Whitbread's Observatory, Cardington

THE OBSERVATORY OF S. C. WHITBREAD, ESQ., F.R.A.S., PRESIDENT OF THE BRITISH METEOROLOGICAL SOCIETY.

Mr. Whitbread, whose name, as well as that of Mr. Barclay, is so well known in the ranks of commerce, has devoted himself to science with that happy union of zeal and practical ability that are so characteristic of the English mind. In addition to the foundation of the observatory of which we are about to speak, he is at the head of a recent organization for advancing the science of meteorology, and has accepted the office of president of the new society that has been formed. Of this society we shall have occasion to speak in the sequel, in connexion with the various meteorological observatories that have been established on an organized plan, mainly by the exertions and instrumentality of Mr. Glaisher, of the Royal Observatory. For the present we must confine ourselves to the description of Mr. Whitbread's astronomical observatory.

There are two or three interesting circumstances which we will previously mention.

The observatory is situated at Cardington, near Bedford, in a garden belonging to Mr. Whitbread's estate, which was planted by the celebrated John Howard the Philanthropist, under whose will it has descended to the present occupier.

The sidereal clock used in the observatory is remarkable for its age and its construction. It was made about the year 1760, by Thomas Brass, of Guildford, who was an enthusiast in his profession. It is very old-fashioned in appearance, but performs admirably at the present time, and the beat is remarkably distinct.

A permanent assistant, Mr. John B. McLarin, has been engaged for conducting the observations; and this circumstance gives prospect of good and useful work. Indeed an observatory without establishment must become at length either an incumbrance or a plaything to its owner; but a little additional and permanent expense in endowment has in almost every known case been productive both of honour to the proprietor and of gain to science.

The height of the observatory above the level of the sea is 81 ft.

The principal instruments in this observatory are an equatorial, a transit circle, and an altitude and azimuth instrument.

The equatorial was made by Troughton and Simms, for the Rev. Samuel King, of Latimer, near Chesham. The instrument, in regard to its general arrangement, resembles those made by Fraunhofer. The telescope is an achromatic of 4¼ in. clear aperture, and about 5 ft. focal length. It carries a finder, and is furnished with adjustment for focus; six negative eye-pieces, of powers varying from 47 to 410, also one of the pancratic kind; it has a position micrometer, illuminating apparatus, and all the usual appliances to fit it for the most delicate operations of sidereal astronomy.

The telescope rests in a cradle at one end of the declination-axis, and overhangs the side of the supporting frame, having free and unobstructed motion in every direction. At the opposite end of the same axis the declination-circle is fixed (this circle is of 12 in. diameter). The divisions are cut upon a band of silver to ten minutes of arc, which by two opposite verniers are subdivided to ten seconds; and these spaces are so broadly distinguished that it is quite easy, by estimation, to take a reading to half that quantity. There are microscopes for reading the verniers, with clamps for fixing, and tangent screw for giving slow motion to the telescope.

A striding level, similar in all respects to the axis-level of a transit-instru-

ment, can be applied to cylindrical collars upon the declination-axis. This level, by which the perfect horizontality of the declination-axis is indicated, greatly facilitates the adjustment of the instrument to the meridian of the observatory, and with due correction of the line of collimation makes the instrument no indifferent substitute for the transit-instrument, in cases where so important an auxiliary is not at hand.

The polar axis is about 25 in. long; the hour circle, 12 in. diameter, is fixed near its lower end. The divisions are cut upon a band of silver to one minute, and these are subdivided by opposite verniers to single seconds of time. The edge of the circle is toothed, and has an endless screw working upon it; which screw can be turned either by hand, for the purpose of setting the telescope to any given right-ascension, or it may be connected with clock-work, when it is desired to keep the object under observation steadily in the field of the telescope, in other words, to counteract the effect of the diurnal motion of the earth. The clock is firmly fixed to the iron support of the instrument; it has a centrifugal pendulum, not unlike the governor of a steam-engine, and is altogether so arranged that its regulation and government are within reach and under the absolute control of the observer.

Of the supporting frame it is only necessary to state that it is of cast-iron, having a Y to receive the upper end of the polar axis, and a socket for the lower end, the latter having screw adjustments both for altitude and for meridional position; and that this stand is screwed firmly to the top of a pedestal.

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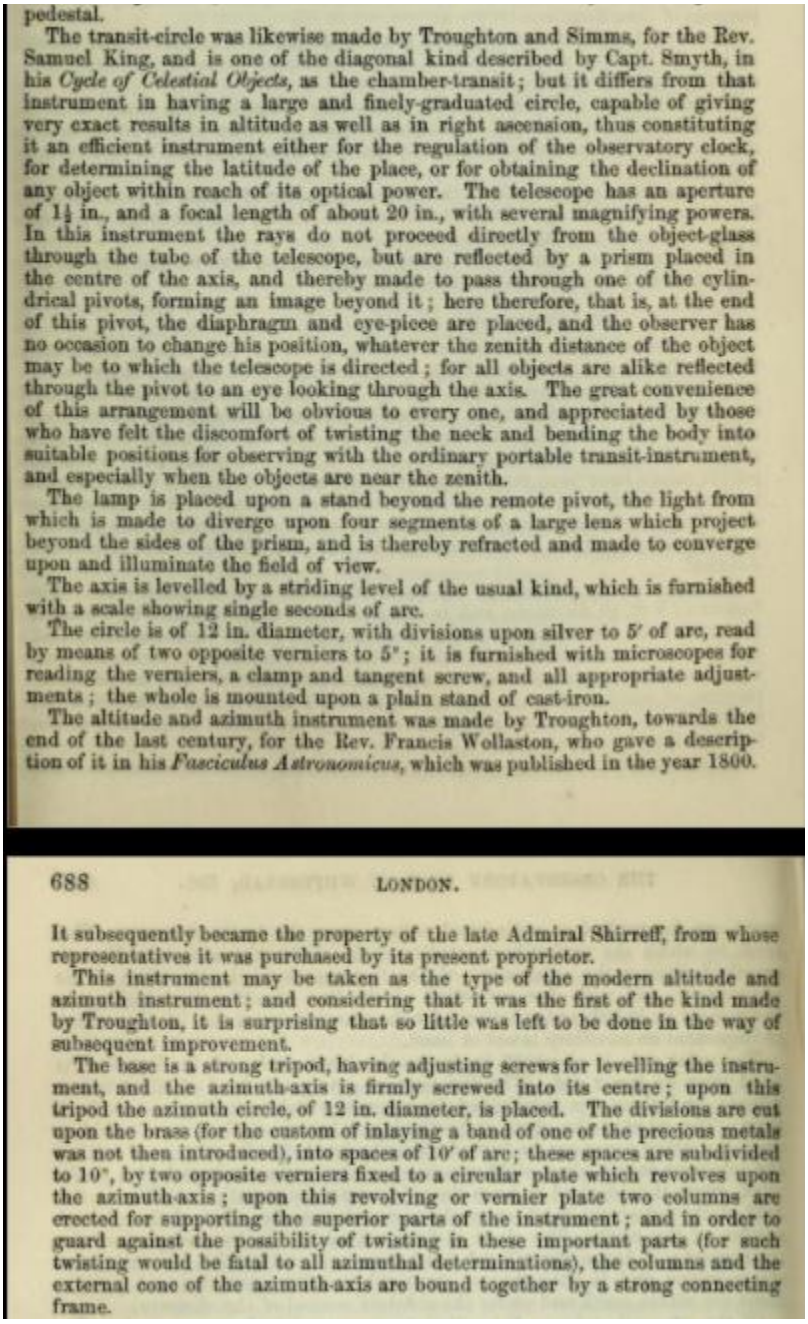

pedestal.

The transit-circle was likewise made by Troughton and Simms, for the Rev. Samuel King, and is one of the diagonal kind described by Capt. Smyth, in his *Cycle of Celestial Objects*, as the chamber-transit; but it differs from that instrument in having a large and finely-graduated circle, capable of giving very exact results in altitude as well as in right ascension, thus constituting it an efficient instrument either for the regulation of the observatory clock, for determining the latitude of the place, or for obtaining the declination of any object within reach of its optical power. The telescope has an aperture of 1½ in., and a focal length of about 20 in., with several magnifying powers. In this instrument the rays do not proceed directly from the object-glass through the tube of the telescope, but are reflected by a prism placed in the centre of the axis, and thereby made to pass through one of the cylindrical pivots, forming an image beyond it; here therefore, that is, at the end of this pivot, the diaphragm and eye-piece are placed, and the observer has no occasion to change his position, whatever the zenith distance of the object may be to which the telescope is directed; for all objects are alike reflected through the pivot to an eye looking through the axis. The great convenience of this arrangement will be obvious to every one, and appreciated by those who have felt the discomfort of twisting the neck and bending the body into suitable positions for observing with the ordinary portable transit-instrument, and especially when the objects are near the zenith.

The lamp is placed upon a stand beyond the remote pivot, the light from which is made to diverge upon four segments of a large lens which project beyond the sides of the prism, and is thereby refracted and made to converge upon and illuminate the field of view.

The axis is levelled by a striding level of the usual kind, which is furnished with a scale showing single seconds of arc.

The circle is of 12 in. diameter, with divisions upon silver to 5′ of arc, read by means of two opposite verniers to 5″; it is furnished with microscopes for reading the verniers, a clamp and tangent screw, and all appropriate adjustments; the whole is mounted upon a plain stand of cast-iron.

The altitude and azimuth instrument was made by Troughton, towards the end of the last century, for the Rev. Francis Wollaston, who gave a description of it in his *Fasciculus Astronomicus*, which was published in the year 1800.

It subsequently became the property of the late Admiral Shirreff, from whose representatives it was purchased by its present proprietor.

This instrument may be taken as the type of the modern altitude and azimuth instrument; and considering that it was the first of the kind made by Troughton, it is surprising that so little was left to be done in the way of subsequent improvement.

The base is a strong tripod, having adjusting screws for levelling the instrument, and the azimuth-axis is firmly screwed into its centre; upon this tripod the azimuth circle, of 12 in. diameter, is placed. The divisions are cut upon the brass (for the custom of inlaying a band of one of the precious metals was not then introduced), into spaces of 10′ of arc; these spaces are subdivided to 10″, by two opposite verniers fixed to a circular plate which revolves upon the azimuth-axis; upon this revolving or vernier plate two columns are erected for supporting the superior parts of the instrument; and in order to guard against the possibility of twisting in these important parts (for such twisting would be fatal to all azimuthal determinations), the columns and the external cone of the azimuth-axis are bound together by a strong connecting frame.

For the purpose of giving greater length to the transit-axis, the columns are made to lean outwards from the vernier-plate upon which they are based; and upon the top of them the Ys for receiving the pivots of the transit-axis are placed, one of which can be adjusted vertically for the purpose of levelling.

The focal length of the telescope is about 20 in., with an aperture of about 1⅞ in. It has five vertical and as many horizontal wires in its focus, with magnifying powers of about 35 or 40 times.

The altitude-circle is double, with connecting pillars between them; it is of 12 in. diameter, and is read to single seconds by means of two micrometer-microscopes, which are supported by an arm firmly secured to one of the columns.

There are two spirit-levels to this instrument, one of which is permanently fixed upon the telescope in the direction of its length, and the other is for the purpose of levelling the transit axis.

Both circles are fitted with clamps and tangent screws, and are in all respects completed as in modern instruments.

Source: Weale 1854, 686-8

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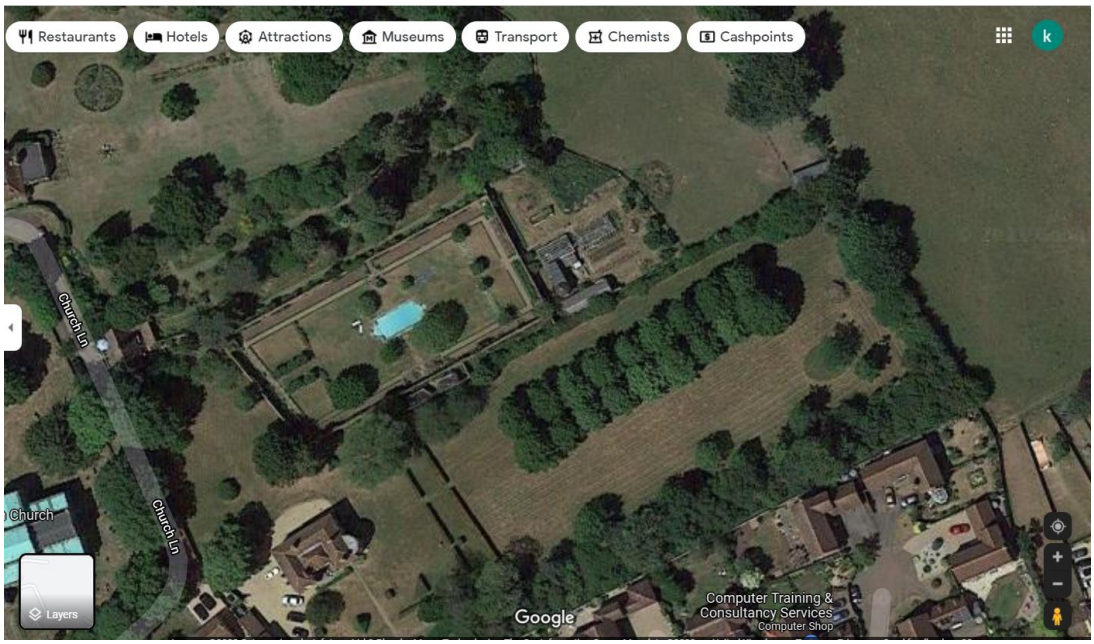
Source: OS 1:1,2500 (1900)



Google Earth with inset of the conical roofed observatory