

A P P E N D I X I I .

P L A N

OF THE

B U I L D I N G S A N D G R O U N D S

OF THE

R O Y A L O B S E R V A T O R Y , G R E E N W I C H ,

1863, AUGUST;

WITH

E X P L A N A T I O N A N D H I S T O R Y .

GREENWICH OBSERVATIONS, 1862.—APP. II.

A

E X P L A N A T I O N
OF
THE PLAN OF BUILDINGS AND GROUNDS
OF THE
ROYAL OBSERVATORY, GREENWICH,
FOR 1863, AUGUST.

(Appendix II. to the Greenwich Astronomical Observations, 1862).

A A, Avenue of trees in a hollow of Greenwich Park, and steep carriage-road. This is the carriage-approach to the Observatory from the town of Greenwich, or from the lower side of the Park. The avenue A A is continued in a straight line till it meets B B.

B B, Side avenue of trees and carriage road, nearly level, leading to Blackheath. This is the approach to the Observatory from Blackheath, or from the upper side of the Park.

C C, Principal avenue of trees leading to Blackheath.

D D, Very steep footpath of approach to the Observatory from the town of Greenwich, or from the lower side of the Park.

E, E, Larger and smaller entrance-gates. E *a*, the porter's lodge. E *b*, the clock-dial, 3 feet in diameter, in sympathetic galvanic communication with the normal clock; open to public view.

F, Front Court. F *a*, covered passage from the inclosed passage X to the small entrance-gate E, and along llll to the door (1) of the South-east Dome m. F *b*, ladder to the leads above the building; rising first to the west till it touches the wall, then rising again to the south. F *c*, fire-plug, constantly charged with water at a pressure of 100 feet.

G, Staircase to the North Dome, and lobby to the Chronographic Room.

G', An open shed, covering the space between G and O.

H, Ground-floor of the North Dome, called the Chronographic Room. (1) is the chronographic apparatus. The North Dome, with Shuckburgh's Equatoreal, is on the first floor.

I, The North Terrace ; an open promenade, commanding the view over the lower part of the Park and the Thames.

K, Staircase to the old North-west Dome. The staircase was formerly reached by passing along the North Terrace through the room L ; it is now accessible from the dwelling-house.

L, Ground-floor of the old North-west Dome. It had formerly a door to the North Terrace, which is now closed. This ground-floor, as well as the dome above and the basement below, are now used as apartments of the dwelling-house.

M, A closet, part of Mr. Pond's zenith-tube-room. Halley's transit-instrument was, apparently, in this place.

N, Ancient entrance to the dwelling-house and to the Octagon Room ; now used only as external entrance to the Ball Lobby and the Octagon Room Staircase. On the adjoining wall of the principal building is an ornamented stone, with the following inscription cut in it in elegant characters :—

Carolus II^s Rex optimus
Astronomiæ et navticæ artis
Patronus maximus
Speculam hanc in vtriusque Commodum
Fecit
Anno Dñi MDCLXXVI regni sui xxviii
Curante Iona Moore milite
R T S G.

(The letters R T S G are the initials of Rei Tormentariæ Supervisore Generali, or Master of the Ordnance.)

O, Ball Lobby and External Staircase to the Octagon Room : (1) is the Normal Clock, or origin of Mean Solar Time, to which it is always accurately adjusted. (2) is the apparatus for dropping the Time Ball. The turret which carries the Time Ball is above the nearest angle of the nearest room P.

P, P, P, P, (P), Apartments of Flamsteed. The Octagon Room or "Great Room" is above the four rooms P, P, P, P. The turret carrying Osler's Anemometer is above the north-westerly angle of that room P which adjoins the north-easterly angle of (P).

Q, The Porch of the present entrance to the dwelling-house.

R, R, R, R, Apartments built for Dr. Maskelyne.

S, S, S, S, Apartments built in the years 1835 and 1836. There are no apartments above R and S.

T, T (1), T (2), Staircases descending to the kitchens and cellars. Above T is the internal staircase to the Octagon Room, constructed in 1849.

V, V (1), Stairs descending to the area.

W W W, Sunk Area, nearly surrounding T, R, R, R, R. One part of the area turns under the two southernmost rooms S S ; the two extremities of the area abut on the southernmost rooms P, P. W (1) and W (2) are subterraneous passages to offices.

X, Inclosed passage from the porch of the dwelling-house to the Observatory, entering the Observatory at what was formerly a window of the Quadrant Room: constructed in 1839.

Y, The first-built Manuscript Room, being part of the ancient Quadrant Room. It was inclosed by walls joining to the pier (1), and made fire-proof, in 1839.

Z, Passage Room, being part of the ancient Quadrant Room; (0) the entrance, formerly a window; (1) the Quadrant Pier, with the Iron Quadrant still mounted on its west side and the Brass Quadrant on its east side; (2) the staircase ascending to the Chronometer Room and Chronometer Office; (3) the ladder to the illuminating lamp of mark of the Altazimuth-Collimator.

a, Ground-floor of the South Dome, called the Lower Depôt, and used for storing printed publications of the Royal Observatory. The three-rayed structure is the pier carrying the Altazimuth. (1) the staircase ascending to the first floor, called the Upper Depôt, and to the South Dome on the second floor; (2) a passage, called the Tower Passage, pierced through the southern portion of a (and included within the south wall of a) from the Lawn *b* to the Middle Garden *d*. The entire space *a* was Flamsteed's Observatory; his mural arc was attached to the strong wall on the western side (which was not then pierced by the doorways shown in the plan); and his equatoreal sector was mounted in the middle; the height of the wall inclosing the space did not then exceed five or six feet. Subsequently it was covered with a revolving dome. Dr. Maskelyne placed on it a sloping roof, highest on the north side, and opening with sliding shutters. The building in this state was called the Advanced Building; and was used for extra-meridional observations with detached telescopes. In this state it remained to 1844, when the South Dome was built on it.

b, The Computing Room. (3) The original entrance to the Observatory, now a window of the Computing Room. In the original arrangement, the entrance at (3) opened into a passage which led westward into the Quadrant Room, eastward into the Transit Room, and southward across a second passage (in which was the staircase now replaced by (2) of Z) into the Computing Room. In 1841 the present arrangement was adopted for enlargement and lighting of the Computing Room. The southern projection had been added in 1835. Above the Computing Room are the Chronometer Room and Chronometer Office, formerly Assistant's Apartments.

c, The Astronomer Royal's Official Room. (4) the passage of communication from the Computing Room *b* to the Transit-Circle Room *d*; (5), the room of the Reflex Zenith Tube. The room *c* and the passage (4) occupy the space which was the Transit-Room of Bradley, Bliss, Maskelyne, and Pond. It was divided, and the parts were appropriated to their present services, after the erection of the Transit-Circle in the Room *d*, in 1850.

d, The Transit-Circle Room. (6), (6), the piers of the Transit-Circle; the western (6) is nearly in the same meridian as the pier of Troughton's Circle, and the eastern (6) is several feet west of the meridian of the pier of Jones's Circle; both

are a few feet south of those circle-piers. The pit and stage for observation are not shown. (7) is the pier for the North Collimator ; (8) the pier for the South Collimator and Transit Clock ; (9)(9) the pier-wings carrying parts of the quicksilver apparatus ; (0), (0), (0), (0), (0), entrance doors into the Transit-Circle Room.

e, The entrance into the East Buildings. (1) the pier supporting the East Equatoreal or Sheepshanks' Equatoreal ; (2) the staircase ascending to the Libraries and the Store Room on the first floor, and to the East Dome on the second floor, and to the leads of the Library.

f, The First Assistant's Room. Above this is Library 2, formerly the Chronometer Room.

g, The East Dépôt for printed publications of the Royal Observatory.

h, The Assistants' Common Room ; h (1), the Second Assistant's Room. Above g, h, and h (1), is Library 1.

k k k, A passage from the door of the Transit-Circle Room, and accessible from the entrance e, passing under the staircase (2), leading past the doors of f, g, h, h (1), to the Lower Record Room k a.

k a, The Lower Record Room, fireproof, appropriated principally to the preservation of Manuscripts and Standards. k b is the iron staircase ascending to the upper floor or Upper Record Room ; k c the place of the Official Copies of the British Standards of Length and Weight ; k d an Arcade covering the stairs which descend to the heating apparatus for warming the Record Rooms, and covering also a small part of the passage l. The Upper Record Room covers both the Lower Record Room k a and the Arcade k d.

l l l l l l l, The long passage leading to the Magnetic Ground. From E to e the passage is covered by a roof ; and from e to the door of m by rough glass. At the north-east angle of the Lower Record Room k a it passes under the arcade k d. (1) is the descent to a cellar ; (2) an iron water-tank.

m, The Ground-floor of the South-east Dome. This room is used principally for deposit of instruments. (1) the Porch-entrance ; (2) the spiral staircase to the first floor (used as a Computing Room for Supernumerary Computers), and to the second floor (the South-east Dome, containing the Great Equatoreal) ; (3), (3), the two halves of the North Pier of the Equatoreal, between which are the entrances to the rooms on the ground floor and first floor ; (4) the South Pier of the Equatoreal ; (5) the central pier supporting the floors ; (6) the clock-work, urged by water-power, for movement of the South-east Equatoreal.

n, n, n, Water-boiler, ash-bin, and carpenters' working shed.

o, Office of Clerk of Works ; o (1) fire-plug, constantly charged with water at pressure of 100 feet.

p, p, p, Masons' and Gardeners' Yards.

q, Anteroom of the Magnetic Observatory, used as Computing Room by the Magnetic Assistants. (1) the copper stove ; (2) the window-seat in which the

electrometers are placed; (3) the electrometer-mast, 80 feet high; (4) the reel for the electrometer-wire.

r, The Magnetic Observatory. (5) the Declination Magnet in its box; (6) the Theodolite for observing the declination magnet and circumpolar stars; (6') the Shutter-Opening in the roof through which circumpolar stars are observed; (7) the Horizontal Force Magnetometer in its box; (7') the place of its Graduated Scale used in eye-observations; (8) the Telescope for eye-observations of the Horizontal Force Magnetometer; (9) the Vertical Force Magnetometer in its box (there is a larger inclosure round (9), not shown in the engraving); (9') the place of its Graduated Scale used in eye-observations; (10) the Telescope for eye-observations of the Vertical Force Magnetometer; (11), (11), Sidereal and Mean Solar Clocks; (22) Rotating Horizontal Photographic Barrel, carefully covered, receiving the light reflected from the mirrors of the Declination and Horizontal Force Magnetometers; (33) Covering for the lamp which throws light on the mirror of the Declination Magnet, and covered passage for the light reflected to (22); (44) Similar Covering for the lamp and light of the Horizontal Force Magnet; (55) Rotating Vertical Photographic Barrel for the Vertical Force Magnetometer and the Barometer; (66) Covered passage for the lamp and light of the Vertical Force Magnet; (77) Similar passage for the Photographic Barometer; (88) the Standard Barometer.

s, The Detached House, built of zinc, in which the coal-gas is passed over naphtha.

t, t, t, t, t, t, The stumps to which the shrouds of the electrometer mast are fastened.

u, The Rotating Vertical Barrel for photographic registration of Wet Bulb and Dry Bulb Thermometers, under a square shed, open on all sides, with adjustable sun-screens.

v, The Post and Rotatory Frame carrying dry and wet thermometers, dew-point apparatus, &c., for eye-observations.

w, The Ground-Thermometers, to depths of 3, 6, 12, and 24 French feet. At a short distance to the west are two Pluviometers.

x, A small space inclosed by low rails, for experiments on radiation, &c.

y, The place of the transit instrument used by Mr. Struve for the determination of the longitude of Altona.

z, z, z, z, z, z, z, Magnetic and Photographic Offices, containing seven rooms. Magnetic Dips and Deflexions are observed in No. 7.

a (1), Large Shed; a (2), Small Shed; a (3), a (4), Sheds for planks and ladders.

b, The Lawn, which is level, and nearly at the same height as the front court.

c, The Drying Ground, which is level, and nearly at the same height.

d, The Middle Garden, declining to the south-west.

e, The Hothouse.

f, The Garden-House (formerly a stable). This building consists of two low stories, yet its roof is very little elevated above the lawn.

g g g g g, A path very nearly level, from 1 to 2 feet lower than the front court, the lawn, and the magnetic ground.

h h h h h, A Fence of Shrubs, dividing the magnetic ground from the garden.

i i i i i, A Garden Path, very nearly level, about 16 feet lower than the front court.

k, The site of Mr. Pond's Magnetic Observatory.

l, A small Reservoir of Water.

m m m, A Garden Path, very nearly level, about 26 feet lower than the front court.

n n n, The Lowest Path, about 36 feet lower than the front court.

p, The place of Flamsteed's Well, as inferred from a plan in Flamsteed's MSS., vol. 18, which is copied in Baily's "Account of the Rev. John Flamsteed," page 40. This place agrees well with the appearance of the hut covering the well, as shown in some engraved views, of the time of Flamsteed, preserved in the Royal Observatory.

p', The place of the Well, as inferred from a detached manuscript plan, which is copied in an engraving (accompanying the views above mentioned) and in Plate II. following this Explanation.

q, A Well (under a shed), said to be about 120 feet deep.

r, An Ice-house, belonging to the house of the Ranger of Greenwich Park.

s s s, A Public Path, which, as far as it surrounds the front court and house, is level, and about $8\frac{1}{2}$ feet lower than the front court; it then descends rapidly by the west side of the garden.

The heads of the small arrows shew the direction in which the ground slopes downwards.

The slope of the ground on the north and west sides of the dwelling-house is extremely rapid, the descent being generally 1 foot vertical for 3 feet horizontal, and in some places approaching to 1 foot vertical for 2 feet horizontal. Within the garden the ground is less steep (except at one part where a gravel-pit was formerly worked, and where at present there remains a very steep cliff); but even there, with the exception of that part in which the paths have a square arrangement, the slope varies probably from 1 in 3 to 1 in 4. The rapid slope on the north side of the house continues to a descent of about 80 feet, after which there is a continued gradual descent to the river Thames. The slopes on the west side of the lawn and grounds continue till they nearly reach the avenue A A, after which the ground rises on the other side. On the east and south-east sides of the Magnetic Ground there is a plain of considerable extent; and in the direction of the avenue C C the ground is nearly level for a mile.

The Front Court and the North Terrace are supported by a retaining wall about $8\frac{1}{2}$ feet high. The western and southern sides of the lawn are supported by a retaining wall, varying in height from 9 feet (near the south-west angle of the house) to 16 feet (near the south-west angle of the lawn). It is evident that a part of the Front Court and a still greater part of the lawn consist of "made ground." It is not improbable

that the latter was formed during the existence of Greenwich Castle. The lower part of the Middle Garden is supported by a retaining wall to the height of about 8 feet.

From these remarks it will appear that the Dwelling House and Astronomical Observatory stand upon a peninsula, of which the space immediately beyond the South-east Dome constitutes the isthmus; and that the Magnetic Ground is so severely defined by the slopes of ground on some sides and the public avenue on others, that no material extension can ever be gained for it. If additional buildings of any great extent should ever be required, it would probably be necessary to occupy some space beyond the Blackheath Avenue C C.

The following statement regarding the grounds and buildings of the Royal Observatory at different periods may perhaps interest the astronomical antiquary. It is derived partly from Minutes of the Visitors of the Royal Observatory (now preserved in the Royal Observatory), and partly from published works. For the first document I am indebted to the courtesy of Thomas Duffus Hardy, Esq., Keeper of Records in the Tower of London.

In the 15th year of Henry VI., 1437, a private Act of Parliament was passed, authorizing Humphrey Duke of Gloucester (the King's uncle) and Eleanor his wife to inclose certain ground and make of it a park. (It would appear that the Roman road to Canterbury was interrupted by this inclosure; the present high road, coming from Shooter's Hill, quits the line of the Roman road nearly a mile east of the park, in order to pass round the south-west angle of the park). And in this Act, authority was given "*quod ipsi manerium suum sive mansionem de Grenewyche muris petrâ et calce includere et firmare, et muros illos kernellare battellare et turrellare etc. possint.*" The original intention therefore in the erection of Greenwich Castle was to make it fit to be used as a place of defence. It is stated in Baily's "Account of the Rev. John Flamsteed," page 39, note, that the Castle was rebuilt by Henry VIII. in 1526. In 1642 it was considered sufficiently important in a military view to be garrisoned by the Parliament. An engraved view of it, taken about this time, represents it as an irregular chateau, with turrets and pyramidal tops. Before 1675 it had been pulled down or had gone to ruin, as the warrant of Charles II. (Baily's "Account," page 112) dated 1675, June 22, states "we have resolved to build a small observatory within our park at Greenwich, upon the highest ground, at or near the place where the castle stood."

In the time of Flamsteed (see the plan in Plate II., copied from an old manuscript plan preserved at the Royal Observatory, of which an engraved copy exists in a collection of engraved views apparently made by Flamsteed), the Observatory and its grounds were bounded as follows: On the north, by the wall of the North Terrace in its present position (the turrets now used as north and north-west domes existing as at present, but under the name of summer-houses, covered by what were called pine-apple roofs, without the surmounting domes or the attached staircases).

GREENWICH OBSERVATIONS, 1862.—APP. II.

B

On the west, by a straight wall from the eastern wall of the north-west dome to the south-west angle of the lawn. Of this wall, the present west wall of the lawn is part; and the exterior wall of the area where it passes under the rooms S S S is probably a part. On the south, by the present south wall of the lawn; there being a very small out-house in the place of *f*, and a narrow garden beyond the south wall; the utmost projection of the out-house and garden were about ten feet. On the east, by a straight wall from the south-east angle of *a* to the middle of the south side of the north dome; no part of this wall exists except the eastern wall of *a*. The entrance-gate was in this wall nearly opposite to *Q*. Thus, Flamsteed's territories may be described as including only the domes, the dwelling-house (above which was the Octagon Room), the lawn, with very insignificant ground beyond, and the building *a* (in which his Mural Arc and Equatoreal Sector were placed). No wall or building connected the dwelling-house with the domes. On the south side of the rooms *P* there was an inclosure and building of the same extent east and west as the rooms *P*, and extending in the whole about 20 feet south: they were of inconsiderable elevation, as they scarcely appear in the admirable views which are preserved in the Royal Observatory.

The next information which I find regarding the Observatory is in a Minute of the Council of the Royal Society acting as Board of Visitors, dated Feb. 18, 1713-4, containing a Draft of Letter to the Office of Ordnance. It states that in the Great Room there are two Clocks with inscriptions signifying that Sir Jonas Moore caused them to be made, and a Quadrant of 4-feet radius not well divided, and it suggests that telescopes of 8-feet and 16-feet radius be provided. And "That in the Garden there
 " being a shed [a of the plan] with a Sextant, a Wall Quadrant, and a Clock therein,
 " the shed should be removed six or eight yards further from the brow of the hill, that
 " the ground may not sink under it; and the western wall should be thick and firm
 " with a broad foundation, that it may not warp, because the wall quadrant is to be
 " fixed upon it," &c. The date of the inspection at which these remarks were made seems to have been a few days before August 24, 1713; it was apparently the first Visitation of the Observatory. There is no reason to think that the removal of the shed here suggested was ever made.

On the 26th of May 1726, a Visiting Committee made a Report on the Observatory (partly copied in Rigaud's "Miscellaneous Works and Correspondence of the Rev. James Bradley,") to the President and Council of the Royal Society. The inspection was made on May 16, shortly after the commencement of Dr. Halley's presidency over the Observatory. It appears that all Flamsteed's instruments had been taken away, and that Dr. Halley had been obliged immediately to provide himself with some. "That he accordingly first provided a Meridian Instrument, having an axis fitted to
 " an excellent five-foot Telescope, made with very great care, substantially supported
 " with freestone, and placed in a little room built on purpose adjoining to the west
 " side of the Observatory, and fitted up with proper openings both at the top and
 " each end, for directing the telescope to all parts of the meridian." This little room

must have been in the place M or near it; (the places M, S, S, S, S, were unoccupied by buildings in Flamsteed's time); no trace of it remains. Then it states, "he (Dr. Halley) resolved, upon the receipt of that money herein-after mentioned to be given by His Majesty, to build to the S.E. of the Observatory and near the middle of the hill a strong stone wall, of about nine foot long, two foot thick, and eleven foot high, in the plane of the meridian, and to fix to each side thereof a Quadrant exactly divided of about 8-foot radius, and fitted with a telescope-index of the same length, one of these quadrants looking southwards and the other northwards; and to cover both the wall and instruments with a room or small house in whose roof there should be proper openings for the directions of each telescope as the occasion might require. That he has accordingly so far carried on this work that the stone wall, consisting of no more than nine stones, is entirely furnished with the quadrant looking southwards, which has been made and fixed with the greatest exactness in every particular, the limb being very curiously [accurately] divided after the manner commonly called Nonius into two several sorts of parts, the first of which are half minutes of a degree, and the others such whereof the whole quadrant contains 24576 [formed by continual bisection of the arc of 60°], each part answering nearly to 13 seconds, by means of which, observations may be made with good consistency to less than the halves of these quantities"...and the house that covers the whole is compleatly finished, except some work about the opening in the roof for using the quadrant [looking northwards] that is not yet put together." And subsequently, a certain balance of money "is not sufficient for finishing the other quadrant and the work remaining to be done about the roof of the New house on account thereof." There is also mention of clocks provided, and of telescopes of 24, 16, and 9 foot.

There can be no doubt that the room here mentioned is the Quadrant Room including Y and Z of the plan. The pier (1) answers precisely to the description above, and it bears the two quadrants, (the additional walls which inclose Y as a room were built only in 1839). The brickwork of its north front is however precisely similar to that of b and c, which were built at a later time (Bradley's), but a bricklayer whom I have consulted thinks it possible that the brickwork of the west wall is different. It appears however quite certain that this quadrant room Y and Z was built alone, at the commencement of Halley's superintendence.

In Rigaud's "Miscellaneous Works, &c., of the Rev. James Bradley," there are some mistakes, arising from his want of acquaintance with this Report, in which it is positively stated that the house [quadrant room] was built over the stone wall or pier. Thus in page l he supposes that the reason of the ceiling being low was that it was a room of Flamsteed's adapted to a smaller instrument used by Flamsteed; in the note to page lxxv he remarks that it is not said that the room was "newly" erected; both which statements are disproved by the terms of the Report. In Bradley's statement (Rigaud, page 381), "The roof of the quadrant room was so near to the top of the stone wall that in some seasons the warping of the timber would cause the leaden weight which

“ balances the telescope of the quadrant to rub against the boards;” the term “ stone wall” is used as by Halley ; and the quadrant pier between Y and Z is the only stone erection of distant date in the Observatory. The cause of the rubbing was removed in 1779 (see Maskelyne’s Transits, 1779, July 30, vol. ii. p. 160), where it is said “ the same rooms [Transit and Quadrant] have been also rendered more capacious “ and airy by removing the flat ceilings, &c.” The marks of these flat ceilings are visible in the rooms ; and that in the quadrant room must have approached very near to the quadrant.

The Report continues, “ the Observatory must be lookt upon as not compleatly “ provided, till some Instrument is got proper to observe in other verticals as well as “ the Meridian.”

On October 17, 1748, a petition (which had been deferred for amendments from Aug. 10, 1748,) framed by Dr. Bradley, was signed by the Council of the Royal Society. Application is made for “ A brass quadrant on the west side of the wall, of “ the same radius as that which is now fixed on the east side. A moveable brass “ quadrant of 4 feet radius for taking observations on other verticals beside the “ meridian. A parallactick sector of 12 or 13 feet radius for observing stars near the “ zenith. A transit instrument with an axis of 4 feet and a telescope of 8 feet in “ length, to be supported by two substantial stone pillars. A diurnal sector “ [apparently an equatoreal] with a telescope of 30 inches.” Also a clock : Various telescopes : Apparatus for magnetic variation and dip.

In the *Gentleman’s Magazine* for March 1749 is a plan of Greenwich Park, with a plan of the grounds of “ Flamsteed House ” (as the Royal Observatory is commonly called by the inhabitants of the neighbourhood even at the present time), and a “ North View of Flamsteed House.” The grounds have precisely the same extent as in Flamsteed’s time, and the north front of the house is precisely the same, except that the lower windows (which in Flamsteed’s time were small) are enlarged to their present size. The house and the turrets are not connected by any intervening buildings.

On 1754, October 16, a visiting Committee inspected the Observatory, and found that everything was supplied as applied for, except that the radius of the moveable brass quadrant was reduced to 40 inches, and that one of the telescopes was not supplied. As the transit-room was now in constant use, it would seem that the transit-room, and the computing room with assistant’s room above, must have been erected between 1749 and 1754 : as their erection implied an extension of the grounds beyond Flamsteed’s limits, which seem to have been preserved unaltered in 1749. But I have not succeeded in finding a single word about their erection, except in the note in Rigaud, page lxxv, where it is mentioned as subsequent to 1749, and where the quadrant room is spoken of as “ the new quadrant-room,” perhaps from some change in its walls.

On 1762, August 18, a Visitation was made, after the death of Dr. Bradley. It was resolved to recommend “ that the room which is usually called Mr. Flamsteed’s

" Sextant Room [a of the plan] be fitted up with a stone floor, and a circular versatile " roof for the reception of the 40-inch moveable quadrant, which is now in the " Great Room." All the instruments in the list of 1748 are reported in this document to be in good order, except a broken thermometer.

On 1765, March 16, on occasion of the appointment of Dr. Maskelyne as Astronomer Royal, a Visitation took place. In the list of instruments, the 40-inch moveable quadrant is mentioned as in the Great Room, with this note. " There is a " room lately compleated [a] on the south side of the Observatory for the reception " of this quadrant." The Visitors' Report states that the five-foot Transit Instrument is still at the West End of the House.

In Bernoulli's *Lettres Astronomiques* is a rude view of the observing rooms (not of the dwelling-house) as they appeared in 1769. This is the " new observatory " of Bradley, erected in 1749. The north entrance-door, the transit-room, the quadrant-room, and the assistant's apartment, are in nearly the same state as in 1835. The east and west ends of the ridge are represented as sloped down in what carpenters usually call a " hip-roof;" this was altered by Dr. Maskelyne in 1779.

On 1770, July 12, Dr. Maskelyne represented to the Council of the Royal Society that a place was wanted for an Equatoreal (Graham's Equatoreal Sector being the only one at the Observatory), and suggested that two rooms should be built, one to the east and the other to the west of the Observatory, both adjoining to the Great Room, and that the instrument might be occasionally transferred from one room to the other. He also desired a larger equatoreal sector. The Visitors, after inspection, preferred the summer-houses H and L; " provided the pine-apple roofs were taken " away from the said summer-houses and a new story was added to each, and conical " moveable roofs thereon." This was done shortly afterwards, as I was informed by Mrs. Storey (daughter of Dr. Maskelyne). The date is confirmed by a carpenter's inscription, which I have found cut upon the chain of rollers of the revolving dome (discovered upon taking off some of the internal lining): the year there marked is 1773. The staircases G and K were of course built at the same time. I was informed by Mrs. Storey that a single equatoreal sector was used (perhaps at first, or perhaps while the other was disabled), and that it was transferred occasionally from the north dome to the north-west dome, or *vice versa*, according (I suppose) as the obstruction by the over-towering Octagon Room made it necessary.

At the Visitation of 1774, December 14, when a very complete list of the instruments was taken, the " Parallactic Sector of $12\frac{1}{2}$ feet radius " is registered as in the Quadrant Room, with the remark, " This Sector can be removed into and used in the " Transit Room." (This was the only way then recognized for reversing the Sector; after 1779 it was reversed by carrying it from the east wall of the Quadrant Room to the west wall, or the converse.) The moveable quadrant of 40 inches radius was in the South Room (a); various telescopes in the Great Room; and in each of the Observatories on the Terrace (H and L) there was an Equatoreal Sector by Sisson.

On 1775, October 5, the Equatoreal Sectors were found to be very defective; on October 26 it was resolved that, instead of repairing one, it would be more eligible to have a new instrument made; and on 1778, July 13, an equatoreal with 5-foot telescope and 5-foot circles was ordered of Ramsden. Repeated reference is made to this, which was still unfinished in 1784, when the Volume of Minutes in my custody terminates. Apparently the Equatoreal mounted in the north Dome H (whose circles are 4 feet in diameter, and of which a different history is given below) is not the same.

On 1778, July 13, it was proposed that "a new room be built in the garden, with a roof capable of being thrown all back," for the use of telescopes. This was done in the next year (see Maskelyne's Transits, 1779) by taking the "versatile roof" from a, raising its north wall to a considerable height, and placing above the room a steep wooden roof, sloping down to the south, and consisting of sliding shutters. At the same time, the flat ceilings were taken out of the Transit and Quadrant Rooms, and the observation-openings were increased in width from 6 inches to nearly 3 feet. The hip-roofs were removed, and the roof-ridges extended to the ends of the building. Book-cases were erected in the Great Room. A covered passage from the dwelling-house to the Quadrant Room was proposed, but none was made before 1839.

In the "Account of the Trigonometrical Survey," vol.i., is a Plan of the Observatory as it was in the year 1788 (copied in the second Plate following this explanation). The domes H and L, and their staircases G and K, are exhibited here. There is no connexion between the house and the domes. The house is almost exactly as in Flamsteed's time. The detached buildings are the Quadrant Room, Computing Room, Bradley's Transit Room, Advanced South Room, Garden House, and Hothouse (then a mere shed), (Y, Z, b, c, a, f, e). The boundary on the north and west is the same (except where the dome staircase K projects) as in Flamsteed's time. On the south, the boundary is the south wall of the lawn till it meets the Garden House, f, and afterwards the south wall of the Middle Garden, d, as far as a point w, some distance to the west of p. Then the boundary is a wall running due north (or exactly parallel to that which now separates the Middle Garden d, from the Drying Ground c), which wall is continued in the same direction, at the distance 12 feet from the east end of the Transit Room, to a point in the east-and-west line ranging 12 feet north of the north front of the Transit Room. (I take this position of the wall from the plan to which I have referred; but, judging from the appearance of the brickwork, and the improbability that without any great reason this wall should have been pulled down, and a wall exactly parallel substituted for it, I think it not improbable that the plan is in error, and that the wall was the same as the wall now existing between the Middle Garden and the Drying Ground.) Then the boundary wall is continued parallel to the north front of the Transit Room, Computing Room, and Quadrant Room, at the distance of 12 feet from that front, till it meets with Flamsteed's eastern boundary wall, which, from that point to the staircase G, remains as the boundary. The entrance-gate is in the same position as in Flamsteed's time.

The arrangement of the Computing Room and staircase to Assistant's Apartments is the same which remained to 1835.

About 1790 (as I was informed by Mrs. Storey) the rooms R R R were built. The new entrance door, Q, the eastern of the three staircases T, the area, and the stairs into the area (not in their present position but on the south side of the entrance Q), were constructed at the same time. The front court, F, was inclosed, and the wall between the Middle Garden and the Drying Ground, if not built before, was built now, and continued to the entrance-gate EE.

In 1808 or 1809 (as I was informed by Mrs. Storey, and by Mr. Taylor, many years Assistant at the Observatory) the Circle Room was built in the site d of the plan, but extending no farther south than the south wall of (4). Troughton's circle was mounted in 1812.

In 1813 (as I learnt from a private journal kept by Mr. Henry, who obligingly submitted it to my inspection) the Drying Ground, c, was inclosed, the wall separating the Middle Garden and the Drying Ground was partially broken down, and the eastern rooms, e, f, g, h, with the pier (1) for the east Dome, were erected. The bad arrangement of these rooms, the circumstance that the dome walls are supported principally by the ceiling-joists, and the existence of gables without any roof abutting to them, induced me to suppose that the Dome and pier had been erected subsequently to the other rooms, yet I find it is certain that they were erected together. The Library was not yet built.

In 1814 a part of the lower garden was inclosed. Its southern boundary ran from *t* to the back of the shed *g*, and thence to the point *v*.

In 1815 the well *g* was dug. The water proved bad and the well was covered in.

The history of Sir George Shuckburgh's equatoreal is sufficiently given in the Philosophical Transactions 1793. It was commenced by Ramsden in 1781 and finished in 1791; and it appears not improbable that it was partly composed of the materials prepared for the equatoreal which was ordered for the Observatory, in 1778. It was presented to the Observatory by the Honourable C. C. C. Jenkinson, (Sir George Shuckburgh's heir) in 1811; and, as I was informed by Mr. Taylor, the pier (1) in the East Dome was built for the purpose of mounting it as an Altazimuth, to be supported at its upper pivot by an arched frame carried on four pillars, similar to that of the Palermo Circle. The pillars were based, apparently by merely screwing, upon a four-armed iron cross (which still exists with its center imbedded in the pier). Upon trying this mounting, it was found so unsteady, that the instrument was never erected there at all. In 1816 it was erected by Mr. Berge as an Equatoreal in the North Dome, where it still remains. The Equatoreal Sector in that dome was taken down, and has never since been used; its principal arc (as is believed) is still preserved in the Observatory. The other Equatoreal Sector, perhaps, was delivered to an artist for repair, and was never returned. The East Dome remained vacant to the erection of Mr. Sheepshanks's telescope in 1838.

In 1820 the room M for the Zenith Tube was erected, on or near to the site of

Halley's Transit, connecting the dwelling-house with the building for the staircase of the North West Dome. At the same time, to give uniformity of appearance to the front, the wall was built which connects the dwelling-house with the staircase of the North Dome.

In 1821 the charge of the Chronometers of the Royal Navy was transferred from the Hydrographical Office to the Royal Observatory. The room above f, which had been used as Library, was now appropriated to the chronometers, and a new room was built above g, h, h (1), and part of k, for Library.

In 1824 the pier for Jones's Circle was built, a short distance north-east of the pier (6); it was built into the neighbouring wall, but without absolute contact.

In 1835 and 1836, the four apartments S, S, S, S, were built, as also the two western staircases T (1) and T (2); and the Computing Room b was enlarged to the south.

The Magnetic Ground, and other parts of the garden, exterior to Mr. Pond's boundary, were inclosed in 1837.

The Magnetic Observatory was built in 1837-8. Its four arms, as at first built, were of equal lengths.

In 1837 the object glass of the Sheepshanks Telescope was presented by the Rev. Richard Sheepshanks, and in 1838 it was mounted equatorially in the east Dome, on the pier (1).

The room Y was separated (by the erection of walls joining on to the Quadrant Pier) as a Manuscript Room, and the covered passage X was made, late in 1839. The staircase V was then made, in its present position.

In 1840 and 1841, various magnetical apparatus was mounted in the Magnetical Observatory; the self-registering Anemometer was erected on the western turret, above the north-east angle of (P) and the north-west angle of P next to it; the computing room was made to extend to the north wall and north windows, by the removal of two intermediate passages, the old entrance door (3) being converted into a window, and the staircase (2) being substituted for the staircase in one of the passages. About the same time, the shutters of the Circle Room, whose apertures had been contracted by Mr. Pond, were again opened to their full width.

In 1843, a small room was built a few feet to the south-east of u, for the observation of Magnetic Dip; in 1847 it was enlarged; in 1862 it was removed, on the erection of the Magnetic Offices.

In 1844, the roof of the Advanced Building a was removed, and the South Dome was built on its walls. The Altazimuth was brought into use in 1847. In the same year a small observatory was built for the reception of Mr. Struve's transit-instrument, whose pier occupied the position y; it was removed on the erection of the Magnetic Offices.

In 1848, Mr. Pond's Zenith Tube in M was dismounted, the door of L on the North Terrace was closed, and the communication with the dwelling-house was opened. The Polar Axis in the North-west Dome had previously been sent to the Cape of Good Hope, and its stone piers were now removed.

In 1849, operations were begun for taking down the piers of Troughton's and Jones's Circles, and for erecting the Transit Circle Room d. The Transit Circle was brought into use on the first day of 1851. In 1849 also the internal staircase above T to the Octagon Room was made, and the ladder F b for external access to the leads of the Octagon Room was fixed.

In 1850, gas-pipes were laid to the Observatory.

In 1851, Mr. Pond's Transit was taken down, and the wall was built which separates the Astronomer Royal's Official Room c from the passage (4). The Navy Chronometers were removed to the room above the Computing Room b from the room above f, which was then converted into Library 2. In the same year, the east and west doors of H (which formerly was merely a passage-room) were closed, and a door was opened from F into G. The Reflex Zenith Tube was constructed, and was first mounted in the small room at the north-east corner of d. The large shed a (1) was also built.

In 1852, the chronographic apparatus (1) was mounted in H; and telegraphic communication was made, partly by subterranean wires, to the offices of Telegraph Companies in London.

In 1855, the Record Room k a was built. The small room (5) near the south-west angle of d was built for the Reflex Zenith Tube.

In 1856, the cellars under G and H were made to communicate with the cellar under O by a subterraneous passage, for extension of the [Galvanic] Battery Basement.

In 1857, the South-east Dome m was built. To make room for it, a small carpenters' shop at the side of the passage l was taken down (the room o being built instead), and the iron tank (2) was shifted. The South-east Equatoreal was mounted in 1859. The Tower Passage (2) was pierced through the south part of a in 1857.

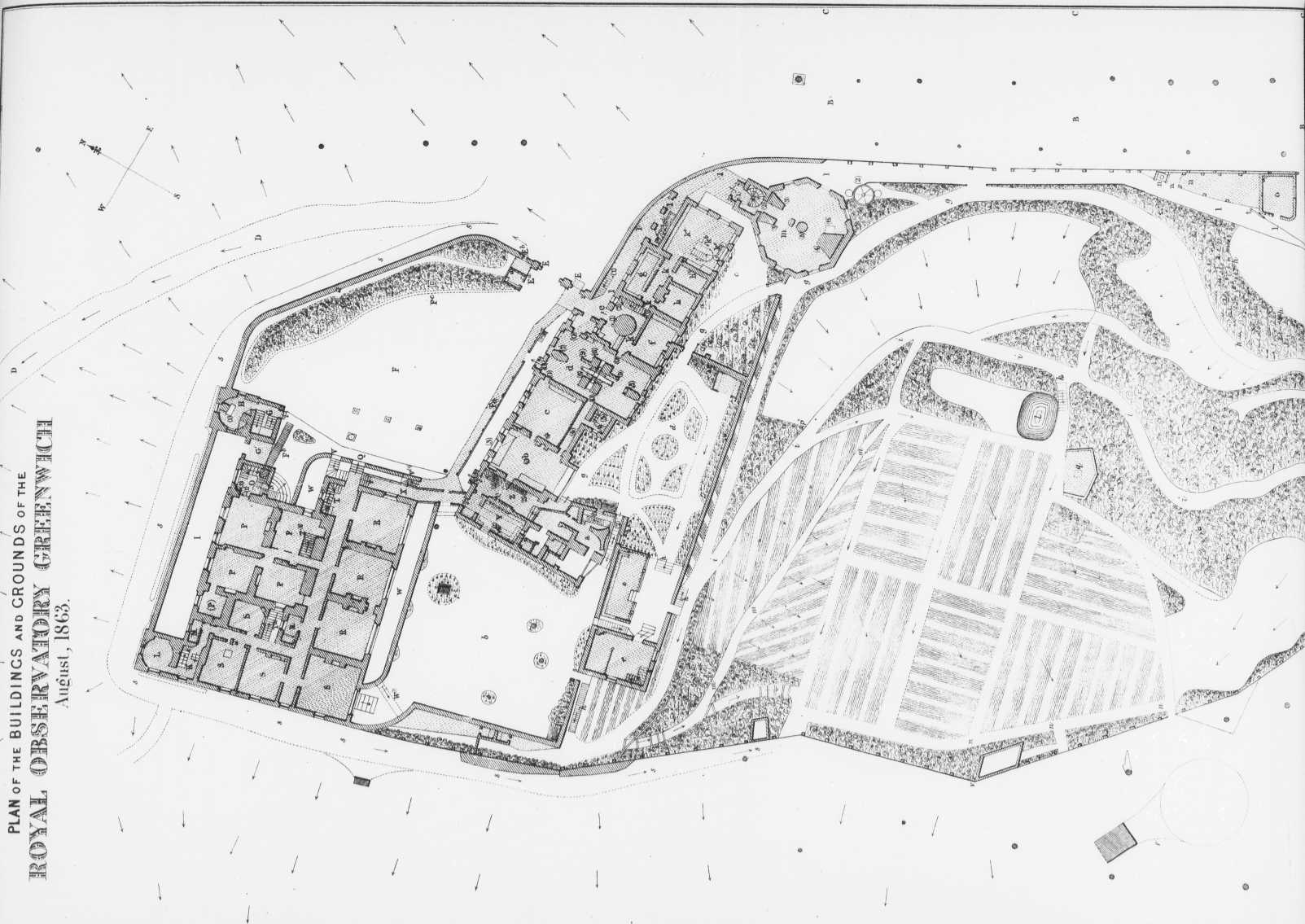
In 1860, a pole was planted on the leads of the Octagon Room, for attachment of open-air telegraph-wires, instead of the subterranean wires above-mentioned.

In 1862, the Magnetic Offices z were built, the anteroom q of the Magnetic Observatory was extended northwards, and the naphthalizing room s was built.

For many particulars the reader is referred to the Introductions to the Volumes of Greenwich Observations, and to the Reports to the Board of Visitors.

G. B. AIRY.

PLAN OF THE BUILDINGS AND GROUNDS OF THE
ROYAL OBSERVATORY GREENWICH
 August, 1863.

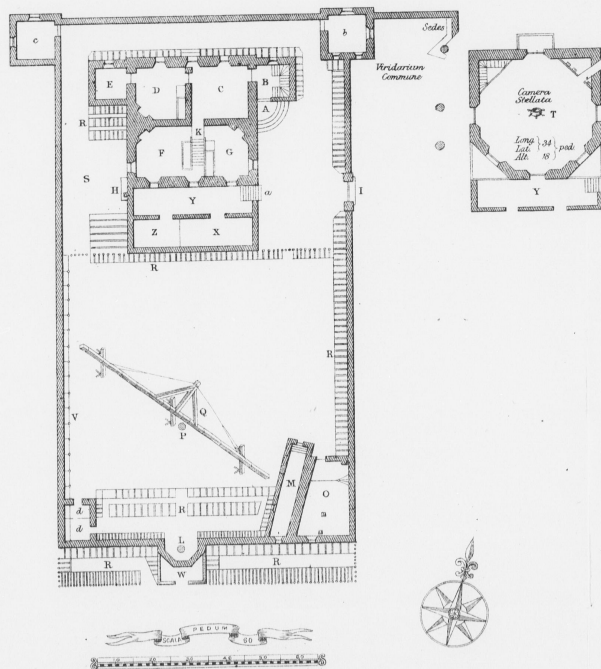




PLAN OF THE ROYAL OBSERVATORY GREENWICH

From a drawing made by FLAMSTEED.

Ichographia.
SPECULÆ REGLE GRENOVICI
Requisitæ factæ.

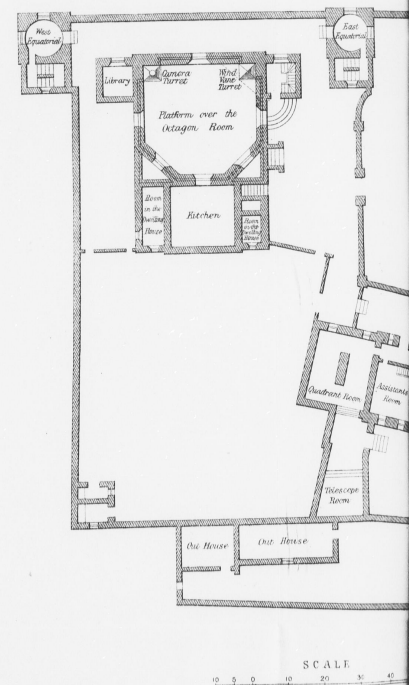


Præter profunditatem 120 ped.
cum tubo pro Observ. Astronom.
Turris.

PLAN OF THE ROYAL OBSERVATORY GREENWICH

IN 1788.

From the "Account of Trigonometrical Survey" Vol. I.

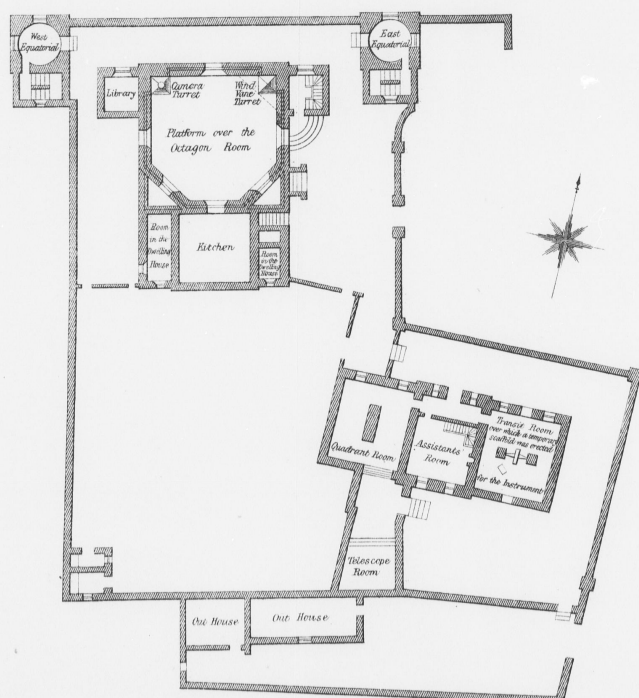


SCALE

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PLAN OF THE ROYAL OBSERVATORY GREENWICH
IN 1788.

From the "Account of Trigonometrical Survey" Vol. I.



SCALE
10 5 0 10 20 30 40 50 FEET

