1. Claude CHAPPE (1763-1805) & other semaphores

1. INTRODUCTION

1.1. Signalling in ancient times

There has always been a strong desire to communicate urgently; whether this is by audible, visual or other means. Fire and smoke had been in use in the old world for millennia without achieving, except in the most highly developed ancient civilizations, the means of sending anything other than signals of which the meanings were pre-arranged. The remains of Roman signal towers can still be seen in France (Arles and Nîmes) from which signalling was done by waving burning torches. Polibius tells us that he had perfected a torch telegraph that either Cleoxenus or Democlitus had invented. It was an advanced form of signalling by which troop movements in the rear areas could be directed. Their method was based on two sets of torches: the alphabet was divided into groups of five letters, with the first torch indicating the group and the second the position of the letter of the alphabet within that group, enabling a message to be spelt out letter by letter. The Romans had also a chain of signal stations along the Yorkshire coast; archaeological evidence has shown that they were occupied in the years AD370-395. Signalling was also done by reflecting the sun's rays.

Carrier pigeons have, evidently, been used to transport messages. It is known for certain that Greek sailors were using pigeons to carry messages to the coast as far back as 3000BC. Egyptian, Greek and Roman armies all used the same method of telecommunication. Julius Reuter used them in the 1850s to distribute news reports, and they were used in twentieth-century warfare.
Not to forget the low-tech church bells which gave singular messages, like ‘the invaders are coming’.
If the horse controlled the pace of news on land, at sea communication has for a long time been limited by the speed of the vessel. An example: in the early days of Britain’s involvement with India a message sent by ship, round the Cape of Good Hope, would not get a reply inside a year…

1.2. What is the difference between a semaphore and a telegraph

The name for Chappe and Chappe-like systems should be applicable to apparatus that conveys information by means of visual signals, as with movable arms or panels, pivoting shutters, flags, etc..
Specialists could spend more than one evening discussing this question. I have solved this semantic discussion for myself by simply saying that a semaphore is a visible or optical telegraph. Therefore one can say that all semaphores are telegraphs, but not all telegraphs are semaphores. Whatever, I am using here the two names 'at random'…

Derivatives of the semaphore system include flag semaphore (a flag relay system) and the heliograph (optical telegraphy using mirror-directed sunlight reflections). The annex includes some colourful pictures of flag signalling and alphabets.

1.2. Etymology and terminology

* It was Chappe (Claude and/or his brothers) who coined the word ***tachygraph***, meaning 'fast writer', from the Greek "tachy", fast; and "graphein", to write.

* The word ***telegraph***, meaning 'far writer', was proposed by French diplomat André François Miot de Mélito to Chappe in 1793. From the Greek "tele", far; and "graphein", to write.

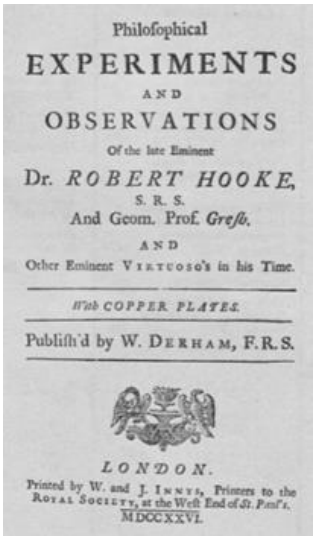
* The word ***semaphore*** comes from the Greek words "sema", sign; and "phoros", carrying (or "phérein", to bear). It was coined in 1801 by Depillon to describe his French coastal telegraph (see 2.3.).

* The word ***telegram*** (1850's) was coined from the Greek "tele", far; and "gramma", character.

* The word ***telecommunication*.** It was in 1904, while director of the 'École Professionnelle des Postes et Télégraphes', that Edouard Estaunié published his lecture notes in the book « Traité Pratique de Télécommunication Électrique (Télégraphie, Téléphonie) ». He built the new word telecommunication from Greek "tele", far; and Latin "communicare", to make contact.

1.3. Early ideas

Although it is reasonable to attribute to Claude Chappe (1763-1805) the invention of the optical telegraph, on a point of accuracy, his telegraphic experiments were not the first. But although Chappe was the first to develop an operational telegraph, one which was unique, durable and most serviceable, the concept of telegraphy was not his.
Out of the many forerunners I will mention here just a few important ones.


Philoſophical
EXPERIMENTS
AND
OBSERVATIONS
Of the late Eminent
Dr. ROBERT HOOKE,
S. R. S.
And Geom. Prof. Greſh.
AND
Other Eminent VIRTUOSO's in his Time.
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Publiſh'd by W. DERHAM, F.R.S.
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Printed by W. and J. INNYS, Printers to the ROYAL SOCIETY, at the Weſt End of St. Paul's.
MDCCXXVI.

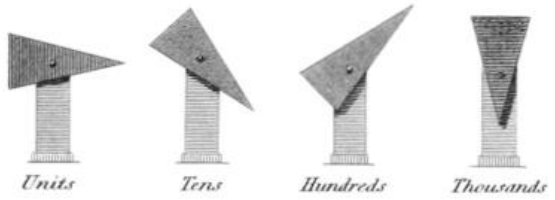
The modern design of semaphores was first foreseen by the British polymath and astronomer Dr Robert Hooke (1635-1703). On 21 May 1684 he gave a vivid and comprehensive outline of visual telegraphy by proposing a primitive sort of shutter telegraph to the Royal Society (of which he was one of the first members) in a submission in the Philosophical Transactions 'Method for making your thoughts known far away', in which he outlined many practical details (using moving geometrical figures that had a specific meaning). The system, which was motivated by military concerns following the recent Battle of Vienna in 1683, was never put into practice.

The first documented proposal to use a telescope related to the transmission of messages was made in a letter dated 21 March 1651 (found in the Bavarian state archives in Wurzburg in 1985 [oo]), written by a monk, Anton Schyrleus de Rheita (1604-1660). Alas, his proposal did not find approval.

Guillaume Amontons (1663–1705) was a French scientific instrument inventor and physicist. Among his contributions to scientific instrumentation were improvements to the barometer (1695), hygrometer (1687), and thermometer (1695), particularly for use of these instruments at sea. He also carried out a first semaphore experiment in the Luxembourg Gardens (near Paris) in 1690. He put signals on the sails of a windmill that were observed at the next station with a telescope. These signals were simply signs with the letters of the alphabet passing successively as the mill turned slowly. The idea consisted of placing at several consecutive posts persons who, having perceived through a telescope the signals from the

preceding post, transmitted them to the following ones, and so forth. But this experiment was only a curiosity.

One of the first experiments of optical signalling was carried out by the Anglo-Irish landowner and inventor, Sir Richard Lovell Edgeworth (1744–1817). He proposed a network of signalling stations erected on high ground; the signal from one station would be observed at the next by means of a telescope. The signal itself would consist of a large pointer that could be placed into eight possible positions in 45 degree increments. The rotational position of each one of the four indicators represented a number 1-7 (0 being "rest"), forming a four-digit number. The number stood for a particular word in a codebook. He returned to his idea in 1795, after hearing of Chappe's system. Not until 1794, when Ireland seemed to be under threat of invasion by revolutionary France, did he resume his activities related to telegraphy. In 1796 his system was rejected by the Irish administration in favour of the Admiralty system even though it was more expensive. In the years after, Amontons played an important role in the setting up of a semaphore network in Ireland.



The old visual telegraphs, which used giant semaphore indicators on a series of highly conspicuous sites, each visible from the next, were developed in France during the French Revolution, where the network was exploited as an instrument of the Central Government.

The signalling technology was soon copied by the British, who set up telegraph routes from London to the great seaports – Portsmouth, Deal, Yarmouth and Plymouth – for transmitting messages to and from the British fleet, then engaged in the war against Napoleon's France. Here it was the Admiralty, although not always gloriously, which was to be in control of the application of this new technology.

For the first time in history news of military victories and defeats could be sent by an army in the field back to the capital in minutes, compared with the hours or days it would take by horse. Examples are how the great news stories of a lifetime – the Nile, Trafalgar and Waterloo – arrived in England.

No optical semaphore could do without a telescope ('Lunette' in French).The first person to apply for a patent for a telescope was a Dutch eyeglass maker named Hans Lippershey (or Lipperhey). In 1608, Lippershey laid claim to a device that could magnify objects three times. And soon after, in 1609, Galileo made his first telescope, modelled after the Lippershey one; it could magnify objects twenty times. It is clear that the use of telescopes is the most essential element in any optical semaphore system. Although it was already mentioned in the Amontons proposal, remarkably, it took almost 200 years after the invention before the first semaphores were put into use. Over the years modifications to improve the quality of a telescope have been proposed, amongst others by Leonhard Euler (1707-1783). All this new knowledge was combined in the construction of the so-called "Dollond telescope" by the Englishman John Dollond (1706–1761), with much improved image quality and resolution. It became the standard for many years to come, and was used in the optical telegraphic systems that followed within a matter of years. The availability of the Dollond telescopes made a critical difference in the feasibility of optical telegraphy.

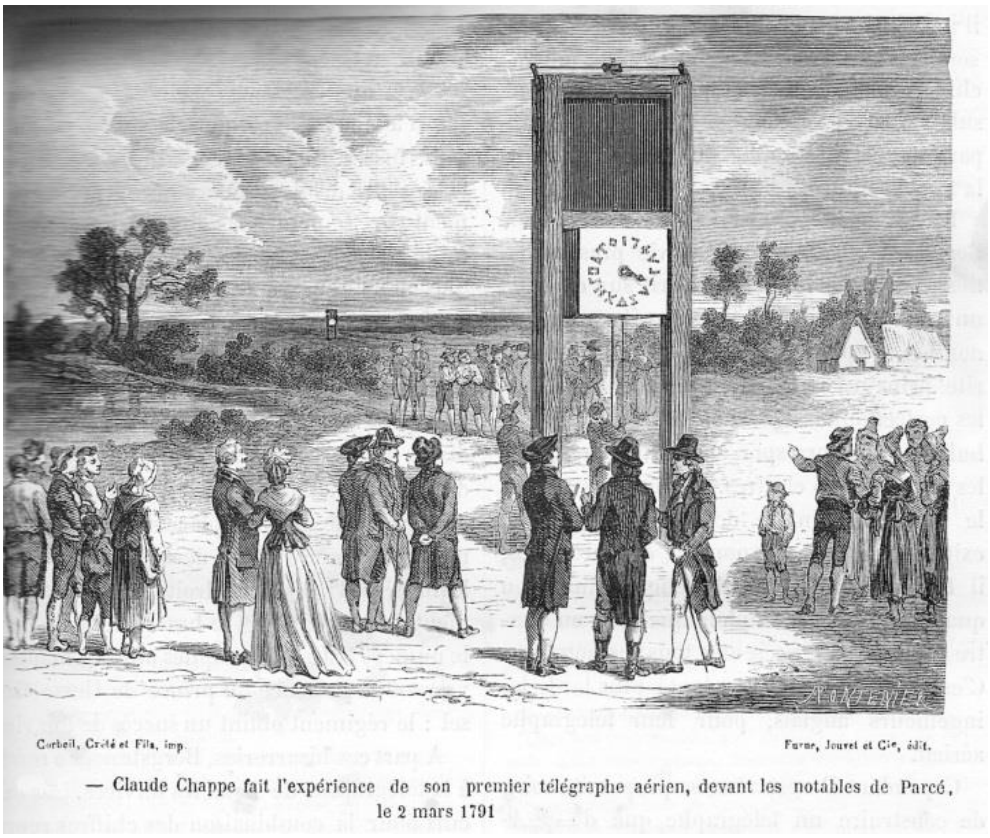
2. SEMAPHORE IN FRANCE

2.1. Life and work of Claude Chappe

'Tour de la Babote' in Montpellier

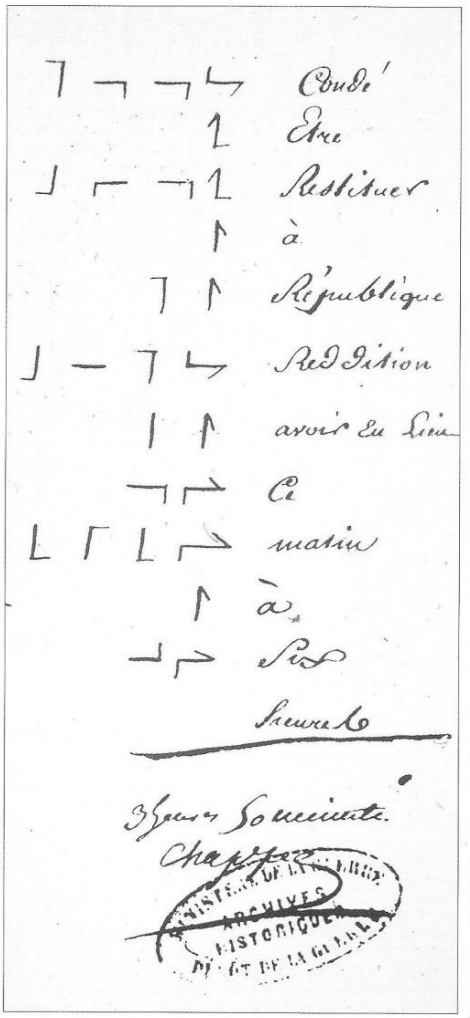
Claude Chappe (25 December 1763 – 23 January 1805) was born into a prosperous family (a couple of hours before his twin-sister Marie-Marthe) of Brûlon (Sarthe dept., East of France). His father was the General Controller of the King's estate in the Laval department, and his mother came from an old bourgeois family (doctors and surgeons) in Laval. He had been educated in the 'Collège de Joyeuse' in Rouen followed by the 'Collège Royal de la Flèche' starting in 1772 (to an unknown date). Here students were prepared for a career in Law or the Church. He entered the Church as 'Abbé Commendataire' (a category of Lay Priests). The clergy were a rich and resented component of the 'Ancien Régime', and Claude received a monthly remuneration. As he had not practised as a priest this gave him an extremely comfortable living and time to explore his love of science. He experimented with static electricity and developed his ideas about telegraphy.

But soon after the Revolution of 1789 it was not a good time to be explicitly Christian, and very dangerous to be part, as Claude was, of the established Roman Church. In fear of his life and robbed of his living, he left the Church soon after the attacks began. He returned to the sanctuary of a quiet life in his still comfortable parental home in Brûlon. Claude had no greater ambition than to indulge himself in his interest in science, to keep his head down, and await further developments. But his development work on telegraphy was too important for him to remain at rest.
He and his four brothers (he also had two sisters) tried out different systems and their first experiments were conducted by communicating with neighbouring friends. A successful experimental demonstration on 2 March 1791 was held over a distance of about 14km between their home in Brûlon and Parcé.



— Claude Chappe fait l'expérience de son premier télégraphe aérien, devant les notables de Parcé, le 2 mars 1791

An attempt near L'Étoile in Paris in March 1792 was a disaster. People were convinced that the apparatus was subversive to the Revolution and thus summarily destroyed it. In September 1792 further trials were held at Belleville (near Paris), but they suffered the same fate.
But Claude gained some advantage from the disasters of his trials; he was now able to abandon all his previous telegraph concepts for a new semaphore system which would become the definitive one used in France.
On 12 July 1793 the official trial was held between Ménilmontant (Belleville?) and St-Martin-du-Terre, a total distance of 35km, with an intermediate station at Écouan. Success, it worked! All the officials present concurred (with a positive report on 25 July); messages could be sent and the first telegraph age had arrived. Chappe's 'T'-type telegraph, as it was also to be known, was destined to be the standard distance communication device in France for the duration of the first telegraph age, becoming obsolete only with the rise of the electric telegraph (around 1850). In 1793 the word télégraphe was coined to replace the less elegant word 'tachygraphe' by which name the Chappes had previously called their apparatus. On 26 July the Convention adopted the apparatus as a national asset and confirmed Chappe as the man in charge, named him 'Ingénieur-Télégraphiste' and granted an Engineer-Lieutenant's pay. On the 4 August 1793 the Minister of War was instructed to acquire sites between Paris and Lille. The c. 220km line was declared open on 16 July 1794. And on 15 August Chappe's telegraph brought news to Paris of the victory at Le Quesnoy, via 22 stations, one hour after the town surrendered; kind of start of the age of communication from a distance... And on 30 August the 'historic' message "Condé is recaptured" was sent. [One can compare this situation with the historic "What hath God wrought" message send by Samuel Morse on 24 May 1844…]

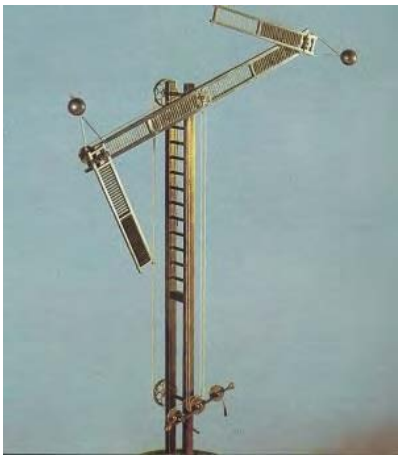


1er septembre 1944. 150e anniversaire de la prise de Condé, annoncée par le télégraphe aérien de Chappe à la Convention nationale. Celle-ci adresse le même jour à l'armée un télégramme de félicitations.

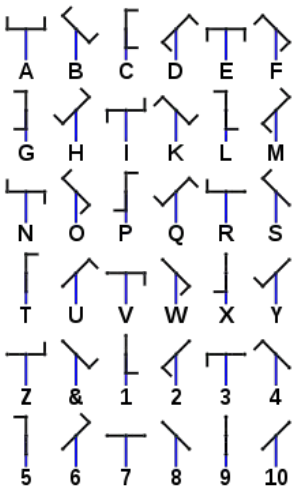
"Condé Etre Restituer à République Reddition avoir eu lieu Ce matin à Six heure »

2.2 His semaphore

The machine was ingenious and consisted of a cross beam ('régulateur') of 4.6m attached to a post, with counter-balanced arms ('indicateurs') each of 2m at the end of the beam; louvered panels in the moving sections created areas of shade to make the apparatus is more visible.
Using levers, wheels, chains and ropes, the beam and signal arms are rotated to different positions.
Chappe needed help in the design of the pulley mechanism and this was provided by the well-known clockmaker of the time, Abraham Louis Breguet (1747-1823) who helped to design the mechanism. *(We will meet Abraham's grandson Louis later in another story about telegraphy…)*

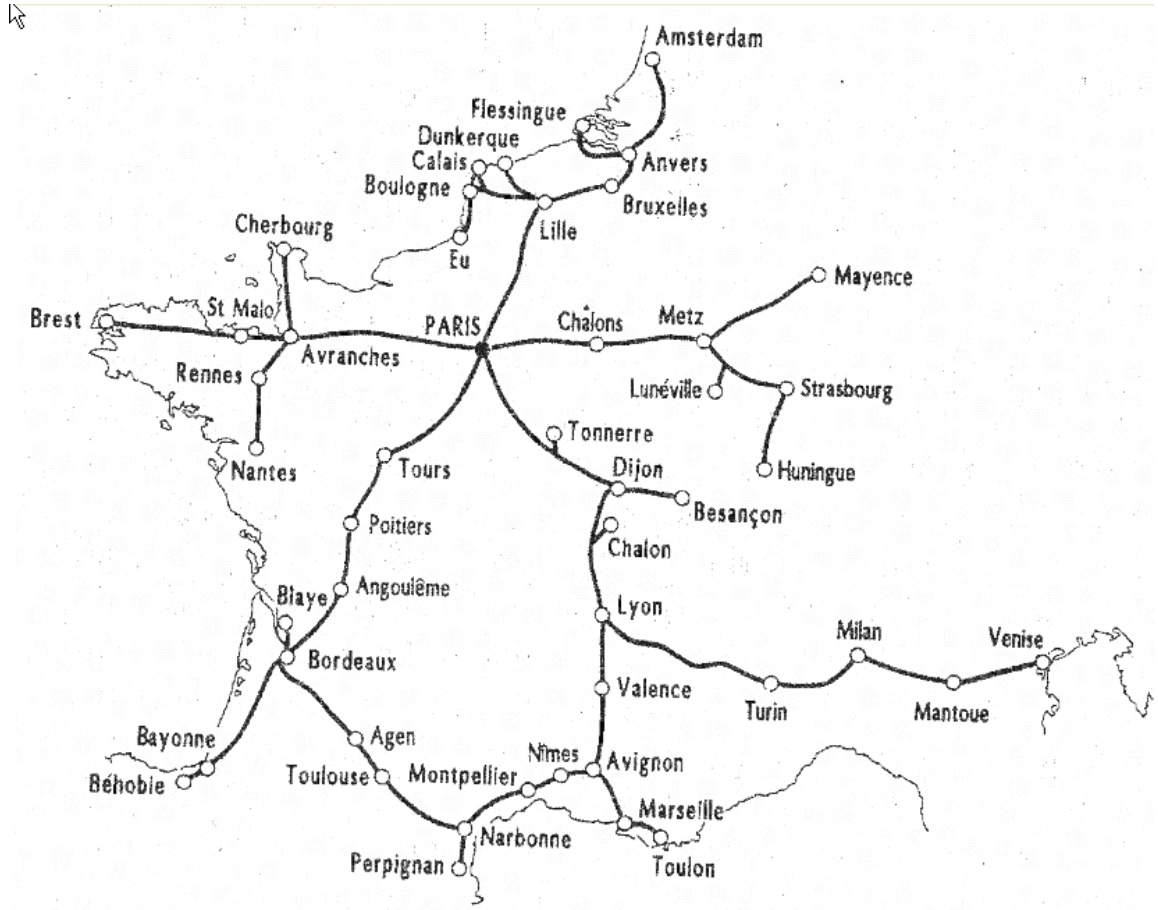


Like all the mechanical telegraphs which followed, the combinations of positions could be assigned to letters, numbers or a code. In theory 4 (positions for the cross beam) x 8 (positions for the left hand side panel) x 8 (positions for the right hand side panel) = 256 positions were possible. But Chappe very sensibly decided to use only the vertical and horizontal cross beam positions (although the two diagonals were used for special service commands) so as to come to 128 positions. They then were reduced to 92 so as to avoid the positions that could create confusion.



At the same time, he introduced a (new) coded vocabulary, divided into three books, each with 92 pages of 92 expressions apiece giving a total of 25,392 (92x92=8464 x3= 25392) words, common expressions, natural or geographical terms and formal phrases, any of which could be identified by three movements of the arms (one each for book, page and expression).
The code books were secret and exclusively in the hands of selected users and only in the end posts. So the telegraphers themselves had no idea what the content of the message was. The different positions of the Chappe alphabet were observed in the receiving post using binoculars (telescope) and then recorded and immediately transmitted to the next post. The distance between two posts was about 10 to 15 kilometres. Of course, they were always positioned as high as possible. Special towers were often built for this purpose. But in the inhabited areas a lot of public buildings and church towers were used. More than once the spire of the church tower was demolished to accommodate the equipment.

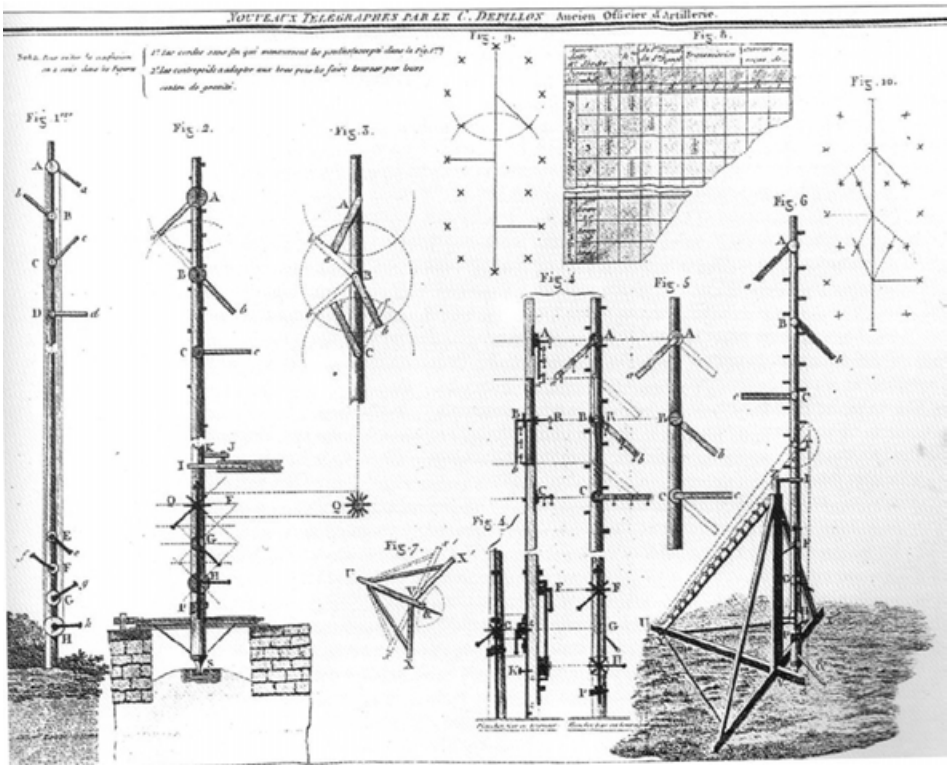
Over the years I have managed to acquire a few times a telescope, the so-called "lunette Chappe". My joy was very great because a Chappe telescope is absolutely the oldest artefact that can be part of a telecommunication collection! In the model on the left of the picture the following is engraved in graceful letters: "Freminville - Ligne de Milan - 176".
One station could reach an absolute maximum speed of 3 signals per minute (4 seconds to set the signal, plus 16 to let the receiver record it), but in practice 2 seems to have been the maximum. In 1794 it was possible, if all was well, to transfer a message consisting of 50 signals from Paris to Lille (c. 220 km) via the 14 intermediate stations in less than an hour. The first symbol of a message to Lille would pass through all stations in only nine minutes. The speed of the line varied with the weather, but the line to Lille typically transferred 36 symbols, a complete message, in about 32 minutes.
Another line of 50 stations was completed in 1798, covering some 450 km between Paris and Strasbourg. The Chappe network was expanded from 1794 onwards. By 1845 the network had expanded to about 5000 km long and connected Paris with the 29 main cities via 534 intermediate stations.



Claude Chappe, who had always hoped that his invention might be applied to commerce, proposed to Bonaparte a pan-European commercial system stretching from Amsterdam to Cadiz (South of Spain) and even taking in London, as he claimed to be able to correspond between Calais and Dover. He also proposed to relay stock exchange news daily, send out the news of the day &c. But Bonaparte only consented to his idea of the weekly transmission of the winning numbers in the national lottery…

2.3. Coastal signalling

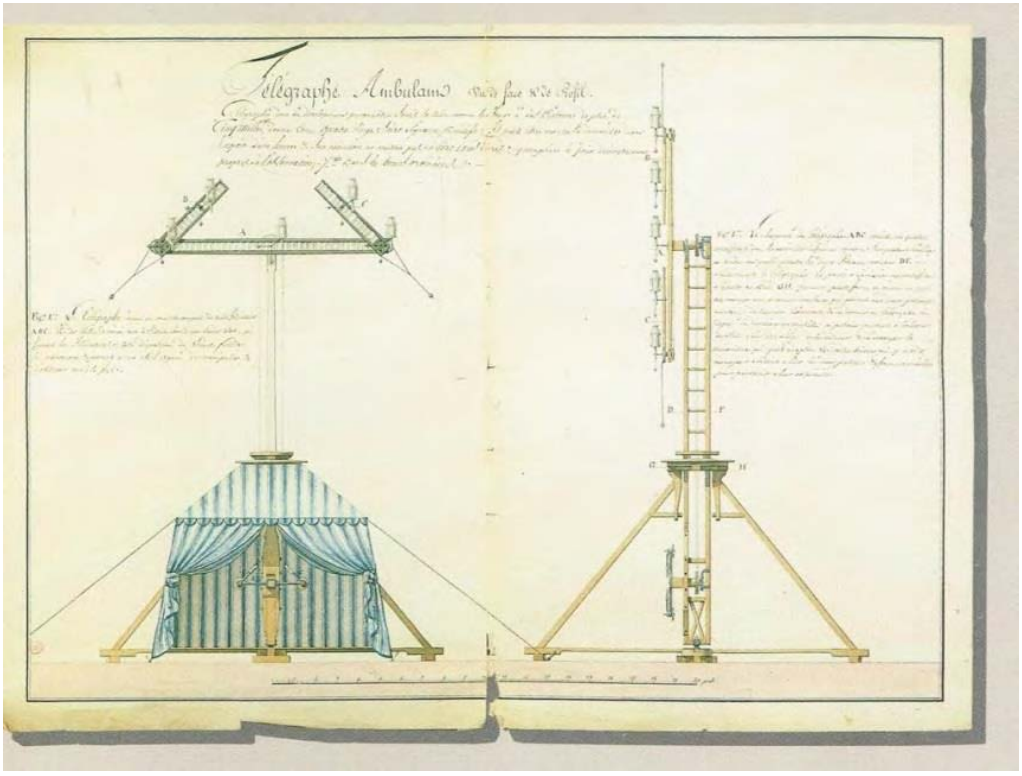
During the time of Napoleon he considered how he could gain strategic advantage over the Royal Navy and how it could be overcome in a new war. A new development in telegraphy was to give him the opportunity to gain an advantage. In 1801 an artillery officer turned inventor, named Charles Depillon (1768-1805), promulgated a three-armed semaphore which had advantages over the Chappe system. At first the main object was to report English fleet movements along the coast and pass details to the nearest naval base. It turned out to be particularly useful for ship-to-shore work. It was adopted almost at once for coastal signalling and it was installed along part of the French coastline from about 1803. It was considered easier than the Chappe system to 'read' at distance at times of poor visibility.
Depillon's system was the forerunner of such telegraphs as Popham's, Paley's, Parker's, Watson's, and Pistor's.
Two, three or four movable arms, each with 8 positions (angles of 45°), were mounted on a mast. For visibility reasons, one vertical position was not used. This resulted in a theoretical maximum number of positions of 49, 343 or 2401 respectively (7^n). Furthermore, still for the sake of clarity, certain positions were eliminated resulting in 43, 301 and 1819 possibilities (later modifications increased the number of usable signals). Another good idea of Depillon was to rotate the mast around its axis, in such a way that it was not only directed to the two corresponding stations, but could also be turned to a ship at sea.
In 1806, the system was further improved by a man named Hubert, a naval engineer from Rochefort.



The Depillon System

2.4. Mobile telegraph

In 1801 Abraham Chappe devised a mobile field telegraph for the Army of the North. In fact, the machine was a small version of the standard design.



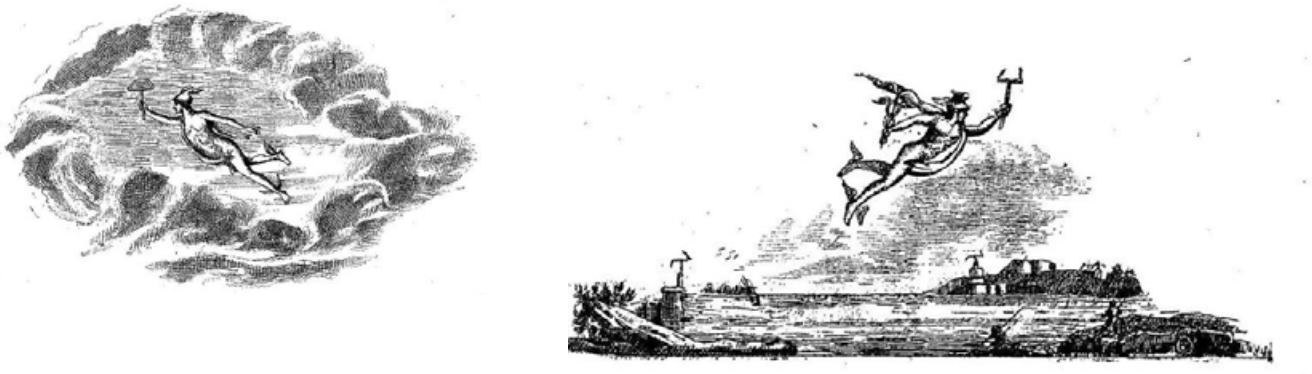
2.5. Claude Chappe's demise

Claude Chappe was not married. He died, at the age of 42, on 23 January 1805, by throwing himself down a well at the telegraph headquarters in Paris. He had become ill during an inspection tour and had suspected food poisoning (but other reports mentioned a painful ear infection, which may have affected his balance). In the same period he had to fight insidious attacks by others on claims for priority in the invention of the 'T'-type telegraph (even by Abraham Louis Breguet). No wonder that he was deeply depressed and increasingly paranoid.

Claude did get, rightly, a beautiful bronze statue in Paris. Unfortunately, it was demolished in 1942 by the occupier during the Second World War and, like so many others, it was melted down.

A postage stamp showing a Chappe apparatus was issued in 1972; stamps depicting Claude Chappe had appeared in 1844 and 1949.

And what happened to his four brothers after Claude's death? René (1769-1854) had already been placed in charge of the Brussels line. Following the death of Claude (1763-1805), the brothers Ignace (1762-1829) and Pierre-François (1765-1834) were appointed jointly to the role of administrators of the telegraphs and were retired in 1823. The fifth brother Abraham (1773-1830) took on a military job close to Napoleon; his task was to translate messages from or to the Emperor from their telegraphic code and thus to be a key part of Napoleon's control over troop movements. In October 1810 he was sent to Amsterdam to supervise the extension of the Lille line. Both Abraham and René held telegraph posts until the new revolution in 1830. Louis XVIII made Abraham, Ignace and Pierre-François Chevaliers de la Légion d'Honneur.
When Ignace died in 1829, Claude was reburied next to him at the cemetery at Père Lachaise in Paris.



Allegories that were printed on the head of messages.
Left the oldest one, right the one as from 1830

2.6. Postscript

The Chappe network was gradually extended to Spain, Italy, Belgium, the Netherlands, the border with Switzerland, and Germany. And in France cross-country connections were added. As late as 1850 two short branch-lines on the Lyons route added another eight stations. During the Crimean war, a semaphore line of seven stations was installed along the Black Sea coast between Varna and Balchik, where troops embarked. It operated from 15 August to 15 November 1854.
The network was put out of service in around 1855/1856. It had been the perfect tool to signal administrative and military orders and to gather information from the provinces. As it was the absolute monopoly of the French State, the public could not use it.
It is clear that fog, mist, rain, snow, strong winds, ... could severely hamper the operation of the optical telegraph and also make it impossible for it to operate for longer periods (days...). Anyway, when it was in operation -the average was six hours a day in the Summer and three hours in the Winter- it was a formidable asset.
The telegraphists ('stationnaires') were often recruited from disabled soldiers (who were, among others, housed in the 'Hôtel des Invalides'). As they had only a small military pension, the labour costs were significantly lower than those of regulatory officials.
Several attempts were made to equip the Chappe with lights so that it could also be used at night, but when the electric telegraph emerged the solution was not yet satisfactory and the idea, together with the optical telegraph as such, was abandoned. The last Chappe semaphore was taken out of service in France in 1853.

I have a question:
May I call Claude Chappe "THE FATHER OF THE MOTHER OF ALL TELECOMMUNICATION NETWORKS"?

Restored Chappe towers and telegraphs in France (Photos: FNARH - Paris)

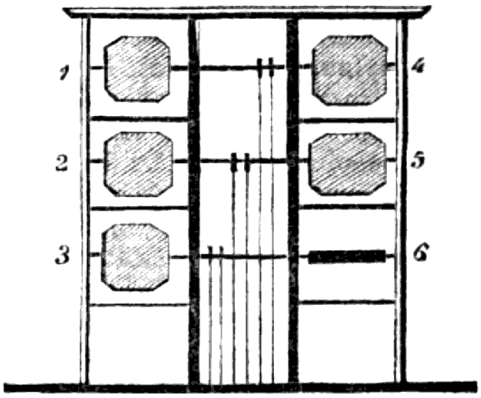
3. SEMAPHORE SYSTEMS IN ENGLAND

3.1. The Admiralty shutter telegraph

The Admiralty Shutter Telegraph System, from Wilson 'The Old Telegraphs'.

On 15 August 1794 a drawing and codebook of the Chappe system was taken from a French prisoner-of-war on the Belgian frontier. At first it did not attract much interest, it was regarded more as a curiosity; the British Army preferred to continue to use 'gallopers' for long distance communications… Later on, a certain chaplain, the Revd John Gamble, studied the documents and thought that he could make an improved system. He proposed a different system based on five shutters, each of which would be manipulated by ropes. There would be only two states for each shutter - open or shut - giving 32 possible combinations. But Gamble found out that a rival, another clergyman, the Revd Lord George Murray (1761-1803) was attracting the attention of the Admiralty with a six shutter system, allowing 64 combinations (in fact 63, leaving one position aside for 'at rest'). Murray's shutters were stated to have been 3ft square. On 25 September 1795 the Admiralty appointed a surveyor, named George Roebuck, to select sites for Murray stations on lines to link London with Deal, Sheerness and Portsmouth. (That was almost exactly a year after Chappe's Paris-Lille line had been completed.) He started with the line to Deal which came into operation on 27 January 1796, using 15 stations. (The shutter stations were temporary wooden huts, and at the conclusion of the Napoleonic wars they were no longer necessary, and were closed down by the Admiralty in March 1816). The Portsmouth line was completed by the end of 1796. The 'Peace of Amiens' (27 March 1802) held up further progress. But in October 1805 Roebuck was directed to choose sites for an extension of the system to Plymouth, branching from the Portsmouth line at Beacon Hill. It was a much more ambitious scheme than the two existing lines. And in 1807 he was commissioned to survey a new route to Yarmouth, which was ready for use in June 1808. Most of the stations were on 'green-field sites'. Contrary to the French 'tower system', the setting up of a station was a rather easy and quick task. The line to Portsmouth was not finally closed down until 1847. In good weather the system was surprisingly effective: a message between London and Portsmouth might take about 15min to pass through the ten stations en route, with a shorter time required

for acknowledgment. And it is interesting to know that some of the prominences on which the telegraphs were built are still today known as ‘Telegraph Hill’.

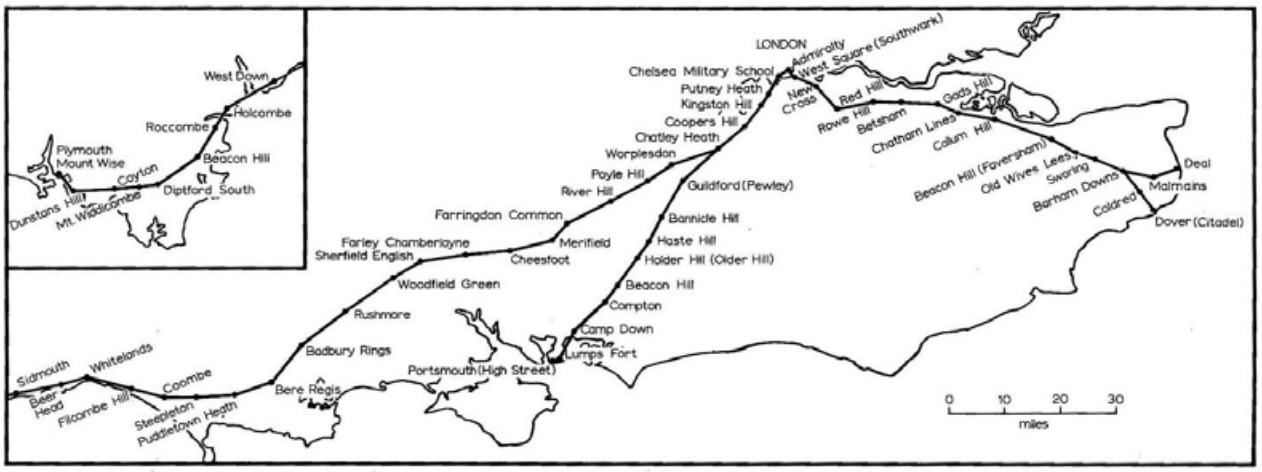


In the experience of the Portsmouth line operators, poor visibility (fog!) made continuous contact impossible on about 100 days a year, intermittent contact was possible on another 60, and on the remaining 200 signals could be read throughout daylight hours. A speed of about six characters per minute could be achieved..

Wilson [5] describes these routes and all locations in very great detail.

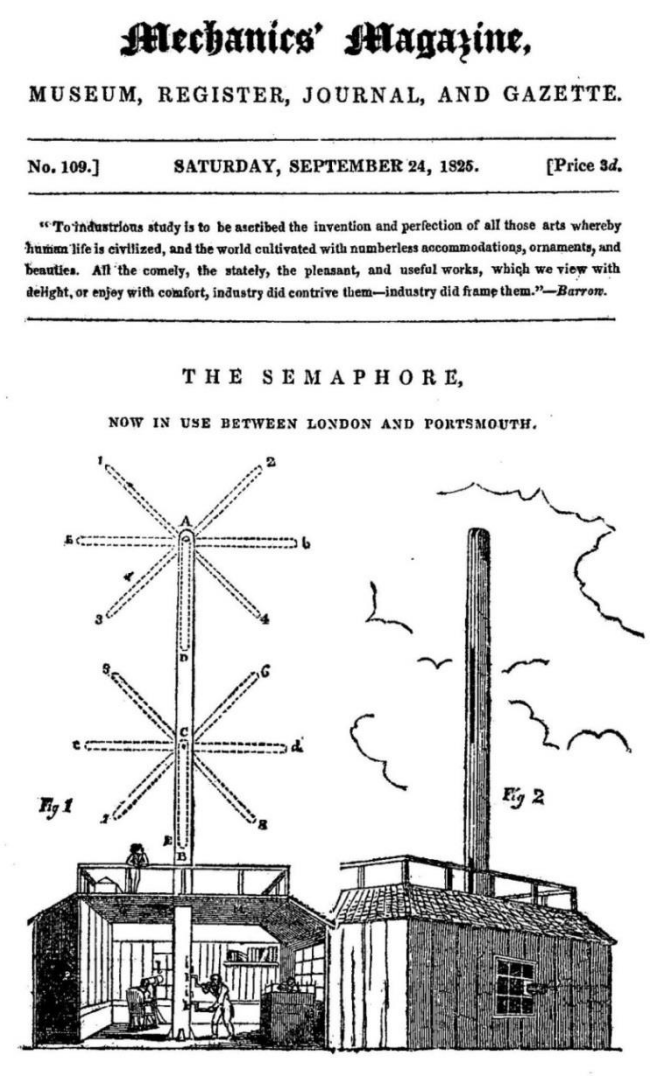
St. Albans High Street in 1807, showing the shutter telegraph on top of the city’s Clock Tower.

3.2. The Admiralty semaphore telegraph



The Admiralty semaphore lines, actual and projected.

On March 20 1815, Napoleon marched into Paris with his supporters, having escaped from exile in Elba a month earlier. During Napoleon’s Hundred Days (ended at his defeat in Waterloo, here in my neighbourhood) there had been no time to resurrect the abandoned shutter lines, but it was intended to



Mechanics' Magazine,

MUSEUM, REGISTER, JOURNAL, AND GAZETTE.

No. 109.] SATURDAY, SEPTEMBER 24, 1825. [Price 3d.

"To industrious study is to be ascribed the invention and perfection of all those arts whereby human life is civilized, and the world cultivated with numberless accommodations, ornaments, and beauties. All the comely, the stately, the pleasant, and useful works, which we view with delight, or enjoy with comfort, industry did contrive them—industry did frame them."—*Barrow.*

THE SEMAPHORE,

NOW IN USE BETWEEN LONDON AND PORTSMOUTH.

Fig 1

Fig 2

The London-Portsmouth semaphore in 1825.

reinstate the service if necessary by using a new land telegraph devised by Sir H.R. Popham (1762-1820). Having earlier carried out much of scientific work for the Admiralty he had been made a Fellow of the Royal Society (FRS) in 1799. His 'new' telegraph was derived from his earlier telegraph, a 2-arm semaphore for use on ships, modelled after the 3-arm Depillon French semaphore (see above 2.3). The design was meant to be used both on land and on ships (where until then only flag signalling systems had been in use). The eight-foot-long (2.43m) arms were fixed on a 30-foot (9.14m) mast. The length of the mast inside the building naturally varied, but in a bungalow it was 12 feet (3.66m). Both arms were movable into seven positions about their point of attachment. One was fixed on top of the mast and the second somewhat lower. Because of those dimensions the arms were much more visible than the shutter rectangles. Although only 48 (7x7 minus 1 for the 'rest' position) separate signs could be made, this was still sufficient to provide a short 'brevity code' besides the basic letters and numerals. It was agreed to set up permanent lines from Whitehall to Portsmouth (subsequently also to Plymouth) and to Chatham, Sheerness, Deal and Dover. A new link with Yarmouth was not considered. The tenders were not issued until April 1821 and also there were delays with the procurement of operating machinery…

In 1822 Colonel (later General) Charles W. Pasley revised Popham's design. The new line from London to Portsmouth (the old one had been abandoned in 1816) was in operation from 1822 onwards. The new system still had two movable arms, but this time each arm could be set in one of eight positions, producing 8×8 or 64 code combinations, and of course resembling the Depillon system even more closely. The upper arm in Pasley's design had a fixed V-shape, to make it easier to distinguish it.

The 'glasses' (telescopes) were not to be left for more than two minutes a time. Some officers seem to have indicated the fog signal when they felt like a respite from duty, a practice against which they were sternly warned!

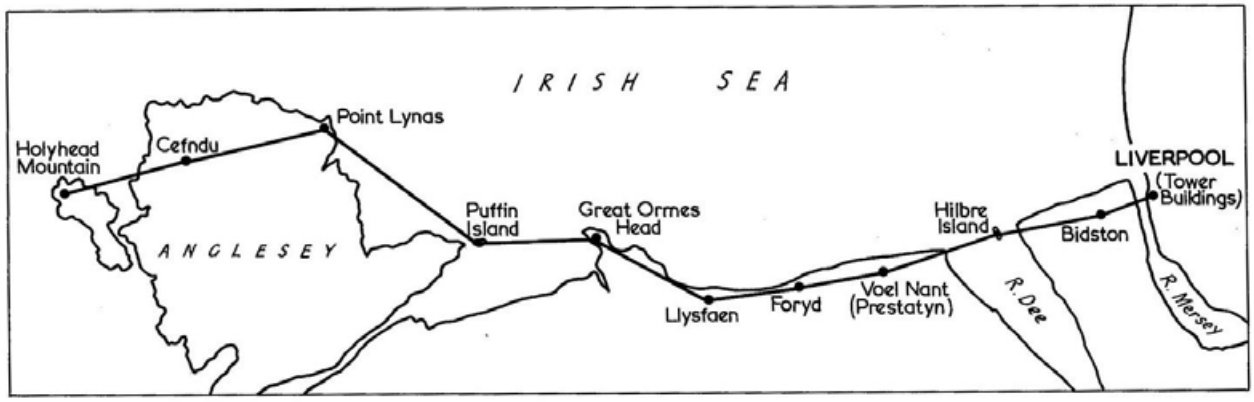
In 1820 the Admiralty decided to make the London-Chatham line permanent and extend it to Sheerness, Deal and Dover.

And on 13 July 1825 instructions were given to have 30 semaphores ready for the Plymouth line. The former shutter sites were not reused, a new course being preferred, its first section lying close to the present A31 road. The semaphore stations were closed in 1847 on the grounds of excessive running costs, and replaced by an electric telegraph system alongside the Southwestern Railway, linking the Admiralty with its port at Plymouth (see the chapter on 'William Cooke & Prof. Charles Wheatstone'). The use of the Pasley system, however, survived much longer still on ships. Its use, for instance, was reported during a review of the fleet at Spithead by Queen Victoria in 1859.

The semaphore tower at Chatley Heath, which replaced the Netley Heath station of the shutter telegraph, has been restored by Surrey County Council and is open to the public. It is a rare example of a tower station on the Admiralty to Portsmouth line, which operated from 1822 to 1847.

3.3. The Holyhead-Liverpool telegraph

The Board of Port of Liverpool obtained a Private Act of Parliament to construct a chain of optical semaphore stations from Liverpool—Holyhead (Wales) in 1825. After much discussion in 1826, the survey for a line between Liverpool and Holyhead was entrusted to Lieutenant B.L. Watson, 'Royal Navy' who came up with a new type of semaphore.
This *commercial* telegraph functioned longer than any other visual telegraph in the British Isles. It probably handled much more traffic than the Admiralty line to Portsmouth, the only comparable system in Britain. It was operational in 1827. It had nine intermediate stations and a distance of 116km. This line was used to communicate news of ships arriving in the Mersey, replacing an earlier 'ball and flag' system. Unlike internal telegraph lines, this system, as well as communicating messages from end to end of the chain, had to be able to send and receive signals from intermediate stations.

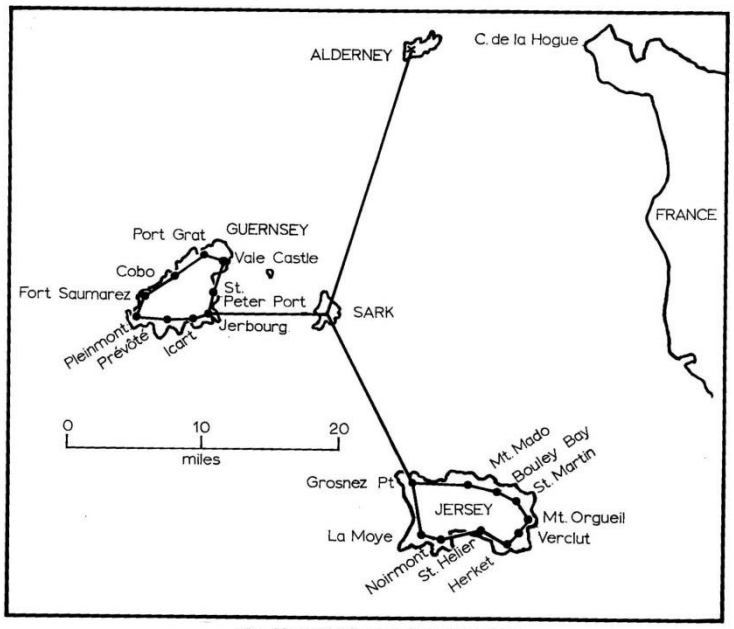


Holyhead-Liverpool semaphore telegraph.

The mast had three pairs of arms, working on three separate pivots, and displayed at the 45°, horizontal and 135° positions. The same mast was used for hoisting the flags for signalling passing ships when necessary; there were 12 different flags. Each pair of the arms could therefore take up nine positions to which the numbers 1 to 9 were assigned. The top mast pair represented hundreds, the middle pair tens and the lowest pair units. All message numbers were referable to a vocabulary or code, in the following order: letters, compass points, portions of time, words and sentences, merchants' names, gazetteer, names of vessels using Liverpool. Watson's Code of Signals was printed first in several editions between 1827 and 1842.
The telegraph provided reassurance to mariners who knew that lifeboats and steamers would be on hand as soon as 'ship in danger' was telegraphed. Its value to owners of outward-bound vessels was that it told them of the force and direction of winds in the open sea before they left the river anchorage. The length of the line was about 75 miles (121km). In 1830 the system was extended to the Tuskar Rock and Cape Clear in Ireland, and reports were sent by Wexford and Skibbereen respectively, presumably by post. The last message was most probably sent on 26 November 1860.

Watson had several other ventures, but this would lead us too far for this chapter.

3.4. The Channel Islands



The Channel Islands telegraph routes.

In view of the position and strategic importance of the Channel Islands it is not surprising that in Britain's wars with Revolutionary and Napoleonic France there was a need for early warning of French naval movements in St. Malo straits.
The map hereby shows the coastwise 'circle' locations of Guernsey and Jersey, which used a 2-arm (one arm carried a cross piece at the end) semaphore designed by a certain Peter Mulgrave (1778-1847). It could show 42 positions…

3.5. The Portable

Then remember the Revd John Gamble who had unsuccessfully bid for the naval shutter system. To meet the requirement of the Admiralty he had designed a 'radiated' telegraph in 1797, each capable of expressing 31 signal variations by suitable settings of three signal arms (or rays, hence radiated) each 1.5m long. At the end of each arm was a disc to help the observer to discern its position

Woolwich Parish Church showing the Revd Mr Gamble's experimental radiated telegraph on its tower: correspondence was made with a similar apparatus on Shooters Hill, near the shutter telegraph station.

The admiralty also asked to deploy a portable system.
Twelve sets of carts with their mobile semaphore telegraphs were ordered. Little is known about its use. There are claims that this mobile solution was used in the Peninsular War (1808-1814) but there is no clear evidence.

4. SEMAPHORE SYSTEMS IN BELGIUM AND THE NETHERLANDS.

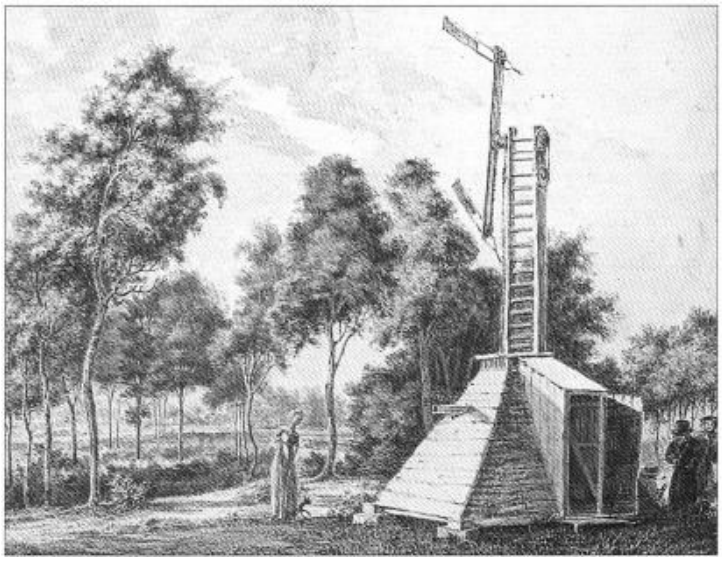
4.1. Belgium

The first traces of Chappe installations in Belgium and the Netherlands date from the period of the Napoleonic occupation here: they were for the French a support of the political and military control over the occupied territories. This explains why the Paris-Lille line was extended to Brussels in 1803. In 1809 this line was extended via Antwerp to Vlissingen (NL) via, amongst others, intermediate stations in Melsele, Sint-Gilles-Waas and Breskens. This choice was of course not a coincidence: Vlissingen is situated at the mouth of the Schelde (Escaut). Afterwards it turned out that the many fog banks and mist were a big problem, as there the Schelde is about 5 km wide.... There was also a lack of money and then there was the occupation of Vlissingen by the English. In 1810 the posts between Antwerp and Vlissingen were dismantled. And in 1813 the other "French" line to Amsterdam of 1811 (see 5.2) was in turn dismantled as a result of the political and military turmoil of 1813/14/15, in which eventually the Allies defeated Napoleon and William took over control of the Southern Netherlands.
It should be noted that in Brussels a "Chappe" post was placed on each of the two towers of St. Gudula's Church; one to correspond with Lille via, amongst others, Dilbeek – Pamel and Roubaix, and the other with Antwerp via Vilvoorde, Mechelen and Waarloos.
Unlike in France, where special towers were usually built, the apparatus was often placed on church towers. Of course after the spire had been demolished, which was always very much against the will of the local population.

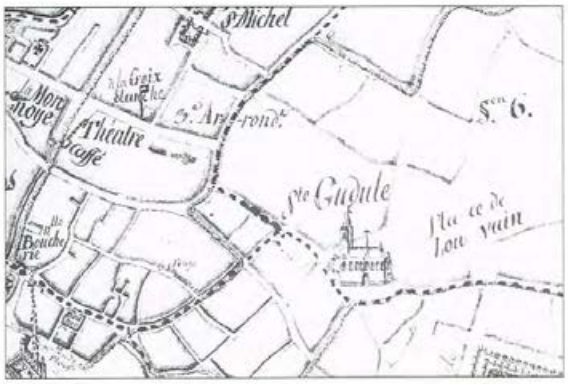
It is useful to mention that here in Belgium, between 1834 and 1847, some private semaphore lines were installed with Chappe apparatus. These were erected by stock exchange speculators (mostly industrialists and wholesalers). There were only lines (depending on the source 3, 4 or 5) between Brussels and Antwerp, the only two cities in Belgium with a stock exchange. The intention was obvious: 'foreknowledge'! One has to know that the Antwerp stock exchange opened earlier in the morning than the Brussels stock exchange... The newspapers "L'Indépendant" and "Mercure Belge" also used these lines to send stock exchange information. In Brussels there was a telegraph on the roof of a shop in the Wolvengracht, a street near the market square and the Brussels stock exchange, and on the Munthotel. In Schaarbeek and Eppegem they stood on a wooden tower. In Mechelen, there were intermediate stations on the tower of the church of 'Our Lady across the Dyle', one on the Putterie and one on the 'Brussels Gate'. Intermediate stations were located in Mortsel, Wilrijk and Kontich. Regarding Antwerp it is known that a telegraph was placed on top of a building in the Meir (in 1835) and on the 16th century building De Thoren in the Beddenstraat (close to the fair). As the information about these (3 or 4 or 5 lines?) is rather scarce and somewhat obscure, I only want to mention here some names of people that have been involved with one of the different lines: A. De Hornes, who was, in 1833, the first to propose a concrete plan; A. Ferrier, an engineer and writer from France: he had already established the stock exchange line between Paris and Rouen (1833); the brothers Vander Elst, who proposed a line with Chappe telegraphs; E. Van der Hecht, who claimed to have invented a telegraph that also could work by night; M. Lefèbvre-Meuret, a politician and businessman and P.-J. and Fr. E. Blanc from Bordeaux, who had already installed a line in France using Chappe's; and Bauwens-De Heyn who bought the rights from the Blancs. And later, in 1841, the Antwerp trader Flébus erected a final stock exchange telegraph, using the Chappe system. When in 1846 the first electric telegraph line was built between Brussels and Antwerp, the Bauwens-De Heyn line continued to function. Presumably it was taken out of service at the end of 1847.

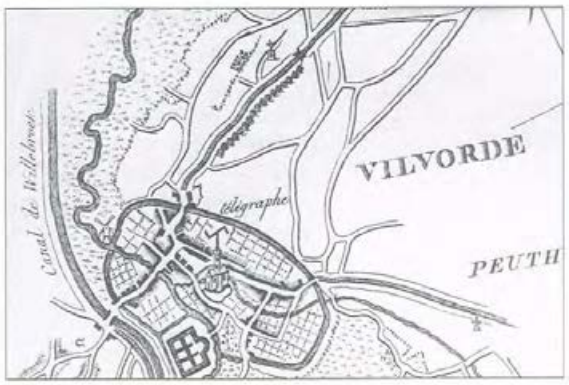
In July 1840, A.J. Van Duerne applied to the government for the installation of a connection between Brussels and Ostend, via Asse, Aalst, Ghent and Bruges. The application was deliberated over by the government very slowly and eventually died a silent death. Involved in the decision was a joint study committee of members of parliament and technicians that was set up to see whether or not entrepreneurs should be allowed to build and operate private telegraph networks (as they were allowed to do in France). Adolphe Quetelet (1796-1874), a Belgian astronomer, mathematician, statistician, sociologist and founder and director of the Brussels Observatory (in 1828) played a key role in this and later on in various other committees that dealt with telegraphy. He is the man who later on introduced the needle telegraph from Cooke and Wheatstone in Belgium.

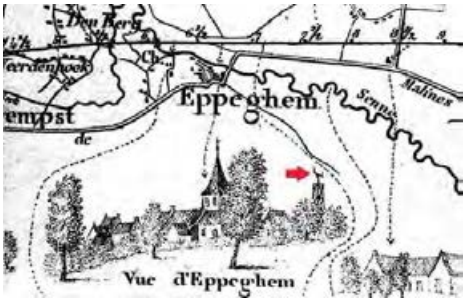
The last Chappe semaphore was taken out of service in France in 1853.
Only one Chappe telegraph apparatus was found. It was kept in Belgium in the basement of the city museum of Sint-Gillis-Waas, and therefore dates from the Antwerp-Vlissingen line of 1809. It was expertly restored by the Dutch P.T.T. in 1993.



Left: The wooden signal house in Dilbeek in 1804; a drawing from Paul Vitzehumb; Royal Library of Brussels.:
Right: The only Chappe machine that has survived, it was lying in a basement in Sint-Gillis-Waas (B) and in 1993 restored by the Museum of the Dutch PTT.








LES LIGNES DU NORD
0 10 20 30 40 50 60 70 80 90 100 Km
Mer du Nord
ANGLETERRE
Great Yarmouth
Harwich
Douvres
AMSTERDAM
Ouderkerk a/d Amstel
Vreeland
Westbroek
Utrecht
Houten
Hagestein
Leerdam
Brakel
Veen
Heusden
Sprang
Dongen
Bavel
Meerle
Minderhout
Brecht
s-Gravenwezel
ANVERS
Waarloos
Malines
Vilvoorde
Louvain
BRUXELLES
FLESSINGUE
Groede
Watervliet
Assenede
Axel
St. Jansteen
St. Gillis Waas
Merksem
Ostende
Bruges
DUNKERQUE
CALAIS
Sangatte
Sombres
Colembert
Ardres
Zouafques
Bergues
Zegerscappel
Cassel
Bailleul
Nieppe
Lomme
LILLE
Roubaix
St. Denijs
Tiegem
St. Kornil
Nukerke
St. Marie Oudenhove
Anteliniks
Pamel
Dilbeek
Bazinghen
Wimille
BOULOGNE-sur-Mer
St. Etienne-aux-Monts
La Houlette
St. Josse
Verton
Colline
Arry
Forest Moutier
Port-le-Grand
Miannay
St. Mard
EU
Woincourt
Clerques
Tournehem
Bayenghem
/Eperlecques
St. Omer
Lynde
Morbecque
Merville
La Gorgue
Erquinghem/Lys
Faches
Seclin
Carvin
Harnes
Thelus
Neuville-Vitasse
Hamelincourt
Biefvillers
Ginchy
Curlu
Dompierre
Lihons
Parvillers-le-Quesnoy
Boulogne-la-Grasse
Belloy
Fouilleuse
Clermont
Bury
Erquis
St. Martin-du-Tertre
Ecouen
Montmartre
PARIS
Gand
Escaut
Charleroi
Valenciennes
Cambrai
Amiens
Somme
St Quentin
Oise
Beauvais
Soissons
Reims
Verdun
Rouen
Haarlem
La Haye
Scheveningen
Rotterdam
Bergen
Alkmaar
Zuyderzee
Helder
Texel
E. LUDWIG. 1991

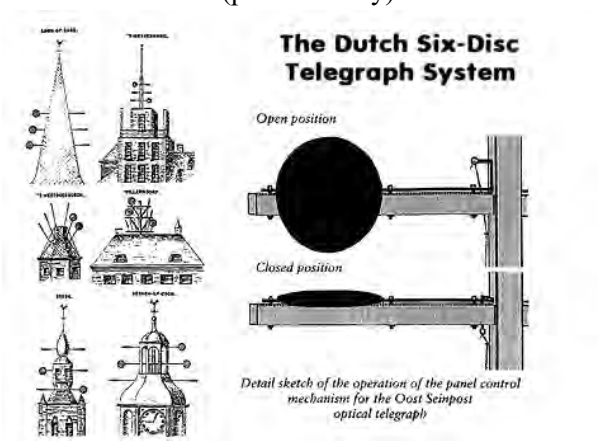
4.2. The Netherlands

4.2.1. The Chappe telegraph

In 1809 the Paris-Brussels Chappe link was extended via Antwerp to Sas-van-Gent and Vlissingen. In the same year a line was opened from Amsterdam via Rotterdam to Ossendrecht, the headquarters of King Louis Bonaparte's Marchal. Soon afterwards, an additional station was built at Yerseke on a branch from Bergen-op-Zoom. A second line followed from Amsterdam via Nijkerk to the palace of Het Loo. The apparatus consisted of a wooden cross hanging from a yardarm and furnished with five discs. The system lasted only until Louis Bonaparte's kingdom was absorbed into the French Empire on 9 July 1810.
After Napoleon's crushing defeat at Leipzig in October 1813, French troops were forced to evacuate the Netherlands, and the telegraph lines were dismantled and largely destroyed.
[In 1815 the Northern and Southern Netherlands (now Belgium) were united into one kingdom under Willem I, but till 1830 political tensions were running high…]
However, the unrest returned when Napoleon left the island of Elba and entered Paris on 20 March 1815 with a small army of faithful soldiers. As a result of this danger of war, there was renewed interest in the 'United' Netherlands for a fast connection to the French border. There were concrete plans to set up 140 telegraph posts, with Chappe telegraphs, from Amsterdam via The Hague, Antwerp and Brussels to Tournai. But after Napoleon had been defeated, this time definitively, the construction of this line was no longer necessary.

4.2.2. The Lipkens telegraph

The next and last telegraph operated in the 1830s. In August 1831, because of the uprisings in the southern provinces which led to Belgian independence, William I ordered Antoine Lipkens to establish a line within 14 days between the Residency at The Hague and the army of North Brabant, where the Prince of Orange had his headquarters. Lipkens succeeded in completing the section between The Hague and Breda in only 11 days. In 1830 the line was extended to 's Hertogenbosch.
The Lipkens telegraph consisted of six discs of wickerwork, 110-120 cm in diameter. They were attached to spars and could be moved to present either their face or edge. Of the 63 signs possible, 10 were reserved for numbers, 26 for the letters of the alphabet, and the remaining 27 for special messages. On 1 January 1833 a line between Lillo and Vlissingen (the Navy base) came into use.
There was little delay in transmission: The Hague to Breda took 30 seconds via 7 intermediate stations, to Bergen-op-Zoom 38 seconds via 11 stations and to 's Hertogenbosch 50 seconds via 11 stations. That was much faster than its predecessors, the Chappe and the Depillon.
Remarkably, the telegraph was only out of service because of bad weather for 20 days a year on average. No ships could approach Walcheren or the Wester Schelde without the news being known at the Residency within a few minutes.
The telegraph, being solely for national defence, became redundant and was given up by Royal Decree on 24 September 1839.
A model of the Lipkens telegraph, built by its author, can be found in the 'Modellenkamer' of the 'Rijksmuseum' in Amsterdam (photo hereby).



Model of the Lipkens telegraph in the Rijksmuseum Amsterdam

4.2.3.The coastal semaphore (see also 2.3.)

A French coastal Depillon semaphore line ran along the (short) coast of Belgium and along the (long) coast of the Netherlands. Part of one of the lines ran from Cap Griz-Nez, Calais and Dunkirk (Fr) via, amongst others, Nieuwpoort and Ostend (B) to Texel (via Lissewege,…). A branch of it ran from Vlissingen via Terneuzen (NL) to Antwerp (B).
The islands of Noord- and Zuid-Beverland, Schouwen, Goeree and Overflakkee were also provided with coastal semaphores; and there was a connection over Hollands Diep to Willemstad.

***

Lipkens telegraph – Binnenhof - Den Haag

5. SEMAPHORE SYSTEMS IN GERMANY

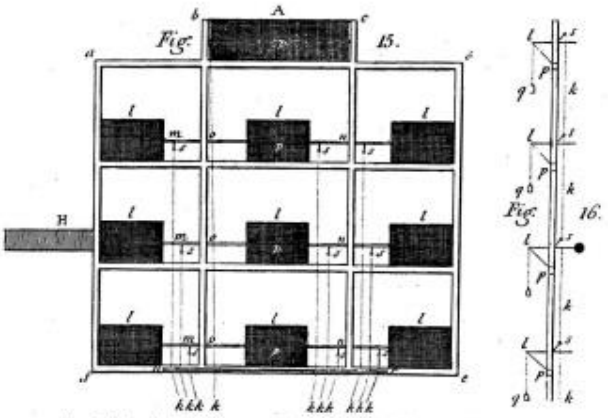
5.1. Schmidt's telegraph

In October 1794 a Senator Gunther of Hamburg proposed the establishment of a telegraph line between Hamburg and Cuxhaven for rapidly transmitting shipping and commercial news. It became a paper scheme for about 40 years… But then, in February 1837, the line was ready. In 1839 a proposal was made for a similar line between Bremen and Bremerhaven; it was completed and opened throughout at the beginning of 1847. A link line was also built from Bremerhaven to the Hamburg-Cuxhaven line, making through communication between Bremen and Hamburg possible. (However, note that in the same period an electric telegraph line began working between Bremen and Bremerhaven…). The Hamburg-Cuxhaven line closed down in 1850

5.2. Pistor's telegraph

In the meantime (albeit about 40 years after the start in France) a line was established in 1832 in Prussia, for use by the military. It linked Berlin, Potsdam, Brandenburg, Magdeburg, Braunschweig, Hildesheim, Paderborn, Cologne, Bonn, Koblenz and Treves (see the map). This Prussian line was 587km long with a total of 61 intermediate stations and initially used to transmit administrative and military messages. Later on a single-arm 'regulator' was used with two 'indicator' arms located at each end, as in the original Chappe system. Three dispatch departments located in Berlin, Cologne and Koblenz handled the coding and decoding of official telegrams. The line was in full operation in 1834-1835 and closed down in 1853. Carl P. H. Pistor (1778-1847) was the 'initiator'. The design went back to Watson's ideas of 1810 and consisted of a wooden mast (6-7 m.) with six cable-operated arms (about 1.50m in length and 0.50m wide). The lowest pair of arms represented the 'hundreds', the middle pair the 'tens' and the topmost pair the 'units'. By placing the arms at 45°, 90° or 135° to the mast, the code made 4,096 abbreviations and combinations possible. A normal transit time seems to have been an hour for a message of about 30 signs. Each station kept a journal in which the signs received were recorded, along with details of the weather and light, and statements of which operator was at the machine and which at the telescope.
The picture above shows station no. 50 which was installed in 1834 in Cologne-Flittard and is still there today. This semaphore now signals permanently "Thunderstorm in Cologne". The Prussian system remained the only state-run optical telegraph system within German territory. There were also a couple of examples of privately run systems between 1837 and 1852. The first existed between 1837 and 1850 and the second was inaugurated in 1847. This last system ran between Bremen and Bremerhaven, but was taken out of service by 1852 due to the competition of an electric telegraph line.

6. SEMAPHORE SYSTEMS IN SWEDEN



A replica of an optical telegraph in Stockholm

Sweden was the second country in the world, after France, to introduce an optical telegraph network. By 1809 the network comprised about fifty stations distributed over a distance of 200km. Like its French counterpart, it was mainly used for military purposes. The system was confined to three archipelagos: in and around Stockholm, around Gothenburg, and around Karlskrona, the chief naval port at the time.

In most countries government visual telegraphs were never allowed to accept private or commercial message, but in Sweden it was decided quite early on that an income could be derived by allowing the system to be used for such traffic at a fixed tariff. The decision was sensible as the lines were not busy and could be usefully employed, especially in remote places. That service began in May 1834 and Sweden claims to have possessed the first telegraph in the world to be managed by a State for private and commercial ends. In 1836 the lines were open for seven months of the year and in 1858 all stations were open the whole year round. The semaphore stations in the Stockholm region were given up between 1858 and 1876. Those in the Gothenburg and Karlskrona areas lasted a little longer but all went by 1880.

At the same time as Chappe, the Swedish inventor Abraham N. Edelcrantz (1754-1821), private secretary to the King of Sweden, experimented with the Chappe system in Sweden. At the end of October 1794 he inaugurated his telegraph with a poem dedicated to the Swedish King on his birthday. But dissatisfied with the limitations of his first machine he soon developed his own system which was quite different from its French counterpart and nearly twice as fast. In July 1795 a station was set up on the tower of the St. Catherine Church in Stockholm. The system was based on ten collapsible iron shutters. The various positions of the shutters formed 1,024 (2^{10}) combinations of numbers which were translated into letters, words or phrases via codebooks. The telegraph network consisted of telegraph stations positioned at about 10 kilometres from one another. Soon telegraph circuits linking castles and fortresses in the neighbourhood of Stockholm were set up and the system was extended to Grisslehamn, Signliskär and Eckerö on Åland. Subsequently, telegraph circuits were introduced between Gothenburg and Marstrand, at Helsingborg and between Karlskrona and its fortresses. During the war of 1808-9 against Russia the telegraphs around Stockholm played an outstanding part in coastal defence, after which they fell into decay. They were not reorganised until 1830, when relations with the Russian-Prussian-Austrian coalition became strained. In 1839, when there was a threat of war, several extra lines were proposed..

The last semaphore link in regular service was in Sweden; it went out of service in 1880!

7. SEMAPHORE SYSTEMS IN THE US

The first optical telegraph, based upon Chappe's, was built by Jonathan Grout in 1801 but ceased operation on 24 April 1807. A c. 104 kilometre line connected Martha's Vineyard with Boston via 16 stations. Its purpose was to transmit news about shipping entering the straits.

An optical telegraph system linking Philadelphia and the mouth of the Delaware Bay was in place by 1809 and had a similar purpose; a second line to New York City was operational by 1834, when its Philadelphia terminus was moved to the tower of the Merchants Exchange.

John R. Parker substituted in the early 1820's a semaphore for Topliff's 'signal post' at Long Island Head, and later extended the line to Boston Light. Parker must have kept in close touch with development in the Old World, for his apparatus was of a sophisticated type, with similarities to the design of Pasley (see 3.2.). A single, lofty, tapering mast carried three arms, one above the other (that at the top was shorter than the other two, and only used as an indicator). The arms could take one of six different settings. Several thousand combinations of four numbers each were possible. It relayed news of the arrival of vessels (2104 in 1833). It was used to identify ships approaching Long Island South and to telegraph this information to New York. Parker was an enthusiastic advocate of the semaphore. He published a book on it in 1832 ('The US Telegraph Vocabulary') and in 1837 he initiated a proposal to Congress for a cross-country line of semaphores linking New York with New Orleans, a distance of 1,900km. This was not built, mainly on account of the high cost, but the request did have one unexpected result… One of the objectors to the proposal was Samuel Morse, who took the opportunity to present his own ideas on telegraphic communication to Congress… with far reaching effect, as we all know. This visual system was given up in or about 1859.

A certain Mr. William C. Briggs, a Philadelphia broker, established in 1840 a line between New York and Philadelphia. The reason was to convey stock prices and the drawn numbers of the lotteries by means of coded messages. Morse's telegraph put it out of business some years later.

One of the principal hills in San Francisco is also named "Telegraph Hill", after the semaphore telegraph which was established there in 1849 to signal the arrival of ships into San Francisco Bay. In the years to 1856 several other semaphore lines were built linking Boston, Hull and New York, all providing shipping information for ship owners and traders.

In 1849 the town of San Francisco acquired a semaphore telegraph. It advised clients of the arrival of ships off the Golden Gate. The service was supported by public subscription and seems to have satisfied the community. But the occasional fogs of the Pacific Coast were a drawback which compelled the partners to replace it in 1853 by an electric telegraph over the same route.

8. SEMAPHORE SYSTEMS IN CANADA

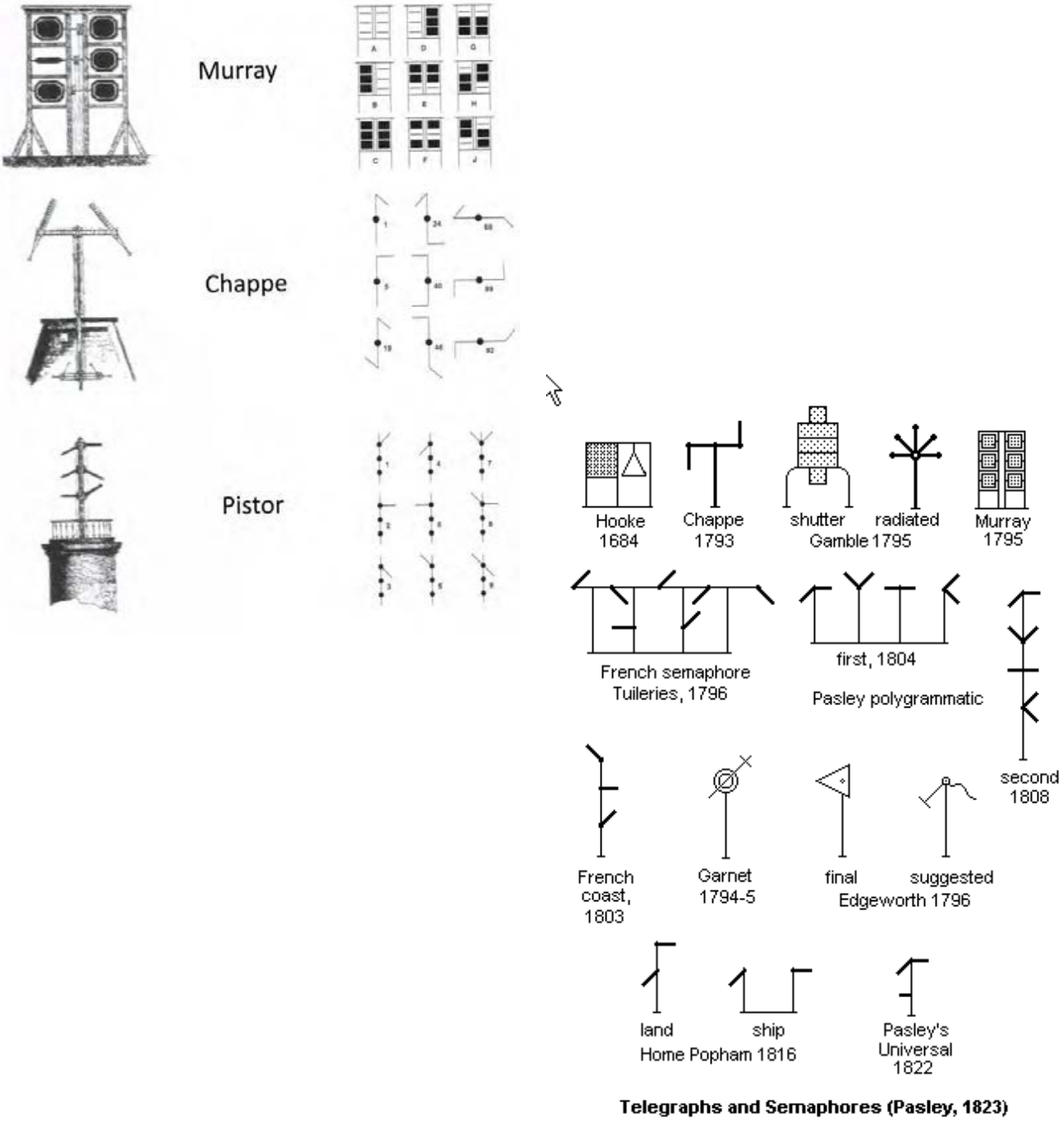
Prince Edward, Duke of Kent, established the first semaphore line in North America. In operation by 1800, it ran between the city of Halifax and the town of Annapolis in Nova Scotia, and across the Bay of Fundy to Saint John and Fredericton in New Brunswick. In addition to providing information on approaching ships, the Duke used the system to relay military commands, especially as they related to troop discipline. The Duke had envisioned the line reaching as far as the British garrison at Quebec City; however, the many hills and coastal fog meant the towers needed to be placed relatively close together to ensure visibility. The labour required to build and continually man so many stations taxed the already stretched-thin British military and there is doubt the New Brunswick line was ever in operation. With the exception of the towers around Halifax harbour, the system was abandoned shortly after the Duke's departure. In 1811 the military decline was complete.

The desirability of sending rapid intelligence of ships in the St. Lawrence River to Quebec City brought the telegraph to Quebec early in the 19th century. A line was established in 1808 between Isle Vert/l'Isle-Verte and the capital, 120 miles, along the South bank of the river. The system used is not known… In 1817, the

stations between Brandy Pots and St. Roch inclusive, and in 1822 between L'Islette and St. Michel, were given up, leaving only Île d'Orléans and Quebec. The St. Lawrence telegraph seems to have lasted until the end of the 1830s, and some closed stations must have reopened.

9. SEMAPHORE SYSTEMS IN OTHER COUNTRIES

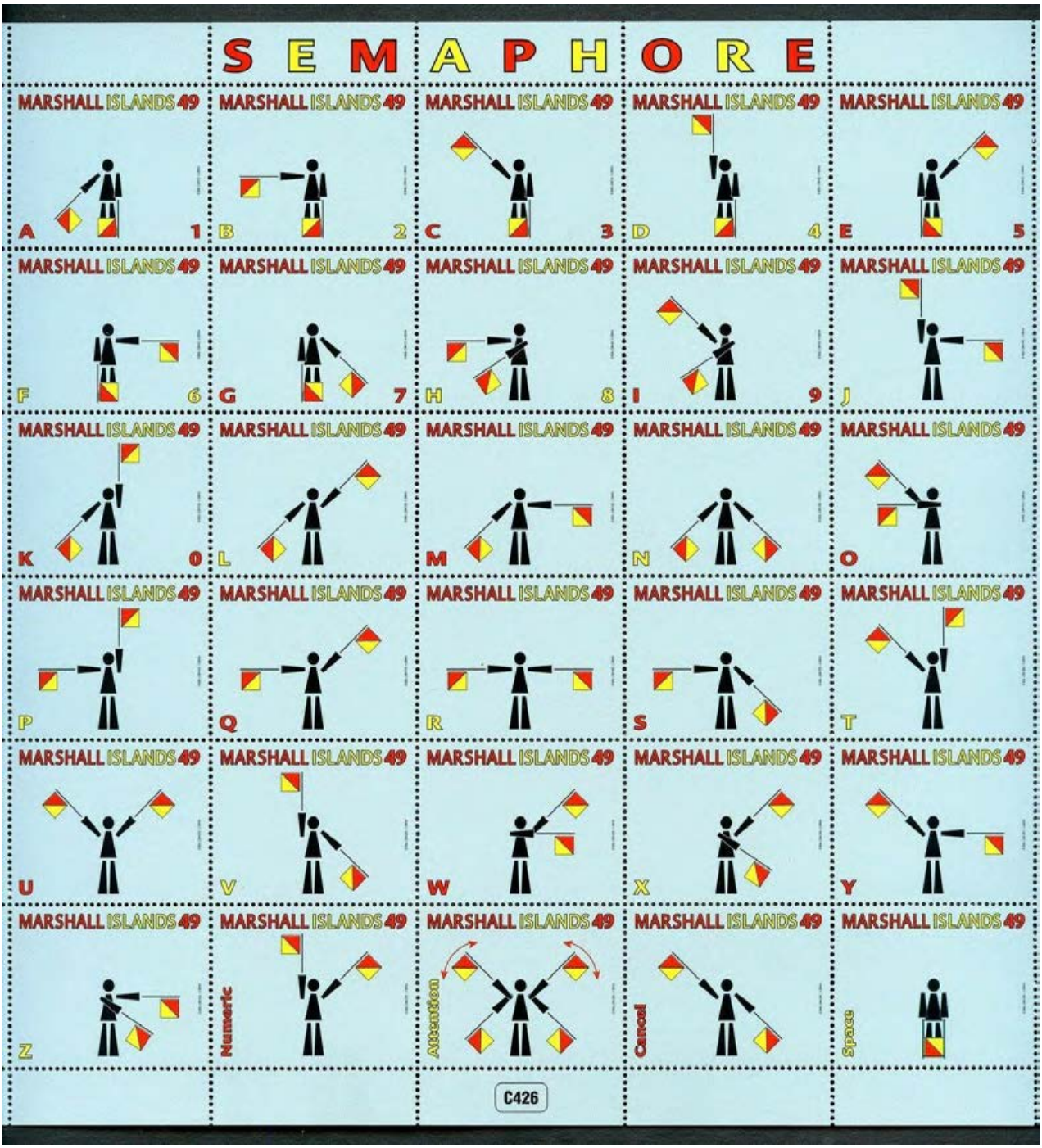
I have to refer readers interested in other countries to [5]



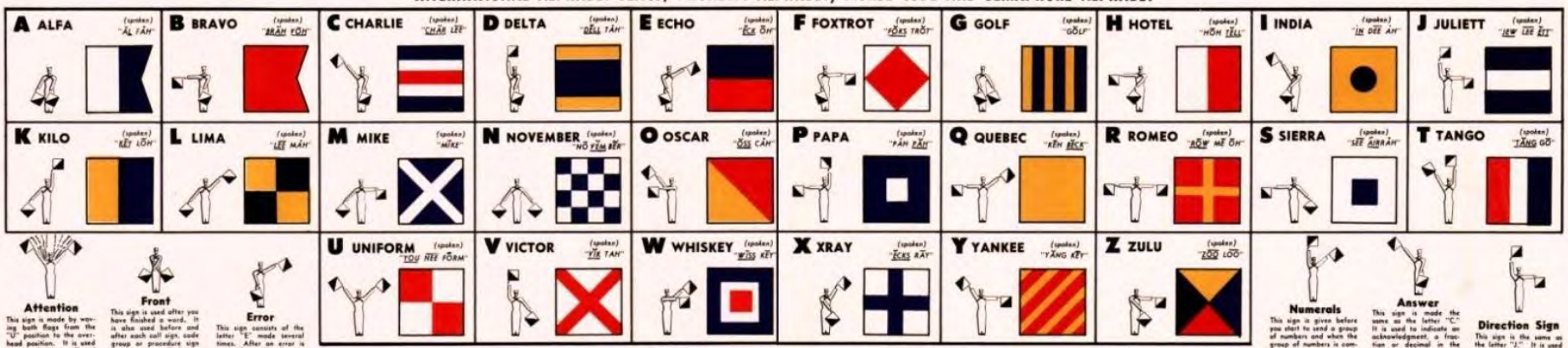
Telegraphs and Semaphores (Pasley, 1823)

10 .FLAG SEMAPHORES

I will limit myself here by only showing two colourful tables.
By the way, the classic semaphore signs below remind me well that I had to learn, as a young boy-scout, those flag positions (together with the Morse code) in order to obtain my ‘badge’ as a ‘signal boy’.

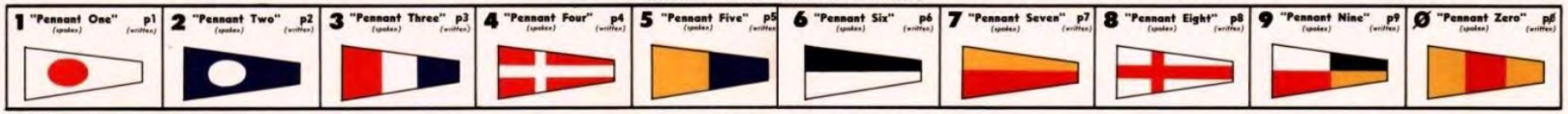


INTERNATIONAL ALPHABET FLAGS, PHONETIC ALPHABET, MORSE CODE AND SEMAPHORE ALPHABET

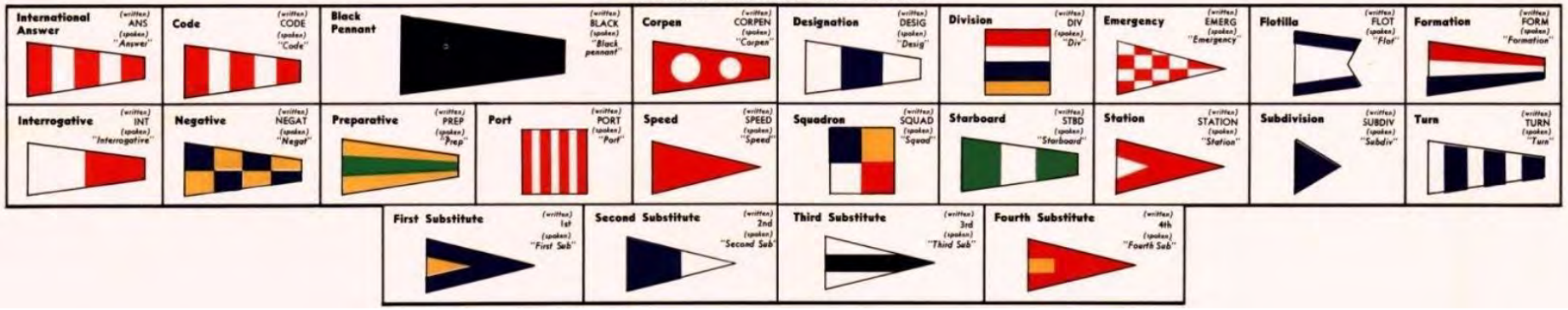


NAVAL NUMERAL FLAGS, PHONETIC NUMERALS AND MORSE CODE

INTERNATIONAL NUMERAL PENNANTS



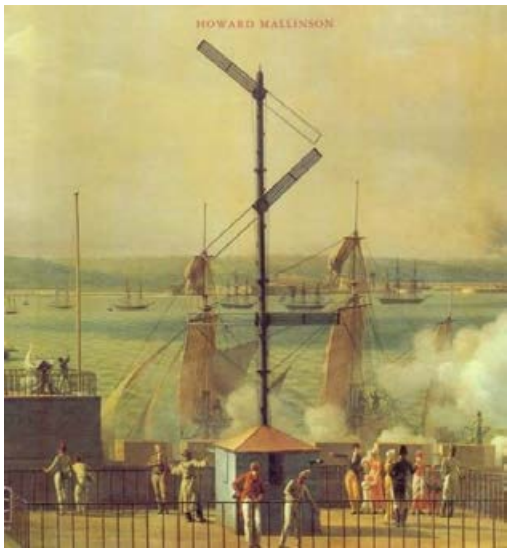
NAVAL SPECIAL FLAGS AND PENNANTS



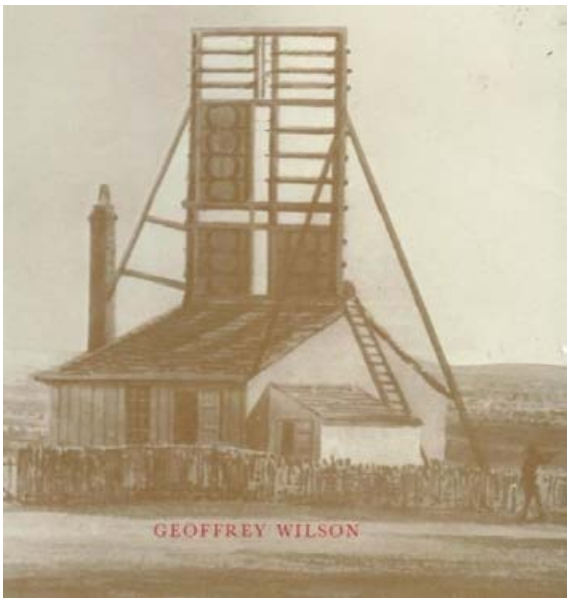
ILLUSTRATIONS

As usual, at the end of each chapter I add a number of illustrations: postcards, stamps, telephone cards, photographs, trading cards, images from books, old images on consumer products,... related to the subject. You can often learn from this... It is amazing that there are so many illustrations related to this telegraph/semaphore, which is in fact quite unknown to the general public.

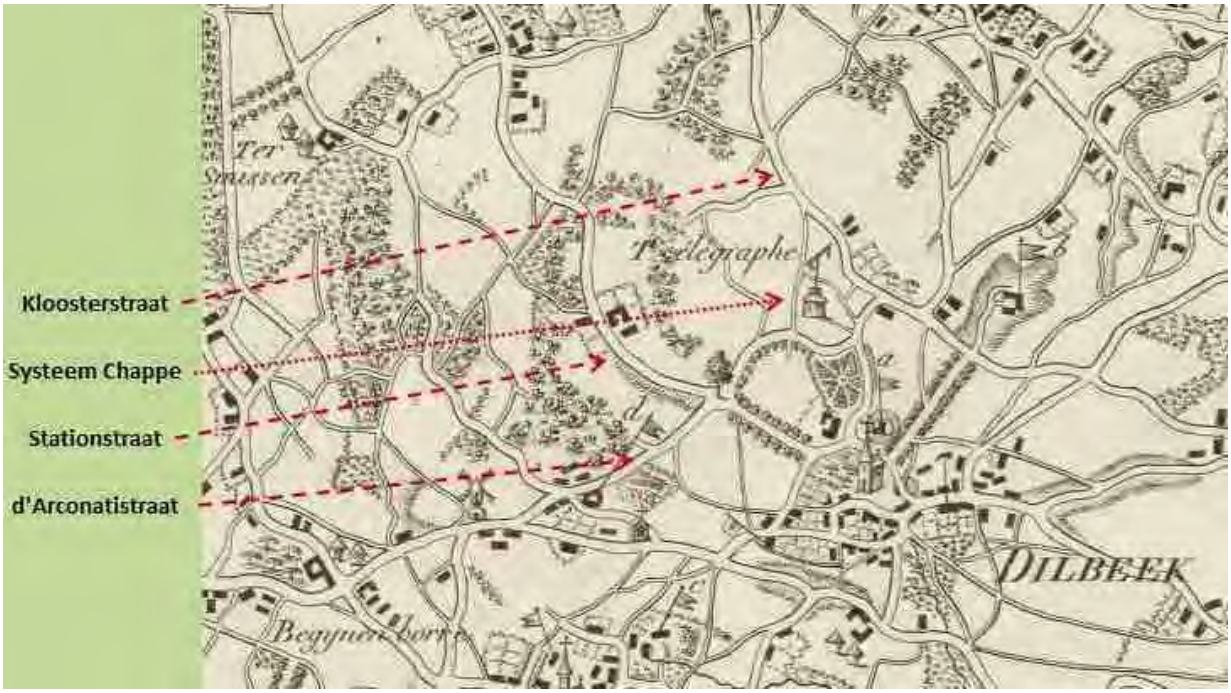
8057 — PARIS (carrefour Bd Raspail St Germain)
Statue de Claude CHAPPE (1763-1805) par *Damé*



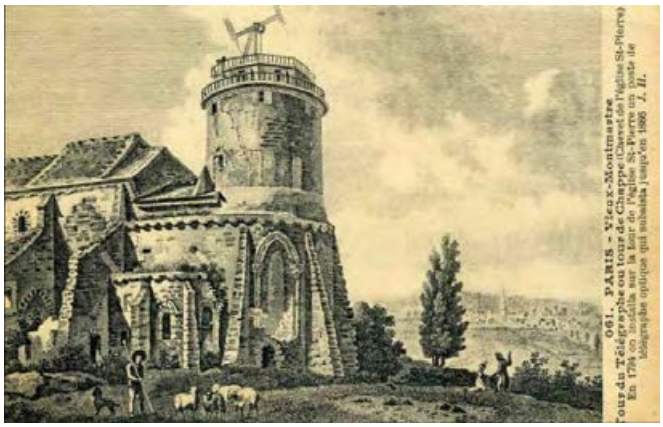
Depillon telegraph in Cherbourg, 1822



Murray telegraph on Dunstable Downs



Location of the Chappe telegraph in DILBEEK (near Brussels)

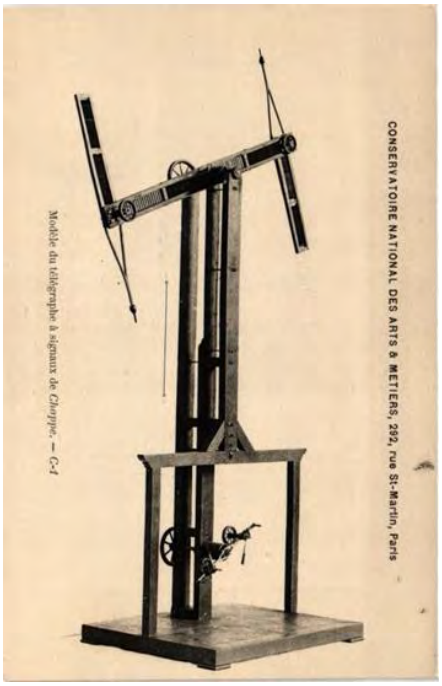


061. PARIS - Vieux-Montmartre
Tour du Télégraphe ou tour de Chappe (Chevet de l'église St-Pierre)
En 1794 on installa sur la tour de l'église St-Pierre un poste de télégraphe optique qui subsista jusqu'en 1866 *J. H.*

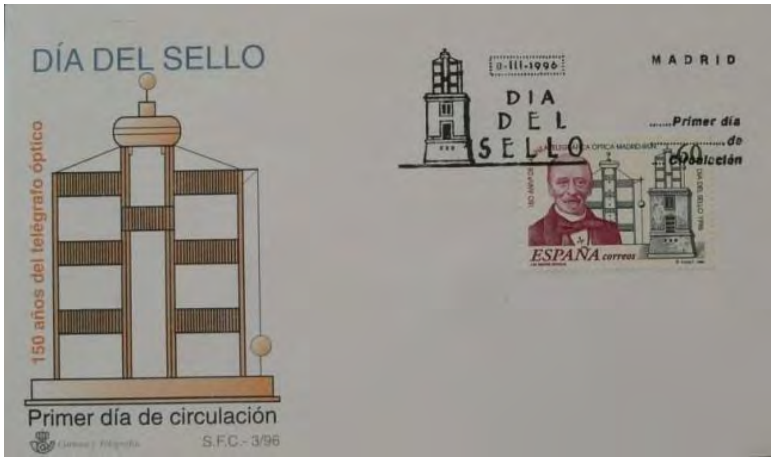

TÉLÉGRAPHE CHAPPE
FIRST DAY COVER
TELEGRAPHE CHAPPE
PREMIER JOUR
30 JUILLET 1993
ST MARTIN DU TERTRE
PREMIER JOUR

Antwerp


BICENTENAIRE DU
PREMIER JOUR
D'ÉMISSION
FIRST DAY COVER
TÉLÉGRAPHE CHAPPE


CONSERVATOIRE NATIONAL DES ARTS & MÉTIERS, 292, rue St-Martin, Paris


MONACO
UIT
0,70
MONACO
1865
UIT
1965
0,50
MONACO
PREMIER JOUR
D'ÉMISSION
FIRST DAY COVER
Centenaire de la Fondation de
l'Union Internationale des Télécommunications


DÍA DEL SELLO
150 años del telégrafo óptico
Primer día de circulación
S.F.C.- 3/96
MADRID
DIA
DEL
SELLO
ESPAÑA correos


MONACO
C.CHAPPE
INGENIEUR FRANÇAIS, CREA
LE TELEGRAPHE AERIEN
QUI FONCTIONNA
EN 1794 .
PREMIER JOUR
D'EMISSION
FIRST DAY COVER
0,70
MONACO
UIT
1865
1965

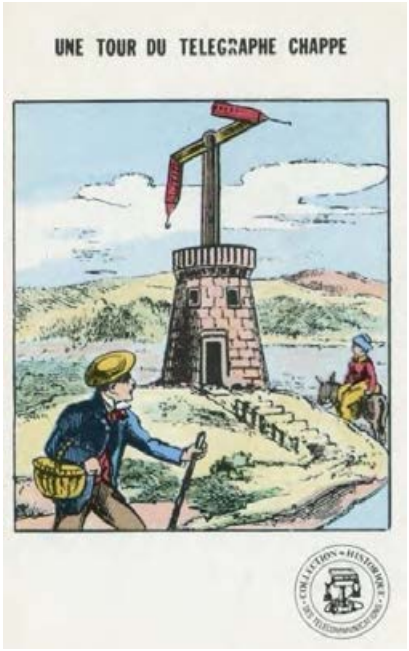

RELAIS TELEGRAPHIQUE DE BARR
1798
LIGNE PARIS-STRASBOURG
0,25
REPUBLIQUE FRANÇAISE


Tag der Briefmarke 1990
Optischer Telegraf von Claude Chappe
Metz – Mainz
29. Mai 1813 Inbetriebnahme der
ersten Telegrafenlinie in Deutschland
500
Jahre Post
Metz - Mainz - Europäische
Nachrichtenlinie
LV Saar · PI 21 50 · Schiffweiler
GEBÜHR BEZAHLT
SCHIFFWEILER
101
28.10.90
6685
45
SCHLOSS RASTATT
Herrn
Nikolaus Jung
Bürgermeister
Am Markt 6
6610 Lebach

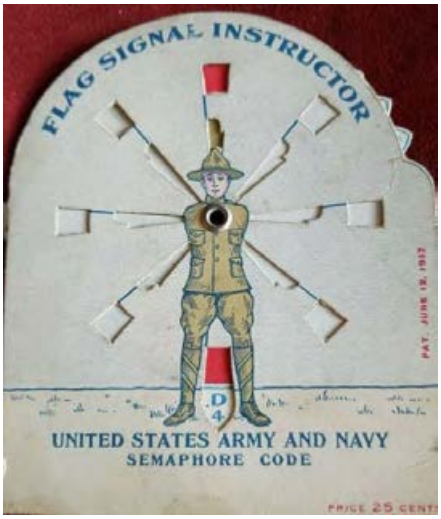

Tag der Briefmarke 1990
500
Jahre Post
1794: Optischer Telegraf von Claude Chappe
Vom Sattel zum Satelliten
Landesverband der Briefmarkensammler
des Saarlandes e.V. im BDPh


REPUBLIQUE GABONAISE
PREMIER JOUR
Bicentenaire de l'invention du télégraphe
PREMIER JOUR D'EMISSION


500
Jahre Post
Metz - Mainz - Europäische
Nachrichtenlinie
LV Saar · PI 21 50 · Schiffweiler
GEBÜHR BEZAHLT
SCHIFFWEILER
101
28.10.90
6685
45
SCHLOSS RASTATT



No, it's not me in this photo, but a good friend of mine: Prof. Emeritus Karel Van Camp from the University of Antwerp



CLAUDE CHAPPE

Claude Chappe, inventeur de la Télégraphie aérienne, naquit à Brulon, (Sarthe), en 1763. En 1792, il soumit à l'Assemblée nationale la description d'un appareil qu'il avait imaginé pour correspondre par signes et qu'il appelait « Télégraphe ». Adopté officiellement, le « *Télégraphe* » rendit les plus grands services, d'abord, aux armées de la République, en 1793, le Gouvernement établit une ligne télégraphique entre Paris et Lille et ce système fut ensuite adopté pour toute la France ainsi que pour l'Angleterre et l'Allemagne. Des envieux ayant contesté à Chappe l'honneur de cette invention, il fut pris d'un tel accès de désespoir qu'il se suicida en se jetant dans un puits, le 23 janvier 1805.

Chappe eût pour collaborateurs ses trois frères, principalement Ignace, ingénieur, qui a laissé une « Histoire de la Télégraphie ».

DIVULGATEURS DE LA SCIENCE. — 4e Série

composée de 10 sujets, édités et mise en relief par la CHOCOLATERIE POULAIN.

Série Encyclopédyque GLUCQ
des Leçons de Choses Illustrées

L'HISTOIRE DU TÉLÉGRAPHE

IMAGERIE D'ÉPINAL N° 3842
PELLERIN & Cie, imp.-édit.

Dans l'antiquité, on transmettait les nouvelles en allumant au sommet des montagnes de grands feux dont on apercevait la fumée pendant le jour et la flamme pendant la nuit.

Ce moyen primitif est encore employé actuellement par les Arabes et les Indiens.

Les Grecs s'en servaient ; et au IIe siècle avant J.-C. Cléomène, puis Polybe, combinèrent les signaux lumineux de manière à former un code.

Ils représentaient chaque lettre de l'alphabet par un groupe de torches qu'on faisait apparaître au-dessus d'un pan de mur.

Les Carthaginois employèrent aussi ce mode de transmission des nouvelles ; et plus tard les Romains, initiés par eux à l'art des signaux, jalonnèrent de ces postes toutes les routes de l'Empire. Dans la conquête de la Gaule, César en fit fréquemment usage et trouva, d'ailleurs, les Gaulois pourvus d'un service de communication analogue.

L'invasion barbare détruisit cette organisation. Aux XVIe et XVIIe siècles, les savants cherchèrent vainement à faire bénéficier la télégraphie des progrès accomplis par les sciences physiques. Toutefois Guillaume Amontons, physicien français, songea à poster de loin en loin des hommes munis de télescopes pour observer des signaux dont la signification n'était connue qu'aux deux postes extrêmes.

Enfin en 1791, Claude Chappe, jeune ingénieur et physicien distingué, après avoir cherché à réaliser un télégraphe électrique par l'application du peu de connaissances qu'on avait alors sur l'électricité, puis un télégraphe acoustique, inventa son ingénieuse machine à bras et proposa aussitôt à l'État ce *système de signaux télégraphiques aériens*.

Le 22 mars 1792, un décret de l'Assemblée reconnut l'utilité du projet de Chappe et l'autorisa à établir son premier appareil à Ménilmontant. On devait, en effet, regarder comme bien précieuse une invention permettant la transmission rapide des ordres du gouvernement aux armées de la République.

Malheureusement le peuple, surpris de ces signaux perpétuels auxquels il ne comprenait naturellement rien, se rua un beau matin sur la machine de Chappe et la mit en pièces. C'est l'éternelle histoire de l'ignorance brutale et bête qui commence par détruire stupidement ce qu'elle ne sait pas comprendre.

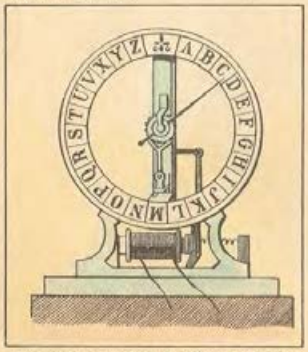
C'est seulement en 1793, sur un rapport favorable de Lakanal à la Convention, que Chappe obtint d'établir de Paris à Lille la première ligne de télégraphie aérienne dont les heureux débuts firent adopter le système avec enthousiasme.

Cette ligne rendit les plus grands services aux armées françaises et, le 1er septembre 1794, Carnot pouvait, à une heure, annoncer à la Convention la prise de Condé sur les Autrichiens, victoire remportée le matin même.

Le télégraphe de Chappe a été employé jusqu'en 1855. Il transmettait à Paris les dépêches de Calais (98 lieues) en trois minutes ; celles de Strasbourg (120 lieues) en six minutes et demie. Sa dernière dépêche fut l'annonce de la prise de Sébastopol (9 sept. 1855)

La télégraphie électrique est une conséquence de l'invention de l'*électro-aimant*. On appelle ainsi un barreau de fer doux entouré d'un grand nombre de spires de fil métallique isolé. Si on fait passer un courant dans ce fil, le barreau de fer acquiert immédiatement les propriétés de l'aimant et les conserve aussi longtemps que dure le courant.

Le premier électro-aimant puissant a été construit en 1831 par Pouillet. Il se composait d'un morceau de fer doux, courbé en fer à cheval, autour duquel circulait le courant. Dès que ce dernier cessait, l'aimantation cessait aussi, de sorte qu'on pouvait ainsi aimanter et désaimanter le fer un nombre infini de fois dans une seconde.



Les différents appareils de télégraphie utilisent tous cette propriété du fer doux. Dans le télégraphe à cadran, l'électro-aimant du poste récepteur attire à lui, à chaque passage du courant, un petit ressort dont le mouvement fait déplacer une aiguille sur un cadran présentant imprimées les lettres de l'alphabet.

Dans le télégraphe **Morse**, le récepteur se compose essentiellement d'un électro-aimant devant lequel est placé un levier en fer doux mobile autour d'un point. Quand le courant passe, l'une des extrémités du levier est attirée par l'électro-aimant tandis que l'autre appuie, contre une molette chargée d'encre d'imprimerie, une bande de papier sans fin qui se déroule d'une façon continue. La molette imprime sur cette bande un trait ou un point suivant le temps plus ou moins long pendant lequel passe le courant. Morse a combiné ces traits et ces points de façon à former un alphabet complet, de sorte que, la transmission terminée, l'employé n'a plus qu'à traduire en langage ordinaire les signes conventionnels imprimés sur la bande de papier.

L'emploi de l'électricité a permis, à raison de son mode de propagation, de transmettre les signaux instantanément par tous les temps et même pendant la nuit. Il n'est pas nécessaire pour cela d'employer des appareils puissants, puisqu'une très petite pile suffirait pour envoyer une dépêche d'Europe en Amérique.

BIBLIOGRAPHY

FNARH

The best source to find information about Chappe and his semaphore is the French association 'FNARH'.
FNARH is the abbreviation of, hold your breath, « Fédération Nationale des Associations de personnel de La Poste et de France Télécom pour la Recherche Historique ». Or in English: "National Federation of the Staff Associations of La Poste and France Telecom for Historical Research".
Not being a member of that staff, I was able to join it at the beginning of the 1990s. Over the years, as a sign of gratitude, I have published several contributions in the twice-yearly magazine “Les Cahiers de la FNARH”.
Each year, this federation organises a conference on one of the themes that fits with the research. And this has often been about Chappe. I attended some of them. The lectures are then bundled together in the 'Cahiers' and in addition there are occasionally also separate books published.
The first book I mention below in the bibliography is a very extensive, high quality and very interesting source. Several eminent FNARH members have contributed to it after having carried out in-depth scientific research for this purpose. It was published in 1993, exact 200 years after the transmission of the first message over a Chappe telegraph line. I highly recommend it to those who want to get to know the theme into the last detail; however there is only this French-language edition.
As a tribute to those eminent writers (that I had the honour to meet several times, about 25 years ago), I am passing on here some of their names. As you can see, several have passed away at the time I am writing this (2019): Paul Charbon(+), Gérard Contant(+), Yves Lecouturier, Etienne-Pierre Lhospital(+), Erik Ludwig(+), Michel Ollivier(+), Claude Perardel, Guy De Saint Denis, Michel Siméon, Jean-Pierre Volatron, They deserve my deep respect.

[1] LA TÉLÉGRAPHIE CHAPPE - FNARH - edited by Guy De Saint Denis - 1993 - 441 p.

[2] BICENTENAIRE DU TÉLÉGRAPHE CHAPPE - Actes du 8ème Colloque - 1993 - 261 p.

[3] LA FAMILLE CHAPPE –FNARH - 1991 – 45 p.

- Then I have two excellent books in English:

[4] SEND IT BY SEMAPHORE - Howard MALLINSON - 2005 - 240 p

[5] THE OLD TELEGRAPHS - Geoffrey WILSON - 1975 - 252 p.

- Other books dedicated to Chappe / Semaphore:

[6] THE EARLY HISTORY OF DATA NETWORKS - Gerard J. Holzmann & Björn Pehrson - 1994 - 304p.

[7] LA TÉLÉGRAPHIE HISTORIQUE - Alexis BELLOC -1888 - 343 p.(French)

[8] EEN TIJDING MET DE SNELHEID DES BLIKSEMS - Rob KORVING, BART VAN DER HERTEN e.a. - 1997 – 105p. (Dutch)

[9] OPTISK TELEGRAPH - Paul G HEURGREN - 1932 - 48 p (Swedish)

[10] CLAUDE CHAPPE ET LE TÉLÉGRAPHE– Aimé LEPVRAUD – 1970 – 24 p. (French)

- Books with interesting chapters on semaphores (there are many, many more)

[11] DIE GROSSEN ERFINDUNGEN > NACHRICHTENTECHNIK - Roland GÖÖCK - 1988 - 286p (German)

[12] HISTORY OF TELEGRAPHY - Ken BEAUCHAMP - 2001 413p (French)

[13] SEMAPHORE TO SHORT WAVES - Edt. by Frank JAMES Proceedings of a RSA Conference 1996 - 167 p

[14]FROM SEMAPHORE TO SATELLITE - Antony MICHAELIS – Celebration of the Centenary of the I.T.U. - 343 p

[15] THE EARLY HISTORY OF DATA NETWORKS - Gerard J. HOLZMANN & Björn PEHRSON - 1994 - 304p.

[16] TÉLÉGRAPHES & TÉLÉPHONES - Catherine BERTHO - 1981 - 541 p (French)

[17] AU FIL DE L'HISTOIRE - Musée des Télécommunications de Lyon - 1995 – 24p (French)

[18] THE VICTORIAN INTERNET - Tom STANDAGE -1998 - 216 p

[19] THE TELEGRAPH MANUAL - PART 1 - T.P. SHAFFNER - 1859 replica - 2003 - 468 p.

[20] UN SIECLE DE TÉLÉCOMMUNICATIONS EN SUISSE - Direction des PTT - 1952 - 324 p. (French)

[21] LES MERVEILLES DE LA SCIENCE - FIGUIER - 284 p. (French)

WEBOGRAPHY

As always, there is a lot of information about the subject that one can easily find, in different languages, on the internet. Here are just a few examples of useful sites:

https://www.britannica.com/biography/Claude-Chappe#ref109197

https://www.britannica.com/technology/semaphore

https://en.wikipedia.org/wiki/Semaphore_telegraph

https://en.wikipedia.org/wiki/Flag_semaphore

https://en.wikipedia.org/wiki/Prussian_semaphore_system
https://en.wikipedia.org/wiki/Heliograph

https://en.wikipedia.org/wiki/Signal_lamp

https://en.wikipedia.org/wiki/Signalling_block_system

And many more!

THANK YOU!

Mr. Nigel HOULT, PhD in Electronic Eng., radio amateur and collector of very early vintage radios, for having corrected my "Flemish English".

Mr. **Bruno STROOBANTS**, a retired RTT employee, who provided me with some interesting illustrations.

*****