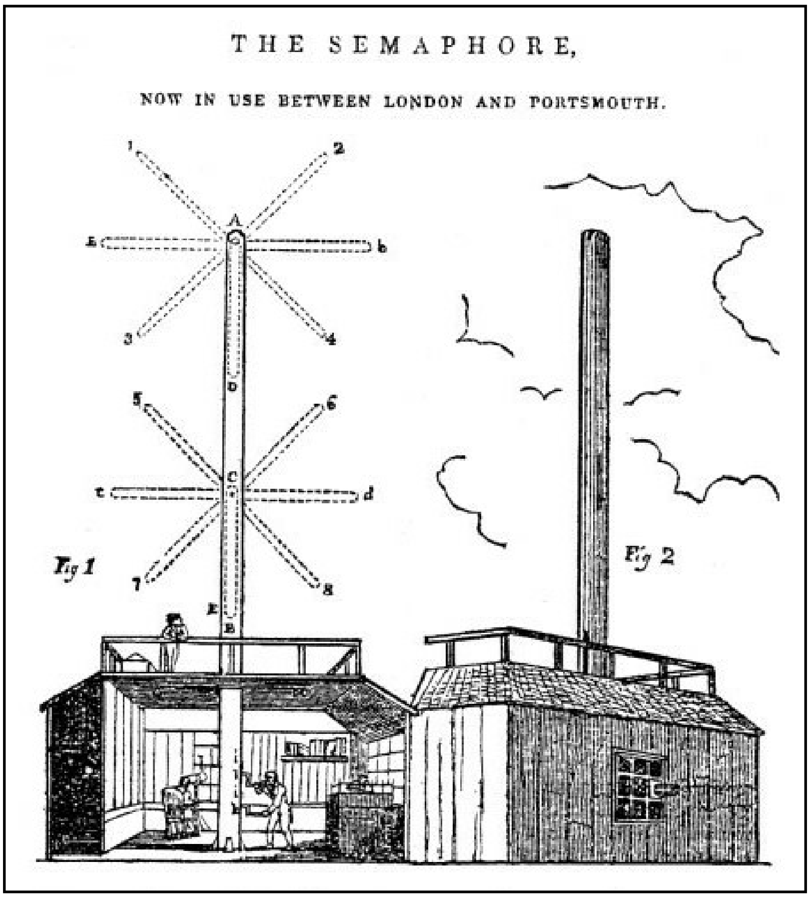
**Semaphore Signalling Towers:**

The Shutter system of signalling was superseded by a system of semaphores. The first record of the semaphore being used in Britain is a communication from the Admiralty dated 12th March 1812, this was sent to the superintendents of the coastal signal stations and stated that it had:

“Been deemed expedient that the signals made at your station shall, for the future, be communicated by semaphore instead of by balls and flags.”

The same communication stated that each signal station should be serviced by one Lieutenant, one Midshipman and also one other Man. Semaphore was thus first used along the coastal stations in Suffolk and Essex, each station having a mast with three movable arms.

In 1815 a two-armed semaphore was tried out by the Admiralty, this had been invented by Admiral Sir Home Riggs Popham. In 1800, whilst a captain, Popham had success with introducing a vocabulary of useful words linked to numerical signals, and it was his code book on flag signalling that was in use throughout the navy.



In 1816 a trial line of eight semaphore stations was constructed between the Admiralty in London and Chatham. Lieutenant, B. Robertson, who had experienced being in charge if the shutter station at New Cross between 1815 and 1816, was transferred to the new semaphore station at Nunhead. He gave a report about the semaphore systems saying that:

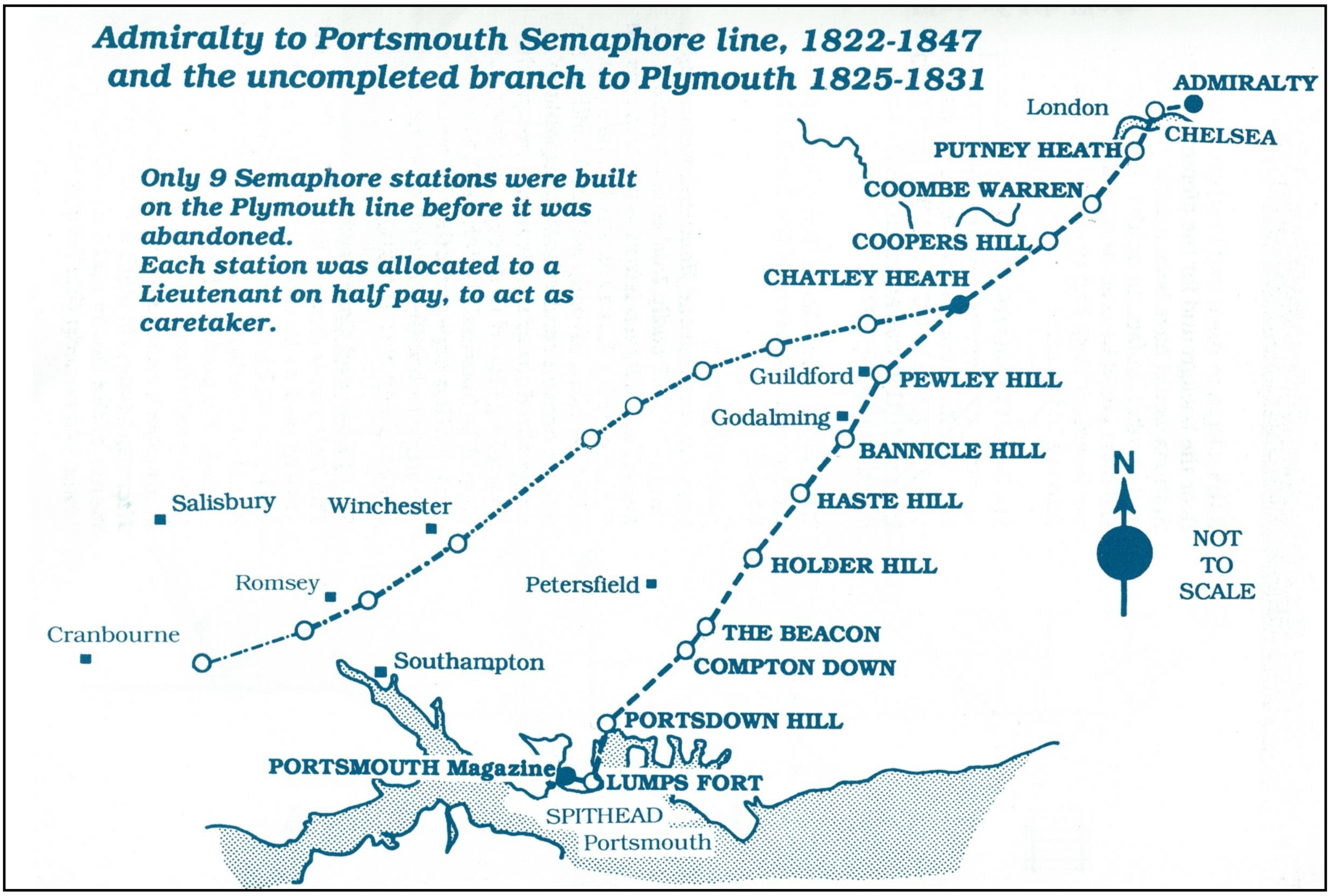
“When the mast is seen there is no difficulty, when any attention is paid, in taking and repeating the positions of the arms correctly. This was not the case with the shutters; there was hardly a day during the winter I was at New Cross but we had our fog signal up, for altho’ I could frequently see both stations I looked to (I mean the frames) I could not read off the number of shutters they had up, or down, from the haze that hung about the frame.”

As a result of these initial trials of the semaphore system it was decided to make a line to Portsmouth. The Admiralty felt that the route of the shutter stations could be improved, and that the distances between stations had been too great. In 1818, Thomas Goddard, the Purser of the Royal Yacht, the “Royal George”, surveyed the new line (Goddard had already been involved with instructing the lieutenants manning the coastal stations on how to use the semaphore system).

The line of semaphore stations from the Admiralty in London to the magazine at Portsmouth was in use from 1822 to 1847, it consisted of fifteen stations.

From 1822 until 1848, the five centuries old Square Tower at Portsmouth had another tower on top, and it was topped out with a 30 foot mast from which the two arms of the signal station sent messages both to the fleet at Spithead, and to and from the Admiralty.

Chatley Heath Tower




**Making use of Electricity for Communications**

It took nearly a hundred years from the realisation that electricity could provide an “expeditious method of conveying intelligence”, for the Admiralty to be connected from Portsmouth to London by electric telegraphy.

The beginnings of wired telegraphy start in 1747 when a member of the Royal Society, Sir William Watson, passed electricity through 10,000 feet of wire suspended at Shooters Hill near London. Benjamin Franklin did similar experiments in Philadelphia the following year, and in 1749 Du Lac did similar across Lake Geneva. Two problems needed to be overcome. The electricity used in these experiments was produced by friction as static electricity, and this was an erratic source of power, there was also the problem of insulation of the wires.

In 1800 the problem of providing a controlled flow of electricity had been overcome. It was in this year that the Italian physicist, Alessandro Volta, informed the Royal Society of the invention of the electric battery.

Alessandro Volta

This battery used the discovery by another Italian physicist, Luigi Galvani, that electricity could be produced by contact between two metals. The battery supplied a gentle, steady and controllable current at a moderate voltage, just what was needed for an electric telegraph. Within months huge electric batteries were built. By 1810 André Ampère was showing how a magnetic needle could be deflected by an electric current.

Probably the first electric telegraph showing its practical use was constructed in a garden at Hammersmith, London, in 1816. This was the garden of a 28 year old called Francis Ronalds, at Upper Mall, Hammersmith. He placed two wooden structures in the garden, 20 yards apart. He then strung a continuous length of insulated iron wire backwards and forwards between these frames, with a total length of 8 miles. Ronalds was able to show that the transmission of electricity through the wire was instantaneous.

Ronald’s Electric Telegraph in his Garden at Hammersmith

Ronalds then built a second model with a shorter length of wire, 525 feet. The line was threaded through glass tubes and placed in a trench 4 feet deep and lined with pitch. The signals were received at the end of the wire by an arrangement of brass dials. Although his apparatus used high-voltage electricity, which probably would have failed over long distances, some principles in its construction and maintenance were of subsequent use. He had used a more efficient means of insulation then others had previously, and his underground wire was not so very different from those used later.

Realising the practical possibility of his device, Ronalds wrote to the Admiralty on 11 July 1816 stressing its “rapidity, accuracy and certainty”, and he offered to demonstrate it. Although he initially received an encouraging reply, Mr John Burrow, Secretary of the Admiralty, wrote a letter on 5 August 1816 saying that “Telegraphs of any kind are wholly unnecessary, no other than the one in use will be adopted”. The system in use was the semaphore system based on the devices of Claude Chappe.

As a result Ronalds gave up telegraphy and turned to meteorology. He was honorary director of the Royal Observatory at Kew between 1843 and 1852, He made a library of literature relating to electricity and magnetism, and in 1870, a year before his death, he received a belated knighthood for his services to telegraphy.

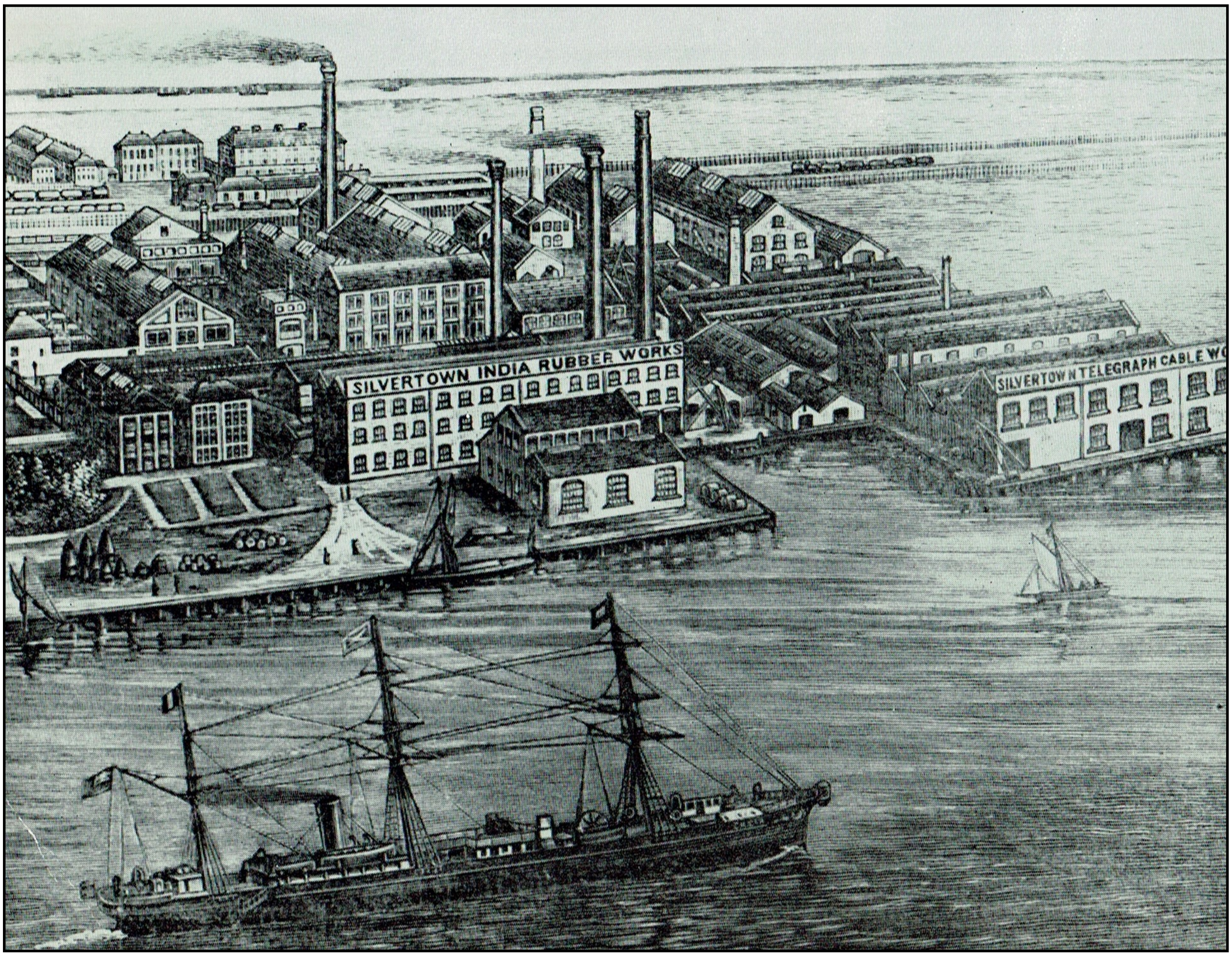
Having dismissed electric telegraphy in 1816, it was not until 1844 that London and the Admiralty were linked to Portsmouth. In the intervening time it was the need for signalling on the expanding railway network that gave the impetus to develop the telegraph. In 1837, 19 miles of wire had been placed between Euston and Cambden Town, the telegraph using four wires and four needles to successfully convey messages.

Both the “railway greats”, Isambard Kingdom Brunel and Robert Stephenson, realised the significance of electric telegraphy. Towards the end of the construction of the Great Western Railway, an agreement was made in 1838 for telegraph wires to be laid alongside the rail track. Brunel made the decision to run the wires, insulated with cotton and carefully varnished, through a hollow iron tube below ground. The initial 13½ miles of the line from Paddington to West Drayton took just over a year to complete, opening in July 1839 with five-needle instruments at the two terminal stations. This was the first working telegraph in daily use over a fairly long distance, and its success made foreign countries wish to have similar systems.

As the telegraph wires extended along the railway network, it was in 1844 that the longest telegraph line so far was started between Nine Elms, London, and Gosport. This 88 mile long line on the London and South Western Railway linked the Admiralty in London with Portsmouth, and the Admiralty agreed to pay £1,500 a year for 20 years, and £1,000 a year for a further 20 years for the maintenance of a double-needle telegraph for its own purposes. With the completion of the line in February 1845, the old semaphore system was nearly superseded.

The first submarine cable was laid across the English Channel in 1850 by the English Channel Submarine Telegraph Company, The cable was 25 nautical miles long with a central copper conductor coated in ½ inch of the substance gutta percha. Michael Faraday in the 1840s realised the excellent insulating properties of gutta percha, which was produced from the latex of gutta trees present only in the Malay peninsula,

Gutta percha is a natural plastic which can be shaped when it is hot, and stays flexible on cooling, After being applied to submarine cables for insulation it needed to be stored in water to retain its properties. For a century gutta percha reigned supreme, until the development of polythene-based synthetics. Britain had a monopoly on gutta percha, and hence had a strangle-hold on the production of underwater cables.

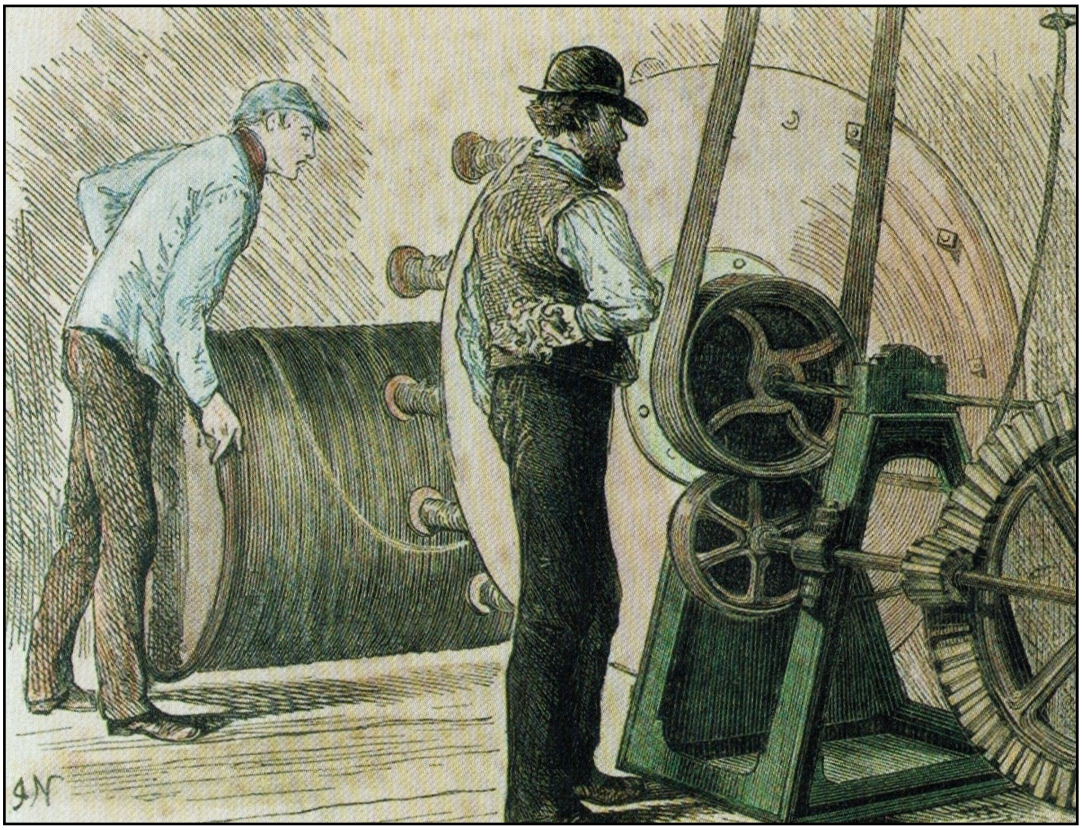



The Gutta Percha Company site in London

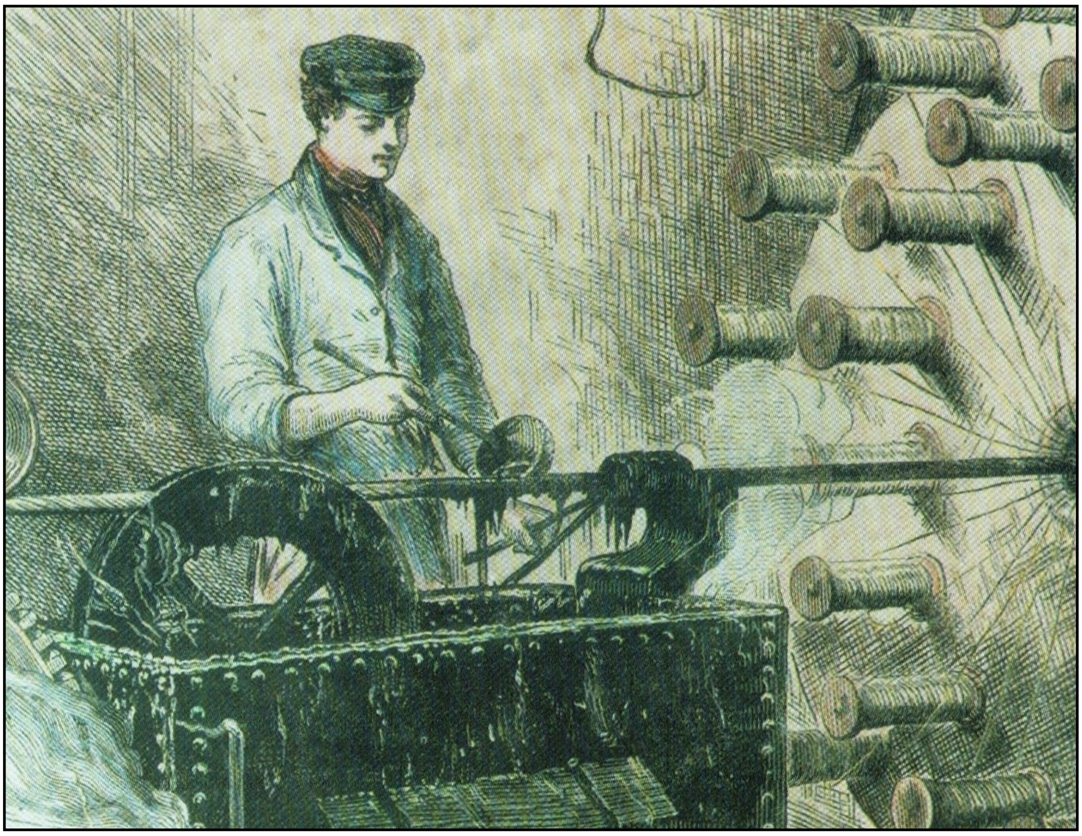
The 25 nautical miles long cable was manufactured by the Gutta Percha Company, on City Road in London. It was then mounted onto a drum which revolved on a horizontal axis, which was itself placed onto the deck of a small steam-tug called Goliath. The Goliath, with the cable on board, travelled from London to Dover. The two shore-ends of the cable were laid first. On the English side, a horse-box in the yard of the South Eastern Railway was linked to a structure of piles, part of the new Admiralty pier in Dover. On the French side the shore-end went just beyond the rocky ledge which stretches out from Cape Gris Nez, the headland near Calais.

The Goliath left Dover on 23 August 1850, the seaward part of the English shore-end was picked up and joined to the main portion of the line and the line was successfully laid. Signals were exchanged using this line, including one being sent to Louis Napoleon, however within a few hours communication failed completely. Apparently the cable had broken, some suspected that a fisherman might have brought the cable up whilst trawling in the Channel.

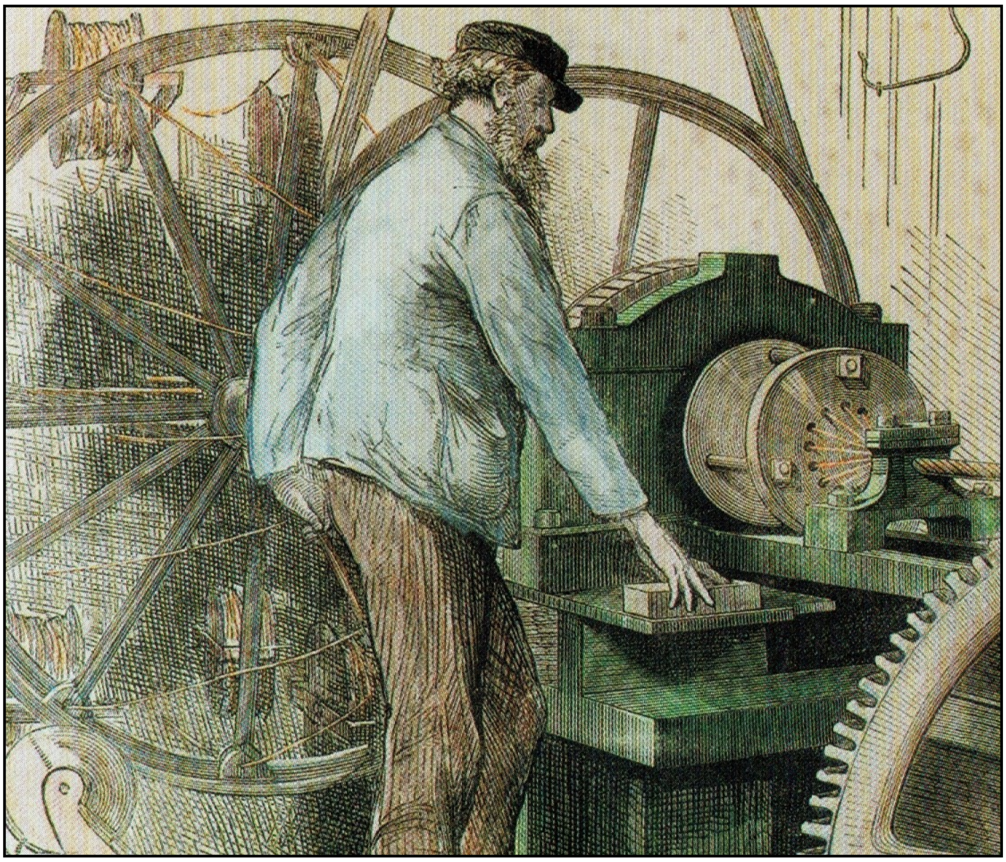
## Manufacturing an electric telegraph cable



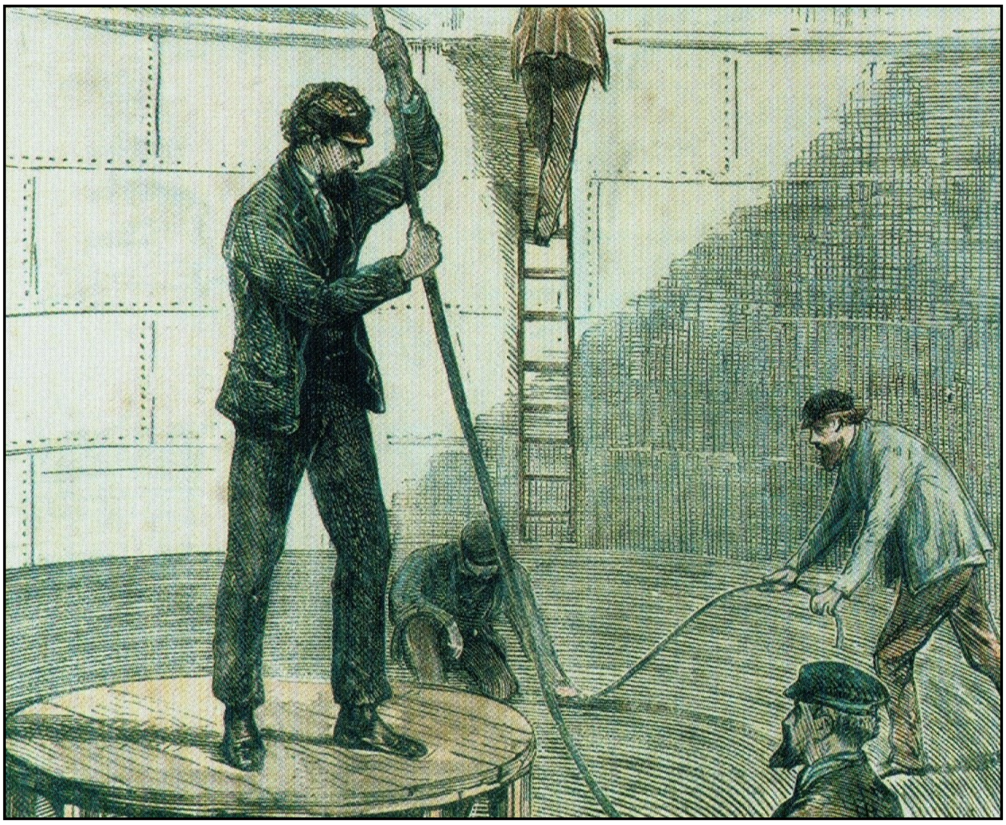
Coating the electric core with jute



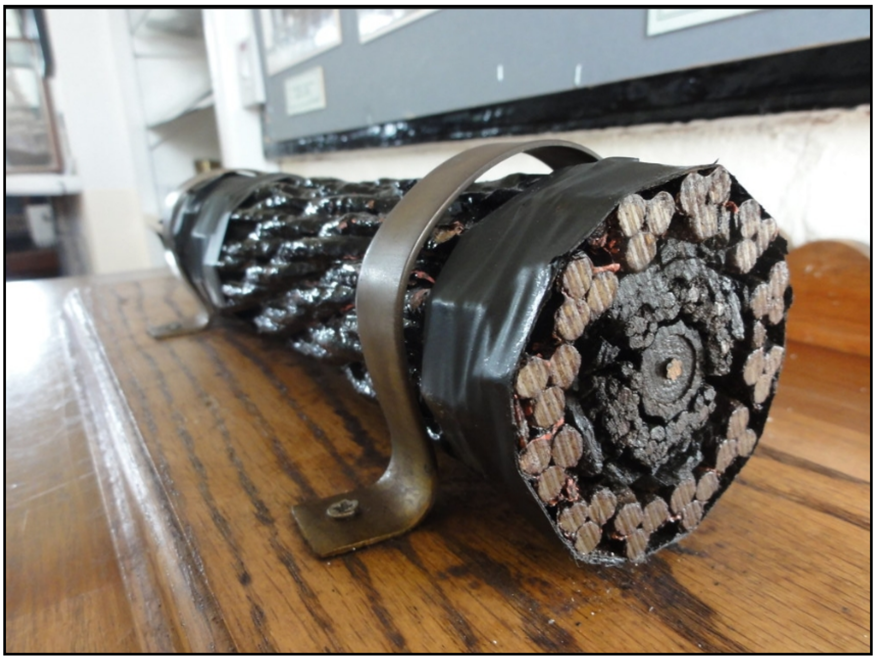
Covering the cable with jute and tar



Covering the core with wire



Coiling down the cable in the tank



A section of submarine cable

A second cable was successfully laid across the Channel just over a year later, on 25 September 1851. The feat was announced to scientists at the Great Exhibition held in the Crystal Palace just as Queen Victoria was leaving the platform from which she had declared the Exhibition closed. This cable consisted of four copper wires, each covered with a double layer of gutta percha. These four wires were twisted together, filled with tarred hemp, wound over with tarred cord, and then all was covered in iron wire. This submarine cable was a longer term success than the first cable, and it encouraged many further submarine cables to be laid, for example between Portpatrick in Scotland and Donaghadee in Ireland.

In September 1856 the Atlantic Telegraph Company was formed in order to provide telegraphic communications between Newfoundland and Ireland. By this time the Atlantic Ocean had been surveyed by a series of soundings, and the depth between Newfoundland and Ireland varied from 1,700 to 2,400 fathoms as compared with depths of 6,000 to 7,000 fathoms further south in the Ocean. Valentia Bay was the choice for the Irish end of this Atlantic cable, with Trinity Bay, Newfoundland, for the start of the Western end.

The Gutta Percha Company began producing the cable in February 1857, the cable was 2,500 nautical miles long. HMS Agamemnon, a 91-gun ship which had been Admiral Lyon’s flagship at the bombardment of Sebastopol, was adapted for cable-laying and half of the cable was stored aboard her. The other half of the cable was coiled aboard the US Naval steam frigate, Niagara.

The ships left Valentia on 6 April 1857 with the Niagara leading, from which the first half of the cable was to be laid. After 274 nautical miles of cable had been laid the ship pitched in heavy seas and the cable broke.

A second attempt was made in the spring of 1858. This time the two ships, the Agamemnon and the Niagara, travelled to the mid-ocean region, the two portions of the cable were spliced together and the ships separated. The Agamemnon laid cable towards Valentia and the Niagara towards Newfoundland. It was the fourth attempt using this method that was successful.

On 5 August 1858 the cable was landed at Trinity Bay, and on the same day the Agamemnon entered Valentia Bay. Trinity Bay reported “very strong currents of electricity throughout the whole of the cable from the other side of the Atlantic”. Subsequently messages of congratulation were exchanged, using the cable, between Queen Victoria and the President of the United States, James Buchanan.

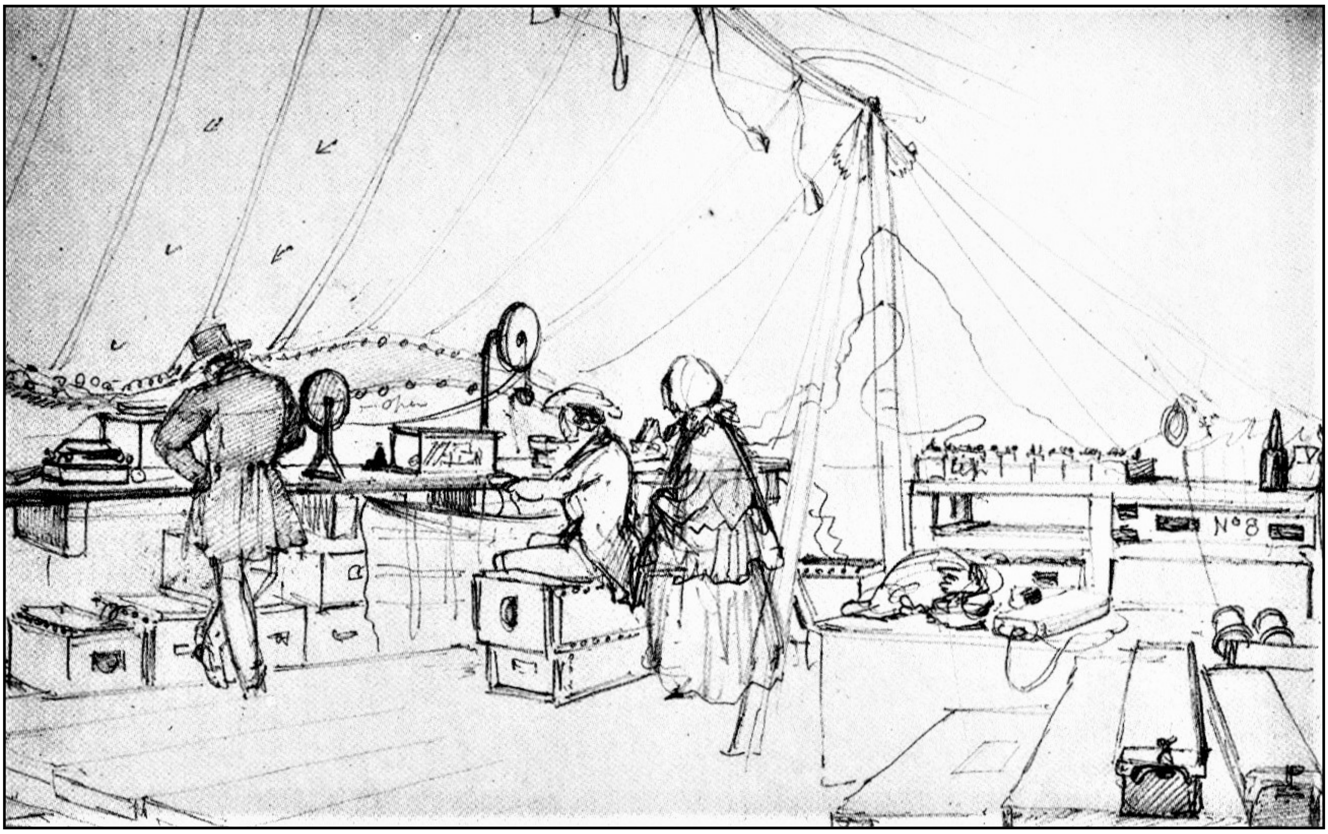
By 1880 nine cables crossed the Atlantic.

The Great Eastern, Brunel’s enormous vessel of the day at 22,500 tons, was used from 1865 to 1866 for laying Atlantic cables since it could take on board the whole cable required, eliminating the inconvenience of two vessels laying cable simultaneously.

In 1869 the Great Eastern was used to lay cable between Egypt and India for the British-Indian Submarine Telegraph Company.


Monument in Telegraph Field, Valentia Island, Ireland

Marking the site where messages were sent to America by cable




Telegraph station in a tent at Valentia, drawn by Robert Dudley

Wireless telegraphy was the last major development in communication in the nineteenth century. In 1884 the chief engineer for the Post Office, Sir William Preece, discovered that wireless messages could be sent by induction. Telegraph wires 80 feet above Grays Inn Road in London were carrying messages which were coming from underground circuits with no linkage by wire between the two.

Sir William Henry Preece

At Newcastle, in 1885 the Post Office placed two rectangles of insulated wire parallel to each other and found that electric pulses fed into one loop would induce similar currents in the other. It was possible to transmit over a quarter of a mile without wire connection.

In 1889, at Coniston Water in the Lake District, William Preece succeeded in transmitting and receiving Morse radio signals over a distance of 1mile across the water

Coniston Water

In 1896 it was the same William Preece who permitted a twenty-two year old Italian, Guglielmo Marconi, to show his wireless telegraph apparatus to officials at the Post Office. Initially trials held on Salisbury Plain did not impress Sir William, however in 1897 Marconi introduced elevated aerial to both his transmitter and receiver resulting in a dramatic improvement. By 1900 wireless was being tried out in naval manoeuvres and its importance for the military was clear.

Hugh Turner

(Acknowledgements: "The Story of Chatley Heath Tower" by John & Beryl Skelly
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"Electric Telegraph" by J L Kieve
"The Cable" by Gillian Cookson)

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