

Charles Grover: some autobiographical notes.

Charles Grover was born March 2nd 1840. Of course this is mere hearsay. I have no personal recollection of this important event, and can therefore only rely on what I am told by those who are older and therefore presumably wiser than myself.

My mother dying when I was about two months old I was consigned to the care of my grandmother and therefore saw very little of my father who died about 1850.

My grand mother was so extremely kind (of course in an old fashioned and mistaken way) that had I long remained with her after my father's death I should have been good for nothing, but fortunately for my future welfare she also shortly died and then I was consigned to a Brush Maker to be initiated into the mysteries of that trade as a future living.

The education I received during these early days was of the most elementary character. The British School of Chesham in Buckinghamshire did not furnish anything very advanced and the days of Board Schools and Codes were then in the distant future. So that beyond Reading, Writing and the veriest rudiments of Arithmetic I did not get much.

So far as reading was concerned I always seemed to take to it quite naturally and I can never remember the time when I had to learn to read, on the contrary I read with eagerness any books that came my way.

I have a grateful recollection of one of the Masters who permitted me gratuitously to join the drawing class and though the available time was very short, I just learned to draw a few geometrical figures and this knowledge further developed I have found of the greatest use in after life.

The appearance of the Great Comet of 1858 drew my attention to the study of Astronomy. I observed with wonder the great development of the tail during September and October and when on the night of October 11th this grand comet swept over the bright star Arcturus it presented a spectacle not easily forgotten.

The only optical instrument I could then procure was a very old and rickety ship's spy glass which just showed the Satellites of Jupiter, the Phases of Venus and the more prominent markings on the moon.

With this however I saw much that excited my wonder and lead me to read up any works I could come across on Astronomy so that I soon felt the want of more perfect means of observation.

In the course of my reading I lighted on a description of the Non-Achromatic telescope which I determined to give a trial and accordingly in 1860 procured a double convex lens of 6 feet focus and 3 inches diameter as an object glass and another double convex lens of about 3/4 inch diameter and 11/2 inch focus as an eye piece, the Body tube of this telescope was 5 foot 9 inches long with a sliding tube of 1 foot to carry the eye piece.

The performance of such a telescope is by no means to be despised, although owing to special and Chromatic aberrations it is not suitable for scrutinising the details of Jupiter's belts or the rings of Saturn, and in fact will not bear powers high enough for such purposes.

Yet owing to its having only two lenses the light grasping power in proportion to aperture is very great and therefore when the magnifying power is not pressed more than 15 to the inch of aperture it forms an excellent comet seeker.

And I obtained very good observations of the comet of 1861 and was able to follow the comet far into the Autumn when it had lost all trace of a tail and merely appeared as an extremely faint nebulous spot on the deep blue of the field of view. As may be inferred, such a telescope is also useful in observations of Nebulae and serves to give the amateur astronomer grand views of the Milky Way, the Pleiades, Bee Hive in Cancer and many other such objects.

Some little care is needed in mounting the eye lens of this kind of telescope. The lens should be put a distance inside the eye tube equal to its focus, that is to say, if the eye lens is 11/2 inches focus the distance from the centre of the lens A to the eye hole in the Cap B should also be 11/2 inches, if this is properly attended to the image of the field of view completely fills the eye lens, if not, the field is more or less imperfect to the corresponding hindrance of correct observation. It is well to mount the lens in an inner sliding tube so as to allow of careful adjustment and when this is accomplished to make it a fixture.

In March 1862 I procured an achromatic telescope of 2 inches aperture and 36 inches focus and with this made a long series of observations. The phenomena of the transits of Jupiter's satellites and their shadows, and of the surface of the Moon particularly Tracastorius, Gassendus and Plato, also the disappearance of Saturn's ring in 1862 were particularly studied.

The Planet Mars was very disappointing in this little telescope, the ordinary powers of 50, 65 and 80 showing nothing but little confused patches of light and shade with no definite outline such as the ordinary drawings in Astronomical works would lead one to expect. The Revd T W Webb here came to my assistance and by giving me a short focus lens which produced a power of 200 on the 3 feet focus I was able to see the Kaiser Sea and a few other of the more prominent markings in 1866 - 7.

To the genial and kind author of "Celestial Objects" I was indebted for most valuable assistance. Commencing with January 1865 our correspondence continued up to very shortly before his lamented death on May 19th 1885. He wrote a small and very neat hand and I have a considerable collection of his letters giving the most minute and practical instruction as to the mounting and adjustment of telescopes, diagrams of various celestial objects etc. In the 4th Edition of Celestial Objects published in 1881 he introduced many references to my observations as a proof of what was within the reach of small telescopes.

With the 2-inch telescope I observed a great number of the more easy and conspicuous double stars and soon felt the need of some method of measuring their angular positions. The Position Micrometer being from its cost quite beyond my reach, I devised a very simple and easily applied substitute which I found in practice gave very good approximate results.

On the eye end of the telescope (Fig 2) is attached a cardboard circle divided to 1 degree and with the four points 0, 90, 180 and 270 degrees specially marked. A pointer P is fixed to the tube carrying the eye piece so that by revolving the tube in its fitting the pointer traverses the circle, and a little collar put on at C keeps the eye pieces during revolution always in focus.

Across the diaphragm of the eye piece (Fig 3) a single wire (W) is stretched and the method is using is as follows.

A double star being brought into the field, the eye piece is revolved until the brightest star A of the pair exactly threads the wire as it passes by its own motion across the field and the degree shown by the pointer on the circle is noted, the star being then brought back to the centre of the field the eye piece is revolved until the same wire passes exactly through both stars as shown at B' and B" and the pointer again read. Obviously now the angular distance or difference between these two readings is the difference between 90 or 270 degrees. Thus suppose we have a pair of stars as in Figure 3 and the brighter runs along the wire W that shows the position angle of 270 degrees and on revolving the eye tube until the wire cuts both stars the pointer reads 210 degrees this is the angle of Position and the Index has passed over 60 degrees.

Of course, these would be the readings assuming that the circle was so adjusted on the eye end of the telescope that the index pointed to 90 or 270 degrees as the star threaded the wire, but it is not only very difficult so to adjust this circle but impossible unless the telescope be mounted equatorially to maintain this adjustment, therefore the actual readings of the circle may be disregarded, and it is only the differences between these angles with which we are concerned.

Thus supposing our first reading when the star threads the wire to be 255 degrees and when the wire cuts both stars it is 185 degrees - then the difference is 60 which in this example has to be subtracted from 270 thus giving the angular position of this pair as 210 degrees.

A paper describing this arrangement under the title of "A Substitute for the Position Micrometer" was published in the "Intellectual Observer" for January 1866, and as an example what may be done with such home made appliances, the following measures published in the "Astronomical Register" for November 1867 may be quoted:

(Here follows a table showing positions, measures and epochs of 14 stars)

In 1865 the late Dr Lee took a great interest in my astronomical observations and invited me to visit his observatory at Hartwell House near Aylesbury, Bucks which I did in June and again in August of that year.

The Dr. received me with the greatest kindness, made the most minute enquiries as to my circumstances, Instruments, Books etc. and looked carefully through my manuscript observations which I had been asked to bring for his inspection, and before I left he expressed himself as much surprised and pleased at the accuracy of the work I had accomplished with very small and limited means, made me a liberal pecuniary present and gave me a large number of books and materials which I found of the greatest service.

This was the first Observatory I had an opportunity of inspecting and as every facility was given me, I made the best use of my time to learn as much as possible. It appears Dr Lee commenced Astronomical observations at Hartwell as early as 1828 and during these 37 years had acquired a very large and valuable collection of Instruments as well as a most extensive library replete with works on every department of science.

A most beautifully mounted 5 1/2 inch Gregorian telescope on a portable Equatorial stand by Cooke attracted my attention. Also a very curious Orrery of the Solar system, and another machine showing the movements of Saturn's Ring and Satellites, besides a smaller and simpler instrument showing Jupiter's four moons going round their giant planet.

The principal Instrument was the Equatorial telescope of 5.9 inches aperture and 8 foot 8 inches focal length, mounted on the English plan with a Polar axis 14 foot long and covered with a dome 15 feet in diameter. There was a Position Micrometer and a very large number of eyepieces giving powers from about 50 up to 1200.

One evening being very clear, in company with the assistant Mr Samuel Horton I had an hour or two with this telescope and learned (as I have since found is generally the case) that most of the work is done with these eye pieces giving powers of about 150, 240 350 with the 240, definition was exquisite and the superb view of Saturn I shall never forget.

This telescope has a somewhat eventful history. The object glass was made by Tully about 1829. The flint glass disc having been purchased by Sir James South in Paris the previous year. From 1830 to 1836 it was mounted in the Bedford Observatory and employed by Admiral Smyth in the compilation of the well known "Cycle of Celestial Objects".

From this Observatory it was transferred to Hartwell where it remained about 30 years till in 1866 on the death of Dr Lee this observatory was dismantled. In 1882 I found it at the Radcliffe Observatory, Oxford, packed for transmission to Bermuda for the Observation of the Transit of Venus, and in 1885 it was transferred to the Hong Kong Observatory where it has been employed by Dr Doberek in Measures of the Planets Jupiter and Saturn.

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Original typing by John Grover. (Great grandson)

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