The Landmark Trust

SEMAPHORE TOWER

History Album

Rear Admiral Sir Home Riggs Popham's memorial at St Michael's, Sunninghill, commemorating his signalling expertise.

Caroline Stanford

March 2021

The Landmark Trust Shottesbrooke Maidenhead Berkshire SL6 3SW
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BASIC DETAILS

Built	**1820-2, restored by Surrey County Council and Surrey Historic Buildings Trust after fire in 1989, further restored by Landmark in 2020.**
Responsible for construction	**Thomas Goddard, surveyor**
Listing	**Grade II***
Landmark tenure	**Long lease from Surrey County Council**
Opened as a Landmark	**February 2021**
Restoration architect	**Louise Bainbridge of Seymour & Bainbridge**
Landmark Surveyor	**Richard Burton**
Contractors	**Valley Builders of East Grinstead**
Mast restoration	**Ian Clark Restoration of Winchester**

Acknowledgments

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We are hugely grateful to the 1,152 supporters who gave so generously to make the restoration of Semaphore Tower possible. They include:

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In memory of Mr P Harris

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Dr R & Mrs E Jurd made a donation towards the cost of the Landmark library books. The library also contains books bequeathed by the late Dr Patricia Crimmin, a naval historian who specialised in the Regency period.

We thank all who have supported the appeal, including other Guardians, Patrons and trusts, and those have chosen to remain anonymous.

Thank you!

Research acknowledgements

The documentary research of Brian Lavery and of John & Beryl Skelly contributed greatly to our understanding of the tower and its history. Thanks also to Captain Nick Kettlewell RN for his input.

Rear Admiral Sir Home Riggs Popham (1762-1820), inventor of the Popham semaphore.

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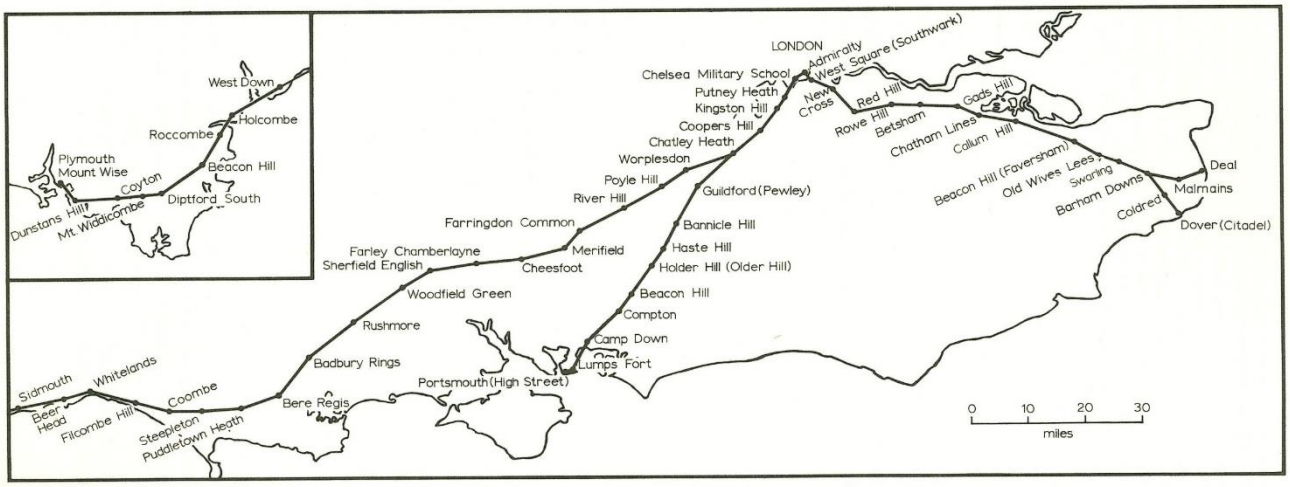
The Chatley Heath Semaphore Tower in its setting, looking northeast to London.



The Admiralty semaphore lines, actual and projected.

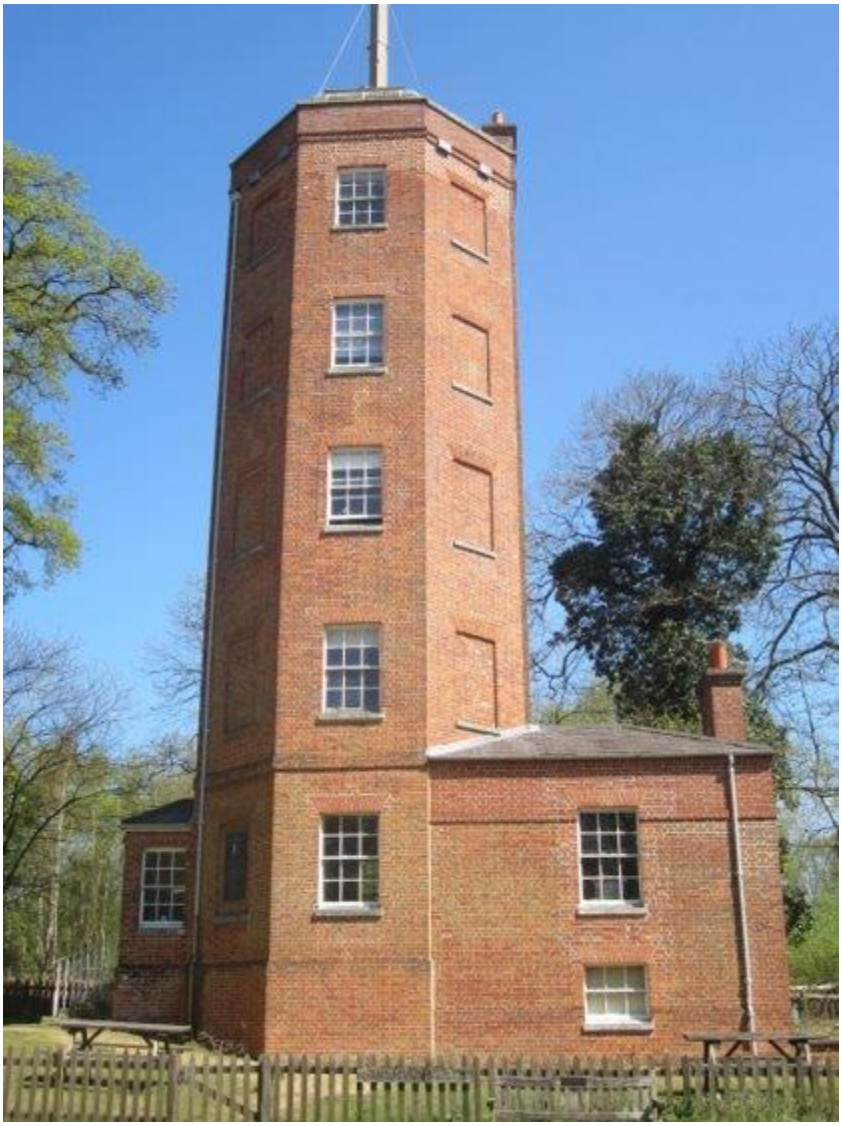
Summary

The Semaphore Tower standing on ancient Chatley Heath is the last surviving tower semaphore station in the country. This unique remnant from the Napoleonic era was once a vital link in a signalling chain that transmitted messages from Admiralty House in London to Portsmouth Docks in a matter of minutes. The construction of the line was ordered in 1816 in the aftermath of the Battle of Waterloo, when foreign invasion still seemed a real possibility. For over 20 years the affairs of the Royal Navy passed back and forth along this line, relaying orders to the fleet and reporting the movements of friend and foe alike. When it was built, its semaphore system was state-of-the-art. If things had turned out differently – if there had been another war with France, if England had been invaded – this tower on Chatley Heath would have played a key role in a great naval conflict. As it turned out, peace reigned during its period of active service, until its mechanical signalling was superseded by the arrival of the electric telegraph in the 1830s.

Historically, long-range military communication was a real challenge: simple hilltop beacons signalled the arrival of the Spanish Armada in 1588. As naval warfare developed across the centuries, more sophisticated signalling systems were invented using flags or moving balls, but these were slow and unreliable. Semaphore was the solution; moveable arms on a mast that signalled letters of the alphabet. The French invented the first semaphore system to use 'arms' in 1794, but the British preferred to devise their own signalling methods. The first British coastal stations in the 1790s used either flags and balls, or shutters in a frame for land-based signal stations, but none were efficient in bad weather.

The British semaphore was devised by Rear Admiral Sir Home Riggs Popham, who had long been fascinated by signalling. In 1800, Popham devised his own telegraphic code for flags, famously used by Nelson to declare 'England expects that every man will do his duty.' In 1813, he devised a semaphore with wooden arms for ship-to-ship signalling. This was easier to operate than the shutter system, and the Navy began to use it on land, the signalling masts mounted on the roofs of existing buildings or specially built signal stations. Yet in 1814, with Napoleon apparently safely confined on Elba, the Admiralty decommissioned all their signal stations. Napoleon's escape and the 'damn nearest run thing' at the Battle of Waterloo soon made them realise this optimism was mistaken. Just eleven days after the Battle of Waterloo in 1815, an Act was passed to acquire land for a new chain of signal systems, this time using Popham's semaphore.

Naval surveyor Thomas Goddard was instructed to survey and acquire sites for a line of fourteen semaphore masts to cover the 75 miles between Admiralty House in Whitehall and the naval base at Portsmouth. Only the Chatley Heath mast required a five-storey tower, for visibility over seven miles to its two neighbours, Claygate to the NE and Pewley Hill to the SW.



The Semaphore Tower, completed in 1822 (before restoration).

Most other stations were little more than one or two storey blocks. In 1822, on its completion, Chatley Heath was also chosen as the junction for another line to lead to Plymouth, although this line was never completed. The tower and the accommodation block at its base were well-built by the Navy's contractors of light red brick with fine penny-struck pointing, an octagonal tower being easier to build than a round one. The alternate windows were always blind, no doubt a measure to save costs (government buildings were exempt from window tax so this did not apply). Erecting the 40-foot mast and the chains to operate the arms proved a challenge even for the naval engineers of Chatham Dockyard, but the mast was fully operational by 1822.

The stations were lived in and operated by Royal Naval lieutenants who were close to retirement and had fallen on hard times. They worked with one or two retired ratings who found themselves similarly down on their luck. At Chatley Heath, the men stood for long hours at the first floor windows, telescopes trained on the stations to either side for messages passing up or down the line. On a clear day and when everyone was on their toes, a message could be relayed to, or from, Portsmouth in fifteen minutes. By 1830, however, the railways were coming, and with them the electric telegraph: messages could pass down the wire instantaneously. In 1847, the semaphore lines were decommissioned. Heath wardens and gamekeepers lived in the tower until 1963, when the lack of modern services made it no longer habitable. Left empty, it suffered vandalism and then was gutted in a major fire in 1984. In 1988, Surrey County Council carried out a full restoration to mark the 100th anniversary of their founding under the Local Government Act of 1888, with the help of Surrey Historic Buildings Trust. Water and electricity were brought in and the tower was let residentially. Its care passed to the Surrey Wildlife Trust, which manages the Chatley Heath Site of Special Scientific Interest around the tower. However, the detailing of the tower in this exposed site had been a problem in both original and restored forms. 30 years on, water ingress at the base of the mast and around the windows was again causing problems beyond the SWT's remit or resources.

The Landmark Trust was called in as a specialist organisation that could also provide a new use for the tower to pay for its future maintenance. The tower was completely re-wired and –plumbed, and the roof re-leaded. Windows were repaired and replaced where necessary, and a new kitchen and bathrooms were created. The mast and its arms (which can still be operated for open days etc. but are kept fixed in between) has been completely overhauled and repainted its original red oxide colour. The stairs and chimney pieces date to the 1988 restoration: as they are entirely in keeping with the original period, we have kept them. The tower's early residents endured an often lonely existence with frequent complaints to the Admiralty about the state of their accommodation. Today, the tower's solitude in the woods is something to be sought out, and, we hope, its rooms a cosy place for a few days' retreat musing on the days when the semaphore arms clacked daily overhead.

The Lords of the Admiralty met in the splendid Board Room at Admiralty House on Whitehall, from where orders were issued for, and reports received from, the signal lines. The large dial is connected to a weather vane on the roof and indicates the prevailing wind. It continues to do so today.
(Rudolf Ackermann, *Microcosm of London*, 1810).

A Brief History of Signalling

Definitions:

A *telegraph* is a means of sending messages over some distance, whether visual or, in due course, electrical.

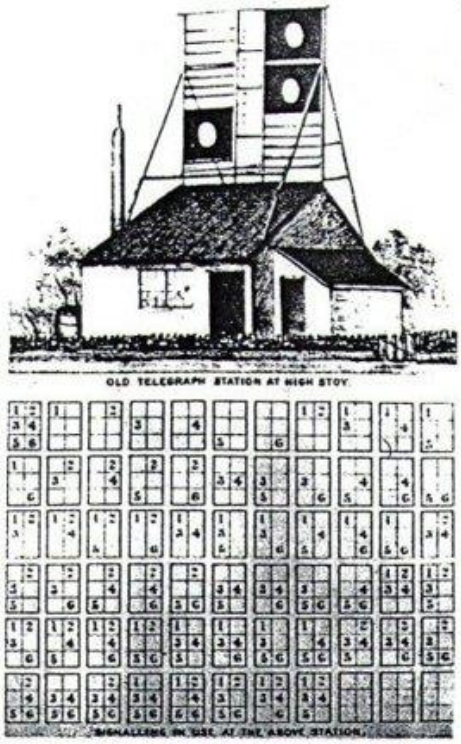
Semaphore is a system of telegraphy which uses moveable arms, whether human or artificial, to convey numbers or letters. In other words, a semaphore is one type of telegraph, and the two terms are often used interchangeably for a semaphore system, but not all telegraph systems use semaphore.

Naval Administration

To set the scene, the various bodies of naval administration are worth brief decription. In the Regency period (1795-1837), with which we are initially concerned, the navy was headed by the Board of Admiralty, except for a period in the late 1820s when the Duke of Clarence (the future King William IV) resumed the duties of Lord High Admiral, which were usually put 'in commission' to the Board. The Admiralty Board was made up of a mixture of politicians and naval officers, with civil service support in the form of secretaries (J. W. Croker and Sir John Barrow for most of this period) and clerks. Naval strategy was usually a matter for the Cabinet under the Prime Minister, while the Admiralty provided the ships and commanding officers to execute that strategy, as well as deciding on general naval policy. The Board was based in Admiralty House in Whitehall. It was the principal user of the semaphore telegraph, and the line began with a mast on the roof of (Old) Admiralty House.

The Admiralty initiated the work on the telegraph and had supervision of it. The Navy Board was subordinate to the Admiralty and met at Somerset House. It was responsible for the more technical and administrative matters such as

the Royal Dockyards, shipbuilding and naval stores, and finance. It took responsibility for building and maintaining the semaphore stations.



High Stoy with revised code. 1806.

Shutter Telegraph, showing 13 (fourth man is out of picture).

Above and below :

Illustration from a Cable and Wireless Advertisement.

Four men, two glass men, two on ropes

Earlier British signal systems in the Napoleonic Wars used shutters or suspended balls or flags.

The Navy Board was abolished in 1832, when its duties were merged with the Admiralty (and then reinstated in 1964 as part of the new Ministry of Defence).

Each dockyard, including Portsmouth, was administered by the various officers of the yard, who reported to the Navy Board. However, the telegraph was intended mainly to communicate with the port admiral, the Commander-In-Chief, Portsmouth, who was in charge of all commissioned naval ships in the area and of naval personnel, with a certain amount of responsibility for local defence. He usually had his headquarters ('flew his flag') from a ship moored in the harbour or just outside at Spithead.

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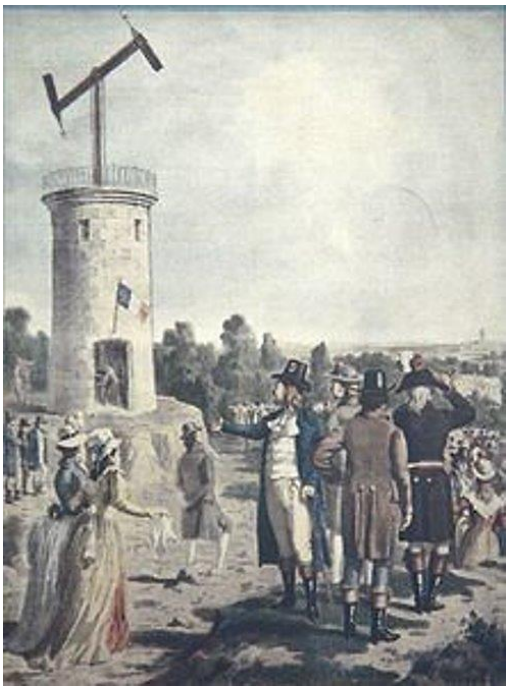
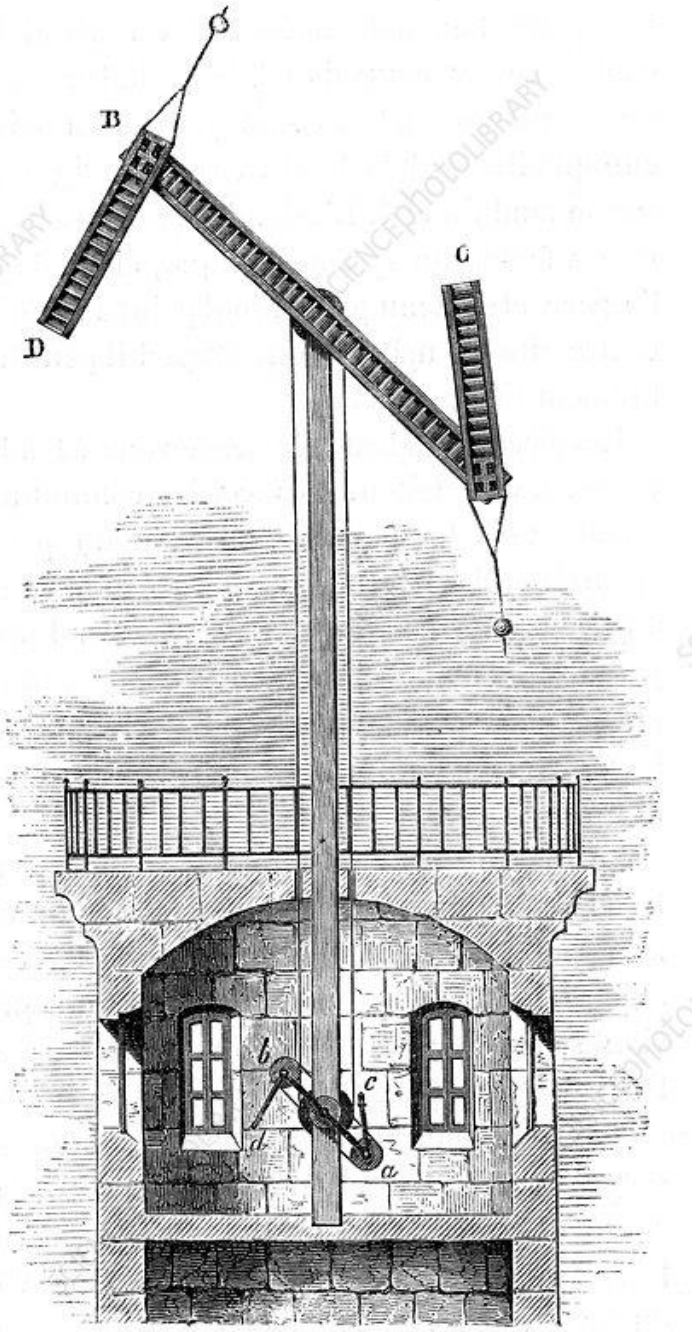
Today, we take instantaneous communications for granted. It is easy to forget that the phenomenon has only existed for two hundred years of so, and voice to voice communication for even less. We forget that it took all of three days and two hours for word of Wellington's victory at Waterloo to travel the 250 miles from Belgium to London in a form that people could rely upon.

While always a challenge, the need for effective long-range communication took on even greater urgency in time of war, when it became a literal matter of life and death. For centuries, military communication on the battlefield, was limited to despatch riders in the poor visibility and smoke of battle. Long range alarm was raised simply by church bells or chains of simple hilltop beacons, as in 1588 to signal the arrival of the Spanish Armada. And there was equally a need for more mundane communications, between London headquarters and the principal naval yards, fleet bases and anchorages.

From the late eighteenth century, many telegraph systems were devised, as the Napoleonic Wars brought the challenges of effective communication sharply to the fore. Some telegraphs used flags, others systems of balls or shutters, raised, opened or closed in different combinations to signify the coded messages. None were very effective in conditions of poor visibility.





The first semaphore system was Frenchman Claude Chappe's, first demonstrated in 1792. The British were disconcerted by its speed and efficiency, but chose to stick with their own signalling methods for another ten years.

The Chappe semaphore

A breakthrough came in 1792, when a French inventor called Claude Chappe developed a T-shaped semaphore system, a stout mast 18 feet high with a crossbeam pivoted in the centre at the top. At each end was a short arm that pivoted through 180 degrees. Crossbeam and arms together could form 196 separate signals. It proved highly effective and easy to read, and in no time the French had lines running from Paris to Lille, and east/west Strasbourg to Brest, with others later connecting Boulogne, Lyons and even Turin, Milan and Venice as Napoleon conquered more territories. It was claimed Chappe's system could transmit a sentence over 100 miles in five minutes, something reported with alarm in the London newspapers as war broke out with revolutionary and later imperial France. By its very visual prominence, the Chappe system could hardly be kept secret. Its significance was immediately recognised by military and naval commanders alike, although it was the naval men who took the lead in devising the British systems.

Despite the self-evident success of the French system, the Admiralty decided to stick with more familiar forms of signals.

The Shutter Telegraph

In 1795 the Admiralty set up a system of coastal signal stations on headlands. The officers in charge used flags and balls to communicate with naval and merchant ships at sea, warning them of enemy movements. The following year a separate system was set up transmitting signals down a chain of stations to the dockyard ports. The line used a system devised by the Reverend Lord George Murray, son of the Duke of Atholl. It consisted of a frame holding six shutters mounted in pairs in a frame. Each three foot square shutter could be opened or closed to signal individual letters of the alphabet. As well as the line from London to Portsmouth and the Spithead Anchorage, by the end of 1796 other lines had been set up on so-called Telegraph Hills to Plymouth, Chatham, Deal and, by 1808, all the way Great Yarmouth.

The system performed fairly effectively, and it was recorded that in good conditions, a simple message could be sent from London to Portsmouth in 7½ minutes. However, as well as the obvious problems of visibility in fog and rain, the shutter system was much affected by high winds. In 1810, the shutters on the Yarmouth line were found to be unmanageable and it must have been heavy work to move them. The system was regarded as a temporary measure during wartime. Nevertheless, it continued in use until 1814 when, after Napoleon's abdication and the Peace of Paris, the Admiralty, with misguided confidence, ordered the line to be dismantled.

At sea, of course, different methods were needed, and the ships of Nelson's fleet used primarily flags and pennants to communicate ship-to-ship and ship-to-shore. However, this was obviously ineffectual when conditions were still, and the flags hung limp.

And now we must meet the hero of the story of Chatley Heath Semaphore Tower, in the form of Sir Home Riggs Popham, a career naval officer and one of the 'wayward geniuses' of Nelson's navy. A fuller biographical sketch of the colourful figure can be found later in this album, and here we will consider only his contributions to signalling.

Naval officers often found themselves with time on their hands while at sea, and Popham put his idle hours to good use. Becalmed off Copenhagen in August 1800 he developed a word vocabulary which he had privately printed in 1799 as *Telegraphic Signals or Marine Vocabulary*, further revised in 1803,1813 and 1816. This allowed individual letters, words and common phrases to be encapsulated in a single signal rather than being spelt out letter by letter, a practical solution for a practical need – now a commander could say exactly what he meant rather than being constrained to single-meaning, prearranged signals.

As Popham himself put it:

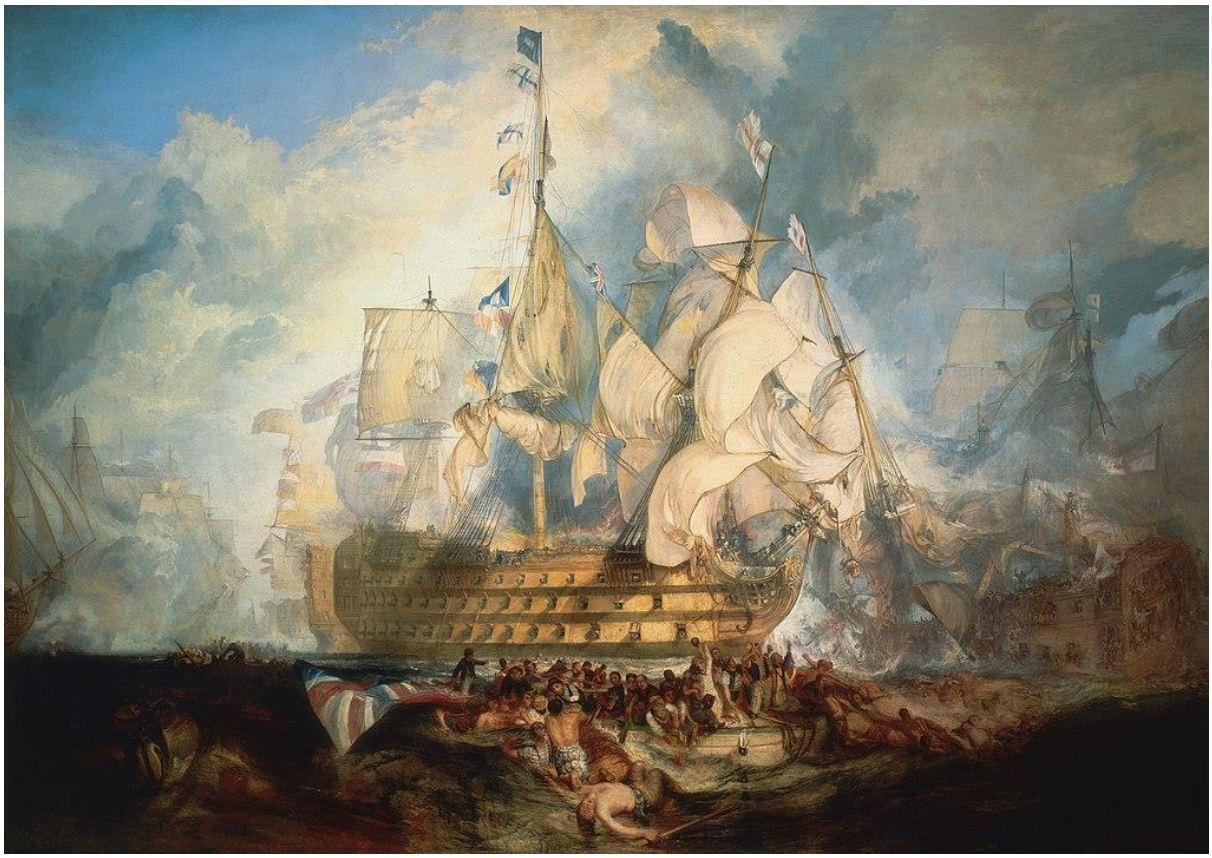
> 'It is by no means intended to interfere with the established signals, as a single signal is certainly the most efficient for military evolutions. It frequently however happens that officers wish to make communications of very essential moment far beyond the capacity of established signals and it is presumed that this Vocabulary will afford such convenience.'

Popham's code allowed a more conversational style of communication than the previously abrupt commands or reports. An expanded version of the Marine Vocabulary was printed in 1803 and issued officially to the Navy in 1805, replacing the more limited *Fighting Instructions* previously in use. Popham's code supplemented rather than supplanted the official Signal Book for the Ships of War. He improved it in successive editions—at his own expense—over the next twelve years, and it was widely used, but it was not accepted officially by the Admiralty until 1812. The definitive edition appeared in 1816 and Popham's system continued in use for as long as communication by flag was used, indeed evolving through Fleet Signal Books to the Allied Naval Signal Book used by NATO and Allies to this day.

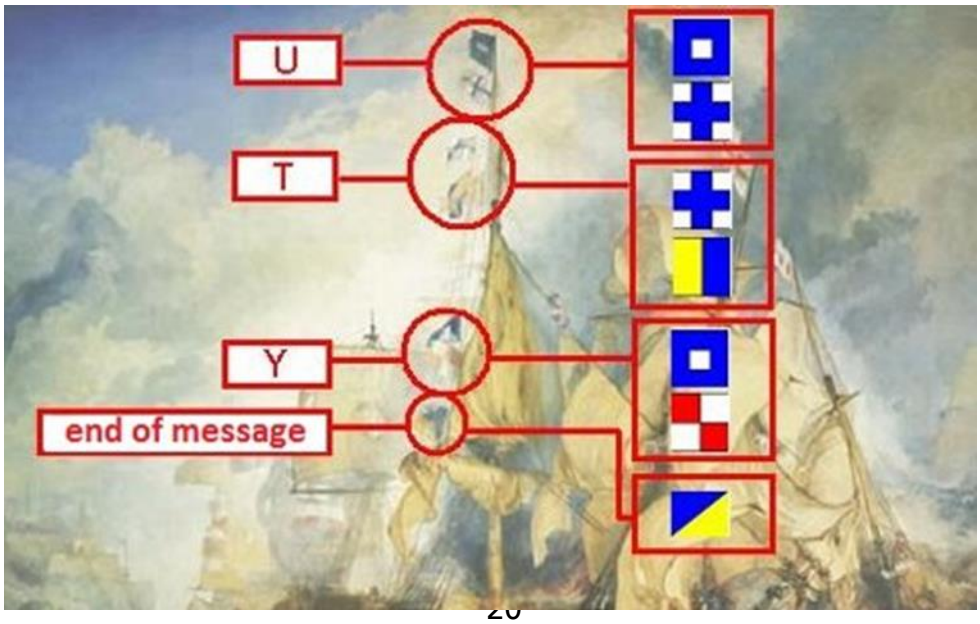
Nelson was a great fan of the Popham code and his use of it at the Battle of Trafalgar gave him a tactical edge. However, even he had to resort to the 'nearest synonymous word' in his famous message that 'England expects that every man will do his duty.' Nelson originally wanted to say the less insistent 'England confides [i.e. is confident] that every man will do his duty.' In fact, we owe the final version of this memorable exhortation to John Pasco, Signal Officer aboard the *Victory*, who had to make the substitution on the spur of the moment as he consulted a copy of the vocabulary book and found no signal for 'confides.' Even so, thirty-one flags had to be extracted from the *Victory's* lockers and hoisted aloft and in sequence, and all as the fleet bore down on the enemy and were about to come under fire.

Nelson's brilliant improvisation at the Battle of the Nile and his minute planning of an unusual mode of attack as at Trafalgar and Copenhagen were

both enabled by Popham's new *Vocabulary*, its contribution judged by naval historians as 'truly momentous'.



'England expects [substituting for Nelson's 'confides'] that every man will do his duty' – Popham's telegraphic flag code was used for Nelson's message at the start of the Battle of Trafalgar in 1805, as accurately imagined here by J M W Turner. It was still a laborious system. The Telegraph flag is used to indicate that a sequence of hoists constituted one message and is hauled down on completion



On land, the shutter system persisted throughout the war. When in spring 1814 Napoleon abdicated, was imprisoned on Elba and the Peace of Paris was signed, in the euphoria of the moment the authorities ordered the telegraph system be dismantled. A year later, they realised their mistake. Napoleon escaped from Elba, sailed to France and marched north to Paris, gathering an army as he went. The final denouement of the Napoleonic Wars was of course fought on land at Waterloo rather than at sea, and that was 'a damned nice thing — the nearest run thing you ever saw in your life', as the Duke of Wellington pithily put it.

Waterloo ended the immediate threat to national security, but the need to remain prepared against every eventuality was clear. On 29 June 1815, just eleven days after Waterloo, an Act of Parliament was passed to allow the Admiralty to acquire land

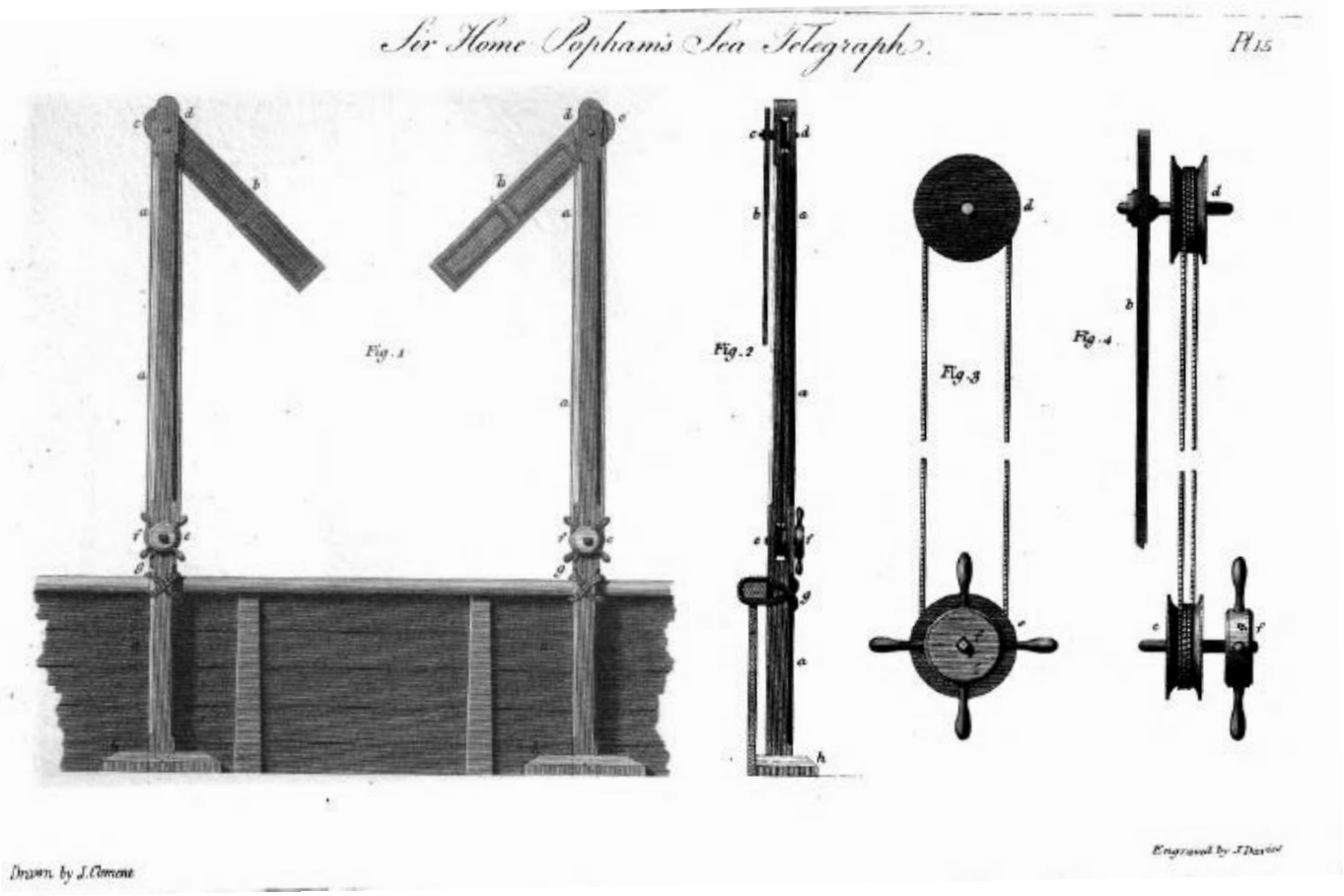
> '… for the purposes of signal or telegraph stations, and of making, preserving, and maintaining a free and uninterrupted communication between the respective signals or telegraphs erected or to be erected thereon, and of preventing and removing any obstructions thereto, either by buildings, trees, or in any other manner. Together also with all necessary ways unto and from the same. '

The new stations were to use the Popham semaphore. In extremis, the land could be acquired by compulsory purchase, although in the event these powers were not exercised.

Over the past few years, many ingenious ideas and devices for improved communications had been put forward. Colonel Pasley of the Royal Engineers also proposed a two-arm system, but Popham's won out. Popham was one the Admiralty's own (by now he was a commodore) whose reputation for signalling nous no doubt travelled before him. He was also by now an MP, and well-connected, for all his chequered past.

Popham's semaphore began its existence as a sea semaphore for use on board ships, a solution to the difficulty of signalling with flags when becalmed. The on- board semaphore consisted of two masts twelve feet high, each with a

single rotating arm. The masts were fixed to trollies, which could be wheeled across deck and lashed to any suitable bulkhead. (Later, two arms were put on the same mast, with an additional 'indicator arm' to show which direction the mast was pointing, so it could be read from either side. Much later, around 1874, the two signalling arms were combined, and mechanical semaphores based on this system remained in use on larger ships of the fleet until 1943, superseded at the masthead by the newly invented Radar aerial. Thirteen years after the semaphore chain to Portsmouth was superseded by the electric telegraph, the Popham System was installed on the newly commissioned 'Palmerston forts' in the Solent (connecting them to the electric telegraph would have been a very complicated task). These semaphores remained in service until 1956.



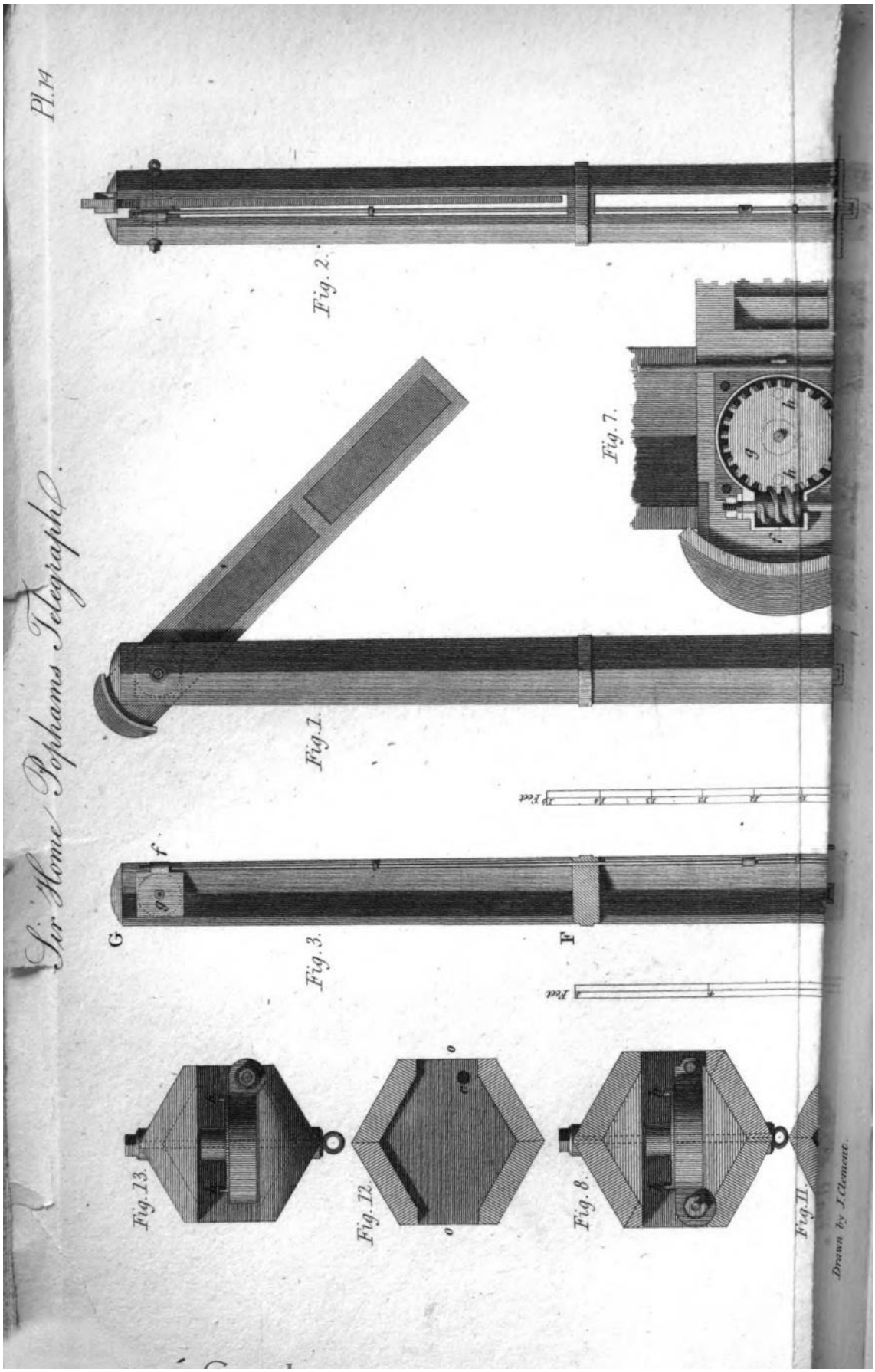
Sir Home Riggs Popham's Sea Telegraph, as submitted to the Royal Society of Arts and awarded a gold medal in 1816.

It was only in 1880 that someone realised that human arms could imitate the positions of the mechanical arms, as demonstrated by countless Scouts and Girl Guides ever since.)

The system was simple but effective and easy to read, and considered state of the art at the time. With hindsight however, it's hard not to condemn their Lordships' complacency: they completely failed to spot the potential of the electric telegraph. In July 1816, a young inventor called Francis Ronalds wrote to the Admiralty about his communication method that used static electricity. From his home in Hammersmith, Ronalds installed alternative systems to demonstrate its potential, both burying a cable in a 175-yard (160 m) long trench and erecting an eight-mile (13 km) long overhead telegraph. The lines were connected at both ends to revolving dials marked with the letters of the alphabet and electrical impulses sent along the wire were used to transmit messages. The Admiralty rejected his breakthough as 'wholly unnecessary.' Ronalds reflected philosophically that their Lordships' rejection of his offer of his electric telegraph was 'because everyone knows that telegraphs have long been great bores at the Admiralty.' A hundred such plans had been submitted and the Lords were sick of the subject. Popham was awarded £2,000 for his invention (the equivalent of around £120,000 today).

Popham's Semaphore

Popham's initial sea telegraph, while ingenious, was a straightforward piece of familiar marine joinery, the arms worked by a straightforward ship's wheel, winch and rope. The next stage was to develop it for long distance use on land – which is much less level than even a rough sea, so that the masts bearing the semaphore arms had to be much taller, mounted on the roofs of specially constructed semaphore stations.



Popham' semphore, as presented to the Royal Society of Arts in 1816.

In 1816, Popham's semaphore won a Gold Medal in the Mechanics category of the annual competition of the Society for the Encouragement of Arts, Manufactures and Commerce (today known as the Society of Arts) and the Society published his full description of it in its *Transactions* for 1816. In his submission, Popham claimed the two arms in their variable positions could display 220,000 signals, and their vocabulary 'used as a cypher with a secret key; by which means those who possess it will be able to carry on, in a secret manner, a correspondence with their respective ships.' [1]

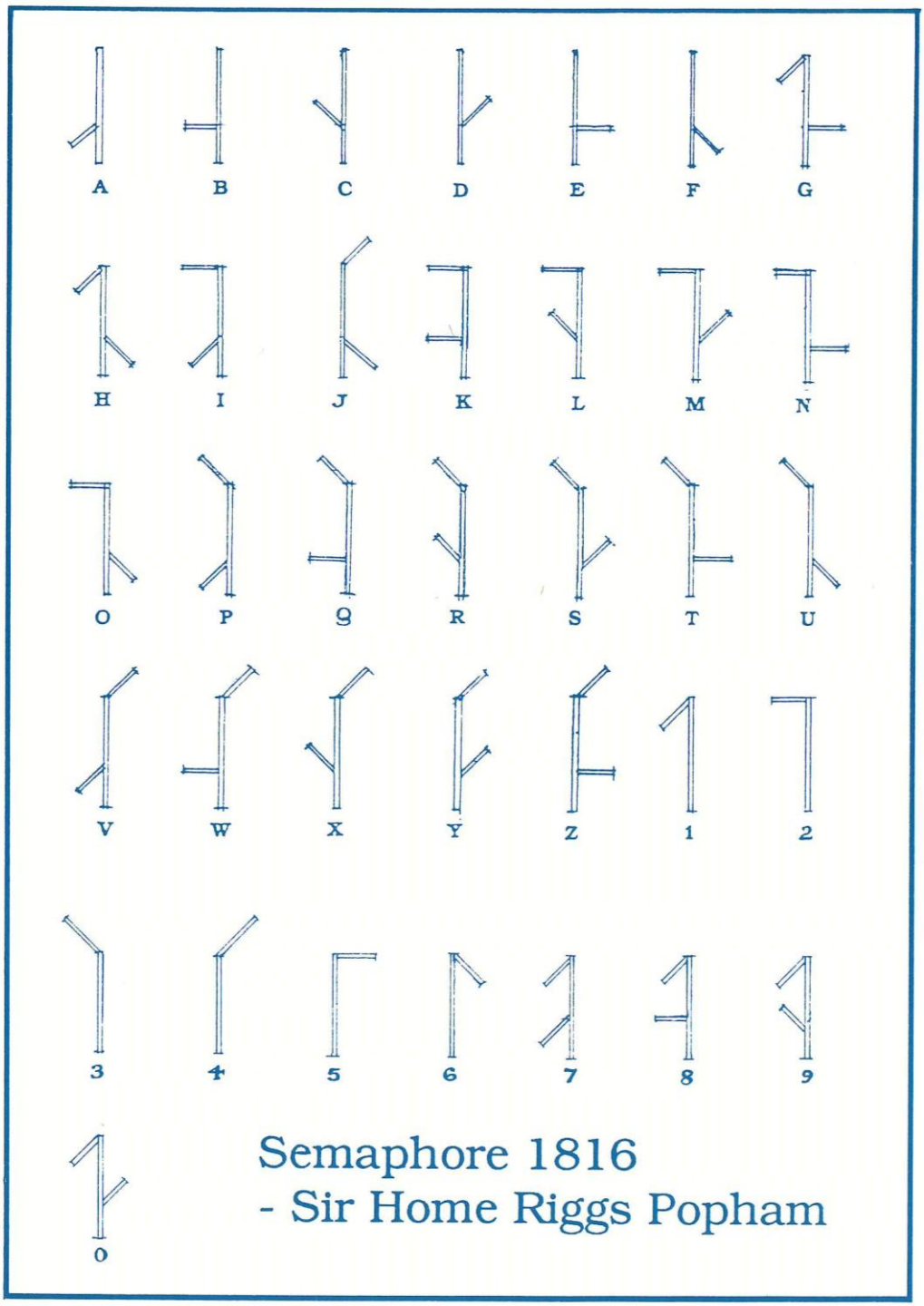
Other than its second arm, the mechanism at the Chatley Heath example replicates exactly the detailed description and drawings Popham provided the RSA. While it is a reproduction created after the tower was gutted by fire in 1984, it is the only fully operational example of Popham's semaphore. Popham's own description explains its template. The hexagonal mast was formed of 10-inch fir boards, to create a diameter of 1ft 8in. At Chatley Heath, it rises 40 feet above the roof, one arm pivoting 12 feet up, the second 16 feet 6 inches higher so there was no possibility of them clashing. Each arm was 8 feet long and 15 inches wide, and each could take up six positions from its hinge. The length of the mast inside a given semaphore station naturally varied depending on its elevation; the operations room was typically on the first floor. Wooden blocks fixed to the outside of the mast served as steps, so that with the help of a rope, a man could ascend the mast to attend to and oil the mechanism of the arms, not such a challenge to sailors used to shinning up masts aboard. Such steps are clearly visible in contemporary sketches of various semaphore stations.

The mechanism required to operate the arms at such height was considerably more sophisticated than used for the sea semaphore, demanding precision engineering to produce its metal cogs, screw-wheels, screws and rods. The

[1] Popham's own description in 'Papers in Mechanics', Transactions of the Royal Society of Arts (1816).

semaphore arms were operated by bevel wheels and rods leading from winch handles in the operating room.

SEMAPHORE SIGNALS



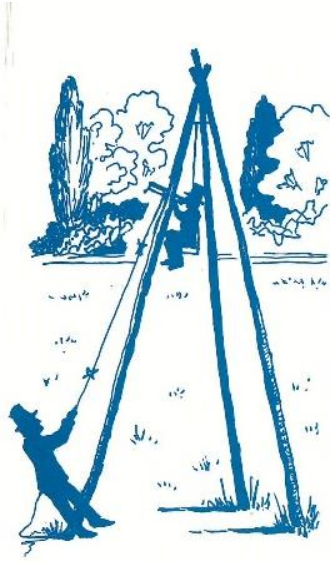
They could convey 48 different symbols, allocated to letters, numbers and a few frequent terms like 'fog', 'closing down' and 'Commander in Chief'. The 1815 Act to establish semaphore lines had as its aim the acquisition of land:

> '… for the purposes of signal or telegraph stations, and of making, preserving, and maintaining a free and uninterrupted communication between the respective signals or telegraphs erected or to be erected thereon, and of preventing and removing any obstructions thereto, either by buildings, trees, or in any other manner. Together also with all necessary ways unto and from the same.'

A naval surveyor now serving as purser to the Royal Yacht, Thomas Goddard, of whom we will hear more, was appointed to survey new sites for an experimental line across the relatively flat landscape from Admiralty House to Chatham Dockyard. This he did between January and October 1816, producing a detailed report, and a trial line was set up to Chatham, using the Popham semaphore. This was working, and working well, by the end of July 1816, although its stations were little more than wooden huts.

However, the international chessboard had shifted since Chatham came to pre-eminence as a naval dockyard in the seventeenth century, when the Dutch were the biggest enemy. A repeat of the 1667 Dutch raid on the Medway was now much less likely, whereas suspicion remained about future hostility from the French across the Channel, and so it was decided to establish a second semaphore line with Portsmouth on the south coast. Meanwhile, and indeed during the eventual operation of Popham's semaphore, these main line signal routes were accompanied by more ad hoc coastal systems still using flags and other signalling methods.

On 19 February 1818, Goddard was instructed to survey likely sites for this second telegraph line. In March, he set out to assess the site lines, with two riggers to help him, for whom he requested stout shoes.



One of Goddard's surveying techniques.

A mule carried the equipment. Goddard was a thorough surveyor; his letters describe how he toiled up numerous promising hills, sometimes drenched and picking his way through brambles to mount a ladder held by his assistants, or be hoisted aloft in a cradle with a telescope to scan the neighbouring heights.

The old signal stations had been erected hastily and on a temporary basis, and Goddard took the chance to identify a better route. For the first and last stages, between the Admiralty and Putney and from Beacon Hill to Portsmouth, he retained sites on or close to the existing ones. Crossing the North Downs was more problematic, and the four existing stations at Cabbage Hill, Netley Heath, Hascombe and Blackdown were replaced by seven new ones.

The new line eventually ran from Admiralty House to Chelsea; and on to Putney Heath; Kingston Hill (Coombe); Claygate (near Esher), Chatley Heath (also called Pointers Hill); Pewley Hill (near Guildford); Bannicle Hill (near Witley); Haste Hill (near Haslemere); Older Hill (NW of Midhurst); Beacon Hill; Compton; Camp Down (near Bedhampton); Lumps Fort, and finally reached the dockyard terminus in Portsmouth. It covered a distance of 75 miles.

On 7 April 1821, a notice in the *London Gazette* invited tenders from contractors to build the stations on the Portsmouth line, and Thomas Corfe of Putney was duly appointed. And as peace continued, in February 1822 the

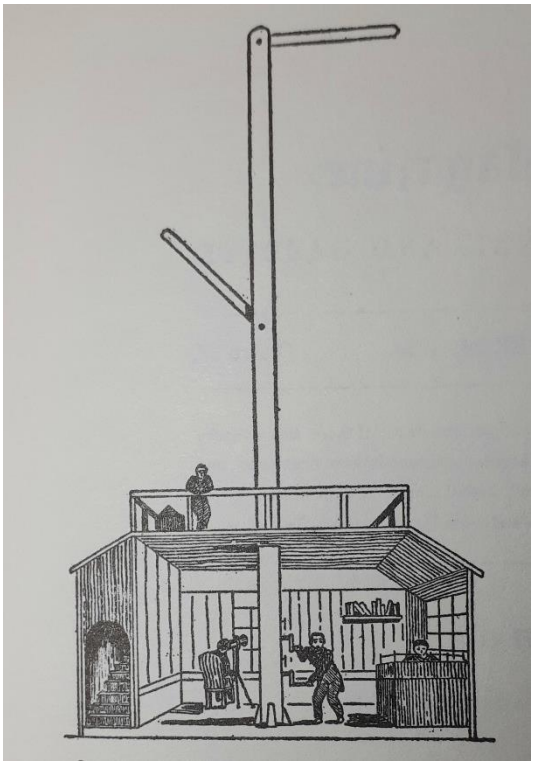
Admiralty decided to decommission the Chatham line and transfer its resources to the new Portsmouth line.

The average cost of each of the fourteen stations was £47 3s 4d: the cheapest cost just £20 to build, but Pewley cost £120. These were no longer two-roomed shacks, but well-designed dwellings for permanent habitation, big enough for the officer and his family and often a live-in assistant too. They conformed to three types: single-storey (mostly found on hills with the mast sited on the ground alongside), three-storey (mostly on medium elevations with the mast mounted on the roof) and towers, in low lying or wooded country. Chatley Heath was the only five-storey tower.

Corfe seems to have been a good contractor, overcoming the challenges of the project, which have a familiar ring to anyone involved in such works today. In June 1821 he wrote that progress on the line was being delayed by 'many causes' and 'in many parts there are no new bricks to be had at present (being early in season) and the old stock are gone.' He thought it might be possible to get them from further afield, but only at greater cost. In August, he reported that the lead on the roof of the station at Kingston Hill had been stolen and requested a night watchman for each site to prevent further thefts.

Water supply for the stations could also be problematic, especially at a remote site like Chatley Heath, where the roof was not large enough to collect enough water for the tower's residents. In July 1821 it was reported for Chatley that 'Water cannot be supplied to the station under fifteen shillings per week, government finding the cask and water cart but there are several spring ponds in the vicinity which are never dry in the hottest seasons, and it is supposed that water might be obtained at a depth of twenty to twenty five feet.'[2]

[2] Adm 106/3133



The operating room at the Admiralty semaphore.
Mechanic Magazine,
24 Sept 1825

Old Admiralty House on Whitehall, designed by Thomas Ripley in the 1720s, its screen by Robert Adam. A semaphore mast stood on its roof, the start of the line.

Thomas Page, whom we will meet below and who sold the land to the Admiralty via Goddard, had adjacent fir tree plantations. He proactively made a helpful suggestion on water as well as offering to fell some of his trees (and was clearly enjoying being part of the project):

> 'I am so perfectly satisfied that you will not inconvenience us more than is absolutely necessary, that I freely acquiesce in making the vista from the Semaphore in the way you propose and the trees shall in a few days be cut down according to the plan I have just received from you. I think the Building has a very good effect and is generally much admired in the neighbourhood. You still want a Well and it is a pity that the Garrison should not have the benefit of fresh water where I have no doubt it can be obtained at a very moderate expense, and I think no time should be lost in sinking the Well, before the land springs show themselves which they generally do the end of November'.

In September 1821, Corfe duly quoted for digging wells at four stations including at Chatley Heath, which was agreed after some negotiation. The well was dug just to the south of the tower (it has since been filled in) and a kitchen and stores block was built onto the tower's southeast angle. On 22 February 1822 Corfe reported that 'The semaphore buildings at Pointers [as he still called it], Pewley and Bannicle Hill, being completed, I respectfully beg your Honourable Board will be pleased to give directions for some person to take charge of the same, as the frequent depredations being committed thereto in consequence of being at such a distance and it is likewise necessary the building be open daily for air.'[3]

On 11 February 1822, Goddard had reported that the buildings were ready for use, but of course their semaphore apparatus still had to be installed. Two days later, the Admiralty ordered the machinery from the experimental Chatham line to be transferred across to the Portsmouth line, although it is unclear whether this machinery was in fact re-used.

[3] Adm 106/3133

The masts which supported the apparatus were to be made at Deptford and were to be hollow, which probably tested the skill of the mastmakers who were more used to producing solid masts.

> 'The semaphore masts ought to be hollow as upon the line now working between the Admiralty and Chatham, thereby affording a more steady set [?] of the arms than a solid mast possibly can do, as working against each side of the semaphore, and by that means greatly relieving the spindles in windy weather.'[4]

Goddard was allowed the help of three riggers from Deptford Dockyard to erect the masts and semaphores.

In the story of the semaphore, and amid the tales of Sir Home Riggs Popham's other life tales of derring-do, the engineering aspect of the semaphore's apparatus has not generally been given much attention. We take such precision-tooled equipment for granted these days, but in the early nineteenth century, such production lay at the forefront of engineering capability. The semaphore's machinery was made by the great engineer Henry Maudslay of Lambeth (1771-1831), considered a founding father of machine tool technology and mechanical engineering. Maudslay began his working life as a twelve-year old 'powder monkey' filling cartridges in the Royal Arsenal in Woolwich, and then became a bright apprentice blacksmith. From there he rose via Joseph Bramah's locksmith company to found his own business, which became one of the great engineering firms of his day and a major supplier to the Navy. He worked with Marc Isambard Brunel on ground-breaking block-making machinery at Portsmouth Dockyard, and produced a forming machine for the ropery at Chatham which is still in use. Maudslay also deserves his place in the story (and a fuller biographical sketch follows below).

[4] Ibid.

For all the detailed technical drawings provided in Popham's submission for the Society of Arts Gold Medal, assembling the rods and cogs through a hollow mast up to forty feet tall was no mean feat.

Each station was then provided with two telescopes, one for each direction the signals might come from. These were supplied by the Dollond family, the leading makers of the time[5]. In the early days of its operation, Chatley Heath was one of four stations which 'have no glasses but are immediately to be supplied with them from this office' (presumably the Navy Board). In August 1822 Lieutenant Harries of Chatley Heath (see below) complained about one of his glasses and at the end of the month two new ones were forwarded to him for trial. He replied quickly that 'they will not answer to the purpose'. It was agreed that Dollond should send him 4-foot telescopes instead of the usual 3-foot ones. Normally they had a magnifying power of x35.

Chatley Heath was also an odd-one-out with regard to its operating room. There was much debate about the floor from which its apparatus was to be operated. In May 1821 Goddard sent a return for the stations on the Portsmouth line showing which floor was to be used for each, 'with the exception of Chatley Heath (Pointers) which cannot be determined upon until the building at that station is sufficiently advanced to decide the point.' They finally decided that it should be on the first floor (effectively, the second floor, allowing for the elevated entrance floor). This meant the original mast had to travel down all the floors above to reach the first floor, which was specially reinforced with cast iron ties to bear the weight of the mast. During Landmark's repair of the tower, we were surprised to find the joists of the second floor were curved steel ribs, on which were laid stone and concrete slabs. This must have been the additional support deemed necessary to bear the weight of the mast, the tower being of uncertain final height during its construction. The operating room had to be in this lower position because otherwise it would

[5] In 1927, Dolland & Co merged with Aitchinson & Co to become the leading firm of high street opticians, which in turn merged in with Boots Opticians in 2009.

have been impossible to see the Claygate and Pewley Hill masts against the sky. Even then, adjacent landowner Thomas Page had to be asked to cut a 'vista' through his trees to reveal the Claygate mast.

A photo of the original semaphore apparatus, taken in 1962 in the original first floor operating room, before the tower was gutted by fire in 1984. The need for precision-tooling for an effective mechanism is clear.

It was in the operating room that the officer span the dials to set the arms in their positions. Given the requirement for messages to be passed on down or up the line with the utmost speed, we must assume that that the ratings who were spying the adjacent stations also carried out their duties in the operating room, which then at least had clear site lines to the neighbouring masts.

It took until 1824 for the Portsmouth line to be fully operational, all masts erected and all operating machinery installed. Presumably referring to the Pewley Hill station, pamphleteer William Cobbett reacted much as some might do on seeing wind turbines along a skyline, writing in *Rural Rides* (1823) as he rambled near Hambledon,

> *'On one of these hills is one of those precious jobs* [meaning a scam or racket] *called Semaphores. For what reason is this pretty name given to a sort of telegraph house, stuck up at publick expense on a high hill?'*

The Portsmouth line operated so effectively that it was decided to establish a second to Plymouth. In March 1822 Goddard was initially ordered to survey sites for a line between Portsmouth and Plymouth, perhaps following the precedent of the old shutter telegraph line that had diverged from the Portsmouth line at Beacon Hill not far from Portsmouth. Later this was changed to a direct line from London to Plymouth. This was to run along the same stations out of London as the Portsmouth line, but then branch at the Chatley Heath tower. Thomas Goddard surveyed six routes for the proposed branch, but of the chosen route, only nine stations were actually built after the branching off from Chatley Heath. These were at Worplesdon (the only other purpose built tower, of six storeys beside the church but now lost); Poyle Hill (also lost); River Hill at Binstead (still occupied as a house); Farringdon Common (a single storey building, still occupied as a bungalow); Merryfield and Cheesefoot Hill (both lost); Farley Chamberlayne (a single storey structure near the church); Mount Pleasant near Sherfield English (still in use as a house), and finally a station known to have been completed at Goodfield Green but now lost. However, by April 1827, interest in the Plymouth extension was waning and construction was suspended.

The semaphore tower at Portsmouth Dockyard, the end of the line.
(National Maritime Museum)

When the Admiralty residence moved from the High Street in Portsmouth in 1833 to the dockyard, the old Semaphore Tower was erected as above to the roof of the Rigging House and Sail Loft buildings. (The mast had previously been on the roof of the Square Tower in Old Portsmouth.) The tower remained the focal point of the port's communication until its destruction by fire in 1913.

The Sail Loft and Rigging House (1778) were originally two separate buildings. They were joined together by an infilling that formed an archway over the road with the Semaphore Tower on the top.

The existing tower was rebuilt in 1930 as a replica of the original, incorporating the old Lion Gate (1778) from the Portsea fortification. The structure is still known as the Semaphore Tower.

The Building of Chatley Heath Semaphore Tower

Having sketched out how semaphore signalling came to exist, we can focus on this example now in Landmark's care. For the stage south-west of the first new station at Kingston Hill, Goddard initially planned to use sites at Fairmile and Hatchford near Cobham but the owner of Hatchford, a Mrs J. Saltenstall, proved unwilling to sell. She wrote to the Admiralty to make this point on 3 August 1820, prompting Goddard to report ten days later, 'Hatchford - The proprietor of this ground objects to its adoption, vide letter of 13 August 1820'.[6] Although he preferred the Hatchford site as offering a clearer view, Goddard therefore adjusted the line's route to use slightly different sites at Coopers Hill and at Pointings, later known as Chatley Heath or occasionally as Chatley Hill.

The stages between the Admiralty and Coopers Hill were quite short, five miles or less. After that they lengthened, seven miles to Chatley Heath, another seven from there to Pewley Hill, and a similar distance to Bannicle Hill. Some of the later stations had intervals of as much as eight miles.

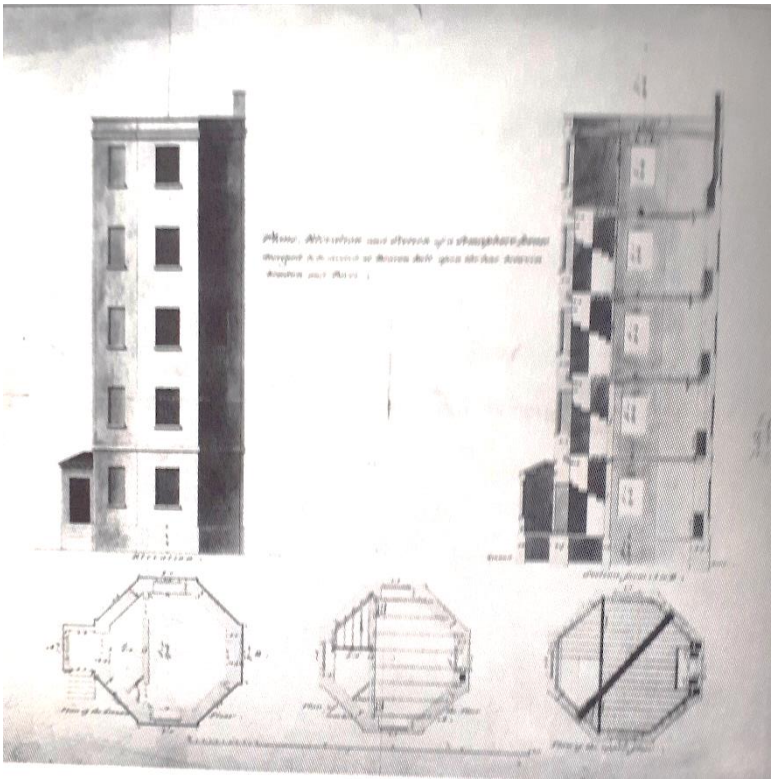
The land at both (superseded) Fairmile and Chatley Heath belonged to Thomas Page. Page made his wealth as a bookseller and stationer at Tower Hill in London. His father, who owned a farm called Poynters in Cobham, bought the lands of the manor of Cobham in 1779. Soon after, Page instigated an Inclosure Act (19 Geo. III, cap. 15) to enclose the common fields of the manor lands, among the first such enclosures in Surrey. Page senior left his estates to trustees for sale, giving the option of purchase to his eldest son, who duly bought the estate , and enlarged the house of Poynters for his own residence. In 1793, Thomas Page II enclosed more common land on the heath (33 Geo. III. cap. 69) with the exception of 300 acres left for pasturage and turf-cutting. As he refers to his 'plantations' in his correspondence about the semaphore tower, it seems that Page then planted the heath with conifers.

[6] Adm 106/3133.

'View from Mr Page's plantations at Cobham' showing the Semaphore Tower on the skyline.

Perhaps as a relatively new man, Page was more tractable than Mrs Saltenstall, and it is evidence of Goddard's astuteness in keeping his options open that he was already in discussions with Page for the alternative site. The pair met on 28 June 1820, when Page agreed to sell the site still known as 'Pointers'. On the 29th Goddard wrote to the Navy Board 'enclosing Admiralty letter directing him to select the sites, therein named 'Pointers'. By 24 July a price of £35 for an acre of land was agreed. On 4 December he wrote 'stating that it is to be used in lieu of Hatchford, and that he had finally agreed to the purchase.'[7]

The tower was built through 1821, being complete by March 1822.The design of the tower may have been based on an unexecuted one for Beacon Hill near Faversham in Kent:



Unexecuted design for a semaphore tower at Beacon Hill, Faversham in Kent.
(National Maritime Museum, from T W Holmes, 1983)

[7] Adm 106/3133

It is unclear how far Edward Holl, the Admiralty architect, was involved in this design. His surviving papers are mostly about more prestigious buildings such as the Naval Hospital at Greenwich. Chatley Heath tower was the tallest of the buildings on the route. The heel of its semaphore was 36 feet above ground level compared with 25 feet at nearby Coopers Hill, Pewley Hill and Bannicle Hill, and only two feet at Beacon Hill (confusingly the same name as the proposed station near Faversham).

The station was built as an octagonal tower, being easier to build than a round one, and offering a better return on volume that a square one. It is constructed of light red brickwork, finely pointed in a penny-struck detail, in a lime-rich mortar. The windows offer a prospect on four, rather than eight, sides, the prospects aligned northeast-southwest according to the orientation of the Portsmouth line sides. The blind windows on the other four facets were always blind, no doubt for reasons of economy as well as to reduced heat loss. (Window tax was not the explanation, since government buildings were in any case exempt.)

Thomas Page still owned the land around the tower. 'I have not the smallest complaint to make against the workmen employed in this concern', he wrote to the Admiralty on 7 March 1822, but did have concerns about the protection of his privacy given the novelty of this new structure. 'At the Time of my making the Bargain with Mr Goddard', he continued, 'it was expressly understood between us, that Government w[oul]d put up a…Close Fence of ten or twelve feet in Height against that part of my Plantation upon which its acre of Ground abuts, to prevent the Nuisance of the Country People going in every direction through the Plantation to look at the Semaphore, & in so doing, annoying my family very much in their own pleasurable walks in this Enclosure.' On 26 April 1822, Edward Holl, Inspector of Housing for the Admiralty, minuted that a fence 60 feet long was duly in place around the building, 'erected at the request of Mr Page but not in the manner suggested by Mr Goddard.'

By 7 June 1822 the mast and its mechanism were in place at Chatley Heath, lacking only some additional chain that was despatched that day along with the mast for the next station at Pewley Hill. The line was operational by summer 1822, although there were still some teething problems to iron out.

The Admiralty did depend on good relations with surrounding landowners, not least in order to keep sight lines clear. At Chatley Heath and the adjacent station at Telegraph Hill, Claygate, it was necessary to request tree felling or lopping in surrounding woods and plantations. In November 1820 it was noted that 'It will be necessary to fell a few of the young fir trees at Pointers, in order to get a view of Claygate'. In July 1822 Lieutenant Harries wrote that 'there are some trees which obstruct the communication between that station and the one at Claygate Hill'. Goddard wrote to Thomas Page, 'begging that the branches may be lopped', which was duly done. Regarding another station, Goddard similarly complained that 'the trees behind Coopers Hill station interfere very much with the signs made by the lower arms of the telegraph'. The proprietor there, Lord King, refused to lop the trees, which he was 'pleased to consider a great ornament, choosing rather to resist the operation of the Act of Parliament if it should be deemed advisable to have recourse to its aid.' Goddard recommended heightening the Coopers Hill mast instead. Lord King remained adamant, and in 1823 the Admiralty approved an extension of the mast rather than invoke the Act.[8]

[8] Adm 12/217

Life at the Tower under the Royal Navy

The Operation of the Semaphore Stations

Each signal station was under the command of a naval lieutenant, following the precedent established with the coastal and shutter telegraphs. Their biographies in O'Byrne's *Naval Biographical Dictionary* show that most had seen a great deal of active service, but very little luck. Promotion to commander and captain was by selection, which meant either finding favour with an admiral in command, or being first lieutenant of a ship which distinguished itself in action, which was largely a matter of luck. All of those who took semaphore stations seem to have been close to poverty, not having made the fortune in prize money bagged by luckier officers. The semaphore stations were considered quite desirable billets by such men, left stranded on half pay at the end of the war.

Even so, the furnishings for the tower issued by the Naval Board were pretty basic. For Chatley Heath, the following stores were supplied (albeit not all at once, as Lieut. Harries later complains):

4 forest grates
1 kitchen range with trivets etc
1 plate iron fender
3 green wire fenders with brass tops
1 set kitchen fire irons
5 chairs for Officers
3 globe-headed fire irons
4 chairs for men
1 cot and bedding complete
4 tables
2 pails
1 bucket with rope

According to instructions of March 1822, each station was to have 'one man as assistant to each lieutenant to be selected either by you [ie the Navy Board] or the officer with your sanction, a preference being always given to such as may have served His Majesty as seamen or marines.'[9] The stations were generally only manned by two people, the lieutenant in charge choosing his assistant as an old shipmate, or someone known to be good with a telescope. However, if

[9] Adm 106/3133

the officer had a wife and family, they might be permitted to join him at the station. There was a constant stream of correspondence with the Navy Board about the inconveniences of life in the semaphore stations, from poorly finished construction to curious 'peasantry' prising back the shutters to see what was going on inside. As we shall see, the Chatley Heath tower was no exception.

Meticulous regulations were drawn up for operating and maintenance of the semaphores. A station was to be swept once day, and washed twice a week in summer and once in autumn. One man was to sleep there to deter burglars and 6d a day was allowed for coal and candles. Officers were instructed never to force the winch handles as 'the machinery of the Telegraph is made with the greatest exactness.' The mast turned on a pivot, and the men were advised to turn the front to the wind at night, to avoid rain penetrating the grooves where the arms fitted. A journal was kept, signed by the officer and submitted to the Admiralty each week. The time of every message received was noted, and also the position of the arms so that the source of any mis-transcribing of the original message along the line could be detected. Lieutenants-in-charge received 3s a day plus their half-pay pension, while the ratings who assisted them got 2s 4d.

Between 10am and 3pm (and until 5pm from April to September) the telescopes were not to be left unmanned for longer than two minutes. If fog made a neighbouring station indistinct, a station was to post the signal to declare that a communication was interrupted. From stern warnings against the practice, it seems some crews were tempted to post the fog signal just to get a break. Visibility was often particularly poor in London peasoupers: the Admiralty station was often unable to send or receive messages because of 'smoke', 'state of the atmosphere to the Eastward' or even simply 'vapour rising from the lake in St James's Park.'

The arms stayed in position until the position had been correctly replicated at the next station. There was a correction sign in case of mistakes; once this was

acknowledged, the correct sign was exhibited, and the message continued. Messages were thus relayed one element at a time down the line, although this was not necessarily letter by letter, since routine messages often had their own code.

Surprisingly few records of the actual messages relayed have survived, mostly from the correspondence of the admiral at Portsmouth, who was the main user of the semaphore line. Here are a few examples:

22 October 1824 - *The Phaeton has arrived…and is placed under quarantine at the Motherbank.*

25 October 1824 - *The following telegraph message was made this morning "may Spaniards land from Phaeton". This refers to a group of refugees from the current conflict in Spain*

8 November 1824 - *The* Rose *has arrived and is placed under quarantine, as reported by telegraph.*

4 November 1824 - *The* Pandora *is arrived from the Mediterranean and is placed under quarantine, as reported by telegraph.*[10]

30 January 1826 - *The* Thetis *has arrived as reported by telegraph; she anchored at Spithead at 7.30 and go underweigh* [sic] *for the Motherbank at 0.30 pm, where she now remains in quarantine.*[11]

30 January 1828 -*The following telegraphic communication has taken place this morning,* Alligator *arrived.*

5 February 1828 - *The following telegraphic communication has taken place this morning, viz;* Jaseur *arrived.*[12]

In August 1827 at least, a more dramatic message was conveyed, that Prime Minister George Canning has died, after just 119 days in office. During peace time, most of the messages must have been fairly mundane, and the impression is that the use of the telegraph was quite limited. Written communications were felt more authoritative than telegraph messages (just as

[10]These from bundle ADM 1/1316.
[11] ADM 1/1327
[12] ADM 1/1342

a hasty email or text can sometimes misconvey today), so naval officers and officials tended to prefer written messages when the content was not urgent.

These could be conveyed from London to Portsmouth in about eight hours. Written material was also less subject to disruption by the weather. However, had war broken out again, especially if with France, the semaphore's speed and urgency would have once again come into its own.

Rear Admiral Sir Home Riggs Popham

Sir Home Riggs Popham (1762–1820), was born in Gibraltar in October 1762. His father, Joseph, was consul at Tetuan. Home was the fifteenth child of his mother, who died giving birth to him. After the usual brief spell for his time and class at Trinity College, Cambridge, in 1778 sixteen-year-old Popham entered the navy. It was a conventional career path for a younger son. He became one of the wayward career heroes of Nelson's navy, whose exploits and rise to seniority would not look amiss in the pages of a novel by C. S. Forester or Patrick O'Brien.

Popham served through The French Revolutionary Wars of 1793–1802 and the Napoleonic Wars of 1803–15, years that saw the Royal Navy at peak effectiveness, dominating all its maritime adversaries in a period of particular international fractiousness. By the time war with the French broke out in 1794, he had already served sixteen years at sea. He began his naval career as Captain Edward Thompson's servant aboard the *Hyaena*; serving in the Channel Fleet in 1779, in the 'moonlight battle' off Cape St Vincent in January 1780, and then in the West Indies. In April 1781 he was transferred to the *Sheilah-nagig*. A month later, she was captured and Popham was taken prisoner, but released on parole three months later. In June 1783 he was promoted lieutenant, and later re-joined Captain Thompson in the *Grampus*. In January 1786 Thompson died; Popham transferred to the *Nautilus* and

surveyed the coast of south-west Africa. His charts from this founded his reputation as a hydrographer.

Early in 1787, unemployed and on half pay, Popham, still just 25, obtained leave from the Admiralty and went to Ostend, where he bought his first ship, the *Madonna*, and spent the next six years as an East India Company trading captain, plying routes to India and China and accused of falling foul of the EIC's charter. The case was unclear and Popham appealed, eventually receiving £25,000 compensation between 1805 and 1808.

Home Riggs Popham aged 21 in 1783, the year he was promoted to lieutenant. He had already served five years in the Navy.
(National Portrait Gallery, artist unknown)

This hefty compensation still left him seriously out of pocket, and left others with a lingering suspicion that he might indeed have been smuggling. He had also failed to renew his leave from the navy and so been temporarily struck off.

However, when war came Popham's buccaneering talent won through. In September 1793, he was reinstated and placed in charge of army transports at Ostend for the military campaign in Flanders under the Duke of York. Popham organised 'sea fencibles' a terms coined for a sort of home-guard for the shipping lanes, gathering groups of fishermen and ferrymen to guard against French vessels off the coast of Nieuwpoort, Belgium.

Popham quickly distinguished himself, and in November 1794, at the recommendation of the Duke, was appointed superintendent of inland navigation and promoted to commander. This led to him being dubbed 'The Duke of York's admiral'. Popham was in charge of the evacuation of the allied forces during their retreat in 1795, which he managed so well that he was promoted to the rank of post captain, again at the Duke's prompting. This swift promotion through service to the army did not endear him to his naval colleagues but he was undoubtedly a man whose logistical talents extended beyond the mere deck of a ship.

When invasion by the French threatened in 1798, at Popham's suggestion the Admiralty authorised the formation of co-ordinated sea fencible units along the English and Irish coasts. From 1804, such units were supported by a network of Martello towers along the south and east coasts, of which Landmark's own at Aldeburgh is the most northerly in England. Popham's Sea Fencible companies consisted of merchant seamen using their own private or commercial vessels, but operating under letters of marque that authorised them to capture enemy ships should opportunity arise. The Navy provided the Fencibles with uniforms and weapons, and protected them from the depredations of navy press gangs.

Meanwhile, in May 1799 Popham was sent to St Petersburg to persuade Tsar Paul to provide troops for a proposed landing in the Netherlands. He took the tsar and his family for a sail, and they enjoyed it so much that they gave him a gold snuff-box and a diamond ring, and the tsar dubbed him a knight of Malta. Popham secured the forces needed and returned to England. In the late summer he was once again involved in inland navigation as an allied expedition under General Sir Ralph Abercromby landed on the Helder peninsula in North Holland —ill-supported by the 10,000 Russian soldiers sent by the tsar. Once again, Popham had to supervise an evacuation, which he managed so well that he was rewarded with a pension of £500 a year. That winter he was sent back to Russia to try to mollify the tsar. After an arduous overland journey of eighty-eight days he reached St Petersburg—where Paul refused to see him.

In 1800 Popham was appointed to command the *Romney* (50 guns so a significant command), and before Christmas sailed with a troop convoy to support Abercromby's army invading Egypt. Alongside this, Popham was secretly negotiating trade treaties on behalf of the East India Company with the sheriff of Mecca and other Arabian states as ambassador directly responsible to the governor-general of Bengal, Wellington's brother Lord Wellesley. Returning to England in the spring of 1803 Popham was accused of having incurred 'enormous and extraordinary' expenses on repairs to the *Romney* in Calcutta. The case emerged as a fabrication by Lord St Vincent's secretary, Benjamin Tucker, who hoped to ingratiate himself with his master, the First Lord of the Admiralty, and who loathed Popham. Popham was cleared by a select committee of the House of Commons, but his enemies preferred to remember the accusations.

Popham was also finding time to pursue a political career. He was ambitious and hoped to become a Lord of the Admiralty. He was Tory MP for the Isle of Wight (1804–6), Shaftesbury (1806–7) and Ipswich (1807–12), and his naval

appointments were in part the result of ministerial favour. During this period Popham also dabbled in Latin American politics, meeting with the Venezuelan patriot Francisco Miranda. Schemes for attacking the Spanish colonies in South America had been discussed within the British government for a decade and expeditions had been planned, then cancelled; Popham himself had submitted a paper on the subject to William Pitt in 1804.

At the end of 1804 Popham was appointed to the *Diadem* (64 guns), and in 1805 sailed as commodore and commander-in-chief of an expedition to the Cape of Good Hope with a military force under General Sir David Baird. They reached Table Bay on 4 January 1806, were ashore by 7 January, and had occupied Cape Town by 10 January. Popham himself led his marine battalion during the operation. The Dutch surrendered the colony. The squadron remained in Table Bay, alert to a possible French attack, until April.

Meanwhile Popham was still thinking about South America and took it upon himself to plan the liberation of Argentina from Spanish rule by attacking the River Plate at Buenos Aires. It was said that the native Argentinians were unhappy with Spanish rule, and could be counted upon to rise against them if given support. While the Tories and Popham's patron, William Pitt, were in power, he could expect tacit approval, particularly if the expedition were successful. Reluctantly Baird let him have 1200 men; the squadron sailed from Cape Town on 14 April, and at St Helena, Popham 'borrowed' a further 180 men. There he heard that Pitt had died the previous January, but not who had replaced him.

Popham sailed on, reaching Buenos Aires in June 1806. Under the command of Brigadier-General William Carr Beresford, their small force of just 1,635 men landed near Buenos Aires on 25th June. The Spanish were taken by surprise: the governor fled and on 2 July the city surrendered, and Beresford took possession. Rashly, Popham then sent a buoyant open letter to the merchants

of England announcing this lucrative new market for their goods. Very soon, however, a force of about 2,000 Spaniards was assembled. They entered the city on 10 August, overwhelmed Beresford's men, and forced their surrender. The honourable terms Popham had arranged were rejected by the Spanish authorities; Beresford and his troops were marched up-country as prisoners; and Popham and his squadron could do nothing but blockade the river and wait for reinforcements.

When they arrived he was able to capture Maldonado and Goretti, two settlements at the mouth of the river; but on 3 December Rear-Admiral Charles Stirling arrived to supersede him and with orders for him to return to England. Popham was devastated but in disgrace and he had no choice but to obey.

When he arrived back on 20 February 1807, he was put under open arrest to await court martial on two charges: of having withdrawn his squadron from the Cape without orders; and of having launched his Argentine enterprise 'without direction or authority'. Bizarrely, Popham is regarded in Argentina not as a foreign aggressor but as the catalyst of the independence movement that followed ‘los invasiones ingleses’. This paradox was matched by his reception at home: to the Admiralty he was an officer who had acted improperly; to the City of London, he was a hero who had made a bold attempt to open up new markets, and he was presented with a sword of honour. Such were the contradictions of a naval officer’s life.

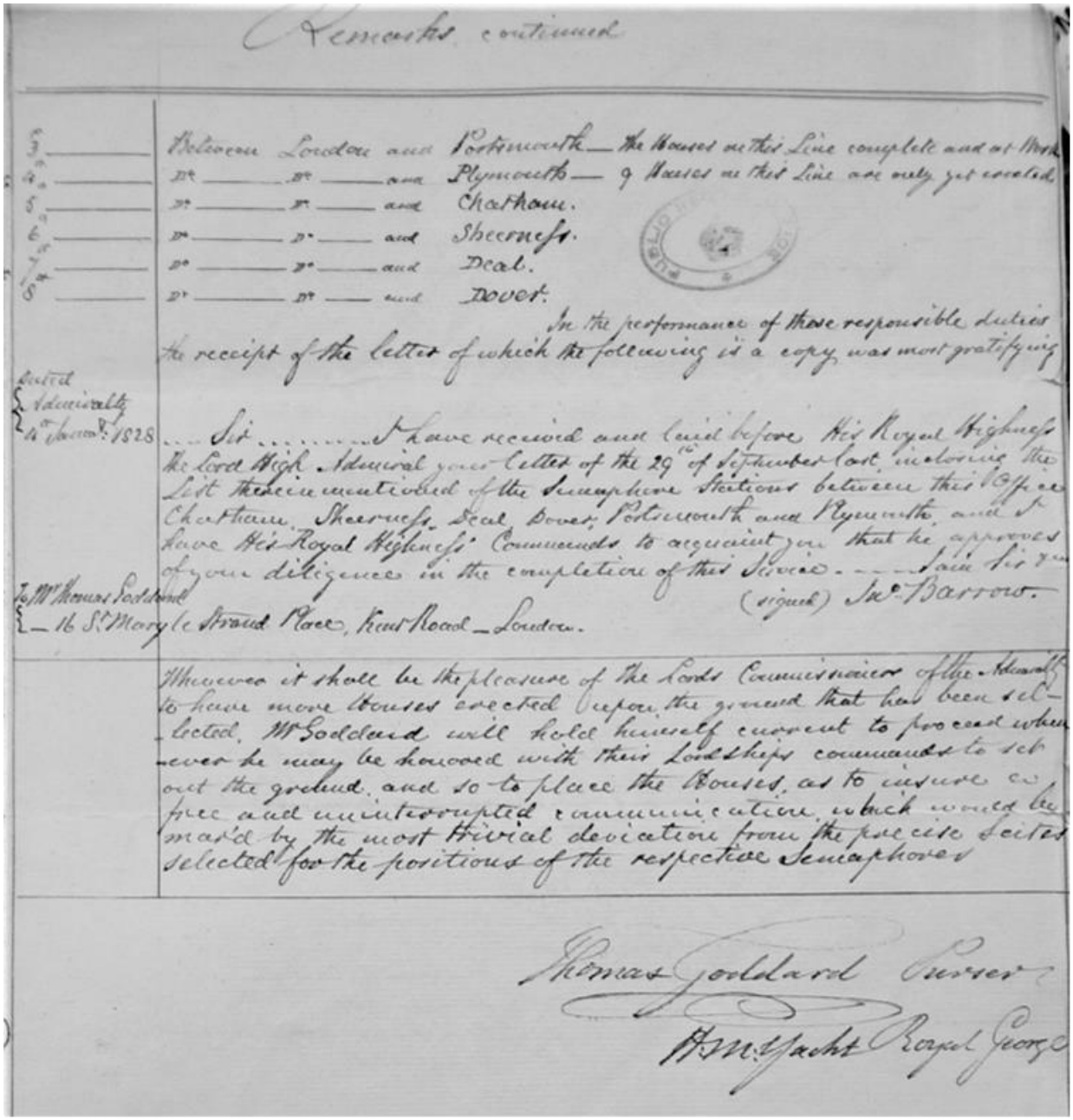
Popham was court martialled at Portsmouth in March 1807. He defended himself vigorously, but was found guilty and severely reprimanded. However, yet again misdemeanour had no visible effect on his career, and in July he was appointed Captain of the Fleet under Admiral James Gambier in the expedition against Denmark, to the chagrin of his fellow captains. After the capitulation of the Danes, Popham was one of the commissioners—with Sir Arthur Wellesley

and Colonel George Murray—for settling the terms by which all the Danish warships were handed over.
In 1809 Popham was given command of the *Venerable* (74 guns), in yet another ill-managed assault on the continent—the expedition on the River Scheldt near Antwerp under Sir R. J. Strachan—and again emerged with credit from a military fiasco. In 1810 he was sent to northern Spain to assess possibilities for co-operating with the guerrillas and distracting the French in support of Wellington's campaign. This, two years later and still in *Venerable,* he achieved most successfully, keeping an entire French army 'distracted', and capturing Santander.

To Popham's disappointment he received no recognition for his success. He was too controversial and by now had made too many enemies, losing what influence he once had. He was not employed on active service again. Nevertheless, in June 1814, he was promoted rear-admiral, and became a Knight Companion of the Bath in 1815, when the Prince Regent expanded the Order 'to the end that those Officers who have had the opportunities of signalising themselves by eminent services during the late war may share in the honours of the said Order, and that their names may be delivered down to remote posterity, accompanied by the marks of distinction which they have so nobly earned.'

From 1817 to 1820 he was commander-in-chief of Jamaica, years which saw a severe outbreak of yellow fever, the death of his son Home and one of his daughters (Popham had also found time in Bengal in 1788 to marry Elizabeth Prince, with whom he had nine children). By now in his early 60s, Popham's own health was also failing. In June 1820 after a series of strokes, he wrote to the Admiralty asking to be relieved of his command, and sailed for England with his wife. He died of a stroke that September in Cheltenham, and was buried in the churchyard of St Michael and All Angels at Sunninghill in Berkshire, close to his home, Titness Park. A 'damn cunning fellow' he may

have been, and unconventional and controversial, but the success of Nelson's and Collingwood's navy was built on such men.



Remarks continued

5 ____ Between London and Portsmouth — the Houses on this Line complete and at Work
4th ____ Do ____ Do ____ and Plymouth — 9 Houses on this Line are only yet erected
5 ____ Do ____ Do ____ and Chatham.
6 ____ Do ____ Do ____ and Sheerness.
7th ____ Do ____ Do ____ and Deal.
8th ____ Do ____ Do ____ and Dover.

In the performance of these responsible duties the receipt of the Letter of which the following is a copy, was most gratifying

Admiralty 16th January 1828

Sir ..... I have received and laid before His Royal Highness the Lord High Admiral your Letter of the 29th of September last, inclosing the List therein mentioned of the Semaphore Stations between this Office Chatham, Sheerness, Deal, Dover, Portsmouth and Plymouth, and I have His Royal Highness' Commands to acquaint you that he approves of your diligence in the completion of this Service. ..... I am Sir &c
(signd) Jno. Barrow.

To Mr Thomas Goddard
16 St Mary le Strand Place, Kent Road — London.

Whereas it shall be the pleasure of the Lords Commissioners of the Admiralty to have more Houses erected upon the ground that has been selected, Mr Goddard will hold himself in readiness to proceed when-ever he may be honored with their Lordships commands to set out the ground, and so to place the Houses, as to insure an free and uninterrupted communication, which would be mar'd by the most trivial deviation from the precise Sites selected for the positions of the respective Semaphores

Thomas Goddard Surveyor
H.M. Yacht Royal George

Extract from the curriculum vitae Goddard submitted to the Admiralty some time after March 1828, likely to be in in his own hand.

Thomas Goddard, Naval Surveyor

Thomas Goddard (d. 1853), who surveyed the semaphore line, spent most of his career as a competent naval secretary to high-ranking officers. His will describes him as 'Purser & Paymaster'. At the time of his appointment to survey the semaphore line in 1815, he was purser for the Royal Yacht, something of a sinecure. However, in his time he had seen active service at sea. Otherwise it might come as something of a surprise to find a secretary out striding the Surrey hills with a mule or two, and hoisting himself forty feet up on jerry-built shears to check site lines.

No likeness of Goddard has survived, but we do have two accounts of his life. Goddard's appointment to the yacht *Royal George* from 1814 was a very desirable one, bringing contact with the royal family. The yacht rarely went to sea, so it was effectively a sinecure for good service that also allowed him time to work on the signal stations. In his will, he bequeathed a snuffbox given to him by George IV to his son Thomas, and thence to *his* son Thomas Ward Goddard 'as an heirloom.' In due course, this grandson, who became Vicar of Nazeing in Essex, donated the tortoiseshell snuffbox to the Royal Collection (below). Its lid is inset with a coronation medal, and it is engraved 'from His Majesty King George IV to Thomas Goddard, Purser of the Royal George Yacht, 1820.' Queen Mary later gave the snuffbox as a Christmas present to George V in 1916, an interesting glimpse of how such donations then circulated.

With the snuffbox, Vicar Goddard also submitted a brief handwritten note giving an account of his life. This note, written perhaps around 1900, reads as follows:

> 'Thomas Goddard was born at Portsmouth & baptised in the Parish Church 13th October 1771. His father William Goddard was a master shipwright in the dockyard (now called constructor). Since the time of King Henry VIII members of the family had occupied the office in the dockyards of Deptford, Chatham & Portsmouth. It was intended that Thomas Goddard should become a naval officer in the usual way but that he might make an early messenger [?] he determined to become a purser. His first berth was to be Keeper of the Chatham Chest but this he voluntarily resigned after making a long report on the waste of the funds in management & proposing a new scheme which was finally adopted nonetheless.
>
> 'About 1800 he was set to survey the counties of Kent Sussex & Hants & set up semaphore signals between London and the Coast when Napoleon threatened invasion of England. Whether he invented the Semaphore or not he decisively improved it increasing the arms, & I have his code of signals in my possession in his own handwriting.
>
> 'After that he was appointed purser to the Royal George Yacht a berth he held for 30 years & according to my father's account he was held in great esteem by the members of the Royal Family both young and old for his humour, courtesy & geniality for my grandfather was a man of cultivated intellect & possessed of many accomplishments. I have heard my father say that after King George IV gave my father the snuffbox, he gave it in a very informal way & accompanied his gift with many kind expressions.'[13]

There is much here that seems inaccurate or conflated. The anecdote about the Chatham Chest seems unlikely as a first appointment, nor did Thomas Goddard invent the semaphore, even if he can perhaps be considered to have improved its operation. Nor has it so far proved possible to trace any master shipwrights called Goddard in the historic records of the dockyards, even if it is a charming family tradition. However, there is also enough that can be substantiated, including his likely date of birth.

[13] RCIN 3865

The other account is his own, of his professional life from what appears to have been a kind of CV submitted to the Admiralty sometime after March 1828. Goddard (by then probably in his late 50s) was apparently seeking more employment in surveying for the semaphore. Here it is transcribed in full:

Remarks on the Services of Mr Thomas Goddard, Purser [14]

February 1787 – June 1790 Entered the Royal Navy in HM S Jupiter and proceeded to the Leeward Island Station in the Office of the late Sir William Parker the Commodore & Commander in Chief.

June 1790 In HMS Salisbury on the Newfoundland Station in the office of the late Admiral Mark Milbank, Commander in Chief.
1793 In HMS Assistance, Secretary to the late Admiral Honourable George Murray,[15] *then Commander of a Squadron employed in the Scheldt.*

1794 Warrant to Kingsfisher [sic] *Sloop.*

1794 In HMS Duke, Secretary to the late Admiral Honourable George Murray in a Squadron to West Indies.

1794 In HMS Glory – ditto – in Channel Fleet

June 1794 Warrant to Apollo, Frigate. Wrecked off the Texel on 7th January 1799.

26th June 1799 Ditto to Vioilante [sic]*. 64 [guns]*

20th July 1799 Ditto to Excellente 78 [guns] In this ship was Secretary to Admiral Honble. Sir R Stopford in temporary command in Chief on Leeward Station at time of restoring the captured Islands.

1809 Order to Ocean 98 [guns]. At Malta. Flagship of late Admiral Lord Collingwood in a vacancy made by Brothers appointment of Storekeeper, Sheerness.

1810 Admiralty Order, in Rota Frigate. Proceeded to Ferol & Corina to investigate (conjointly with the late Captain P. Sommerville & Mr Richard Ford of Sommerset House) some Purchases of Provisions made at the Post for a Squadron under the late Admiral Lord Exmouth.

[14] ADM 6/193
[15] This is a different Lord George Murray from the man who devised the original shutter telegraph.

1811 Compiled and delivered to the late Honble Charles York, then 1st Lord of Admiralty, a Classed Register, or Pedigree of each Ship then in the Navy, setting forth her Sailing and all other Qualities, from Official Papers; with a Cypher Key. NB Presumed now to be an Heirloom to the Office.

24th June1812 Warrant to Trafalgar 98 [guns]. Building at Chatham.
17th March 1812 Ditto to Union 98 [guns]
27th December 1814 Ditto to Royal George, Yacht
4th September 1815 Ditto to ditto. Re-appointed.
21st September 1821 Ditto to Apollo, ditto [yacht]
7th March 1823 Ditto to Royal George. Re-appointed on Apollo being discontinued.
*10th Dec 1828 Ditto to ditto. (By His Royal Highness Lord High Admiral [*Duke of Clarence*])*
26th November 1831 Ditto to ditto. Re-appointed.

Summary of Mr Goddard's Semaphore Services, Warrants, Orders and Letters of following dates to Examine, Select and Purchase in fee ground for Semaphore communication:

8th January 1812
28th June 1815 [a mere ten days after the Battle of Waterloo]
24 February 1818
3rd August 1818
13th May 1819
28th June 1820
18th Sept 1820
28th March 1822
11th April 1826

Proceeded:
1st: Between Wollesely Bay & Downes. And having done so, framed and superintended the Printing 1000 Copies of a Code of Semaphore Signals for the use, and co-operation of the Squadrons rendezvousing at those Places; through Flag Ship at Nore [?] vide Books in Office.

2nd. Between North Foreland & Lands End. Following the Sinuous line of the Coast for communications with the Kings Ships in the Offing.

NB From Torbay, communications can pass through Plymouth Line to London.
3rd Between London and Portsmouth. The Houses on this Line complete and at Work.

4th Ditto and Plymouth. 9 Houses on this Line are only yet erected.
5th Ditto and Chatham.

6th Ditto and Sheerness.
7th Ditto and Deal
8th Ditto and Dover.

In the performance of these responsible duties the receipt of the letter of which the following is copy was most gratifying:

Dated Admiralty 4th March [?] 1828
Sir…I have received and laid before His Royal Highness the Lord High Admiral your letter of 29th September last including the list therein mentioned of the Semaphore Stations between this Office, Chatham, Sheerness, Deal, Dover, Portsmouth and Plymouth and I have His Royal Highness Commands to acquaint you that he approved of your diligence in the completion of their Service.
I am etc John Barrow

Thomas Goddard
16 St Mary le Strand Place, Kew Road, London.

Whenever it shall be the pleasure of the Lords Commissioners of the Admiralty to have more Houses erected upon the ground that has been selected, Mr Goddard will hold himself current to proceed whenever he may be honoured with their Lordships commands to set out the ground and so to place the Houses as to insure a free and uninterrupted communication, which would be mar'd by the most trivial deviation from the precise Sites selected for the positions of the respective Semaphores.

Thomas Goddard, Purser
HM Yacht Royal George

Goddard could clearly claim considerable expertise in the setting out of semaphore lines, but by 1828 of course the technology was already becoming redundant. No evidence has come to light that the Admiralty called upon his services further.

Henry Maudslay (1771-1831) is considered the father of precision-tool engineering. His firm made the apparatus for the semaphore towers.

Henry Maudslay, Engineer

These precision-engineered apparatus of the semaphore stations were made by the great engineer Henry Maudslay (1771-1831), considered a founding father of machine tool technology. His advances were therefore crucial for the Popham semaphore's success. Maudslay's career also illustrates the huge ancillary industries that supported and enabled the Royal Navy. He began his working life at twelve, as a "powder monkey", employed to fill cartridges with gunpowder at the Royal Arsenal in Woolwich. At fifteen he began training as a blacksmith, also working at the Royal Foundry. There, he came to the notice of another founding father of the industrial revolution, Joseph Bramah, inventor (among other things) of the hydraulic press.

Bramah had designed and patented a superior lock based on the tumbler principle, but was having difficulty manufacturing it at an economic price. He took young Maudslay into his employ at the Bramah workshop in Denmark Street, St Giles. Soon, Maudslay had designed and made a set of special tools and machines that allowed the lock to be made at an economic price. So confident was Bramah of the lock's impenetrability that he put one in his shop window with a notice offering a reward of 200 guineas to anyone who could pick it. It resisted all efforts for forty-seven years, and the Bramah Lock Company (founded 1784) survives to this day. Maudslay also improved Bramah's hydraulic press, by introducing a leather cup washer which gave a watertight seal but offered no resistance to movement when the pressure was released. Within the year, he was made manager of Bramah's workshop.

However, Maudslay soon outgrew the workshop. In 1797, he was refused a wage increase to 30s a week and decided to set up his own business. He was also turning his ingenuity to designing a screw-cutting lathe. The typical late-18th century lathe was worked by a treadle as the workman held the cutting tool against the work.

This did not allow for precision, especially in cutting iron, so screw threads were usually made by chipping and filing, skilled freehand use of chisels and files. Nuts were rare; metal screws, when made at all, were usually for use in wood. Metal bolts passing through wood framing to a metal fastening on the other side were usually fastened in non-threaded ways.

By 1800 Maudslay had developed the first industrially practical screw-cutting lathe, allowing screw threads to be precisely cut for the first time. This was a major advance in workshop technology, at last enabling nuts and bolts to be fully interchangeable and revolutionising the production of machine components. We take such advances entirely for granted today, but the mechanism of the semaphore could not have been created without it.

By 1810 Maudslay was employing eighty workers from larger premises in Westminster Bridge Road in Lambeth. Maudslay also recruited a promising young Admiralty draughtsman, Joshua Field, whom he soon took into partnership. Maudslay continued to be intimately involved with marine engineering: his company's his first major commission was to build a series of 42 woodworking machines to produce wooden rigging blocks (each ship required thousands) for the Navy under Sir Marc Isambard Brunel. The machines were installed in the purpose-built Portsmouth Block Mills, which still survive, including some of the original machinery. The machines were capable of making 130,000 ships' blocks a year, employing just 10% of the pre-mechanised work force. Many other innovations can be attributed to Maudslay and his equally talented sons, including the first micrometer and early marine steam engines from 1815. While Popham conceived his semaphore signalling system, it was Maudslay and his workshop who perfected the inner workings of the mast, transforming them from page to precision-tooled parts. Henry Maudslay & Company became one of the most important British engineering manufactories of the nineteenth century, finally closing in 1904.

The naval officers who manned Chatley Heath Semaphore

The list of Lieutenant Superintendents at Chatley Heath is as follows:

Edward Harries	1822-27
Robert Hutchinson	1827-29
Peter White	1829-34
Malachair Donellan	1834-39
Benjamin Baynton	1839-41
C. Hawkins	1842-46
Edward Robinson	1846-48

A biographical sketch follows for each of them, of their naval careers and time at the Chatley Heath tower. As we shall see, among the retired or 'resting' officers who manned such semaphore stations were many more-or-less unsung heroes of Nelson's and Collingwood's navy, who had seen the heat of the action on deck amid acrid gunpowder smoke and burning spars, made desperate sorties ashore, and weathered violent storms at sea. In peacetime, and often with large families to support, they now eked out existence on half-pay. Most ended their days in poverty, frustrated by all efforts to obtain promotion or be accepted for one of the Out Pension Hospital Lists. For such men, the shelter of any kind of a post was welcome, even if it involved the boredom of hours glued to a telescope on a remote hilltop station.

Lieutenant Edward Harries (served at the tower 1822-27)

Although his earlier naval career is obscure, we know most about the life at Chatley Heath of its first Superintendent, 58-year old Lieutenant Edward Harries. His letters are full of useful detail (and he sounds quite a character) so are worth reproducing here in detail. Harries was perhaps a former signal officer, who had been waiting impatiently in Portsmouth for a place. He was one of many retired officers who found themselves in an impecunious position ashore on their pension of half-pay, having perhaps failed to be involved with naval engagements yielding lucrative booty. Having already applied prematurely for a post in 1820, he applied again in February 1822:

> 'As the semaphore now erecting at Portsmouth, Lumps Fort and other places being now in a state of forwardness, I have therefore to entreat you that you will have the goodness to appoint me to any one of them – which would be the means of relieving the distress of an old and faithful Officer, who has a large and unprovided family.'[16]

Harries arrived at the tower with his wife and five children early in May 1822. However, their unconventional billet on the lonely heath soon turned out to be less than Harries had hoped for compared with their former town life in Portsmouth. Within a couple of weeks he began a stream of complaints to the Navy Board about his family's new quarters.

On 19 May 1822 Harries wrote that he had no means to draw water from the well, and 'nor is there any mode of conveying dirty water out of the House, not even excepting the kitchen, without throwing the water out of the window or door.' Mrs Harries perhaps had higher standards than the navy men.

Then there was the need to keep up their appearance in the neighbourhood. Because it was a three mile walk to Cobham and to St Andrew's Church every Sunday, 'to enable me to go on the Sabbath to Church with my family, or procure provisions, it will be necessary to have some sort of cart or conveyance, the road through the Heath being, even in this time of the year, in a wretched state.' [17]

Things were no better for Harries's assistant. Athough the fire goods arrived safely from Woolwich by stage wagon to the White Lion in Cobham, the other stores still had not arrived by 26 May, when Harries wrote again:

> 'Understanding that the Telegraph Man is allowed a cott and bedding, I beg leave to state that, as yet, no such thing has been sent and, in consequence, the man has been obliged to be at lodgings ever since. The working room, which as Mr Goddard has pointed out, will of course

[16] PRO ADM 1/2947
[17] PRO ADM 106/1359

> be the Man's room, which at present has a stone floor and no stove placed in it, which even at this time of year is unfit for proper use.'[18]

Lieutenant Harries's letters do at least allow us to deduce the layout of the tower. His daughters and a maidservant slept on the top floor; next came the boys' room. Mother and father slept on the third floor, and below that, effectively on the second floor, was the telegraph room. This meant that originally the mast passed through all the rooms all the way down to the second floor, from where the arms of the mast were operated. (When the tower was restored after the fire in 1989, a decision was apparently taken only to bring the mast down one floor, so that its base rests on the floor of the top floor, making the tower more habitable, and that is what remains in place today.)

The tower has lasted remarkably well considering the early defects in its construction that became apparent. Here is Lieutenant Harries's defects report of 11 August 1822 (so in high summer), 'submitted for consideration of the Honble Navy Board.' We can sense his frustration, from a man used to a degree of command and agency:

> 'Working Room
> Being a rough stone floor and naturally very cold and badly laid and on which myself and the assistant must traverse for 7 hours daily, have reason to state, from what we have already suffered, will in the winter season render both incapable of doing the duty of the Station - except the Board be pleased to direct that the floor should be boarded, which might be done with trifling expense either by converting the flags to another use or forming a framed floor over the flags.
>
> Front Door and Casements
> The Telegraph House - fronting SSW to NW - is exposed to those winds. The back part is sheltered by a close wood. When it blows and rains from the quarter above stated, the passage into the House is filled ankle deep with water, and the sand which encompasses the building is literally blown through all the departments of the House and into all our provisions. To remedy this very great defect the front door should have been placed immediately the other way, being the sheltered side of the

[18] PRO ADM 106/1359

building. The door and sashes being made of unseasoned timber have shrunk in such a manner that the weather finds its way into the building in many directions, consequently injurious to the House, as also to those who are the inhabitants thereof.

The Well and Apparatus
The water stinks for want of the well being cleaned. The apparatus quite incapable of drawing the water up, from the badness of its construction, with the power of myself and assistant only to do it.

Assistant's Accommodation
At present there is no mode of hanging up the Assistant's cott. A cott stand would be absolutely necessary. But as I have already stated to the Honble Board that a standing bedplace, such as is usually allowed on board ships of war (from the nature of the octagon form of the building) would be more commodious and much more out of the way of the public duty of the Telegraph, being fixed on one side or the other of the room.'[19]

Edward Holl replied in detail a week later, on 19 August 1822. His report was not without sympathy for the Harries family. It also reveals the degree of micromanagement required by the Navy Board in the snagging process:

'The Committee having been pleased, by their Minute of the 6th instant, to desire that I would inspect the several Semaphore Stations between London and Portsdown, and report for their information the state of the buildings and the one herein alluded to being situated on a Heath and very much exposed: and the Officer and his family, in consequence, much inconvenienced by its not being completed, and also by the defects stated in the enclosed paper requiring to be remedied; I availed myself of the opportunity on Thursday last to proceed to Chatley Heath and surveyed the building in question, and beg leave to make the following report thereon.

The room which has been fixed upon as the Working Room is that which was originally intended for the Men's room and is paved with stone, which I am of opinion should be covered with wood, as Lieut. Harries has requested and for the reasons he has stated.

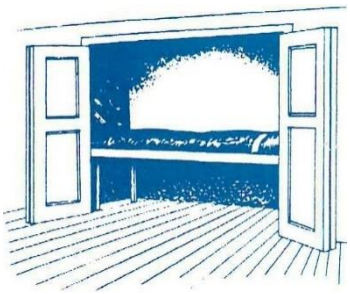
The Entrance Door, in its present situation, is much exposed, and the rain not only finds its way in but the sand also from the adoining Heath

[19] PRO ADM 1106/1359

where it rises in clouds. In order to remedy this evil I have ordered the door to be placed where the window now is and the window removed to the opening now occupied by the door. With regard to the doors and sashes, I shall have occasion to speak of them hereafter, and therefore I shall omit to notice the other part of the second paragraph in Lieut .Harries' enclosure for the present.

The depth of the well being upwards of 80 feet it is very laborious to draw the water therefrom. I would, with a view of obviating that difficulty, submit that I may be authorised to cause a small wheel and pinion to be fixed upon the barrel at the well in question: and also those at Putney Heath, Kingston Hill and Claygate.

With regard to the Bed place for the Assistant: instead of a fixed standing bed place, like those usually fixed in Barracks, I would submit that I may be authorised to provide a common Press Bed-stead, to shut up with a pair of folding doors, which will be more convenient and I presume very little, if any, more expense.



'a common Press Bed-stead , to shut up with a pair of folding doors.'

Having submitted what appears to me proper to be done to remedy the several defects alluded to by Lieut. Harries, it seems proper that I should state for the Committee's information what are the works remaining to be performed to complete the Contract, as well as those which have been improperly executed and which are as under - namely:

The Yorkshire coping upon the Parapet walls have not yet been cramped - requiring two strong 8 inch cramps to each joint. The lead ridge requires to be fixed on the roof of the privies.The ceilings to the several rooms thro' which the chains pass to the working room require to be made good: and the window cills throughout the building to be taken out and re-fixed - having, originally, been fixed in a very unworkmanlike manner.

The Mast, being full of rents, and shakes, the water finds its way into it when it rains. To remedy this evil I would submit that the Lieut. should be authorised to employ some person in the neighbourhood to stop with putty the shakes and rents: and to give it two good coats of oil colour the same as at present - a brick red.

> It would also be desirable that some other mode should be adopted to get to the Mast Head to oil the arms when required. To do this a small outrigger should be fixed to the Mast head to which a single block might be attached, with a fall so that one man might assist in hoisting the other up to do what may be required.
>
> The Doors, Shutters and Sashes at this Station, like those at Putney Heath, and Kingston Hill, are much shrunk; and I have given the necessary directions to the Contractor to make good the whole of these defects without loss of time.
>
> From the very exposed situation of this Building, outside shutters are found inconvenient particularly when the wind blows hard. I would therefore submit that inside shutters may be fixed to the three lower windows.
>
> I am requested by Lieut.Harries to state that in consequence of his having a family of five children, males and females, himself, a wife and a servant, he consequently has but one sitting room; and that sitting room having a stone floor renders it extremely cold and uncomfortable and that it would be considered a great indulgence if it was allowed to be floored with wood: and further, if the upper room, where his daughters and servant sleep, could be permitted to be separated by a slight wooden partition, it would add still further to the obligation and their general comfort: and as these alterations are practicable I am induced from the age and respectability of the officer to recommend his request to the Committee's favourable consideration.'[20]

Sometimes, as in October 1822, Lieut. Harries had to climb the mast: 'I beg leave to state that at 2.45pm, when working a message up, the upper arm became immovable, with the greatest purchase I could apply to it. I have been twice at the Mast Head, and cannot ascertain what is the reason or where the defect… The height of this building is such that the wind has immense power.'[21]

Water seeping down the inside of the mast was long term a problem, and still has to be carefully addressed today: there is no escaping the need for openings around the working arms, and the mast has to be hollow. In 1826 the kitchen

[20] PRO ADM 1106/1359
[21] PRO ADM 1/2947

sprang a leak at its junction to the house, which Harries attributed this to 'the motion of the telegraph tower in the late severe gales', reporting that the ceiling lathes in the ceiling affected were 'much decayed.'

Other weather besides driving wind and rain could be a problem. Early in January 1823, the tower was cut off from Cobham and its Post Office by snow. The nearest market town was Guildford eight and a half miles away, so supply of provisions in the snow was also difficult. 'In consequence', wrote the poor lieutenant,

> 'I have been obliged to pay an exorbitant price for every specie of provisions etc for my family use and often times have been very short for want of some conveyance or other. Under the circumstances, have to request the Honourable Board will be pleased to allow me to purchase a donkey and a pair of panniards in order that I may be able to carry on the public service of the station, as also to procure the necessary supplies for it. The donkey and panniards might be bought in this vicinity upon reasonable terms and the keep of the ass will be 5 shillings a week' [22]

Rather astonishingly, this request was refused by the Board.

Harries came up with a solution and tried again in June 1823, thinking ahead about how he could lay in supplies for the winter:

> 'I beg to assure your Honours that we were several days last winter without bread or meat, not being able to provide supplies from either Cobham or Ripley in consequence of the severity of the weather and the badness of the roads across the Heath. Should objections have arisen in the formation of a cellar under the House, I beg leave to solicit your Honours would be pleased to grant me the indulgence of having a small Privy built at a proper distance from the house, the present one being only 7 feet from the kitchen door - consequently very offensive and un-healthy. Should your Honours be pleased to grant my request, the present Privy might easily be converted into a cellar which would be a great accommodation.'[23]

[22] PRO ADM 106/1359
[23] Ibid.

Mr Holl backed up this suggestion, reporting that 'The expense of altering the present double privy and building one only, in-stead of the two, may be done for a sum not exceeding £20.' This request at least was approved, and the alteration may also explain a faint scar of some kind of outbuilding on the northwest elevation of the accommodation block.

We get a further sense of Lieutenant Harries's view of his own rightful place in the world from an exchange in May 1826. The Reverend James, Rector of Cobham, had called at the tower, fund-raising to enlarge St Andrew's parish church, as his congregation increased in step with the local population. Lieutenant Harries had already been outraged when the churchwardens of Cobham expected him to 'sit among the upper servants of the surrounding gentry,' at which Revd. James had generously allowed the Harrieses to sit in his own family's pew. He would, wrote Harries, have been 'deprived of every religious comfort had it not been for the kind indulgence of the Rector who has given us permission to occupy his own seat until his family should want it, which is likely to take place just now.' The solution suggested by Revd. James was that the Admiralty should subscribe £20 to buy a pew for the officer in charge of the tower in perpetuity. 'Sunday divisions' (as the Navy called Divine Service on a Sunday) were part of the routine lives of naval officers, and the Board agreed to make the subscription. This seems a major concession: in 1822, for example, the Board refused to contribute to the arrears in annual pew rent that one Lieutenant Spiller inherited from his predecessor at the Semaphore Supervisor's house in Southwark. Lieutenant Harries had furnished his borrowed pew with a four-foot horsehair cushion covered in green moreen, and two hassocks. The Naval Board's response is now unknown, but, we may suspect, was unlikely to have been favourable.

By now, Harries and his family had also set about becoming more self sufficient, creating a sizeable holding on the acre around the tower. When his

five years of service came to an end in 1827, Harries described what he left behind for the next Superintendent:

> '3 cherry trees – 3 plum – 1 greengage – 1 apricot – 6 filbert - 15 apple trees in full bearing. A raspberry plantation, strawberry beds, gooseberry and currant trees, upwards of 5OO: shrubs of various sorts, a summerhouse with mast and rigging etc. Woodhouse, henhouse and pigsty thatched'.[24]

Presumably Mrs Harries enjoyed making jam. Harries's successor Lieutenant Robert Hutchinson paid £11 5s 0d for this productive patch.

In January 1827, knowing his term of service was coming to an end, Harries wrote to the Admiralty that,

> 'Your memorialist laments he is shortly to be removed from the Superintendence of this Station - at the advanced age of 63 and therefore *most* humbly entreats your Lordships would be *pleased* to grant him the Out Pension of Greenwich.'

It is yet to be discovered whether his request was granted.

Lieutenant Robert Hutchinson (served at the tower 1827-29)

Again, we know little of Lieutenant Robert Hutchinson's earlier career. When he took over in March 1827, he inherited a dilapidated mast and it was decided to replace it. The shipwrights and riggers erected their scaffolding again and began work on 27 April 1828. Disaster struck, as Hutchinson reported to the Superintendent of the Telegraphs at the Admiralty:

> 'The sheers for the shifting of the Semaphore mast were erected yesterday and all due precautions taken for the security of the same: this morning the frappings [cable wrapping] and guys were carefully examined before lifting the mast: the mast was steadily raised, and the heel just cleared of the parapet when the spars, forming the sheers, buckled and the whole came down by the run snapping the sheers and guys. Two thirds of the old mast are shivered, some damage done to the stucco, some of the stone coping of the parapet loosened and some chimney pots broken. Fortunately, from the secure frapping passed

[24] PRO ADM 1/2950

> through the windows of the upper storey and the scuttle [=?] of the roof to the heels of the sheers and the horizontal tie-spar connecting the same, no accident occurred to the men aloft.' [25]

Service was interrupted along the line for a full seven days before the new mast was operational again, which cannot have pleased the Admiralty Lords. Hutchinson's tour of duty at the tower lasted just two years, and illustrates the straitened position of many retired sailors and soldiers after the long Napoleonic conflict. Hutchinson fell into debt with local tradesmen, one of whom insisted on payment in full. Despite pleading with the Admiralty to intercede on his behalf, in November 1829 Hutchinson was committed to Horsemonger Lane Gaol, from where ('Debtors Side') he wrote again, this time asking for help in obtaining reimbursement from the new superintendent at Chatley Heath for all that he had had to buy from Lieutenant Harries, and now had had to leave behind. He also mentioned the improvements he had paid for himself at the tower:

'I particularly request your attention to the Penthouse or close verandah over the kitchen stairs forming a dry communication to the interior of the house.'

He had also built a large shed, for which he was now reimbursed £5.12s Od, but received no help in regaining the £11.5s Od he had paid Harries for his smallholding. His later fate too is unknown.

Lieutenant Peter White (served at the tower 1829-1834)

Lieutenant Peter White moved in as soon as Hutchinson left for the debtors' prison. White's five years at the tower seem to have been uneventful and we know nothing of the rest of his life, though he too had cause to report the effects of bad weather:

> 'I beg leave to inform you on opening the sitting room window on the morning of 25 September last [1830] I had scarcely taken my hand from the holdfast of the window shutter when it drew from the wall by a

[25] PRO ADM 1/2950

> sudden gust of wind - it blowing a very heavy gale at the time - and in an instant (as if by magic) three panes were broken and smashed to atoms. The two panes in the working room were found cracked on the 14th of last month [March], it having blown a most violent gale with exceeding heavy squalls the whole of the preceding night, and , on the Assistant throwing up the sash, the pieces dropped out...' [26]

Lieutenant Malachair Donellan (served at the tower 1834-1839)

In November 1834, White handed over to Lieutenant Malachair Donellan. In Donellan's case, something is known of his past career, and, still in his mid 40s, he was perhaps younger than other Superintendents. Donellan had joined the Navy in 1800 at thirteen as volunteer first class (and so expected to become a midshipman after five years) aboard the *Leyden.* He saw his first enemy action the same year in an attack on the French flotilla off Boulogne under Nelson's command. When he was fifteen he took part in the forcing of the Dardenelles on board the *Active* and was deployed on one of the boats which destroyed a Turkish frigate and several Forts. He had sailed the world, most of the time on active service, and the stillness and boredom of manning the semaphore in the uneventful 1830s must have seemed some contrast.

Donellan still had ambition, however, and as his term at Chatley Heath was drawing to a close in November 1838, he wrote to the Admiralty reminding them that he had been a Candidate for over ten years on the First Lord's List for a separate Command, or a Post Office Packet. On 30 November, he acknowledged an appointment to Receiving Ship *Crescent* at Sheerness.

Lieutenant Benjamin Baynton (served at the tower 1839-41)

The next Superintendent, Lieutenant Benjamin Baynton (1789-1854) had an even more distinguished service record, which is worth recounting in some detail for its breadth and daring. Bayton was Welsh, the son of a major in the

[26] PRO ADM 106/1443

army and just twelve years old when he joined the navy in 1801 as a non-commissioned seaman first class. He served first on the *Flora* (36 guns) under Captain Edward Kendall, and then on the *Victory*, Lord Nelson's flag-ship. In August 1803 he was promoted to Midshipman aboard the 32–gun *Amphion* where in October 1804 he played his part in the capture of three Spanish frigates laden with treasure and the destruction of a fourth, off Cape St. Mary in Newfoundland.

Baynton next served on the *Halcyon* during which he distinguished himself in numerous actions in the Mediterranean apparently before he turned twenty (assuming his birth year is given correctly). He assisted in taking an enemy launch off Malaga; was instrumental in effecting the capture of the largest of three privateers, the *Neptuno Dios de los Mares*, (14 guns and 72 men) on 13 December 1806; commanded a mortar-boat in an attack on the French batteries at Scylla in the Mediterranean, in February 1808. He became Acting Lieutenant early in 1809, first of the *Ocean* (98 guns), under Lord Collingwood, and then of the *Cambrian* under Captain Fane, where his commission was confirmed in January 1810. In the following September Baynton was part of the capture and destruction of a French battery at Bagur, on the coast of Catalunya. He was also at the storming of a fort near Palamos. In this action, the launch he commanded was struck by a shot, and sank almost before the wounded and the powder could be removed. On 13 December 1810, Baynton was in charge of the *Cambrian's* boats in an attack made with other ships on an enemy's convoy off Palamos. The engagement turned sour for the British who were forced into a disastrous retreat. Men crowded into the boats to escape and Baynton's barge grounded, helpless under fierce enemy fire onto the shore. Thirty men were killed or wounded. The boat was only eventually got under way by the three survivors swimming and towing her off. Baynton received a musket-ball in his thigh. For his services off Catalunya, Baynton received one of eight gold medals, struck by the grateful Spanish Government for British

service at the actions at Bagur and Palamos, and received public thanks from General O'Donnell for his spirited behaviour.

Baynton's valour was also singled out for recognition by the Lloyd's Patriotic Fund, who presented him with a sword valued at £50 (about £2,000 today). The Fund first asked for confirmation of the facts from his acting commanding officer in April 1811, who wrote back that

> 'On the 13 December 1810 the Command of the Cambrian Boats (after landing the detachment of Seamen and Marines) devolved on Lieut.Baynton. At the retreat, from the men crowding into the boats with such precipitation and in such numbers, the Barge, in which he was, grounded; in consequence, exposed them to a most murdering fire from the enemy without any means of resistance: while endeavouring to get her afloat he received a musket ball in the thigh which has not nor is there any appearance of its ever being extracted. Upwards of thirty men were killed and wounded. Seventy-six balls passed thro' one side and sixty-two the other, and upwards of two hundred men were taken out of her next day.' [27]

Lloyd's Patriotic Fund (named after Lloyd's coffee shop) was founded in July 1803 as a fund to give grants to those wounded in service and to set up annuities for the dependents of those killed in action, in which purpose it continues today. In the early 19th century the Fund also awarded prizes to British combatants like Baynton who went beyond the call of duty. The rewards could be a sum of money, a sword or a piece of plate, both suitably inscribed. Such awards were well-publicised to help raise morale. Baynton's sword was one of 91 swords of £50 value awarded to naval lieutenants and marine captains (lesser ranks might be awarded a sword worth £30; those for commanders or above £100). Baynton's sword is now in the Royal Naval Museum in Portsmouth.

After recovering from his wounds, Baynton continued to serve on various ships in the West Indies. In January 1812 he was appointed to the *North Star* (20

[27] PRO ADM 1/2794.

guns) and served until November 1815 in the Channel and the West Indies, where he eventually commanded the tender *Speedwell*[28] until 1818.

Baynton was stood down on half-pay on 1 May 1818. In 1821 he married Anne Ogilvie of London with whom he had six children. He drew half-pay until 1839 except for a brief spell in 1827 when he is recorded as acting as an Agent for Transports Afloat. In the early 1830s, like many others in his position, he accepted command of a 300-ton merchant ship, *Kingston*, trading with Jamaica (as Britain had abolished the slave trade in 1807, Baynton would no longer have been carrying enslaved people on his ship). In October 1834 he wrote to the Admiralty requesting twelve months further leave to continue on the *Kingston.* In 1839, by now aged fifty, he was living in the Semaphore House at River Hill, Alton in Hampshire, one of the stations on the Plymouth line, whose construction had been halted. He took up his appointment at Chatley Heath in November 1839, where he stayed for only two and half years. He was initially appointed Commander in 1841, but was soon returned to half-pay. The *Naval Biographical Dictionary* published in 1849 records him as then unemployed, although in September 1852 (by now in his sixties and perhaps widowed?) he returned to sea as commander of the 3rd-rate *Hercules* 'in particular [private] service.' [29] Benjamin Baynton died two years later, bringing an eventful life to a close.

Lieutenant Edward Robinson (served at the tower 1842-1847)

The last Superintendent at the tower was Lieutenant Edward Robinson, who took charge in 1842. It is a common enough name and nothing is known of

[28] A tender is a boat that supports other ships, usually by transporting people or supplies.
[29] https://en.wikisource.org/wiki/A_Naval_Biographical_Dictionary/Baynton,_Benjamin and https://threedecks.org/index.php?display_type=show_crewman&id=3228 and https://www.pdavis.nl/ShowShip.php?id=1561 Commander is a rank between lieutenant and full ranking captaincy, acknowledging ability to command a ship.

him. By now, technology was advancing and electric telegraph lines were spreading a pace with the railways.

The electric telegraph, first demonstrated by Charles Wheatstone and William Cooke in 1837 (after Francis Roland's earlier prototype had been dismissed by the Admiralty in 1816).

The Tower after the end of the semaphore

Decommission and Sale

In November 1841, the London and South Western Railway opened the line to Gosport, just across the harbour entrance from Portsmouth. A steam ferry carried passengers across the harbour, but in any case Gosport was just as close as the main harbour to the port admiral's flagship at Spithead. A written message could now be sent from London in a few hours. More significantly still, on 25 July 1837, William Fothergill Cooke, an inventor, and Charles Wheatstone, a scientist, carried out a demonstration of communication by electric telegraph between the station rooms at Camden Town – where Cooke was stationed with Robert Stephenson, the engineer – and London Euston, where Wheatstone was situated. A breakthrough in electric telegraphy had been simmering since the mid-18th century, and we have already heard about Francis Ronalds' experiments in 1816 that were so summarily dismissed by the Admiralty.

Cooke and Wheatstone's audience was the directors of the London and Birmingham Railway, since their goal was to improve safety on the railways, but of course the impact of the demonstration was far more wide-reaching than that. Cooke and Wheatstone went on to become the founding fathers of The Electric Telegraph Company, of which BT today is a direct descendant. Cooke and Wheatstone's own innovation was to use needles on a board that moved to point to letters of the alphabet according to the transmission. Any number of needles could be used, depending on the number of characters it was required to code. Their patent recommended five needles, which coded twenty of the alphabet's 26 letters. The pair also pioneered the close relationship between rail and telegraph networks, since the electric cables needed for the telegraph could be easily installed along the railway lines.

Now it was possible to send a message instantaneously and independent of the weather, the semaphore line became redundant. The properties where the

stations stood were usually offered back to the original owners. Thomas Page had died in 1842 and he left the tower at Chatley Heath to his unmarried daughter Sophia. The tower was surveyed by an unknown surveyor in 1847, when Robinson was still the 'man in charge.'

> 'Description: On the Ground Floor, two good Rooms, Kitchen, Scullery and Offices, above are 4 rooms in the Tower in good repair, internally and externally and well supplied with water.
>
> Situation: On Chatley Heath, bounded on one side by a Fir Plantation with a bad approach from the Road leading to Horsley & entirely remote from any habitable locality.
>
> Note: This Building is ill adapted for a residence, but it should be remembered that there is an immense mass of material, the upper stories should be taken down and the surplus materials sold, or used in building an additional room over the room on the Ground Floor.
> The Tower I consider to be ornamental to the Estate of Miss Page and would also be useful as a residence for a Keeper reserving the upper part for the advantage of obtaining therefor as view over her estates in the neighbourhood, and the splendid Panoramic scenery which it commands.'[30]

The mast was still in position; it was estimated that making good after its removal would cost £35.

Miss Page acted on the recommendation, and bought back the tower and its land from the Admiralty on 7 May 1849 for £280. From then on, it became accommodation, initially for estate workers. The tower may have been 'ill adapted for a residence' but it was saved by its picturesque possibilities from the fate of most other signal stations. Only a handful of these survive, and they have mostly been adapted almost beyond recognition from their original form. This semaphore station is the only surviving tower type, and, in the words of the Historic England listing description, 'an unusually fine example of the early 19th -century telegraph-signalling stations.'

[30] Surrey History Centre TS 45/50

The Ivey family lived at the Semaphore Tower in the 1930s. Arthur Ivey, shown left with his dog Jacko, was a gamekeeper on the Heath.

His younger daughter Ruby, who provided us with these memories, is shown above with her three siblings and parents.

The Ivey Family : Memories of Chatley Heath and Telegraph Tower.

In the 1930s, the Ivey family lived at the tower, and during Landmark's restoration, Helen Begley got in touch with on behalf of her mother Ruby, who happened to see a piece about the restoration on BBC1's *Countryfile* in August 2020. With Helen's help, Ruby sent us her wonderful memories of living at the tower, reproduced here in her own words:

> My name is Ruby, I was born in January 1928 to Olive Katharine and Arthur Ivey. I was the youngest of four children, two boys, two girls. My eldest brother Reg was six years older than me, my sister Pam four years and brother Tony two years. When I was about two the family moved from a cottage called Woolvens up the hill to Telegraph Tower. There was no road, only a steep track and a path lined with rhododendrons, it was known as the Badger Path. To move our little bit of furniture and belongings we used a donkey and cart and our big pram.
>
> We moved into the lower part of the Tower shown on the right hand side of the photograph. I remember a big green door which led into a passage, in places the ivy had pushed its way through and was growing on the inside. There was a little side room which had bars at the window which my eldest brother had for his bedroom. The rest of the family had one big bedroom upstairs.
>
> There were stone steps down into our kitchen/ living room which seemed to be almost underground, the only light coming from a basement window above. Our warmth came from an old black kitchen range which did all the cooking. Mum kept it clean with the black lead polish. The oven always seemed to bake well and there was always a pot boiling on the stove, usually rabbit stew.
>
> The one thing I remember so well was the enormous dresser, it covered one wall and nearly touched the ceiling. It was one of my favourite places to sit under. There was always a silver whistle hanging on this dresser which was to be used if ever we wanted to call Dad, it could be heard for quite a distance, especially as there were few other noises then. I do not recall ever having to use it though. I often wonder how we managed to read so much and how Mum was able to mend and sew in such dim light but I don't think we ever noticed it. We also had a cellar which had little square holes in the very thick stone walls.

Top: Pamela, Reginald, Ruby and Anthony Ivey.
Below: a later family group outside the tower.

My father Arthur Ivey was a gamekeeper, his boss was Mr Arthur Fox. As a gamekeeper he had numerous duties, controlling vermin when necessary, cutting rides or paths through the woods and patrolling the Heath to watch out for fires that could get out of control in the summer months. Shoots were also held in the surrounding area. There was an underkeeper called Stan Plumbridge who assisted Dad with their many tasks. In any spare moment my Dad loved to study the wildlife around the woods and heath.

My mother Olive had been a nanny in Chelsea before she married. During the summer at Chatley she would go fruit picking for local farmers. I would play at the edge of the fields with the visiting Romany gypsy children whose parents were also fruit picking. I recall the colourful painted wagons and their horses tethered nearby. When it was time for them to leave at the end of the season, we would wave goodbye from the school playground as the wagons passed through Downside village.

As children we loved climbing trees and would sometimes sit up there for a long time. One of our favourite trees was a very large laurel where we had a platform built in the top. We would sometimes pick a laurel leaf, scratch a message on its underside with a twig, then leave it in a dark place to magically appear later. Some evenings, just at dusk we would suddenly see a figure darting through the trees. It had no shape and seemed to be covered in spots. We used to run screaming but somehow it did not worry us. We later found out that it was our elder brother, covered in an old sheet that was dotted with paint.

Another of our pastimes was to drop anything metal like toy soldiers or Mum's hair pins through a hole in the floorboards of the kitchen/ living room, then with a magnet on a string try to retrieve them. Many things were never found, I wonder if anyone ever found them years later. We were often short of cutlery, spoons were often discovered out in the garden where we used to like making mud pies and digging big holes to sit in. We used to sit in an old tin bath (shown in photograph) and pretend to be pirates sailing out to sea. We would whittle toy catapults and bows and arrows out of wood and play in the huge rhododendron bushes which made wonderful dens within their twisted and gnarled branches.

Sometimes in the summer Mum would take us to Wisley Hut Lake. I would wear my hand knitted bathing costume and stay in the shallows at the edge of the water whilst holding onto our dog, Jacko. One winter, when I was about three, I remember my Mum struggling through deep snow with me in my pushchair to the village of Downside, probably to

meet my brothers and sister from school. It was a long walk of lanes, hedgerows and streams.

On Sundays we would put on our best clothes to go to the evening service at Hatchford Church which was at the other side of the wood. Dad would sometimes carry a candle in a bottle or jar to lead us through the dark. Occasionally the service would include lantern slides, which I enjoyed.

Dad was very good at telling stories. In the winter evenings we would all sit around the old range in the light of the paraffin lamp and candles eating roast chestnuts as we listened. The wind through the trees used to make a wonderful sound, sometimes a gentle humming and sometimes a roar. Dad used to say that they were talking and singing and that occasionally they got angry. The Tower could be a frightening place in a thunderstorm but my elder brother would calm us by saying that it was just God moving the furniture up in the heavens. I remember one night there was a terrible thud and the whole building seemed to shake. We found out that a thunderbolt had landed in a field not far away. There were times when pine trees would be struck and cause a fire on the common.

If Mum needed to go to the shops she would walk to Cobham, following the route of the river Mole. If she went to the butcher's she would return with a small parcel of pigs trotters or a lump of suet with scraps for the dogs. Dad would bring home wild rabbit which was roasted, stewed or baked in a pie. We grew vegetables and also had a few chickens for eggs. Any sweet chestnuts collected in autumn were stored in sand. There was always a bottle of home made wine, often elderberry and especially damson as the garden was surrounded by damson trees. We also used to pick baskets of dandelion flowers on the way home from school for Mum to make dandelion wine.

From the shops we might have a tin of broken biscuits. Any paraffin, candles or batteries had to be carried home. Coal was only occasionally bought as it was expensive, it would be left at the bottom of the hill to be pushed home in our pram. The best fuel for our copper boiler were fir cones which were plentiful in the woods. As children we would collect them, filling up our old pram once again. The copper boiler was situated in an outhouse around the side of the Tower. After washing the clothes, Mum would put us in the water for a scrub down with a big bar of soap. The water came from a well. Mum would lift the lid and put the bucket down, it was difficult to haul it back up without losing any water, there were often frogs in it. Our toilet was down the bottom of the garden in an old wood shed, the bucket itself was in a little brick built corner up a few steps.

At Christmas Dad would go into Guildford on the bus, he would go late so that he could catch the fruit stalls closing down and be able to get things at a cheaper price. There was always a few oranges, nuts and a little present for each of us. We were allowed to wait up for him, he had quite a walk from the Portsmouth Road. It was with great excitement that we would hear him whistling as he walked through the woods on Christmas Eve.

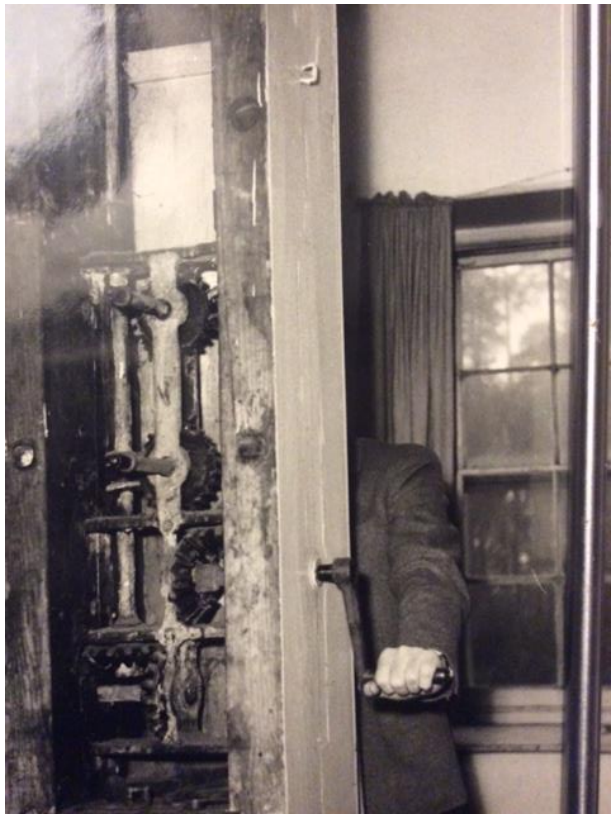
When they were needed Mum would make rag rugs, an old hessian sack with scraps of material woven through it, we would help with this. Dad would cut our hair and Mum would often tie a few rags in mine to try to make it curly. I liked to watch Dad mending shoes and cutting the leather to shape. He would hold the brads in his mouth before hammering them in. We once thought that there were ghosts in the Tower. At certain times we would hear a knocking noise which kept stopping and starting. It was only in later years that we realised that it was Mr Turner, the man living in the other side of the Tower who was mending his shoes too.

When I was about eight or nine we moved from Chatley Tower to Chatley Farm as my Dad's employer wanted him to carry out other duties as well as game keeping. It was while living there a few years later that the outbreak of war was announced on the wireless as we sat and quietly listened. It was not long before the big anti-aircraft guns were put out on the common and barrage balloons were going up around the Vickers factory which was not too far away at Weybridge. I remember one day when one of the balloons broke away from its moorings and was drifting across the countryside with its cable hanging down. At night we would watch the big searchlights sweeping across the sky and we would go down to our air raid shelter most nights, the dog Jacko being the first to go in. We used to have quite a lot of German planes going over and the sirens seemed to be going morning and night.

We usually got to school alright but we were told to get under trees or in a ditch if aircraft came over. Very often a siren would go off just as lessons started so we would file into the school air raid shelter which was very dark, damp and cold. We would hear machine gun fire of the fighter planes which were Spitfires and Hurricanes and the boom of the big guns on the ground. We were often in the shelter for a long time so we would sing songs to keep us cheerful, only emerging when the all clear siren sounded.

The sounds and smells are the things that I will mostly remember about living at Chatley Heath and Tower, the owls calling at dusk, the eerie cry of the vixen and badger, the wonderful smell of the pine trees in summer after a shower of rain and the scent of the azaleas growing thickly down the hill.

John Turner on the tower steps (his association with the tower is uncertain). Note the elevation mark on the top step.



Photos from Graham Johnson, of growing up at the tower in the 1950s and early 60s. Clockwise from top left: Graham in his best suit winding the mechanism for a press photographer (the arms had long since gone); Graham's father drawing water from the well; the winding mechanism; Graham climbing out onto the roof.

Later residents at the Tower & restoration in 1989

Someone else who got in touch by email was Graham Johnson who lived at the tower from 1948 until 1963, and had seen an advert on a local Facebook page when we were looking for a housekeeper (in the context of this particular album, it seems worth capturing today's communication networks, if only to reflect on the contrast with the clacking arms of the semaphore).

Graham wrote:

> I was a year old when my parents moved to the tower on Chatley Heath, they had spent the winter of 1946/7 in a caravan and were delighted to find a house to live in. There was a shortage of housing in the area.
>
> Conditions were primitive, outside loo, no light, heating, drainage, refuse collection etc. We used paraffin for lights and heating away from the fireplace. My father installed a cold water tank in the kitchen which was filled using a semi-rotary pump from the storage tanks in the grounds.
>
> I went to infant and junior school at St. Matthews, Downside, cycling each way from the age of six and was the envy of the boys for my playground, the woods. My mother kept us supplied with ginger beer during school holidays.
>
> We always had a telephone because of the fire-risk, and I remember several, some of which burned for days.

Graham and his parents returned for the tower's reopening after restoration in 1988.

The Semaphore Tower in 1962. The mast had long been dismantled and the tower was clad in an ill-advised cementitious render. (Historic England Archive)

But the days of living at the tower were numbered by the 1960s, as higher standards of living started to be enforced. In May 1961, architect Fred W. Strange reported on the tower for Esher Urban District Council, following up a visit from the council's Senior Health Inspector who had reported various sanitary shortcomings. An estimate to install mains water had found it would cost a prohibitive £2,000 (over £40,000 today). The tower was still owned by Mr Fox of Chatley Farm. Strange's report found the tower somewhat damp, especially on the top floor, but generally in fair condition with 'no sign or settlement or fracture.'

At that date the tower was cement rendered: Strange quite correctly thought that 'the application of cement rendering has probably been unwise, as the type of brick used in the construction of the tower are hard and non-porous.'

Strange also considered with sobering prescience that in view of the tower's national importance:

> 'Every effort should be made to ensure its preservation and occupation for so long as a tenant is available, having in mind the remoteness of its position and rough tracks whereby it can be reached. If at any time it is not possible for it to be completed then adequate measures should be taken to ensure security from vandalism.'

In 1963 the Johnson family were given notice to quit, as without mains water or sewage provision, the tower was no longer considered fit for human habitation. It had been listed very early on, in August 1953 by Ministry of Public Buildings and Works, when its operating gear was still there.

In August 1965, Surrey County Council bought 70 acres of Chatley Heath to add to Ockham and Wisley Commons, including the tower plot. SCC also partly restored the tower in the 1970s to make it weather- and intruder-proof, but also renewing floors, repainting the stairs and re-roofing. All the ground floor windows were filled in and the immediate surroundings were cleared of rubble and growth.

The tower after it was gutted by fire in 1988.

Proposals for the restoration of the tower in 1988.

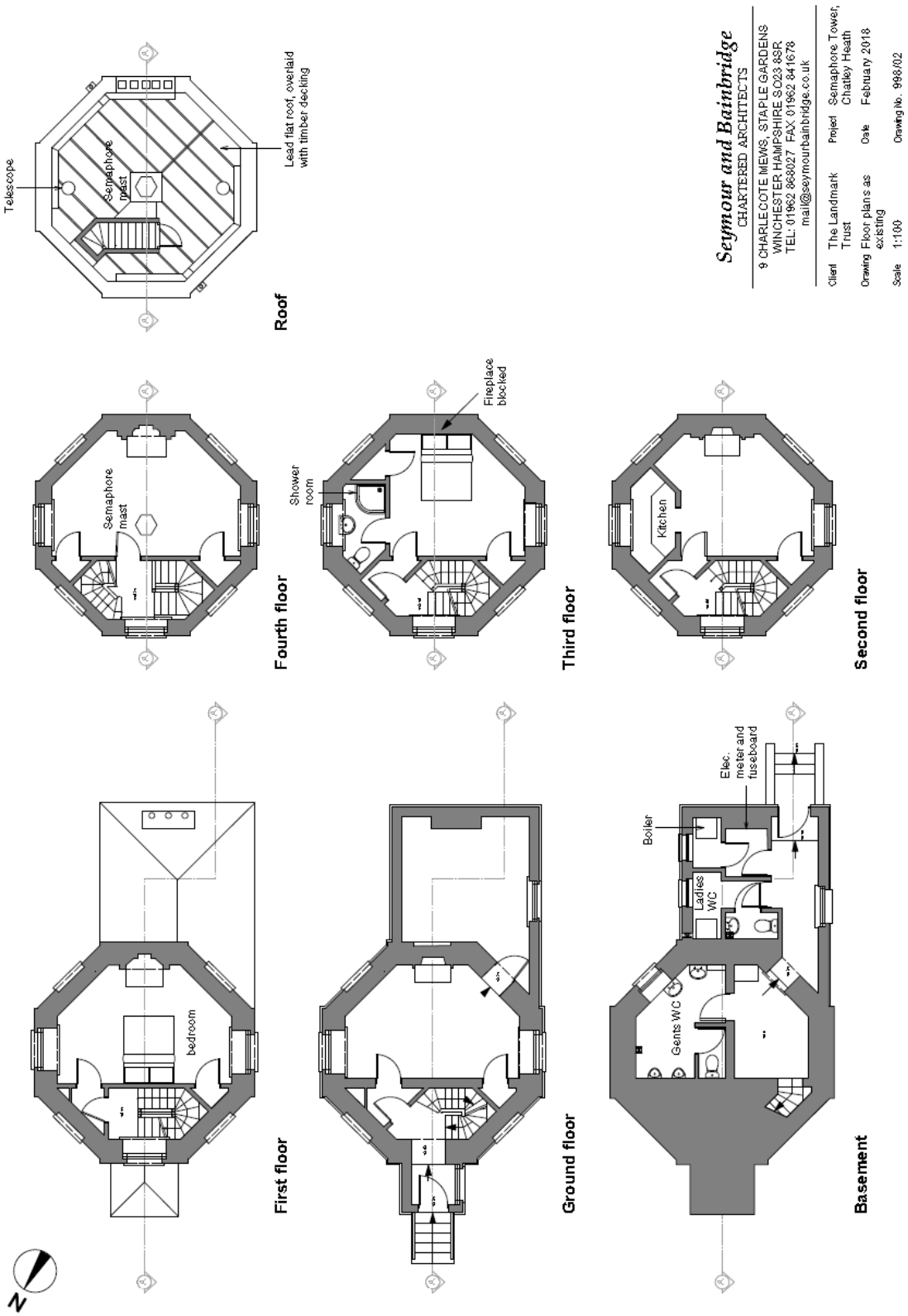
Sadly, even sound and weathertight, leaving such a remote building boarded up and empty is never a long term solution. In 1984 the interior was completely gutted by fire set by vandals. Its brick shaft, soundly built by the naval subcontractors, survived intact and in 1988, in celebration of the centenary of the 1988 Local Government Act and its own foundation in 1889, Surrey County Council decided to restore the tower in partnership with the Surrey Historic Buildings Trust, to convert the tower to (working upwards) a reception, volunteers' mess room, a trainee rangers' flat, museum room and observation point on the roof.

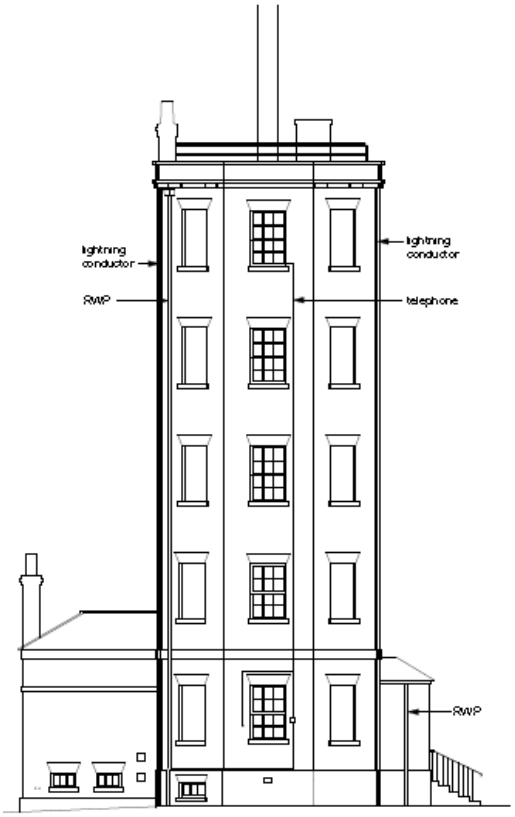
The reopening of the newly restored tower in 1988 saw sea cadets abseiling down from the roof as well as demonstrations of the semaphore.

They did an excellent job, faithfully reproducing the simple Regency joinery and, thanks to Popham's own carefully commissioned drawings, also reproducing the mast and its apparatus. They also brought in water and electricity, and installed a septic tank and safety railings round the roof. A long lease was taken by the Surrey Wildlife Trust, and the tower was once again occupied. It seemed its future was secure.

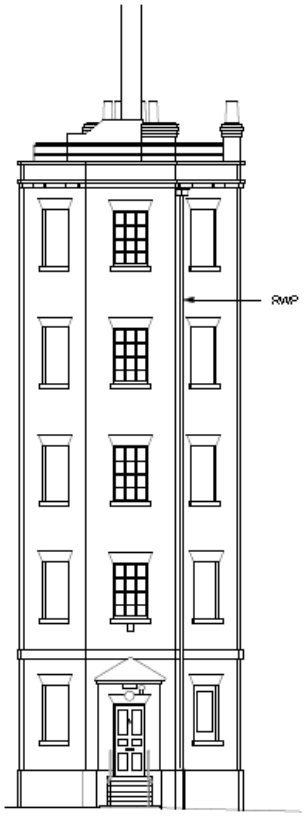
However, fast forward twenty five years and the inevitable maintenance cycle came round again. The tower was once again suffering from damp and needed comprehensive repair that the Surrey Wildlife Trust, with its own different remit, could not afford. This led in 2014 to an approach to Landmark. We had recently carried out a careful review of the Buildings at Risk Registers to identify building categories to target strategically, where Landmark's particular form of re-use would be appropriate. One of our self-defined categories was buildings relating to 'Communications & Technology' – which the Semaphore Tower fitted perfectly.

Plans and elevations – before conversion (2018)

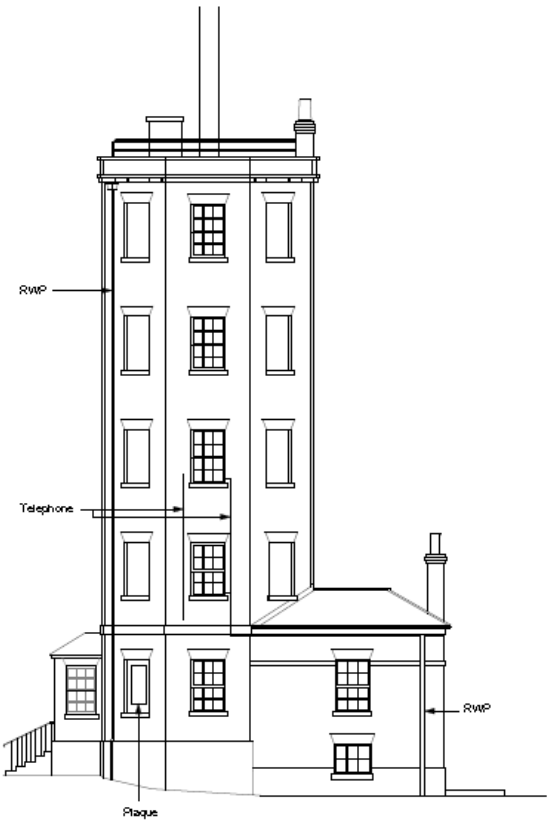




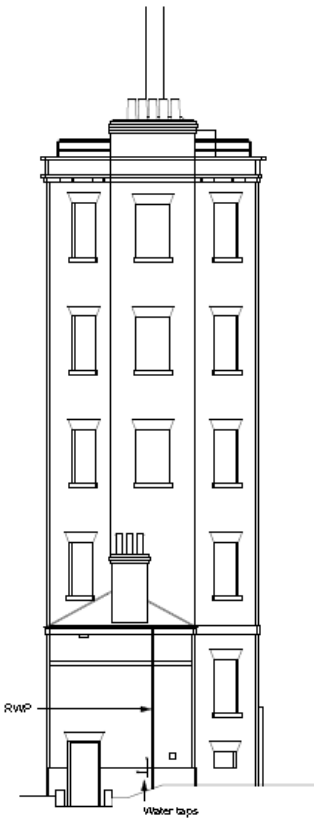
Northeast Elevation



Northwest Elevation

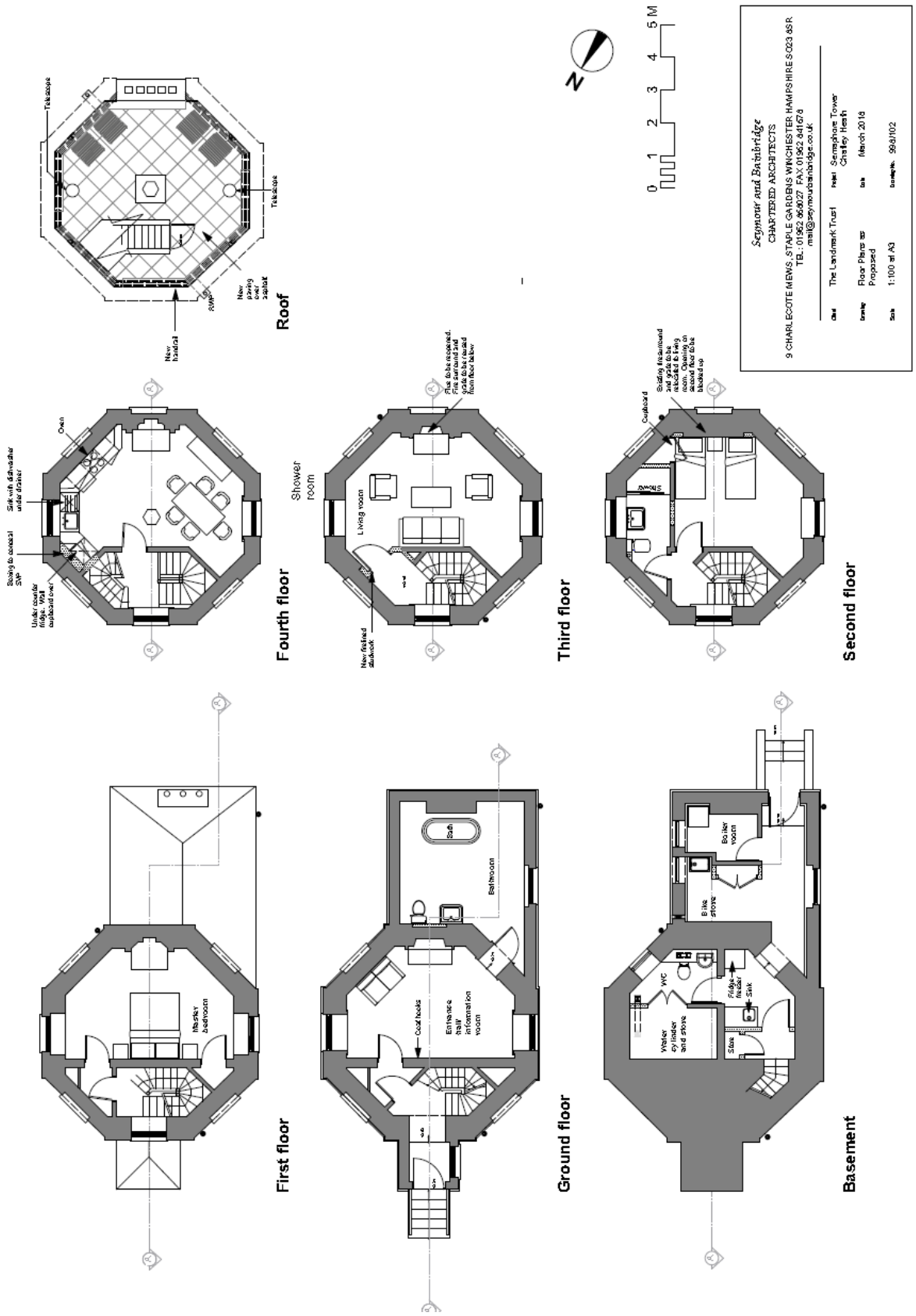


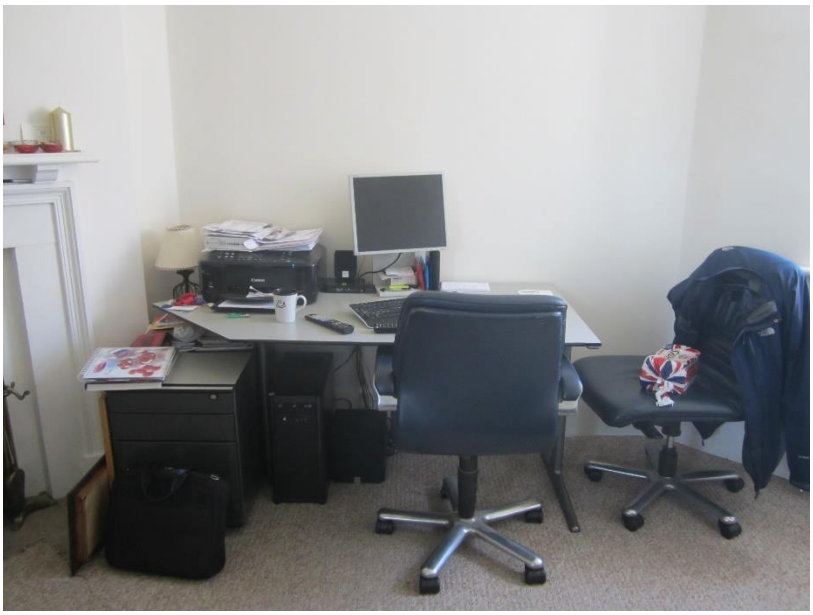
Southwest Elevation



Southeast Elevation

Floorplans after conversion and repair (2020)





The tower interior in 2015, before Landmark's restoration. The first and fourth floors were being used as public interpretation rooms, with a small flat on the second and third floors.

The tower fully scaffolded, mast included, in early summer 2020 during the first Coronavirus lockdown.

The ceilings were stripped back and the plaster removed from the walls where necessary, here on the top floor.

Restoration by the Landmark Trust

The tower has retained its II* listing despite the comprehensive 1980s restoration by Surrey County Council and the Surrey Historic Buildings Trust, whose restoration was well carried out and respectful of the original military detailing of the Regency period both internally and externally. Landmark's works were therefore comprehensive repair of the external shell; the introduction of new and upgraded heating and water services, bathroom and kitchen, and some necessary (but reversible) change in floor layouts, under the guidance of architect Louise Bainbridge.

As with any tower Landmark, particularly careful thought had to be given to the relative functions of all the floors, although happily the already self-contained staircase made compliance with fire safety less problematic than it might have been. A sprinkler system has been installed as fire protection, and all the doors are fire proof to the required standard. Access issues also had to be carefully reviewed at an early stage, to allow car access to the tower for Landmarkers, as well as Fire Authority access. Happily, Highways England were able to confirm that the weight bearing capacity of the bridge across the M25 comfortably exceeds that needed for a fire engine.

Once the tower was completely scaffolded, contractors Valley Builders of East Grinstead went on site early in 2020. In March the country was hit by the Covid-19 pandemic. This resulted in national lockdown from 23rd March until early July; however the Valley Builders team decided they could carry on working compliantly, the separate floors allowing for independent working by the various trades. Through the hot summer of 2020 all site visits had to be made wearing masks, including a couple of small group visits for Guardians.

As little as possible was done to the exterior: any remaining patches of cement render were removed, a few bricks replaced and the pointing repaired in lime mortar only where necessary. The tower was found not to be a true octagon: its walls are thicker at the base. Both this construction and its fine brickwork are testimony to the skill of Thomas Corfe and his builders in 1822. Some window arches were sagging so these were carefully reviewed and repaired as necessary. The extension block was re-roofed in slate and new cast iron rainwater goods were installed, as were new drains and a soakaway. The tower is also the first new Landmark to have a car charging point, the lack of which will soon seem as old fashioned as the semaphore.

Little needed doing in the extension block wing, where a small kitchenette was put in alongside the cloakroom. The rest is given over to storage and mechanical service plant (which includes a pressure unit, to make sure of consistent water pressure right up to the top floor), plus a bike store. A new bathroom was created on the mezzanine level, to serve the first floor bedroom. The entrance floor retains the electric working model of the tower created by Surrey County Council, for the amusement of Landmarkers and for public open days, as well as serving as a hallway for the Landmark.

The 1984 fire did not reach down as far as the first floor, originally the operating room for the semaphore, and so its interesting primary, reinforced floor construction remains. To support the weight of the mast, which came all the way down to this floor, there are steel joists beneath the wooden floor (one hopes Lieut. Harries did get his way and that the cold stone flags were replaced while the tower was still operational). These joists are beaded T-shapes, and curved for additional strength. The steel tray to hold the heel of the mast was also found to be still in place, with traces of the original red oxide. It is possible that this tray was also designed to catch oil and water drips down the mast. The windows in this and the other bedroom are all double glazed.

Panoramic views during works: Top: kitchen (fourth floor); Middle: sitting room (third floor). The windows were used as delivery points for materials – hence the wooden steps beneath. Below: installing the sitting room hearth, and the shower room on the second floor.

On the next (second) floor, partitions were inserted to create an ensuite shower room alongside the bedroom. On the third floor, the bathroom to the ranger's flat was removed to make it the sitting room, to start to benefit from the views above the treetops. On the top floor, Landmark's joiner Mark Smitten installed a new fitted kitchen, its design again maximising the views and working around the base of the mast and its operating winches. These have been fixed in place, but working demonstrations will be given on public open days. As all the tower's occupants have found, it is impossible completely to seal the rods that operate the arms, which must also have space to operate within the hollow mast, and so at times a little water will still trickle down inside the mast. Our architect's solution was to incorporate a drainage channel to lead water away from a tray under the base of the mast, running to the exterior where it can drain harmlessly away.

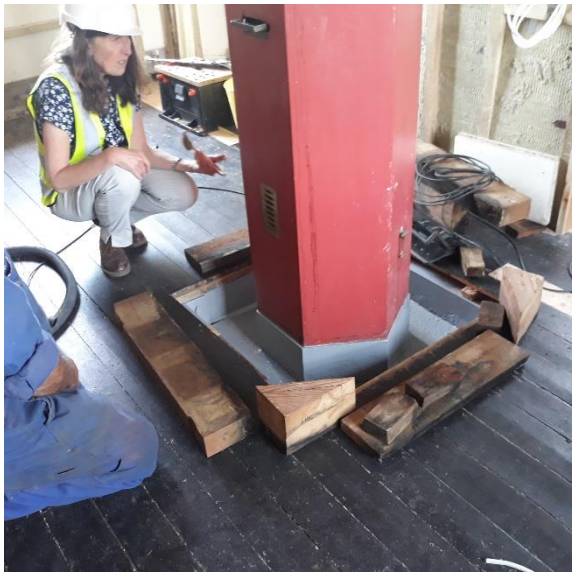
The roof was completely re-boarded and re-leaded, with particular attention paid to the detailing around the mast, where water ingress had been an ongoing problem. There were significant areas where the timbers had rotted, and all the boarding is new. Weather bands have also been fixed along the eight corners, also to prevent water penetration. The railings were re-painted and safety netting installed. One chimney pot had to be replaced: it does not match because this was during lockdown, so we had to use what was available (it was building supplies that proved the biggest challenge in such exceptional times).

As for the mast, restoration engineer Ian Clark was on site for about six weeks carrying a complete overhaul. By happy coincidence, it was Ian's father who re-made the mast and mechanism in 1988, based on the Admiralty drawings. The end of the top arm was rotten and had to be partially replaced by carefully scarfing in, and there were other localised repairs. No dismantling of the mast or apparatus was involved, just careful cleaning. The mechanism was found to

be still working well – it is a relatively simple mechanism, given well-made parts.

Clockwise from top left: the shafts to the semaphore arms revealed; the base tray for the original mast found in the reinforced first floor ceiling (note too the original colour); oak wedges packed around the re-painted and repaired 1980s' mast shaft. These will swell when wet and help prevent both movement and water penetration.



Mast repairs: left to right from top: base on roof before repair; corroded iron from base; scarf repair to arm; repaired base in kitchen; fully repaired top arm; re-leaded

Oak wedges held the mast shaft tight through the roof/ceiling holes, with sawn edges that then bind if they become damp, a solution that we have repeated.

The mast was give six coats of an opaque Dulux paint that should give protection for at least ten years. Although we inherited a beige colour mast from the SWT, we have re-painted in the original red oxide colour found in the remains of the primary apparatus under the first floor, and confirmed by Edward Holl's letter in August 1822 as above, 'that the Lieut. should be authorised to employ some person…to give it two good coats of oil colour the same as at present - a brick red.' Ian patiently painted the mast six times from top to bottom – as paint, of course, drips downwards.

Finally, Landmark's furnishings team move in. Furnishing a tower always presents a challenge, especially one with such a tight spiral stairs and moderately sized windows. For the first time ever at Landmark, a furniture hoist was used to get furniture to the top floors, a solution that worked so well it will deployed again in future.

Appropriately, at the time of opening two naval signalling flags were included. One, in the loo, is the symbol for the letter 'E', which is also deployed in the international signalling code to mean 'I'm altering my course to starboard'. The other, hung with a sense of humour above the bath, stands for 'O'. Under the international signalling code, this also means 'man overboard.'

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The kitchen under construction in Landmark's workshop at Honeybourne and during installation on the top floor.

While Landmark's furnishings team have always relished a challenge (albeit with some gnashing of teeth) the Semaphore Tower saw a major innovation in the form of a furniture hoist, the only practicable solution here

Other surviving semaphore stations on the London-Portsmouth line

Telegraph House, Binsted, Hants

Semaphore Farm, Four Marks, East Hants

Semaphore House, Pewley Hill, Guildford, as originally – and today.

Worplesdon Glebe Station, another five-storey tower nearby on the projected Plymouth line, demolished in 1851. (The unknown artist wrongly depicted six

Bibliography

Coad, Jonathan	*Support for the Fleet: Architecture & Engineering of the Royal Navy's Bases 1700-1914* (2013)
Holmes, T W	*The Semaphore* (1983)
Kent, Captain Barrie	*Signal!* (1993)
Mallinson, Howard	*Send It By Semaphore* (2005)
Popham, Home	*Telegraphic Signals, or Marine Vocabulary* (1806)
Lavery, Brian	*Chatley Heath Tower* (unpublished report, 2018)
Mead, H P	'The Story of the Semaphore' in *Mariners Mirror* 1933-4, especially vol. 20, pp 349-70.
O'Bryne, W R	*Naval Biographical Dictionary* (1849)
Quail, S & Stedman, J	*Images of Portsmouth*
Skelly, John & Beryl	*The Story of Chatley Heath Tower* (pamphlet, 1989)
Wilson, Geoffrey	*The Old Telegraphs* (1976)

Transactions of the Royal Society of Arts (1816) for Popham's gold medal winning submission.

https://en.wikisource.org/wiki/A_Naval_Biographical_Dictionary for naval career details.