

EXTRACT FROM

A Personal History of the
Royal Greenwich Observatory
at Herstmonceux Castle
1948 – 1990

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1 PROLOGUE

1.1 A brief history of the Royal Observatory to 1948

“In order to the finding out of the longitude of places for perfecting navigation and astronomy”, King Charles II resolved in 1675 “to build a small observatory within our park at Greenwich, ..., with lodging rooms for our astronomical observator and assistant, ...”. The observatory expanded and became known as the Royal Observatory, Greenwich (ROG), while the ‘astronomical observator’ became known as the Astronomer Royal (AR). When the Observatory was moved from Greenwich to Herstmonceux Castle the name was formally changed to the Royal Greenwich Observatory (RGO).

The first three Astronomers Royal [John Flamsteed (1675-1719), Edmund Halley (1720-1742), James Bradley (1742-1762)] devoted their efforts to improving the observational data on the positions of the stars and on the motion of the Moon. Such data were required for the development of the method of lunar distances for determining Greenwich time, and hence geographical longitude, from astronomical observations made at sea.

Flamsteed was reluctant to publish his data in instalments and came into dispute with Isaac Newton who wished to use them to test his new theory of gravitation. As a consequence, Queen Anne appointed the President and some Fellows of the Royal Society to serve as ‘Visitors’ to oversee the affairs of the Observatory.

The fourth AR, Nathaniel Bliss (1762-1764), died shortly after his appointment, but his successor, Nevil Maskelyne (1765-1811), was responsible for the publication for the year 1767 of *The Nautical Almanac and Astronomical Ephemeris* (NA), which contained the data that were necessary for the application of the method of lunar distances. He also organised a geophysical expedition to ‘weigh the Earth’ by making observations of the deflection of the vertical by Mount Schiehallion in Scotland.

Maskelyne continued to supervise closely the production of the *Nautical Almanac*, for which the data were computed by individuals who worked at home, but his successor, John Pond (1811-1835) was more concerned with improving the accuracy of the observational work of the Observatory. In 1818, Pond was relieved of the day-to-day responsibility for the *Nautical Almanac* when Thomas Young was appointed ‘Superintendent of the *Nautical Almanac*’. This was also the year in which the Hydrographer of the Admiralty began to play an important part in the running of the Royal Observatory. Young died in 1829 and for about two years Pond was again in charge of the work for the *Almanac*, but then W S Stratford was made Superintendent and the *Nautical Almanac Office* was set up in 1832. The Office remained independent of the Observatory until 1936.

Pond instituted the first public time-signal in the country when, in 1833, the daily dropping at precisely 1 o’clock of the time-ball down a mast on Flamsteed House was started. This signal could be seen by the ships in the port of London and allowed the navigators to check their chronometers. The determination and distribution of time was a major function of the Observatory until the move to Cambridge in 1990.

The Astronomical Society of London became 'Royal' in 1830 and soon afterwards William IV reconstituted the Board of Visitors so that it would include the President and five Fellows of the RAS as well as the President and five Fellows of the Royal Society and the Savilian and Plumian Professors of Astronomy at Oxford and Cambridge. The Board met at least once a year in June, when it received the annual report of the AR.

The next Astronomer Royal, George Airy (1835-1881), is now generally considered to have been the greatest Astronomer Royal and his influence was still clearly visible in the activities of the Observatory at the time of the move to Herstmonceux. He greatly increased the scope of its activities while also effectively acting as the chief scientific advisor to the Government on a wide range of topics. He paid meticulous attention to detail in the technical design of new instruments, in the observing and computing procedures used by the staff and in the keeping of records of all the activities. Airy considered that the main task of the Observatory was to make accurate astrometric observations for application to navigation and the related activities of land surveying (or geodesy) and timekeeping. The rotation of the Earth with respect to the stars provided the standard timescale against which mechanical clocks could be regulated. He saw the need for the widespread distribution of accurate time and he exploited the railway telegraph and later the international telegraph cables for this purpose. The culmination of his efforts came in 1884 when the meridian through the Airy transit-circle at Greenwich was adopted internationally as the zero of measurement for longitude; correspondingly, Greenwich Mean Time (GMT) provided the basis of the system of standard time-zones that is still used throughout the world.

Airy also saw the value of regular observations of magnetic, solar and meteorological phenomena and started long series of measurements that have since been of great importance. He also 'weighed the Earth' by measuring the variations with depth in a coal mine of the period of a pendulum. It is less widely recognised that Airy also initiated programmes of astrophysical observations on the spectra of stars and comets and on stellar photography.

Airy's successor William Christie (1881-1910) devoted his main effort to equipping the Observatory with new telescopes and equipment for astrophysical observations. By the end of the century the Observatory had a 28-inch refractor for visual work, a 26-inch refractor for photographic work and the Thompson 30-inch reflecting telescope. These telescopes were used for the study of comets, satellites and planets as well as of stars. The Observatory also obtained a 13-inch refractor for use in a long-term international project to make a photographic atlas of the whole sky and from it a catalogue of positions. Christie also led several expeditions to observe total eclipses of the Sun.

Frank Dyson (1910-1933) had to cope with the disruption caused by World War 1 (1914-1918), but nevertheless he organised successful expeditions in 1919 to test Einstein's prediction of the bending of light by the Sun. The Cookson Floating Zenith Telescope was used from 1911 to monitor the variation of latitude due to movement of the Earth's axis of rotation within the Earth. In 1924, the BBC 'six-pips' time-signal was first introduced and the magnetic observatory was moved to Abinger in Surrey to get away from the interference caused by the electric trains at Greenwich.

Spectroheliographic observations of the atmosphere of the Sun were introduced to supplement the daily photographic observations of sunspot activity. Work started on

building the Yapp 36-inch reflector and a reversible transit circle (to replace the Airy transit-circle). The Observatory continued to undertake a wide programme of long-term observations, but it changed its programme as new techniques became available or as new requirements arose.

Harold Spencer Jones (1933-1955) was Chief Assistant at Greenwich from 1913 to 1923 and then served as H M Astronomer at the Cape of Good Hope until his return to Greenwich as Astronomer Royal. He soon started discussions about the need to move the Observatory to a better site and these eventually led to the move to Herstmonceux Castle. The work of the Observatory, as well as the discussions about the new site, were badly interrupted by World War 2 (1939-1945). Most, but not all, of the astronomical observations at Greenwich ceased, and the Time and Chronometer Departments were evacuated to Abinger and Bristol (and later to Bradford-on-Avon, Wiltshire), respectively. A reserve time station was set up at the Royal Observatory at Edinburgh.

Spencer Jones' interests were primarily in astrometry and time-measurement, and in 1939 he wrote a paper that fully established that the Earth's rate of rotation is not uniform and that eventually led to the introduction of new time-scales to replace Greenwich mean solar time for some purposes. He recruited Humphry M Smith to head the Time Department and introduce new techniques, such as quartz-crystal clocks. He also expanded the work of the Chronometer Department, which became very important during the war. He was also interested in geophysics and so it is not surprising that the Observatory's activities in astrophysics were not pursued with vigour. In any case, the atmospheric conditions at Greenwich were so bad that many types of observation were impossible. He did, however, join with H H Plaskett in pressing for the construction of the Isaac Newton Telescope, and this was to have a profound effect on the future of the Observatory, even though it was not intended to be a part of it.

In 1936, L J Comrie, who was then Superintendent of HM Nautical Almanac Office (NAO), was suspended from duty and his young deputy, Donald H Sadler, took over his position. The Admiralty decided that Sadler should report to Spencer Jones and not directly to the Admiralty as Comrie had done. The NAO became a part of the Royal Observatory, although it continued to be based in the Royal Naval College and then in Devonport House. At the outbreak of the war the NAO moved to Bath and it stayed there until it became, in 1949, one of the first departments to move to the new site at Herstmonceux Castle.

A concise historical review of the RGO by W H McCrea was issued on the occasion of its tercentenary in 1975. The origins of the Royal Observatory have been discussed by Frances Willmoth (1994), who is the daughter of a former member of the staff of the Observatory; she gives much of the credit for the foundation of the ROG to Sir Jonas More. Many references are given in appendix G.

1.2 The decision to move to Herstmonceux Castle

The decision to move the Observatory from Greenwich to Herstmonceux Castle was announced in April 1946 and very little astronomical work was done at

Greenwich from then on. During 1948 the Lords Commissioners of the Admiralty announced:

“Consequent upon the removal, now in progress, of the Royal Observatory from Greenwich to Herstmonceux, the title by which the Observatory should be known was considered. Because of the long association of the Royal Observatory with Greenwich since the year 1675, the adoption by international agreement of the Greenwich meridian as the zero of longitude, and the world-wide use of a system of time-zones based on that meridian, it was desired to retain the connexion with Greenwich in the new title. The King’s pleasure has been taken as to a suitable new title and His Majesty’s approval of the designation

THE ROYAL GREENWICH OBSERVATORY, HERSTMONCEUX

has been duly signified.”

The buildings at Greenwich were taken over and restored by the National Maritime Museum and were opened to the public under the name of the ‘Old Royal Observatory’.

The case for moving from Greenwich was summarised by Sir Harold Spencer Jones in the final section, “What of the future?”, of his 1943/46 history of *The Royal Observatory Greenwich*; he wrote:

“When the Royal Observatory was founded, Greenwich was a pleasant village in open country several miles from London. The site for the Observatory, chosen by Wren, was an excellent one at that time. But London has grown so large that it has extended out to Greenwich and far beyond it. At the close of the Great War of 1914-18 there were still green fields and country lanes within easy walk of Greenwich to the south and south-east. But the urbanisation of the surrounding country has since proceeded so rapidly that these have long vanished. Along the river and in its vicinity are docks, power-houses, factories and works of every type. A power-house, like a Colossus, bestrides the Greenwich meridian immediately to the north of the Observatory. Densely crowded dwelling-houses add their quota of smoke to that from the works and factories. At Chingford in the Epping Forest, Pond in the year 1824 erected an azimuth mark, to control the azimuth of his transit instrument. The mark is still there, an object of curiosity to passers-by, but it has long since ceased to be visible from Greenwich, even on the clearest of days. The conditions for astronomical observations at Greenwich have for many years been far from good; within the last two decades there has been a rapid deterioration. A new trouble has arisen in recent years from the increasing use of powerful mercury-vapour lamps for street lighting, making the sky so bright that long exposures on fast photographic plates have become impossible. Many types of observation cannot be undertaken; others can be carried out only with great difficulty; all are seriously affected by the bad conditions resulting from a smoky and polluted atmosphere and from the great amount of scattered light.”

Calls for a move from Greenwich had been made since the turn of the century, but it was the AR’s report to a special meeting of the Board of Visitors in November 1938 that eventually led to the conclusion that the Observatory should be moved from Greenwich to a new site and that the magnetic observatory at Abinger should also be moved as it was suffering from disturbance by electric trains on the Guildford line.

At the end of 1938, Spencer Jones was considering a site adjacent to the Norman Lockyer Observatory (NLO), on Salcombe Hill near Sidmouth in Devon; Jones

was a member of the Research Committee of the NLO. The director of the NLO, Donald Edwards pointed out, however, that in the NLO statistics a 'fine night' was merely one during which "a photograph of some sort has been obtained" and that "the number of continuously clear nights was very small – perhaps 10 a year". There was also concern that the proposed electrification of the railway to Sidmouth would have made the site unsuitable for geomagnetic observations. In the following year the Meteorological Office advised that the site should be near the South Coast between Swanage and Dungeness. Spencer Jones was then considering the Chichester area and Shopwyke House on the Goodwood Estate in particular.

During the war, the Observatory staff were scattered, many of the instruments were dismantled for safe storage, and some of the buildings at Greenwich were damaged, and so the conditions were appropriate for a move. The matter was taken up again before the end of the war and in February 1944 the Admiralty approved in principle the move of the Royal Observatory to a new site and the move of the magnetic observatory from Abinger. At this time a list of 61 sites had been identified from Ordnance Survey maps, a further 10 sites had been suggested by the estate agents Knight, Frank and Rutley, and the National Trust had drawn attention to Herstmonceux Castle with the comment that "Sir Paul Latham states that he is not a willing seller, but the idea of the Castle becoming the future home of the Royal Observatory appeals to him". By 21 March 1944 a short list of 5 had been selected:

1. Herstmonceux Castle in Sussex.
2. Hackwood Park, near Basingstoke.
3. Amport House, near Andover.
4. Kingston Maurwood, near Dorchester.
5. Hinton Ampner, near Winchester.

The following year a committee of the Board of Visitors spent three days (15-17 April 1945) visiting each of these 5 sites in turn. On 28 May the committee reported in favour of Herstmonceux Castle (HC), with Amport House as second choice. Hackwood House was felt to be too close to Basingstoke and the last two were unsuitable for other reasons.

The Castle site was the best for absence of cloud at night, but, surprisingly, the worst for industrial haze; it was also best for sunshine, with an average of 4.9 hours per day; and it had the smallest number of foggy days, with an average of 12 days per year. It was the only one that would be available in the near future and it had some temporary buildings that would be useful while new buildings were being constructed.

The Board of Visitors met on 2 June 1945 (in Dorking) and agreed that Herstmonceux Castle would be preferable to Amport House, but the latter would be acceptable. It was then necessary to prepare more detailed plans and estimates of the cost of the move for submission to the Board of Admiralty for approval. The following extract from the letter of 20 July 1945 from Spencer Jones to the Civil Engineer-in-Chief at the Naval Dockyard at Chatham is of interest:

"Though I should have preferred a separate house, I am willing for the plans to go forward with the residence in the main building, in order to save expense."

It is hard to imagine a house that would have matched the facilities and splendour of the AR's residence in the Castle, and it would be interesting to know whether there was any saving in expense!

On 27 September 1945 Spencer Jones wrote to the Hydrographer to say that Sir Paul Latham was anxious for a decision as the rates (£3000) were due on 1 October. He also pointed out that the War Office, which then had the use of Herstmonceux Place, a large house about half-a mile north of the Castle, wanted to rent the Castle for a period. Although the latter statement appeared to have led to a favourable decision, the details of the agreement with Sir Paul Latham were still in doubt six months later as Sir Paul had asked that the shooting rights be let to him. In April 1946 the Admiralty announced its intention to buy Herstmonceux Castle, but the purchase (for £76 000) was not concluded until October 1946 as it was necessary to establish the precise boundary of the estate.

1.3 The Herstmonceux Castle Estate

The Herstmonceux Castle Estate lies about 4 miles north of Pevensey on the northern edge of the Pevensey Marsh (or Levels). There is evidence of Roman occupation of the area and the manor of Herste (a name that suggests a clearing in the wood) is mentioned in the Domesday Book. The current name Herstmonceux results from the fusion with the family name 'de Monceux'. (The alternative, but erroneous, spelling 'Hurstmonceaux' appears to have been given in a standard atlas and was often used on letters to the RGO even when the writer/typist was replying to an RGO letter with the correct address on the letterhead!) The manor eventually came into the possession of Sir Roger Fiennes, who was then the Treasurer of the Household of Henry VI. In 1441 he applied for a licence to "enclose, krenellate, entower and embattle his manor of Hurst Monceux in the County of Sussex".

The Castle was built of brick, then a new material, in the style of a medieval fortress, but its position in a valley and details of its construction suggest that it was intended to be used only as an elegant country house. The interior of the Castle was demolished in 1776/77 and the bricks were used to rebuild Herstmonceux Place, which lies half-a-mile to the north. Fortunately, the massive south gate tower and the outer walls were left standing and they formed the basis of the present Castle. The south wing and parts of the west and east sides were rebuilt (by Lt Colonel Claude Lowther) between 1911 and 1929 and the rest of the square was rebuilt (by Sir Paul Latham) between 1932 and 1935.

The main difference between the present building and the original Castle is that the inner part of the square has been left as an open courtyard. There are many differences in the layout of the accommodation, but the style of the original was retained. Bricks were made specially, and the interior was fitted with wooden staircases, panelling and other early items from other old houses. Part of the moat was flooded again after being widened on the south and east sides of the Castle; the north-west and north sides of the moat are dry. Access to the Castle is normally by the West Entrance, but it is also possible to walk across the South Bridge from the South Courtyard to the imposing South Entrance. A small bridge over the dry moat gives access to the formal walled garden on the north side of the Castle.

The principal rooms in the Castle are the Great Hall in the west wing, the Staircase Hall in the east end of the south wing, the Long Gallery on the first floor of

the north wing, the Chapel in the east wing and the Lady's Bower Room, with an oriel overlooking the moat, on the first floor of the east wing. There is also the small panelled Drummers Hall in the South Tower, overlooking the South Bridge. There are many small attic rooms, most of which were probably used as bedrooms for servants and guests. There are two brick-built cottages near the West Entrance and another at the West Gate opposite the Church. There was also a wooden cottage by the East Gate.

During World War 2 the Castle was occupied by the staff of the Hearts of Oak Friendly Society, which was evacuated from London. Large wooden huts were erected to the south of the South Courtyard and an air-raid shelter was constructed by the south-west corner of the moat. Two huts of lower elevation were built of breeze-block on either side of the South Courtyard. In addition a hut was built in the south-west courtyard of the Castle as an annex to the dining room.

The Castle stood in an estate of some 375 acres, with a perimeter of about seven miles. There was some parkland and woodland, but much of the estate was rented out for farming.

Herstmonceux Church stands on the hill to the west of the Castle, but the original settlement has disappeared. The name of Herstmonceux is now applied to the village that was known, until comparatively recently, as Gardner Street; it lies on the main road from Hailsham to Bexhill, about 2 miles to the north of the Church and Castle. The village of Boreham Street lies on the main road just over 2 miles to the east of Herstmonceux. A minor road runs south from near Boreham Street, past the east drive of the Castle, and across the Pevensey Levels to the main coastal road just to the east of Pevensey. The railway line between Eastbourne and Hastings passes just to the south of Pevensey village and the local trains stop at Pevensey Bay Halt on the road between Pevensey and Pevensey Bay. The ruins of Pevensey Castle lie between Pevensey and the village of Westham, where most London trains stop at Pevensey and Westham station. These ruins, the spire of Pevensey Church and the tower of Westham Church, which has Saxon origins, are easily seen on the skyline from the South Tower of the Castle

1.4 The preparations for the move to Herstmonceux Castle

The Castle and the temporary buildings provided a variety of accommodation that could be used for offices, workshops and hostel accommodation, but nevertheless a considerable amount of work was required to adapt and redecorate the rooms. The main obstacle to moving the staff to Herstmonceux was, however, the lack of suitable housing in the area for the many married staff who were not able to buy their own homes. It appears that Spencer Jones expected that married staff would be prepared to accept temporary accommodation in the huts, but this idea was soon rejected. The Hailsham Rural District Council was keen to help, but the building of new council houses took much longer than was anticipated. Some of the more senior staff, for example W A Scott of the NAO, bought and moved to houses in the area on the basis of the initial timetable. They then found that they had to live in lodgings in Bath during the week and to make long journeys to Sussex to be with their families at the weekends. On the other hand, after the move some married staff had to live in the hostel until suitable houses were provided for their families.

The modifications to the Castle and the other buildings were carried out by Works Department staff from the Naval dockyard at Chatham. It was first of all

necessary to finalise the AR's proposals for the use of the accommodation. In his letter of 20 July 1945 to the Civil Engineer-in-Chief at Chatham he had also written:

“I have not gone into the details of the arrangements on the second floor. There is ample accommodation for the Nautical Almanac Office with some removal of partitions to make a large room out of two smaller ones.”

The accommodation referred to consisted of a series of tiny attic rooms, accessible only by a narrow steep stone staircase. It was immediately rejected by representatives of the NAO staff when they visited the Castle after the decision to move had been taken. Eventually it was agreed that NAO should use the huts on either side of the South Courtyard. Consequently, the attic accommodation in the North Wing was available for the Ladies' Hostel. A separate hut on the south side of the large wooden huts was used as the Men's Hostel.

A group of staff at Abinger expressed their disappointment that the library would not be in the Long Gallery (which they claimed would give more space for books and tables) and that the Great Hall would not be available for the meetings of the Board of Visitors, for luncheons and for hockey dinners! Their objection was over-ruled and the Long Gallery was divided by wooden partitions to make smaller rooms for the use of the staff of the Astrometry and Astrophysics Department. The floor of the Great Hall had to be strengthened to take the weight of the books and a balcony had to be constructed to provide sufficient shelf-space for the large number of journals that were held in the library.

Work started on the alterations to the Castle in 1947. The Works Department had the use of the large wooden huts, two of which were allocated for recreational use by the staff at lunch-time and in the evening. The cottages were allocated to the Head Messenger, the Head Gardener, the Leading Man of Works and the Chief Electrician. Work started on the construction of the new Solar Building and on the access road early in 1948. The building was designed by the staff of the Chief Engineer's Department in the Admiralty (?), and was built by staff from the Chatham Dockyard.

1.5 The background of the author

Before joining the RGO I had lived in Croydon. In 1939 I won a scholarship to the Whitgift Middle School and went on to obtain good results in the Higher Schools Certificate examinations in physics and in pure and applied mathematics. I also won a Royal Scholarship to study physics at the Royal College of Science, one of the colleges of the Imperial College of Science and Technology (IC), in South Kensington. As I was too young for National Service at the time, I was able to take my place in 1946 although most of the students were ex-servicemen. I completed the physics examination in 1948 and then studied mathematics during my third qualifying year. As a consequence of these unusual conditions, I was awarded in 1949 separate honours degrees in physics (2nd class) and mathematics (1st class) and I qualified for a two-year grant to study for a PhD degree.

My PhD supervisor was Professor A.T. Price of the Mathematics Department of Imperial College. He suggested that I should make a numerical analysis of data on the daily variations of the Earth's magnetic field using the automatic computer then being built in the College. When it became clear that the computer would not be

available in time I carried out a large amount of computation using desk calculating machines to demonstrate the validity of the technique that I had devised. Although my thesis was not quite finished I looked for a job that would allow me to continue in a scientific career.

As a young teenager I had taken a general interest in astronomy, but I did not consider looking for an astronomical post. In fact, I had accepted the offer of a post in the laboratories of the Electrical Research Association near Dorking (where I would have been designing electrical power lines) when Professor Price drew my attention to an advertisement for a post at the Royal Greenwich Observatory. The post was actually in HM Nautical Almanac Office (NAO), but Price considered that there would soon be an opportunity for me to transfer to the Magnetic Department and to continue my research in geomagnetism.

My background interest in astronomy and my new interest in computing led me to apply for the post. I have a vague recollection of being interviewed by a large board in the Admiralty. I also recall that I was asked a question about the 'precession of the equinoxes' and that my answer must have shown that I did not understand its significance. Nevertheless, I was offered the post and invited to visit the NAO at Herstmonceux Castle. My only recollection of that day is of walking around the grounds with the Superintendent of the Office, Mr D H Sadler. After lunch on a fine day I accepted the offer and have never regretted doing so!