50 Years an Astronomical Observer.
A few recollections of half a century's work
by Charles Grover

Rousdon Observatory,
Lyme Regis

May 1908.

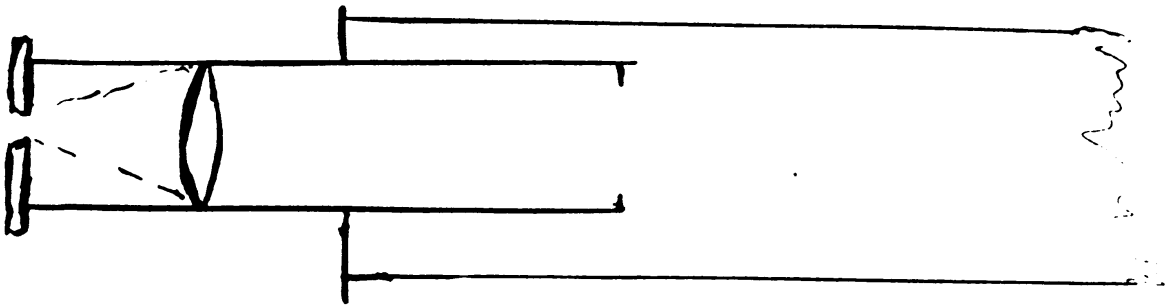
Born[1] on March 2nd 1840 my earliest recollections are of the Boys British School at Chesham Bucks, where the education was of the most elementary character. Reading and writing with a little arithmetic and geography was the extent of learning at that day. I never knew the time when I could not read or write and it was no trouble whatever to acquire this, but I do remember watching a class of older scholars who had a two hours drawing lesson every Wednesday. The kindly schoolmaster **Mr. Osborn**[2], noting this, said to me one day, "Would you like to learn drawing, Grover?" I said I should and he took me into the class. I had three of these two hour lessons when this good man left, and I remember his patting me on the head when he said goodbye and telling me to learn all I could. Those three simple lessons have always been invaluable to me and I could soon make an intelligible sketch of nearly anything.

Among my fellow scholars I best remember **Robert Barnes**[3], a very delicate boy of my own age. I have sat on the same form with him and watched with admiration the beautiful drawings he produced even at that early date, he rose to distinction, exhibited at the Academy in 1873, was a very constant contributor to the Graphic, and died in May 1895. He was particularly noted for his pleasing studies of children and scenes of happy domestic home life.

On leaving this school I was apprenticed to a brush-maker, but my mind was not in this, and all my spare time was devoted to such books as I could get and the pursuit of general knowledge.
The appearance of Donati's comet in 1858 first drew my attention to astronomy. I watched this beautiful object night after night in its path across the heavens, and on October 5th saw it pass in splendour over the bright star Arcturus, and finally disappear from these latitudes. Thus the Great Bear, Arcturus and the Northern Crown (corona borealis) were the first constellations I recognised.

On the evening of (Sunday) May 8th 1859 I noticed a star near the moon, a little while after it was quite close, then it vanished, afterwards appearing on the other side. Looking up the almanac I found this was an occultation of the planet Saturn, and then I found I must have a telescope, so I bought an old ship's spy glass for 10/- and to me it was a wonderful instrument. The satellites of Jupiter, the crescent figure of Venus, The Pleiades, the Cluster in Cancer and other wonders were diligently studied during the next year or so.

In 1861 I wanted a more powerful telescope, money was very scarce, and a cheap achromatic object glasses and fittings were not to be bought as they are now. So I got a double convex lens of 3 inch diameter and 5 foot focus, and with a zinc tube constructed a non-achromatic telescope. The eye piece was a double convex lens ¾ inch in diameter and about 1½ inch focus. Thus the magnifying power was about 45. Much of the success of this kind of telescope depends on the proper construction of the eyepiece, which should have a sliding cap with an eyehole at the exact focal distance from the lens; the entire field of view then appears very brilliant.



This simple form of telescope is by no means to be despised, consisting as it does of only two lenses there is very little loss of light, as proved by a chart of the Pleiades made in the autumn of 1861 which shows 52 stars.

[1] Birth Certificate states (Monday) 7th March 1842 in Chesham
[2] See 1851 census in Appendix
[3] See 1881 census in Appendix

The great Comet of 1861 was an object of much interest, discovered by **Mr. J Tebbutt**[4] of New South Wales on May 13, it passed perihelion on June 11th and rising from the southern hemisphere became visible in these latitudes on June 30. The position of the comet and the peculiar broad fan shaped tails made it very probable that the Earth passed through the cometary envelope at that time, but beyond a peculiar yellowish haze noticed in one or two places, nothing transpired, and the alarming predictions of the destruction of the Earth, or of a Universal deluge as a result of a collision with a comet which so frightened the people of an earlier age were certainly not confirmed. My first drawing of the Comet, (Tuesday) July 2 - just before Midnight, shows a straight narrow tail of enormous length, about 70 degrees - on July 3 a drawing of the head shows two jets of light from each side of the nucleus, and a broad sector of light preceding. After this the brightness rapidly diminished and the comet was last seen on (Thursday) September 5 when it was an exceedingly faint object, having been followed two months and three days. Not a bad record for such an imperfect instrument.

In March 1862 I purchased a 3 foot achromatic telescope of 2 inches aperture, mounted on a plain pillar and claw stand, this had a pancratic eyepiece giving powers 50 65 and 80.

The first observations made with this telescope were the disappearance of Saturn's rings in May and June 1862 (since which date I have been able to watch the succeeding disappearances in 1877, 1892 and in 1907) and during the next five years I did much work on the Sun, Moon, Jupiter and Saturn.

Observing the moon on (Sunday) January 1st 1865, I saw on the dark part of the disc, a bright spot like a 4th Magnitude star to the naked eye, but rather larger, which I watched for fully 30 minutes. It was at the E foot of the Lunar Alps and about the same position in which a bright [spot] was observed 1789 September 26. I wrote an account of this to the **Revd. T W Webb**[5], the author of that wonderful book "Celestial Objects for Common Telescopes", and his kind and genial reply was the beginning of an extensive correspondence, continued almost up to the time of his lamented death May 19th 1885. His great work went through several editions, the fifth, revised and greatly enlarged by **Revd. T E Espin**[6] in two Volumes appeared in 1893. This observation of the bright spot on the moon is given on page 104 of Volume I and there are many other notices of my observations scattered throughout the work.

On (Monday) June 5 and (Tuesday) August 15 1865 I went to Hartwell at the kind invitation of **Dr. Lee**[7]. The Hartwell Observatory, at that time one of the finest private observatories in the Kingdom, was a fine building with a 16 foot revolving dome in which was the celebrated telescope used by **Admiral Smyth**[8] in compiling his "Cycle of Celestial Objects". This telescope of barely 6 inches aperture, was nearly 9 feet focal length, and was mounted as an English equatorial on a wooden polar axis, the Hour and declination circles being each 3 feet in diameter. The definition was splendid, and I have a vivid recollection of the appearance of Saturn with a power of 240. The ring was sharp and clear, and the belts and markings on the ball of the planet remarkably distinct. I was particularly anxious to see the Pole Star with this telescope, as I had been observing the small companion with my little 2 inch. One glance was sufficient to show me my mistake, there was the companion clear enough, but so small and so near the bright star even with this powerful telescope as to show that it was very unlikely to be ever seen with a 2 inch Object glass.

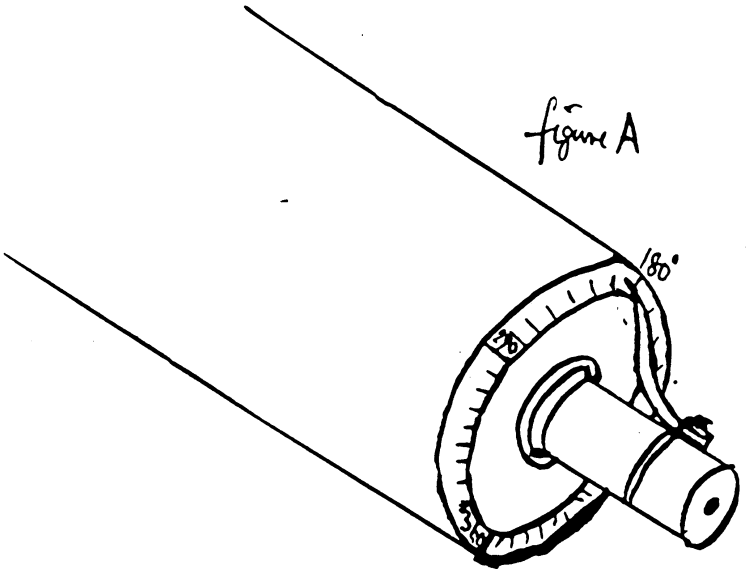
The Library at Hartwell contained many objects of interest, there was an Orrery moved by clockwork, and a similar machine showing the motion of Jupiter's four moons. Also one of the early telescopes of the 17th century (by Campani of Rome, dated 1650) with a 2 inch Object glass and 10 foot Vellum tube. The great map of the moon projected by the British Association was there in progress. This was to be 10 feet in diameter, and the lines of latitude and longitude were set out, some of the larger Lunar formations were sketched in outline, and as one looked at this large scale chart, the magnitude of the work was faintly realised. Unfortunately it was never completed. **Mr. W R Birt**[9] worked at it for years, and the positions of many of the principal Lunar formations were

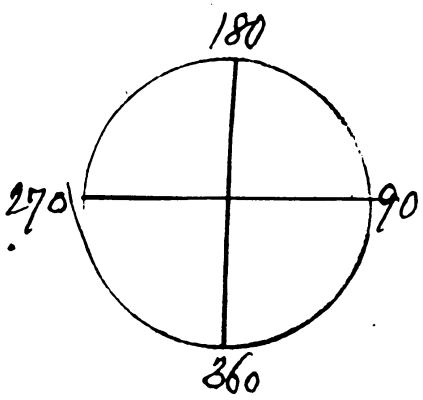
[4] John Tebbutt (1834 - 1916)
[5] Revd. Thomas William Webb (1807 - 1885)
[6] Thomas Henry Espinall Compton Espin (1858 - 1904)
[7] Dr. John Lee (1783-1866)
[8] William Henry Smyth (1788 - 1865) President of the RAS 1845 - 1847
[9] William Radcliff Birt (1804 – 1881)

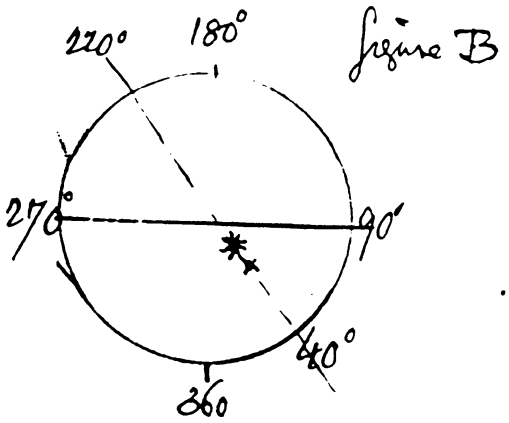
laid down from Micrometer Measures with the Hartwell equatorial. He corresponded with many observers and accumulated much material after the project had been abandoned by the British Association, but the work gradually dropped and Mr. Birt died December 1881. There was a Lunar Globe about two feet in diameter showing in relief the visible hemisphere of the moon, and a fine collection of prints and drawings of Celestial Objects.

The transit room contained a transit instrument of 3¾inch aperture and 5 foot focus, and a siderial clock, both of these the best obtainable at that day, and each costing 100 Guineas. Dr. Lee died February 25th 1866 at the good old age of 83. The observatory was afterwards dismantled and I saw the transit instruments sold at Steven's Auction Rooms, King Street, Covent Garden (Friday) July 2nd 1880.

The position micrometer with which Admiral Smyth made his extensive series of double star measures was to me an instrument of particular interest. I had observed with my small telescope many double stars and often wished to be able to measure their position angle, but of course the position micrometer was out of the question for me, so I contrived a simple apparatus to this end. A carefully divided cardboard circle was attached to the eye end of the telescope, the lines of 90 degrees and 270 degrees being horizontal and 360 and 180 Vertical, the 180 being at the top. The index pointer which just touches the circle is attached to the eyepiece and revolves with it as it is turned in its tube, a little collar being put on so that it always keeps in focus. The whole arrangement will be readily understood from the annexed rough sketch, figure A. Now in the field of the eye piece stretch a single wire as in figure B so arranged that when the index points to 270 this wire is horizontal across the field, and therefore when the telescope is directed southward and on the meridian, the wire coincides with the path of a star as it moves across the field, now bring in a pair of stars as in figure B and let the larger star of the pair traverse the wire as it passes along - note the degree on the circle, this should be 270 degrees now revolve the tube till the wire is parallel to the pair of stars and again read the circle which will show the index has travelled from 270 to 220 degrees but as the smaller star is in the opposite quadrant the reading must also be transferred and the position angle is 40 degrees.







This of course is merely an example, no great accuracy can be expected from such a simple affair, but by taking a number of measures I have got a considerable approach to correctness, and as will be seen it is the measure of the angle which a line joining the two stars makes with the line of their apparent motion across the field which is the important matter. A table of the position angles of 16 well known double stars observed with this contrivance appeared in the "Astronomical Register" for November 1867. And a paper with illustrations of this "Substitute for the Position Micrometer" appeared in the "Intellectual Observer" for January 1866, which was prefaced by the following kindly remarks by the Editor:

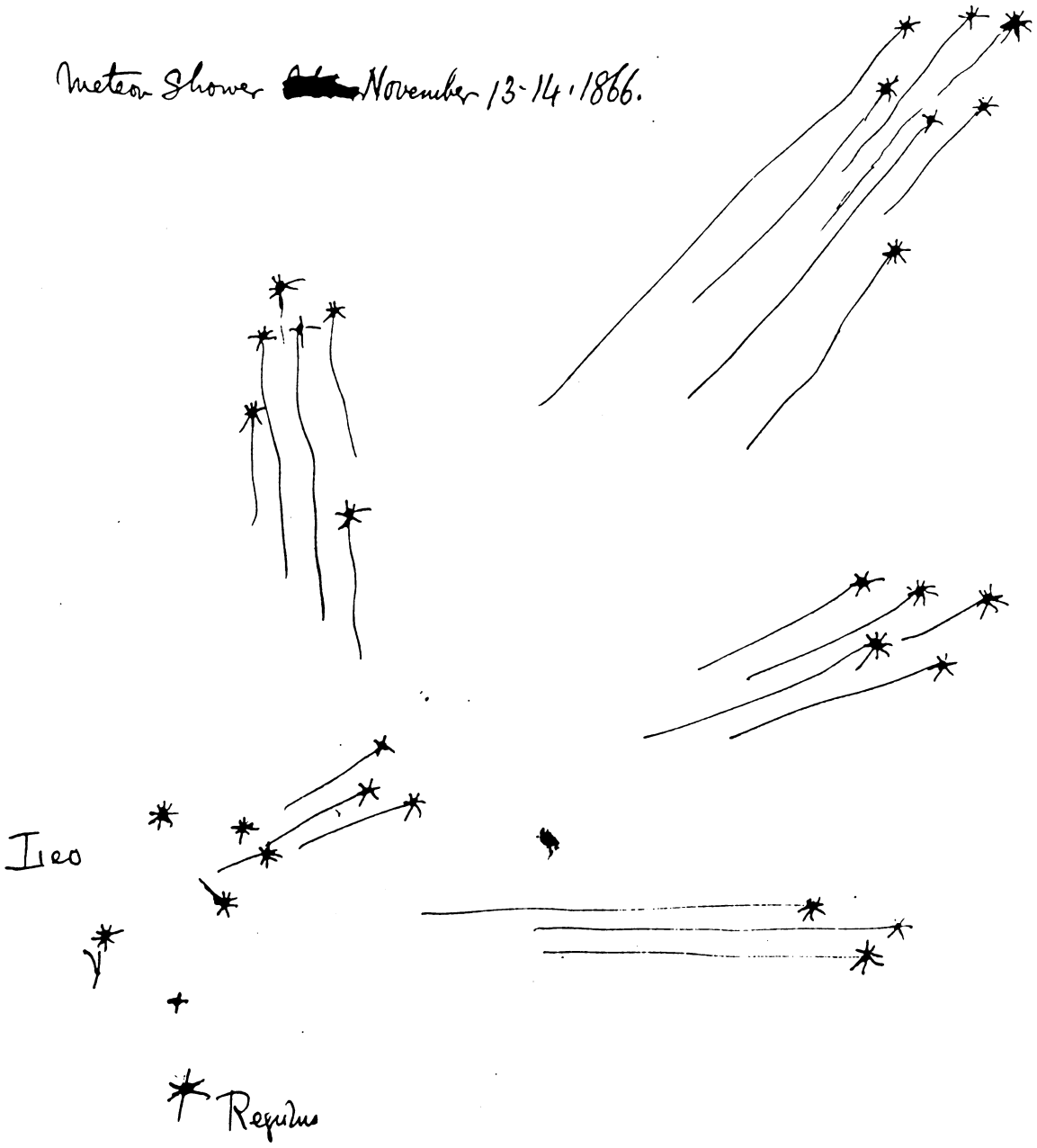
(A strong interest attaches to the pursuit of science under considerable difficulties, and we therefore depart from our usual custom by saying a few words about the author of this communication. He is an artizan - a brush maker - fortunately possessed of a two inch telescope, and doing such good work with it as to have attracted honourable notice from Dr. Lee of Hartwell House, Mr. Birt, and our own highly esteemed contributor, the Revd, T W Webb, by whom this paper has been sent to us. The plan adapted by Mr. Grover is certainly ingenious and may suggest to others, who like him cannot afford more perfect instruments, how much may be accomplished by ingenuity and perseverance. If a poor working man, subsisting and keeping a family upon slender weekly wages, can manage to make considerable progress in Observation astronomy by the diligent employment of his leisure hours, what a wide field is open to those who can devote ample time and money to any favourite pursuit? Ed.)

On (Monday) February 19 1866 I visited the late **Mr. James Buckingham**[10] and saw his great 20 inch achromatic telescope of 25 foot focus, at that time the largest telescope in England. It was mounted in the open air, at his engineering works, Westmoreland Road, Walworth Common. The stand was on the German plan, and the polar axis was about 18 feet above the ground. The tube of iron about 30 foot long was cigar shaped, 3 feet diameter at the centre and two feet at each end and weighed nearly three tons. Notwithstanding its great size it was easy to manipulate and could be reversed or directed to any part of the heavens in a very short time. Whilst there a dense fog came over, so thick that the moon about first quarter, was quite invisible, the telescope was turned on, and to my surprise there was the moon quite distinct, a striking proof of the light grasping power of such a large object glass. A duplicate lens was being ground on a machine driven by a steam engine and I was much interested in the complicated mechanism for altering the length and figure of the stroke and revolving the lens during grinding.

A beautifully constructed equatorial of 10 inches aperture was in a dome close by, also a transit instrument and siderial clock. Mr. Buckingham lent me a 4 inch Gregorian telescope by Short, on a massive brass table stand, with vertical and horizontal movements with which I made a great many observations.

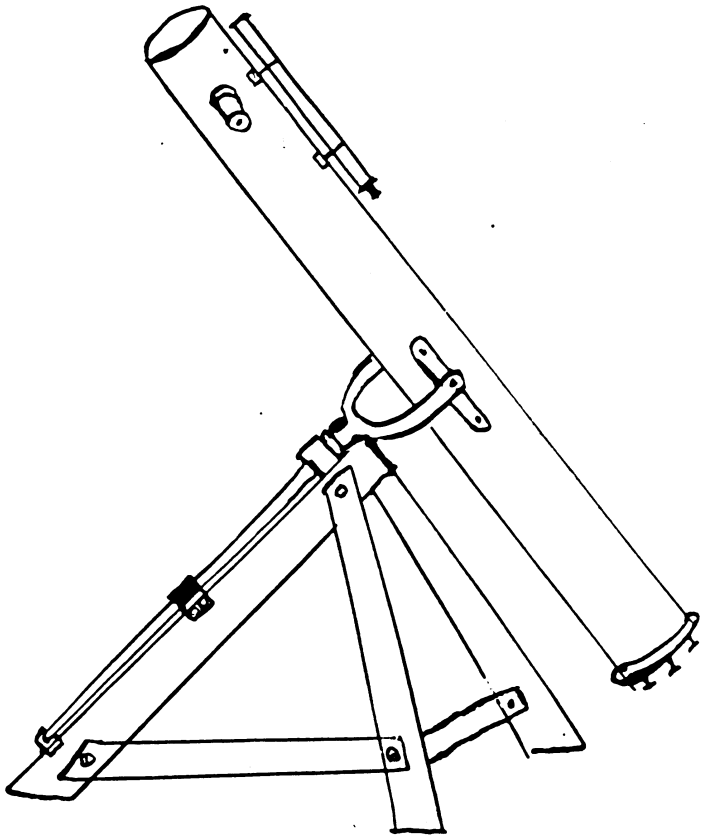
The great Meteoric display of (Tuesday) November 13th 1866 was observed at Chesham in Buckinghamshire, the sky was quite clear and so continued the whole night. About 9.15 p.m. a splendid meteor rose from the direction of the constellation Leo and slowly mounted to near the zenith where it burst with a shower of sparks, brilliantly lighting up the heavens, its path was marked by a beautiful blue track which remained visible for some time. Meteors were seen at intervals, increasing in frequency, and by 11.30 the spectacle was very grand; by midnight bright meteors were shooting from the neighbourhood of Leo at the rate of 20 in one minute and this continued till nearly 2 a.m. on the 14th. Many thousands of meteors must have been seen, as for two hours they were so numerous as to be quite uncountable. A curious feature was a well marked tendency to flights in groups, like the discharge of a number of rockets as shown in the annexed rough sketch. The longest tracks were those farthest from the radiant point in Leo, gradually shortening till near the radiant. Several flashed up and faded away with scarcely any visible motion.

[10] Mr. Buckingham is mentioned in the History of the RAS 1820-1920 p189.



The grandest meteor shower on record was that seen over nearly the whole of the North American continent in 1833 and it was generally accepted as a periodical phenomena every 33 years, and another display was therefore anticipated in 1899, a great deal was written about this in the scientific journals, and daily papers, which raised the expectations of the public to a great excitement, but nothing unusual occurred and only a feeble display was recorded. It is worthy of notice that while the great display of 1833 was seen over America and invisible in Europe, in 1866 the conditions were reversed, and this was well seen over Europe and invisible to the Americans.

Sketch of 6½ inch Silvered glass Reflecting Telescope - on rough equatorial Stand – Sheet iron tube 6 foot in length. 7 in diameter –



Early in 1867 the kindly help of several friends enabled me to set up a silvered glass reflector. **Mr. George With**[11] presented me with one of his mirrors of 6½ inch diameter and 5 foot 6 inches focus, but with great frankness told me in one of his letters that he was afraid the gift would prove a "White Elephant" as so much of the success of this type of telescope depended on the accurate mounting and adjustment of these specula. However the **Revd. Cooper Key**, (who was the pioneer worker of silvered glass specula in England, and who had completed and mounted an 18 inch mirror of great excellence) wrote me many kind and instructive letters, presented me with a good finder, and some money help, and with further kindly assistance from **Mr. George Knott**[12] (the well known double and Variable star observer) the telescope was completed, and the first observation was on (Thursday) April 11th. I very quickly mastered the details of adjustments and found this

[11] George Henry With (1827 – 1904)
[12] George Knott (1835 – 1894)

mirror of great optical perfection, so that I at once took up a survey of some of the Northern constellations and wrote a series of articles on the "Wonders and Beauties of the Starry Heavens" in the Astronomical Registers commencing in 1868. **Mr. With**[13] expressed the greatest pleasure at my success, and the Revd. Cooper Key and Mr. Knott were kindly correspondents for a long time. Alas, at the time of writing this (1908) all three have long since joined the majority.

In 1869 I was presented with a new plane Mirror, Barlow lens and several achromatic eye-pieces which considerably improved the performance of the telescope, these were supplied by **Mr. John Browning**[14] who wrote me many kind letters, and lent me one of his 4½ inch Silvered glass reflectors of 5 foot focus, with which I did such good work that in December he offered me a position in his optical establishment at 111 Minories, and I finally left the country and came to London. He resided at Clapham and I lived near him and had charge of a 12¼ inch Silvered glass reflector on a massive equatorial stand which he had erected in the garden behind his house, which was then all open fields but has long since been closely built over. I used to go to business every day and at night did many hours observing with this fine powerful instrument which was of great excellence. I found that the silvered glass reflector was just then being developed, several instruments of moderate size but great perfection had been made, and I found my duties were to take and enter all orders for telescopes and astronomical apparatus, to measure the focus of all mirrors on the celestial bodies themselves, either the Sun by day, or the Moon or stars at night, and to set out working drawings for the engineer workmen to construct telescopes of all sizes from 3½ to 18 inches diameter. I also tested all eyepieces and plane mirrors and other apparatus, and when complete packed and despatched telescopes to all parts of the world. The silvering of specula was one of my duties in which delicate operation I became quite an expert.

Many of these telescopes were supplied to gentlemen in all parts of the United Kingdom and this led to many journeys to fix up and adjust equatorials etc. In the autumn of 1870 an elderly gentleman **Mr. Frederick A Eck**, ordered an 8½ inch Silvered glass reflector, and when it was finished and sent to his country house at Hollybush, near Ayr, he was quite aghast at the size and weight of such a telescope of the construction of which he knew nothing. So he wrote to Mr. Browning and I was sent to fit it up. Leaving Euston by the Night Mail one Sunday in August I was at Carlisle at 4 a.m. on Monday, and after a look at the "auld brig of Ayr" and the quaint Market Place, I arrived at Hollybush about 2 p.m. The telescope was set up by the evening, and that night for the first time the old gentleman saw some of the wonders of the Heavens. By the next night the telescope was perfectly adjusted, the details of the Lunar Mountains the companion to Alpha Lyrae, the double star Epsilon Lyra, the Ring Nebula in Lyra and many other objects were well seen, and I was going to return to London on the Wednesday, but Mr. Eck said, "nothing of the sort, now you are here I am going to make use of you to learn something of astronomy and I shall write to Mr. Browning and keep you here till Saturday" so I had a good week, by day I went on long walks and saw much of the beautiful Scotch scenery, for this house was on a hill overlooking the Valley and the winding River Doon, on the opposite bank being the Burns Mausoleum and many other places of interest, and each night was filled up with two or three hours astronomy. On Saturday I returned to London and Mr. Eck wrote a most flattering letter to Mr. Browning of my services and ability. When they came to London I was a frequent visitor to their house at 16 Stanhope Gardens W and afterwards at 100 Cromwell Road. Mr. and Mrs. Eck continued my friend till his death 14 years afterwards, and he often said, my frequent letters on astronomical science which I wrote to him at his request almost weekly, afforded him the greatest pleasure.

The late **Mr. C W Lea** of Worcester and the late **Mr. W D Perrins** of Davenham Bank, Great Malvern (of the firm of Lea & Perrins of Worcester Sauce fame) both had large equatorial telescopes which I put up and adjusted - and many others, including a telescope to Jersey which gave me two journeys to the Channel Islands, which happened in this way. I took this telescope and set it up as usual, the owner being a gentleman fond of mechanics, we observed together many double stars and other things and he greatly admired the neat well defined image of difficult pairs of stars. "Now" I said, "You see this is perfect, so be most careful and don't de-range any of the adjusting screws". Very soon letters came to Mr. Browning complaining of imperfect vision, badly defined stars, and so I had to write him many letters, and he confessed that the next night after I left, he was working with the telescope, and could not resist the temptation of just turning one screw, he then found

[13] George Henry With (1827 - 1904)
[14] John Browning (1835 – 1925)

matters worse and turned another and found the instrument hopelessly wrong. So I had another journey to put matters right, and I heard of him for some time as a successful observer.

In the course of a long experience of adjusting equatorials, I observed many stars by daylight, and it is surprising how well many of the stars can be seen by day, if only a moderate power is used and most important of all, the eye-piece is exactly in focus. This should be insured by an observation at night and then marking a well defined circle on the eye tube. With several Silvered glass equatorials of 8½ inch aperture I have seen stars of 11th and 12th magnitude immediately after sunset, when the figures in the Nautical Almanac could be read and the circles set without difficulty by daylight.

Another gentleman I knew well was the late **Mr. N E Green**[15], a most talented artist, a teacher of water colour painting to several members of the Royal Family at that time. His studio then was at 3 Circus Road, St John's Wood. He was an observer of many years experience and many of his early drawings of Jupiter and Mars made with small achromatic telescopes, appeared in the "Astronomical Register." He had Silvered glass reflectors of 6½, 9¼ and others, finally in 1877 going in for an 18 inch Mirror, which I successfully silvered for him, and he took it out to Madeira and there made the splendid series of drawings of Mars which are reproduced in Volume XLIV of the Memoirs of the Royal Astronomical Society. It is not often that accurate observational powers and great artistic talent are combined in the same individual, and after watching this planet at every opposition for nearly fifty years, they are the most accurate drawings I have ever seen.

In July 1871 I went to the observatory of **Mr. W Garrow Lettsom** of Thurloe Place, Lower Norwood. He had just set up a 6.4 inch Achromatic telescope by Merz of Munich on an equatorial stand by Cook of York, and the adjustments did not exactly satisfy him. I paid several visits, and this led to an invitation on Sunday afternoons - which began a friendship of many years duration. He was a man of wide learning, had travelled much, and as an attaché of the British legations had lived in Berlin, Munich, Washington, Turin and Madrid. He was also Charge de Affaires to the Legation at Mexico where he was the object of an attempted assassination. He retired from the Diplomatic Service in 1869. The bullet which was intended to finish his career he often exhibited over the dinner table when recounting his many exciting adventures in foreign lands. He knew most of the eminent scientists of his day and had a fine collection of Philosophical apparatus, and an extensive library. We did much observing together, among other things the transit of the Shadow of Titan over Saturn's disc was well seen on (Sunday) December 9th 1877 and a Transit of Mercury over the sun's disc (Monday) May 6th 1878. The next transit of Mercury I observed with this same telescope in the Rousdon Observatory, (Saturday) November 10th 1894. This took place in the afternoon, and the planet was well seen for 25 minutes before sunset as a very black, circular, well defined spot. (see English Mechanic November 23rd 1894). The next transit November 14th 1907 was invisible owing to dense clouds[16]. The most striking feature of the Mercurian Transits is the very small size of the planet in proportion to the sun's diameter. It appears so very small that it is no wonder that beyond the exhibition of Phases Similar to Venus absolutely nothing is known as to the physical condition or time of rotation of this planet.

During my 13 years in London I did a great deal of lantern work, illustrating lectures for many well known scientific men. There was the late **Dr. Carpenter**, who lectured on the bed of the Atlantic and other ocean depths. **Dr. Mann, Mr. E B Knobel**[17] and many others. I went to the Crystal Palace, Dulwich College, Shoreditch Town Hall, The Society of Arts, the Institute of British Architects and numberless others, and heard lectures on nearly every conceivable subject. There was much Sunday work in connection with the Sunday Evenings for the People, when vast audiences were attracted to hear a lecture by some eminent scientist, followed by a splendid musical performance. I went to the Dome at Brighton where a course of Gilchrist lectures were arranged, the first of which was by **Dr. Carpenter**. So it had to be given a good start, and I did a good show. The Mayor and Corporation attended and it was a brilliant affair. On another occasion I was illustrating a lecture on Spectrum Analysis by a young scientist, who struck a dramatic attitude, and with uplifted hand commences, "Light, Light, More Light" there was a pause in which the audience audibly tittered; after struggling on some time and showing slides of spectroscopes and Spectra, he came to show the actual spectra of a few familiar substances, and explained that Spectrum analysis was so delicate that the one thousandth part of a grain of Sodium could be

[15] Mr. Green is mentioned in the History of the RAS 1820-1920 p197
[16] See letter to Thomas Richards in appendix
[17] Knobel was Secretary to the RAS 1882 – 1892 and President 1892 – 1893 and 1900 - 1901

detected, and a friend of his who was assisting put on the electric light - a very minute particle of Sodium which hardly showed a trace. I suddenly clapped in a liberal supply of Sodium, there was a cloud of smoke, a burst of flame, and a splendid display of Spectral colours on the sheet, which were greeted by the audience with loud applause. When the lecture was over, he said, "That was a fine experiment" I said, "Yes, these minute and exact things do very well in the Laboratory, but in the Lecture Hall you want something brilliant and striking".

There were some very interesting lectures at the Society of Arts in Adam Street. One I remember by **Dr. Perken**[18], on "Aniline Dyes" when the lecture table was set out with a row of gas rings on which were placed a number of copper vessels and heated to a proper degree - the process of dyeing was demonstrated before the audience. Another was on Watches and Watch making, when by means of an Aphengescope on the Electric Lantern, the various types of watch work were shown in motion on the screen. The watch plates magnified to about 4 feet diameter. This was a very interesting exhibition.

About 1873 there was much discussion in the papers as to the work of Gresham College, the Lectures mostly delivered in Latin failed to attract attention and frequently lapsed for want of an audience. The rules specified that if less than 3 presented themselves there was to be no lecture, but frequently 3 or 4 persons would arrange to be present to enjoy the fun of making the professor read his lecture. There were lectures supposed to be delivered on Music, Rhetoric, Divinity, Geometry and Astronomy, and a salary was attached to each professor, but little had been heard of them for many years. As a result of considerable agitation the establishment was reformed and new professors appointed, but it is only of the astronomy that I was concerned. The **Revd. E Ledger**, M.A. was the new lecturer and I went regularly for some time to illustrate his lectures with the lime light. They were made very interesting and the lecture theatre was often quite full. Instead of the former array of empty seats, after a time Mr. Ledger wished to personally observe the heavens, and to acquire a telescope and he was about to purchase a 5½ inch Achromatic equatorially mounted, from **Mr. A Common**[19] of Ealing Rise, so I was sent to inspect this telescope and was able to report that it was a good sound well constructed instrument. This was many years before Mr. Common became famous as the constructor of the 3 foot and the 5 foot Silvered Glass reflecting telescopes. The 5 foot Speculum is still in 1908 I believe the largest Silvered glass reflector in the world. Dr. Common died suddenly on the 2nd June 1903. This 5½ inch Equatorial was acquired by Dr. Common in 1874 and with it he made his first attempts at astronomical photography, but it was soon superseded by silvered Glass Reflectors. But though he brought these to such size and perfection, he un-hesitatingly recognised the advantages of the refractor for this work, particularly as applied to the astrographic chart of the heavens.

About 1874 to 1878 I was frequently at the old Polytechnic in Regent Street, at that time a very popular place of amusement and instruction. There was the Diving Bell in which parties of about a dozen young people enjoyed the novel sensation of being lowered to the bottom of an 18 feet deep tank of water. The Great Induction Coil giving a four foot spark, models of coal mines, Glass Blowing, and machinery in motion. The lecture theatre was fitted up with the finest and most powerful Lantern projection apparatus of the day. Some of the condensing lenses were 9 inches in diameter and the pictures were most beautiful hand paintings on a 7 inch circle, and with a combination of four Lanterns most beautiful effects were produced.

The Lectures were mostly very clever, those on science by **Mr. J L King** especially so. But the great attraction for several years was the late **Professor Pepper**[20]. He was the inventor of Pepper's ghost, and many other strange effects which always brought a crowded house and a golden harvest whenever he was on the bill. While as a conjurer and Sleight of Hand performer he was quite unequalled, and his patter as a lecturer was wonderful. Unfortunately differences arose between him and the Directors and the professor resigned, with the result that the fortunes of the place at once fell. Money difficulties soon came on and there was serious talk of the institution being closed. I think it was December 1878 after a long spell of empty houses the Professor took the institution

[18] Sir William Henry Perkin (1838 - 1907)
[19] Andrew Ainslie Common, (1841 - 1903)
[20] Professor John Henry Pepper (1821 - 1900) Exhibited (1862) optical illusion known as `Pepper's Ghost', invented (1858) by Henry Dircks. (Source. Dictionary of National Biography)
Henry Dircks, (1806 - 1873), civil engineer and author; life member of the British Association, 1837; consulting engineer; invented `Pepper's Ghost', an optical illusion, 1858 (Source. Dictionary of National Biography)

on his own account and agreed to run the show for 6 weeks, extending over Christmas and the New Year, with the result that the place was again crowded and hundreds had to be turned away nearly every day.

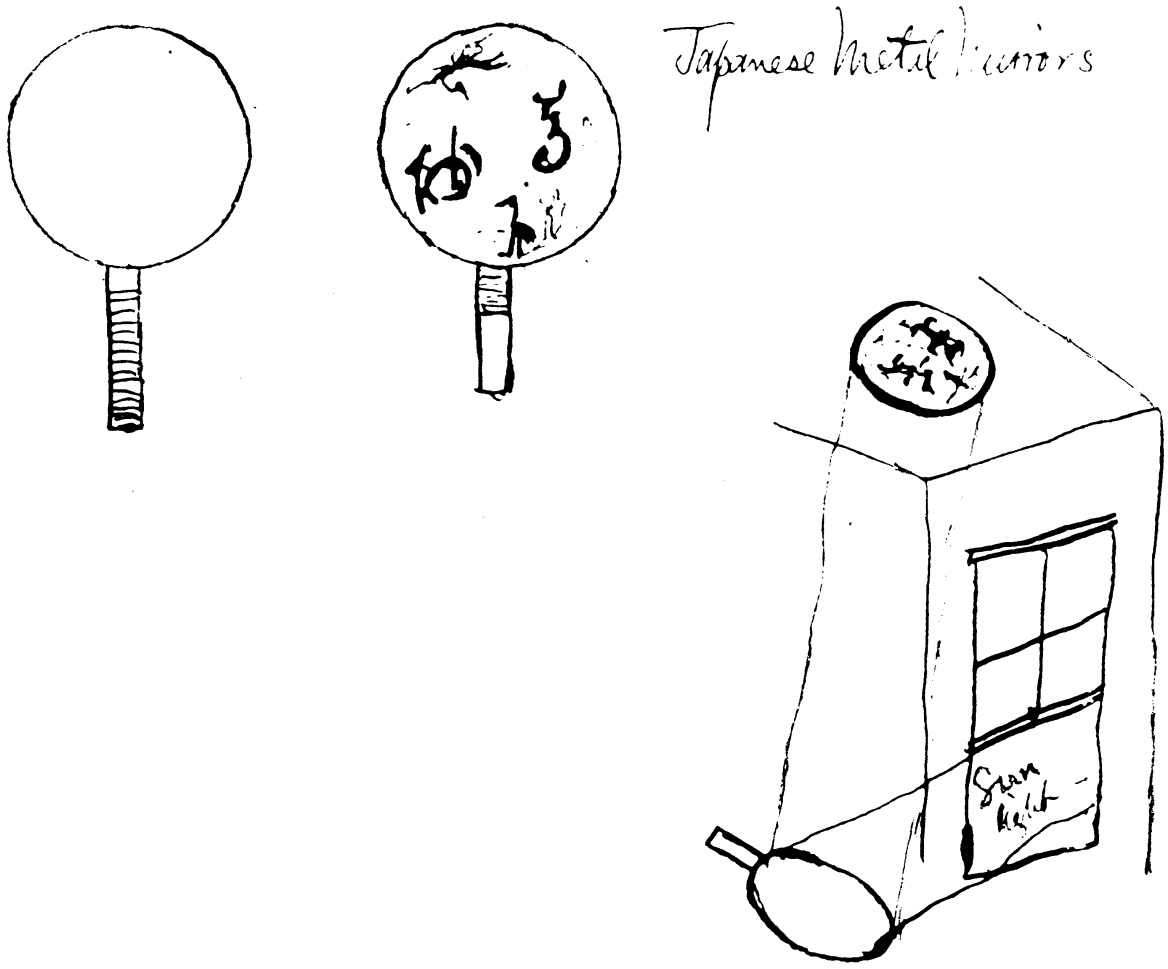
Needless to say Professor Pepper's great success aroused correspondingly intense feelings of jealousy in his less fortunate imitators. I was there one night of a most crowded and enthusiastic audience, and the Professor's tricks went off with remarkable success, amidst loud cheers and applause, when the sound of a few hisses were heard from the back of the theatre. The old gentleman was equal to the occasion, pausing in his performance, he advanced to the front of the stage, and said.
"Ladies and Gentlemen, I am very pleased at the hearty reception you have accorded me tonight, and your hearty applause is conclusive proof that my efforts to amuse you are appreciated. There are however a few discordant sounds coming from the back of this theatre the authors of which are perfectly well known to me, This exhibition is prompted by mean jealousy, and if I hear it repeated I shall name the authors and have them ejected, or if it will please them better they are welcome to come on to this stage, and take my place tonight, and you Ladies and Gentlemen, shall be the judges of the performance. We will now proceed." Needless to say, there was no more interruption that night, and the Professor's six week season was a great success.

After this he went on a tour of America and Australia, and when I was in Brisbane in December 1882 I met the Professor at the Society of Arts, and very pleased he was to see me again and to talk over old times together. Some years later he returned to England and ended his days in the old country.

Here, between p20 and p21, appears a photocopy of an Obituary of Prof Ayrton, annotated by Charles "English Mechanic November 13th 1908", as follows:

Professor Ayrton, the well-known Physicist and electrician, died at his residence in Norfolk–square last Sunday morning. William Edward Ayrton was the son of a barrister, and was born in London on September 14, 1847. He was educated at University College School and University College, and obtained the first place in 1867 in the examination for the Indian Government Telegraph Service. For a short time he studied electrical engineering under Lord Kelvin, and in 1868 went out to Bengal as Assistant Electrical Superintendent of the Telegraph Department, being promoted to the position of Superintendent in 1871. In 1872 he was sent to England on a special mission to superintend the manufacture of the Great Western telegraph cable under its engineers, Lord Kelvin and Professor Fleeming Jenkins, and in 1873 he became Professor of Physics and Telegraphy at the Imperial College of Engineering, Tokio. There he remained for six years; but in 1879 he came back to England and took up the post of Professor of Applied Physics at the Finsbury College of the City and Guilds of London Technical Institute. Finally, in 1884, he was transferred to the Central College in Exhibition Road as Professor of Electrical Engineering, a position which he retained up to the time of his decease.

In 1879 I had a lot to do with what were called the Magical Mirrors of Japan. These were metal mirrors of some alloy of silver, a plain mirror on one side, and on the reverse highly decorated with figures of flowers, birds, landscapes etc and some boldly polished Japanese characters. When a beam of parallel rays was thrown on the plain side of the mirror, the raised characters on the back were distinctly reflected on a white screen.



The late **Professor Ayrton**[21] on his return from the Imperial College of Engineering at Tokio brought to London two cases of these mirrors. They had not been very carefully packed and were much tarnished by the sea voyage, and he consulted with Mr. Browning as to whether he had anyone who could undertake the restoration of these mirrors, and they were handed over to me. There were about 300 of them ranging from 3 inches to about a foot in diameter. When these were cleaned and polished the greater number showed no trace of this magical effect whatever, and not more than 60 or 70 showed it at all well, while about a dozen were very perfect. Many experiments were tried with the oxy-hydrogen and electric lanterns, and lenses giving a parallel beam of light, but the best effect of all was obtained in a room with an open window facing the sun. When the direct sunlight fell on the plane face of the mirror, the pattern and ornaments on the back were clearly projected on the white ceiling, (as shown on the opposite page). There are two of these mirrors in the Rousdon Museum 9 inches in diameter, one shows no trace of the magical effect, the other exhibits the reflection most perfectly.

During the years 1870 to 1880 I was a frequent attendant at the meetings of the Royal Astronomical Society, then held in a little room at Kings College, Strand. Long before the present palatial home of the Society at Burlington House was even thought of. Nearly every month I went with Mr. Browning taking Micrometers, Spectroscopes, Astrometers and all kinds of astronomical apparatus for exhibition and description. I think when I first went in 1870 the President was **Mr. Warren de la Rue**[22] and during the succeeding years I saw there **Airy**[23],

[21] Professor William Edward Ayrton (1847 - 1908)
[22] Warren de la Rue (1815 - 1889) President of the RAS 1864 - 1866
[23] Sir George Biddell Airy (1801 - 1892) Four times President of the RAS between 1835 and 1864

Adams[24], **Lassell**[25], **Pritchard**[26], **Proctor**[27] and many other great astronomers of the day, and was an attentive listener to their papers and communications. Sometimes when the proceedings were a little dull they would be enlivened by the wit of the late **Captain Noble**[28], who had a neat way of asking amusing questions. One night Prof. Pritchard had given a lengthy account of his Wedge Photometer as used at the University Observatory Oxford. When after several comments from various gentlemen had nearly exhausted his patience, Capt. Noble rose and with a childlike smile asked the Professor, "Why do you slide the wedge in front of the scale?" Pritchard looked at him with angry scorn and thundered out, "To extinguish the Star, Sir" and his looks plainly said, "as I should like to extinguish you". About that time the late R A Proctor was bringing out his star maps and read papers on the Projection of the Sphere, which I illustrated with the Oxy-hydrogen lantern. He also read many papers on the best stations for the observation of the Transit of Venus in 1874 on which subject he had great disputes with the Astronomer Royal.

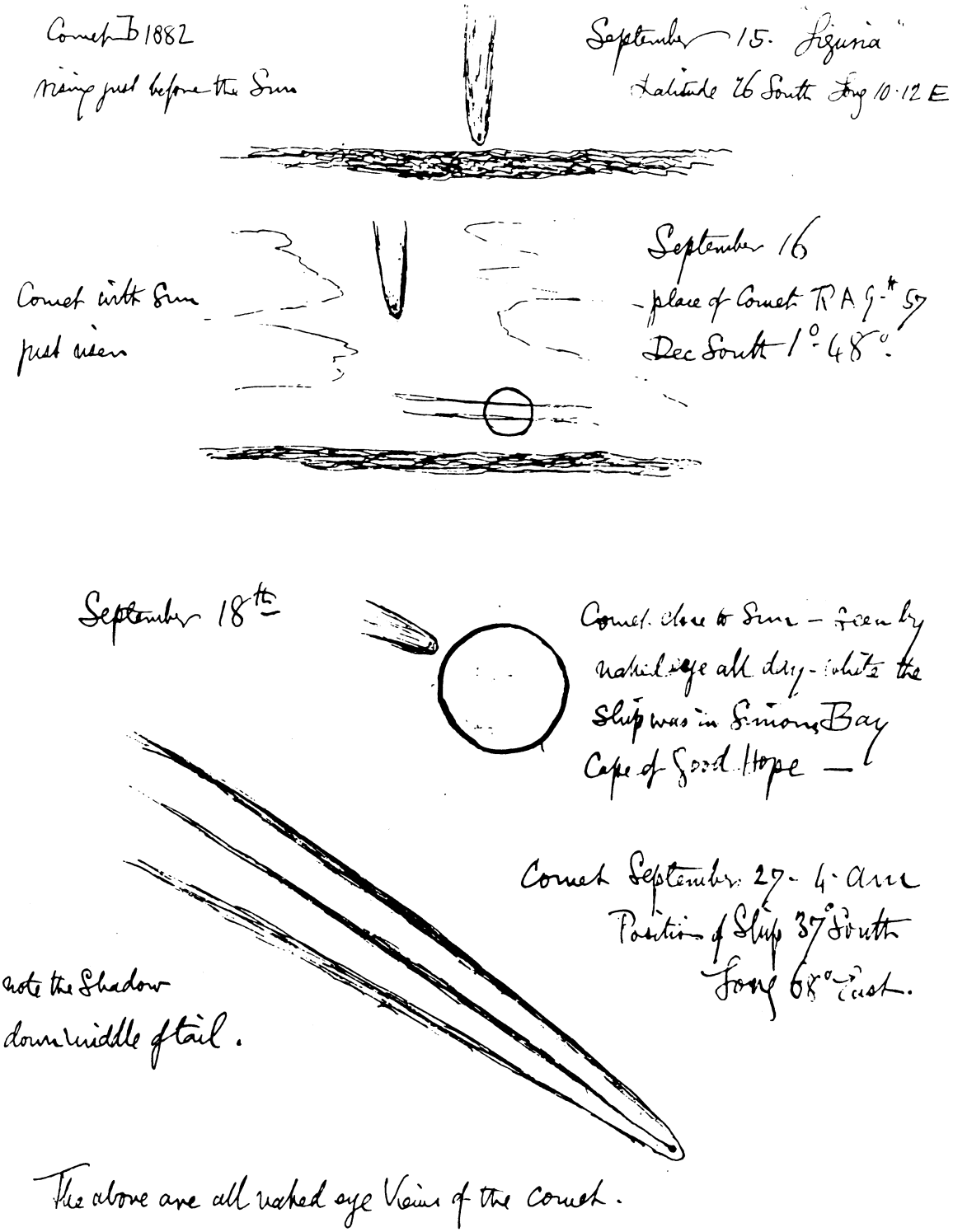
The Transit of Venus brought much business in the way of telescopes, special eyepieces, dark wedges etc and many elaborate expeditions went to distant parts of the world for the observations. Some were defeated by clouds, and those who were most favoured by the weather, were confronted with the unexpected difficulty of deciding what is real contact in the case of a black disc like Venus projected in front of the brilliant sun, and the results differed so much amongst themselves that the transit cannot be held to have but slightly advanced our knowledge of the actual distance of the Sun from our earth. This led to almost endless discussions as the astronomical papers of that time show, and the matter was gradually shelved to wait for the next Transit in 1882.

I little thought when busy with these matters in 1873 - 4 that I should be making a long voyage to observe the transit of 1882, but so it fell out; and this is how it happened. During the years that I was with Mr. Browning I made many friends, and amongst others **Mr. John Coles**, at that time Keeper of the Map Room, and instructor in astronomy and surveying to the Royal Geographical Society. He had a small silvered glass reflector and other instruments at his house at Mitcham in Surrey where I was a frequent visitor. One day in June 1882 I got a note from him asking me to meet him at the R.G.S. and when there, he told me that several expeditions were going out to various distant parts of the world to observe the transit, and one party was going to Brisbane, Queensland. **Capt. Morris**[29] was in charge of this, with **Lieut. Darwin**[30], and a young man of the Royal Engineers as assistant. **Mr. Cuthbert E. Peek**[31] was going out with this party as an independent observer at his own expense to observe the transit, and then to extend his travels in the Colony and go on to New Zealand, and he required a dependable assistant to take charge of his astronomical instruments and assist generally, and Mr. Coles asked me if I would take the post. It was a great surprise to me and being as I was comfortably placed with Mr. Browning it needed a little thinking over. However the chance of a long sea voyage, and a visit to Australia and other places, and above all, the opportunity of seeing the Southern sky, decided the case, and I signed an agreement for the Expedition in July 1882.

The next thing was, Mr. Peek wished to purchase a suitable telescope and if possible, a second hand instrument, and I was consulted on this matter. Now I knew Mr. Lettsom's telescope well having done much observing with it during the years 1871 - 1882 (see page 15) it was of unusually short focus 74 inches to 6.4 inch aperture but 18 inches longer focus. So Mr. Peek bought this telescope as it stood in the observatory at Lower Norwood, and I went to take it down and pack it for removal. It first went to the Radcliffe Observatory Oxford, to be erected and adjusted to the satisfaction of the Director **Mr. E. J. Stone**[32], here were met together the members of many other parties going to various destinations, some to the West Indies etc and their telescopes were all set up for

[24] John Couch Adams (1819 - 1892) President of the RAS 1851 - 1853 and 1874 - 1876
[25] William Lassell (1799 - 1880) President of the RAS 1870 - 1872
[26] Charles Pritchard (1808 - 1893) President of the RAS 1866 - 1868
[27] Richard Anthony Proctor (1837 - 1888) Secretary to the RAS 1872 - 1874
[28] Captain William Henry Noble (1828 – 1904)
[29] Captain William George Morris. R.E. (1847 - 1935)
[30] Leonard Darwin (1850 - 1943)
[31] Sir Cuthbert Edgar Peek (1855 - 1901)
[32] Edward James Stone (1831 - 1897) First Assistant at the Royal Observatory 1860 – 1870, Secretary to the RAS 1866 - 1871

adjustments and practice in observing. Mr. Stone was quite satisfied with the qualities of the instrument and I had about three weeks very pleasant time at the observatory. There was much of interest here, notably the well known Oxford Heliometer of 7½ inch aperture and 10 foot 4 inch focus, and the Carrington Transit Circle of 5 inch aperture and many other instruments. The Equatorial was then taken down and packed for the voyage to Australia, and we sailed from Tilbury (Thursday) August 24th 1882 on the steamer "Liguria" of the Oriental and Pacific Line. The vessel was about 6000 tons, and with passengers and crew made up more than 600 souls. After a rough day or two down Channel and over the Bay of Biscay, we settled down very comfortably. Mr. Peek was adept with the Sextant, and each day at noon I took up the sextant and chronometer to the bridge when the usual observations of the Sun were taken, there were generally four observers. The 1st and 2nd Officers, Mr. Peek and a youngster, and immediately after the observations all would retire to work up, and then compare results, when the position of the ship at noon was posted up. There was always quite a little crowd to see this, and the usual bets were always made every morning after breakfast as to how many miles we had made since yesterday's noon. We made about 350 miles a day. The Commander, **Capt. Coulan** was a most genial gentleman, and his Chief Officer, Perry and the rest of them were good fellows and I had a fine time with them, being much on the bridge and seeing a good deal of the working of the ship. The Chief Engineer, Sparks was also a very genial man who allowed me to go below in the Engine Room, Stoke-holds etc and along the Screw alley, so that I saw much of the machinery in which I was greatly interested.

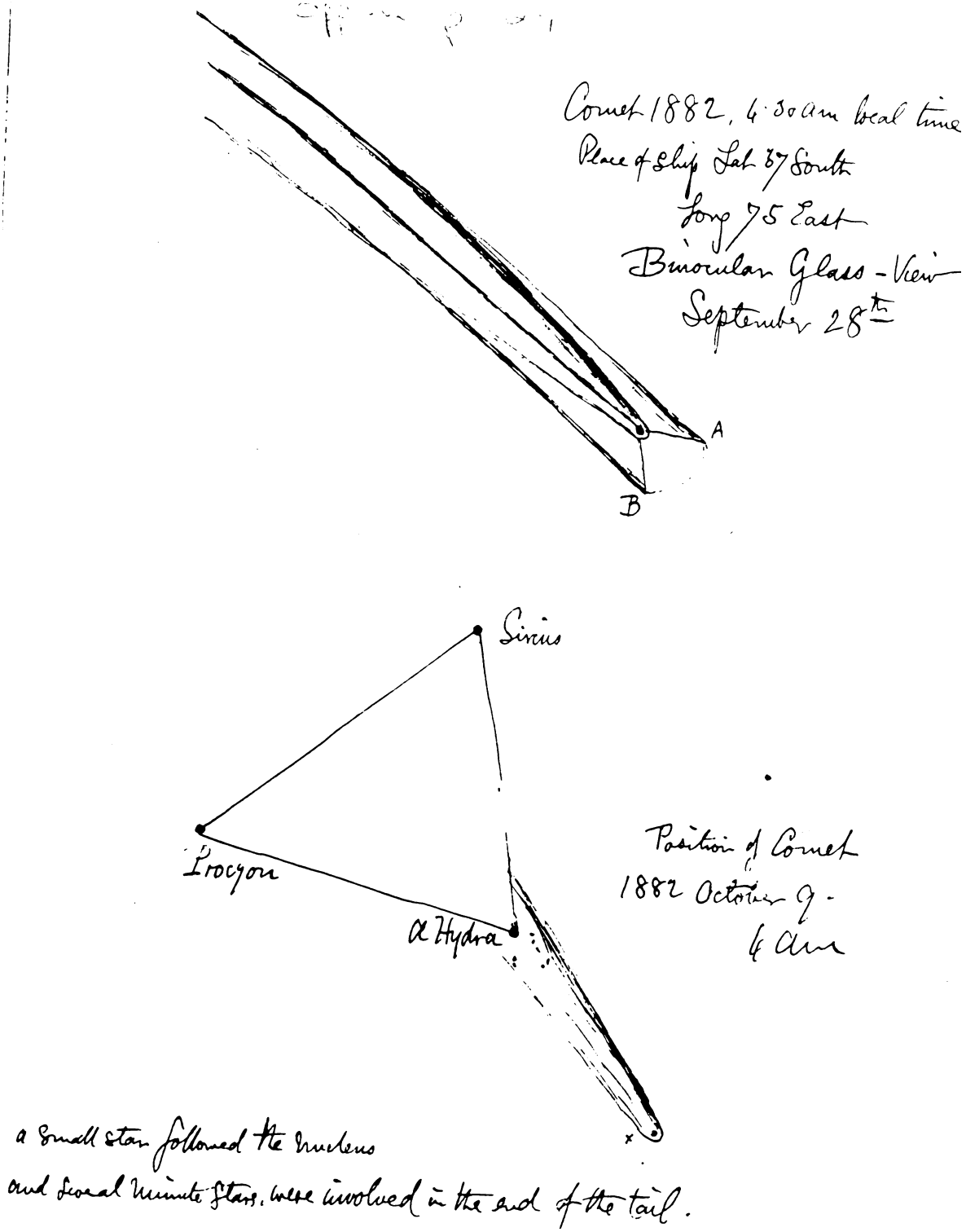


But my great delight was in watching the Southern sky. I had provided myself with several star atlases, and a pair of good large binocular glasses, and I watched with the utmost interest as the stars Alpha and Beta Centauri and the Southern Cross came into view, as we were going South from the Cape Verde Islands to the Cape of Good Hope. On Friday September 15th at 4.45 a.m. a magnificent comet was visible in the East, the tail rose nearly

vertical about 40 minutes before the Sun, and when the nucleus suddenly appeared it was certainly brighter than Sirius and the tail 8 or 9 degrees long. The next morning September 16th, it was so much nearer the Sun that it was not risen till daylight had so far advanced as to obliterate the brightest stars, but the comet was so bright as to remain visible even after the Sun was well above the horizon. Approximate position September 15th 5.30 a.m. R A 9h.57m Dec South 1 degree 48 minutes.

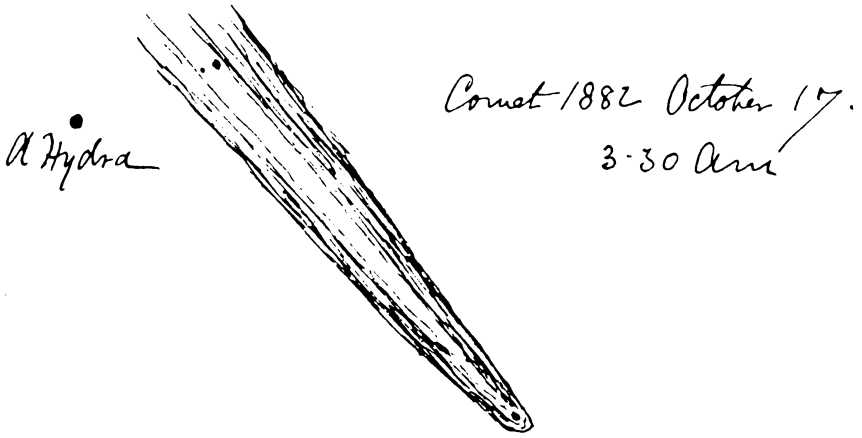
September 17th at Sunrise the comet is again well seen, it is evidently nearing the sun, and the tail points exactly straight away from that luminary.

September 18th. The comet rose just before the Sun with a brilliancy like a little moon and remained visible the whole day. At noon it was about 1degree 30minutes North a little West of the Sun, by just shading the Sun with the hand the comet was quite distinct, and its rapid motion was very striking. This day the ship was at anchor in Simons Bay and so was very favourable for observation. On leaving Simons Bay we encountered a succession of storms, gales, and such very bad weather that the comet was not again seen until (Wednesday) September 27 at 4 a.m. it was observed rising tail first above the East by South horizon, it is a magnificent object and in brilliancy far exceeds any comet I had previously seen (not excepting the splendid Donati Comet of 1858, or the wonderful long tailed comet of 1861.) When well above the horizon the tail is about 10 degrees long, the preceding side is remarkably brilliant and sharply defined. Slightly curved in a direction following the nucleus, and on the following side not so sharply defined and fading away gradually, a dark cone shaped channel or shadow is visible down the middle of the tail and can be traced with the binocular glass as a fine line nearly to the nucleus, which, though intensely bright does not show the appearance of a planetary disc as it did on September 18 when so near the Sun. Sirius, Canopus and Alpha Centauri, with the comet at the lower left hand corner form a gigantic square.



September 28. With the binocular glass the comet is seen enclosed within a larger and fainter envelope, the boundary lines of which are distinctly straight, and do not coincide with the curved figure of the comet within, so that at the points Alpha and Beta it projects some distance in front and on either side of the nucleus. At Beta this straight edged envelope is very plain and at both A and B it ends in a point as drawn, the enclosed sector

between A and B looks quite black, in fact as if a quadrant shaped shadow was projected in front of the nucleus - probably in a powerful telescope this space would be filled with luminous matter, the illusion would then be complete of a brilliant comet enclosed in a much larger but less bright envelope of cometary matter. Observations were continued on numerous dates and many interesting features developed. The motion of the comet was very slow, and on October 17 it was in the position shown overleaf, the light was wonderfully diminished, the nucleus not more than 5th magnitude and all signs of sector and envelopes had disappeared, but another singular appearance had developed, down the centre of the tail where before there had been a dark channel visible even to the naked eye, there is now a bright streak of light and toward the end of the tail this can be clearly seen half a degree beyond the fainter portion giving the comet a very curious appearance compared with September 12 and 28. It is as if the comet had turned one third round on an axial line up the tail. Two stars are in the tail as drawn.



Now I will resume my remarks on the Australian voyage - as I said before we, left London on August 24. On the 30th we sighted Madeira and passed so close to signal, that with a glass the Gardens, buildings etc with people walking about could be plainly seen, the air was soft and balmy with scarce a ripple on the water. On September 2nd we called at San Antonio, Cape Verde Islands. Here a telegram awaited the Captain with the un-welcome intelligence that owing to an epidemic of small pox at the Cape, no one would be allowed to board the ship and sufficient coal was to be taken on for the run to Melbourne. So 1500 tons of coal were then taken on, and we left the harbour of St Vincent at 8 a.m. on Monday September 4th in a few hours passing the Island of Fago, the most Southerly of the Cape Verdes, and this was to most of us the first sight of a volcano, from the summit of the mountain a column of smoke drifted with the wind and was soon lost in the distance. On Sunday September 17th we reached the Cape but were not allowed to go into the Harbour at Cape Town so went round the point and anchored in front of Simons Town. Here a boat came off with **Mr.** (now Sir David) **Gill**[33], H.M. Astronomer at the Observatory at Cape Town, and a few other gentlemen. They came as near as possible and a conversation took place over the ship's side. They were not even allowed to shake hands, and after discussing the affairs of the expedition with Capt. Morris and Lieut. Darwin, returned ashore.

[33] Sir David Gill (1843 - 1914) President of the RAS 1909 - 1911

We left Simons Bay September 18th for the long Easterly run to Melbourne, during which we encountered several severe storms and gales, with beautifully fine weather in between. On the 17th[34] I was on the bridge with the 1st Officer looking over the chart, and he said tomorrow about this time we shall pass Amsterdam Island. Now I knew that owing to gales and storms we had deviated several times from the direct course and on the 20th had only made 194 miles, so I was interested to see how this worked out. So on the 28th September soon after noon I saw the Captain on the look out and sure enough soon after 3 p.m. land was seen directly ahead and the Island was passed within the hour. It is a barren un-inhabited Island with a central peak rising to 2500 feet, and with the adjacent little island of St Paul, marks the half way, and is the only land seen in the 20 days run from the Cape to Melbourne. I was much struck with feat of seamanship and so was Mr. Peek who took a great interest in the navigation.

Melbourne was reached on October 8th and a stay of several days was spent in a good look around what may be called a little London of the Southern Hemisphere. Where the Buildings, Streets, Shops etc are singularly like the British Capital, and one does not feel the least like being on the other side of the world. I called on many people I had met in London, and of course the Observatory was the great attraction. This is beautifully situated in the Botanical Gardens, on a considerable elevation about two miles out of the city. From the top of the tower is a magnificent panorama of the surrounding country, with the domes and spires of the various buildings, the docks, crowded with shipping and beyond all the wide expanse of Hobson's Bay which is indeed of such extent as to be almost a little land locked sea. From this tower a time ball is dropped at 1 p.m. as at the Royal Observatory, Greenwich. At 3.30 a.m. October 13th I went with Mr. Peek to see the great reflecting telescope. The steel tube of this monster is 40 feet in length and five feet in diameter (I found I could almost stand upright inside the end of the tube) It has been so often described and figured in astronomical works that a long account is not needed here, suffice to say it is a model of what a great telescope should be. The movements are smooth and easy. The circles large and distinctly divided. The focussing arrangements and clamps are conveniently placed, and the clock movement very accurate. In fact it is without a doubt one of the handiest of Great Telescopes. The speculum is 48 inches diameter, a spare mirror is kept in a small room near, so as to be always available. The morning was beautifully clear, and **Mr. Turner**[35] who had charge of the great telescope was most obliging, and directed it to the Great nebula surrounding Eta Argus, the Grand Cluster Omega Centauri and several other wonders of the Southern Heavens. When the telescope was turned on to Jupiter the light was almost painfully bright, and many of the finer details visible in smaller telescopes was lost. To remedy this Mr. Turner had ingeniously applied a metal plate with a number of graduated apertures to slide in front of the eye lens of the eye piece, and thus limit the amount of light which reached the eye according to the brilliancy of the object observed, by applying a very small aperture, and consequently cutting of a large amount of the light, a fairly good image was obtained, and the planet looked exactly as I had been accustomed to see it for several years past in a 12¼ inch Silvered glass reflector. The same remarks applied to the planet Saturn. The belts on the ball and the rings were fairly seen, and the five satellites, Iapetus, Titan, Rhea, Dione and Tethys were very bright, but though I looked carefully for the two inner moons Eucaladus and Miunas, no trace of them was visible.

Later on the same day I called on Mr. Turner, and we compared our notes and sketches of the Comet. The agreement was remarkable, the drawings were so much alike that they might have been done by the same hand, and the notes on the structure and details are expressed in nearly the same words. Mr. Turner also showed me his drawings of the Southern Nebulae, carefully copied into a large ledger, with notes etc showing a vast amount of careful work of which he may be justly proud. There is an 8 inch achromatic equatorial, also a 4½ inch, a transit instrument of 4 inch aperture, a Photoheliograph and various other instruments. The genial Director, **Prof. R J Ellery**[36], whom I had met in London on several occasions, was very pleased to see me again, and we talked over many matters. He thought it quite a pity I was returning to England after the transit, as he said handy scientific assistants like me were much wanted in the Colony. He first went to Australia in 1851 and two years later superintended the building of a small observatory at Williamstown, which was followed by the present Melbourne Observatory in 1863. He was for many years the Chief Scientific Man of the Colony of Victoria, and President of the Royal Society of Victoria for 23 years. He continued director of the Observatory till his 68th year and died January 14th 1908 in his 81st year.

[34] This is an error by Charles and should be 27th
[35] Joseph Turner, appointed Chief Observer at Great Melbourne Telescope in 1872
[36] Robert Lewis John Ellery (1827 - 1908)

On Saturday October 14th we left Melbourne, and on Monday October 16th duly arrived at Sydney, the journey taking about 48 hours. Sydney enjoys the advantage of a finer situation than Melbourne. The scenery around the harbour is magnificent, in fact it has been enthusiastically described by some travellers as the most beautiful harbour in the world, and it is certainly one of the safest, for such is the depth of water that large men of war lie at anchor within a stones throw of the sea wall of the Botanic Gardens, and crowds of ships of all nations are lying at the wharves. Sydney is in many ways quite a contrast to Melbourne, it is built on very hilly and irregular ground, and in fact so steep in places that the houses look almost one on the top of the other, the streets run in all manner of directions and are altogether destitute of the order and regularity which characterizes the plan of Melbourne. The reason is not difficult to learn. Sydney was one of the earliest founded of the Australian cities, and passed through many rough and trying years when the earliest settlers faced enormous difficulties. But Melbourne fell on happier times and was a comparatively new city with all modern improvements. The Sydney Botanical Gardens is a splendid place, here is a museum and picture gallery, also a collection of wild animals. The School of Arts has a fine library and reading room, and although a notice tells you it is only open to members, the courteous attendant at once gave me permission to make free use of it during my stay in the City, and assisted me in many ways. There is a laboratory, a studio, and a commodious Lecture Hall, with lectures every Saturday evening, this Saturday, October 21 the subject was comets. From the School of Arts to the Natural History Museum in Hyde Park is but a short walk. The collection is housed in a noble building in front of which stands the statue of Captain Cook, which I at once recognised, having seen it standing on a temporary pedestal in Pall Mall some time before it was sent out to the Colony. I found **Mr. Ramsay**, the Curator busy in his office but he received me with the greatest cordiality and we had an hours chat, Natural History was well supported, and he said the authorities were very liberal to the Museum which is not cramped for want of funds, and the result is very visible in the superior manner in which the numerous specimens are arranged and exhibited.

The Public Library is one of the finest I ever saw with an enormous collection of books, the Catalogue filling two thick volumes. The Reading Room, open from 10 a.m. to 10 p.m. is most comfortable and the attendants most obliging.

On Monday October 23rd I called on **Dr. G A Wright** of Wynyard Square, who I knew by name, as I had, some time before when at Brownings, sent him an 8½ inch Silvered glass Reflecting telescope, he was delighted to see me, and I found the telescope in perfect order. He is one of the leading amateur astronomers of the city, and also possesses some valuable microscopes and other instruments.

John Chinaman is in great force in Sydney, and the Chinese quarter is remarkable not only for its quaint appearance but for its pungent smell. I was taken round this quarter and at once saw what a real danger the Yellow Peril can be to an English community. The beginning is very simple, a street of small working class houses is often owned by thrifty working English men, many of whom through changes of work or business do not live in their own houses but look upon the rents as a pretty certain investment, so an empty house means a pinch in the finances. When a house has been empty some time, John comes along with an enquiry how "Muchee rent" - so much per month says the owner, and eyeing the Chinaman with suspicion says something about money down, and the rent is often paid in advance, so possession is obtained and before long John's brother or other relations come along and the house is full. Then comes difficulties with the people next door who object to the evil smells and strange customs of the neighbours, so they soon leave, and John introduces one of his friends who is willing to take that house too. Then they start trade, I saw some Cabinet Makers turning out most beautifully finished furniture at little more than half English prices. So the street soon gets a name for cheapness, more English leave and more Chinese come till it becomes entirely Chinese, and is not only a disgrace and danger for dirt and disease but a sure menace to fair English trade and commerce. To such an extent do these Chinese invasions come that no wonder if in many countries they are altogether prohibited.

The Post Office is a magnificent building, quite as grand as that at Melbourne. A great feature of these Colonial Post Offices is that they are not merely places for the receiving and dispatch of letters etc., but they are made the great centres of general information. Here are displayed notices of the weather, arrivals and departures of shipping, Summaries of important telegrams from all parts of the world, and an alphabetical list of unclaimed letters, telegrams etc - this last is a feature of special importance to the traveller whose friends at home may have written him at some place where he is not to be found, and as he casually looks down the list and lights on his own name he often secures a welcome letter. The arrival of the English Mail is always a time of great

excitement, people flock into the town from many up country stations, and the vicinity of the Post Office is crowded.

The Sydney Observatory is splendidly situated on a headland projecting into the harbour, and is in fact surrounded by water on three sides. The view of the City and harbour from the top of the central tower is grand, a time ball is displayed here exactly as at Greenwich and being 213 feet above sea level is well within view of the Docks and Shipping. The largest telescope here was a 11 and one third achromatic, equatorially mounted by Schroder of Hamburg. This telescope stands under a dome of muntz metal 22 feet in diameter, and though weighing more than two tons, rotates on five canon balls so easily that a good push sends it half a revolution. There is also a 7½ inch Achromatic Equatorial by Merz under an 18 foot dome of muntz metal, which revolves almost too easily for it is sometimes turned by the wind. The transit room contains a fine transit circle with 7 inch object glass by Troughton and Simms, with Chronographs, Sidereal Clock etc. **Mr. H C Russell**[37], the government astronomer was most obliging and showed us the action of a Polarising eye piece on the Sun with the 11 and one third telescope stopped down to about 7 inches. The definition was most perfect, as I had found with similar eyepieces made at Brownings years before. Mr. Russell is a many sided man and besides the Astronomical work, has organised a most extensive and complete weather service, and publishes elaborate annual reports on the Rainfall and meteorology of the Colony. He has also done much in investigating Ocean currents, a most important but little known branch of research. He gets bottles (prepared and weighted so as to sink vertically to the neck in water) thrown overboard from vessels in known positions, these bottles contain a card requesting the finder to post it at the nearest post office after writing on the date and place where found and his name and address. A small reward is then given, some of these bottles have been picked up after 15 months immersion and travelling several thousand miles, and the collective results have shown the existence of permanent ocean currents in some cases reaching several miles per hour, a knowledge of which is of the greatest importance to Shipmasters and a possible explanation of the mysterious occasional losses of ships through getting set out of their correct course.

There is a workshop attached to the Observatory in which have been constructed several simple equatorial mountings for 3 or 4 inch telescopes designed by Mr. Russell for use at the transit of Venus in 1874. These were now being improved and other apparatus made for use in the present transit of 1882. Electricity was much in use for controlling the driving clocks of the equatorials, Chronographs etc. and Solar photography was carried on with a Photoheliograph on the Kew model. This instrument was intended to be used at the approaching transit.

After a pleasant week in Sydney during which I looked sharp after the landing of the numerous cases of instruments etc from the "Liguria" and saw them safely embarked on the "Katoomba" (a small twin screw steamer of the Australian Steam Navigation Company) on October 24th 1882 we left for Brisbane and on the 26th arrived off Morton Island. Turning the North point of which we steamed across Morton Bay and on the Western horizon see the gigantic summits of the glass house mountains, although at a great distance these present a very remarkable appearance, two of them look exactly like a large and small pyramid and the other four make up a remarkable group. About sunset we entered the Brisbane river, which is here two miles wide and deep enough to go up under full steam, and the next day the whole of the instruments and luggage of the expedition was landed and stowed in the customs sheds until the site of our observing station was decided.

On this short voyage from Sydney to Brisbane we passed several points of interest for instance at 6 p.m. on October 25th we passed the Solitary Islands with its lighthouse, and the next morning at 8 a.m. were opposite Point Danger with another lighthouse, above which tower the colossal crags of Mount Warning, these and the Glass house Mountains and the three Brothers were all discovered and marked on Capt. Cook's charts of 112 years before, and the coast line was laid down with wonderful correctness.[38]

After a consultation with the authorities it was decided that Jimbour was to be the observing station. This was a fine site on an elevation looking over the Darling Downs about 150 miles from Brisbane and on November 1st all the cases were removed from the wharf to the railway station for the journey up country and at 6 a.m. next

[37] Henry Chamberlain Russell (1836 - 1907)

[38] Cook's Journal of his first voyage round the world 1768 - 1771 Edited by Capt. Wharton - published by Elliot Stock, London 1893

morning we left Brisbane. The railway is a single line, and after passing through a good deal of scrub, with here and there a little clearing and a settler's hut it begins the ascent of the mountains of the great dividing range, making many a turn and curve, and at times passing along a narrow shelf cut in the rock with no protection whatever, and you can look out of the carriage windows down precipices many hundred feet below; in other parts the line crosses deep gullies on very fragile looking wooden bridges, with the clouds floating below. At mid-day we reached the highest point 2000 feet above the level of the sea and stopped at Toowoomba. On getting out and looking for Mr. Peek I found he had ridden the whole way up on the Buffer Beam in front of the engine and he said he never saw such magnificent scenery before.

Continuing our journey we arrived late in the afternoon at McAllister Station which is 1075 feet above sea level, and stands near the middle of the Darling Downs. This vast plain is a wonderful sight, almost as level as the sea and totally devoid of bush or tree. The eye can look round and see the clear circle of the horizon and the railway melts away in perspective straight and level. The whole establishment consists of a wool-shed, a small platform and station master's office, and of the wooden shanty in which that official lives, and he is the sole representative.

Here we found five drays each with twelve horses for the transport of the expedition but it was too late to make any further advance that day. So Capt. Morris, Lieut. Darwin and Mr. Peek went on to Jimbour and I was left in charge of the instruments. After a refreshing nights sleep on a tarpaulin wrapped up in a blanket on the floor of the wool shed we were up by 5.30 a.m. and the billy can being put on the fire and the frying pan in requisition, breakfast was the first thing, and to see these men put in a breakfast, a sackful of loaves of bread, and nearly a quarter of a bullock from which steaks more than an inch thick were cut, about half a loaf of bread and a vast steak washed down by copious cans of tea was each mans portion. No wonder they looked strong and hard as giants. Then they loaded up the drays, which took a long time as there were no appliances here for handling heavy goods, and by the time the 60 horses were captured and harnessed it was 3.30 in the afternoon. Our way lay straight across the great level plain, and so clear was the air that the great house and towers of Jimbour 12 miles away were quite distinct, but our destination was not so near as it looked. There was no road worthy of the name only a track on which the wheels of the heavily laden drays were often sinking a foot or 18 inches into the soft ground, so at sunset we halted, the Billy was again boiling and as darkness came on and the fire lighted up the scene, the transport train made a fine picture of Australian life. Again resuming our journey we came upon an object of great interest. There right out on the great plain stood a large, new and valuable Traction engine sunk into the soft ground over the middle of the wheels, and the grass growing high around it. It appeared this fine engine brought out from England at great expense, was conveyed by the railway to the station and then the attempt was made to get it across the plain by its own steam. The soft ground proved too much for it and it got stopped and set where we now saw it with but little hopes of removal, no skilled engineers or powerful tackle being available to lift it from the spongy bed into which it was gradually sinking deeper as time went on. Leaving this behind we plodded on and at 1 a.m. on Saturday November 4th we reached Jimbour; of course all the Station was aroused, there was a great commotion as the drays were drawn into the enclosure, the weary teams un-harnessed and left to graze while we got a few hours sleep.

Jimbour is a most important Government station, on an elevation overlooking the great plain of the Darling Downs. The house one of the finest in Queensland, built of stone, with a colonnade in front supported by lofty pillars, and with fine gardens enclosed by a low stone wall. Being unoccupied at this time it was placed at the disposal of the British Transit of Venus expedition so we were very fortunate. Mr. Peek and myself set to work with a will and in two days had put together the portable wooden hut and erected the equatorial telescope which we commenced observing with on the night of November 6th. I was pleased to find everything in perfect order, not a screw missing and the clock and mechanism generally works as smoothly and accurately as in England. We soon had striking proof of the purity of the air at this place over 1000 feet above sea level, and it proved an ideal place for observation, only two cloudy nights occurring during the six weeks we were here.

The arrival of the expedition at Jimbour caused a great sensation and people began to come in from all the country round to see the wonders of science, and as Mr. Peek's telescope was all in order and at work, it was the center of interest. At last visitors were so numerous that Mr. Peek arranged to have the observatory open for an hour or so after sunset, and crowds came to see the telescope and its mechanism by day, and at night to gaze with wonder at Jupiter and Saturn and other celestial wonders. We used to shut up early and get a few hours in

bed before Midnight, when we began the regular work, and kept on until the approach of daylight put an end to observations.

With Capt. Morris and Lieut. Darwin the case was very different. They had to put up a solid pier for a Transit instrument and put up the hut to cover it, to erect a sidereal clock, and to put up a 6" equatorial, and a portable house for it. The station was connected by telegraph to the Sydney Observatory and the clock beats of the Standard Sidereal Clock there could be heard distinctly at Jimbour. They worked hard taking transits and exchanging signals so as to fix the position of the observing station with all possible accuracy. Needless to say this was a class work which rendered interruptions by visitors impossible, so Mr. Peek was essentially the popular representative of science. Several newspaper men came in, among others the reporter for the "Dalby Herald" for which I wrote a long article giving a simple account of the phenomena of a Transit of Venus and describing the instruments and preparations of this expedition.

The natives soon began to come in and we had a good opportunity of seeing at close quarters what the native Aboriginal of Australia was like. Without a doubt they are nearly the lowest type of the human family. In their natural condition they wear little or no clothing and never build a hut to live in, their only shelter is a few slabs of bark propped up by sticks, back to the wind, they live on all sorts of the smaller wild animals which they cleverly kill with the throwing stick or boomerang. We used to see whole families on the march. The man always walked ahead carrying his spear, axe, knife etc. The woman followed behind carrying a pot or kettle, a bag full of sundries and generally a baby was slung at her back. The rest of the children followed, always walking in single file. When they reached a spot where the man intended to halt or camp for the night, he would give a grunt, stop, and throw his spear on the ground and then squat on his heels. The woman also put down her burdens, the children collected wood and a fire was soon burning. From the bag was produced generally an opossum or some small animal which was put on the fire, skin, hair and all, and when it was well scorched outside but barely warmed through, the man took it up, pulled it to pieces, devoured the best parts himself and threw the wife and children the rest, and they fed just like so many dogs, and then laid down to sleep. There are a few of them a little more enlightened, but they are fast dying out before the advancing white man and civilisation.

They used to bring in for sale Mullah Mullahs, Spears, Shields, Boomerangs, Opossum Skins, native bear skins and many other things for sale and exchange for food. Their notions of money were peculiar, a two shilling piece did not afford anything like so much satisfaction as four sixpences or eight three-penny pieces. I got into conversation with several of them to find out what ideas they had of things. A poor native woman called Mary used to help the cook and she told me in very broken English, "You have no right here, this was our father's hunting ground where we did always hunt and fish, and you have no right to come and take away our country". She evidently deeply felt the cruelties which had in former times been inflicted on her helpless race when they were wantonly shot down for sport. Just like so many rabbits of which we heard so many tales during our stay. Some of the old men handed down the tale of their wonder when the first sailing ships came up the Brisbane river. In those days vessels had to be well armed and a boat crew could only land with caution or they would have been certainly killed and eaten. The natives assembled in thousands, shouting "Chookee, Chookee" meaning Bird Bird - they thought the ship was some monstrous sea bird, and the sails were its wings. They surrounded it in their canoes till matters looked so threatening that the crew had to fire on them. At the report of the cannon and seeing the slaughter made they put their fingers in their ears, shouting Devil Devil, and their aversion to ships survives to this day.

One night a middle aged native man was brought into the observatory and Mr. Peek tried to get him to look at the moon through the telescope; he had to be held on the observing chair almost by force, and at a glance at the moon, uttered a loud yell of Devil Devil, broke away and rushed off and never came near the telescope again. He was evidently thoroughly frightened.

Their senses of sight and smell are wonderfully keen, and when marching through the bush they notice the most minute things; a little bent branch of a tree, a broken twig, a faint foot-mark of man or animal, all is observed and they can tell if man or animal have been that way and about how long before. If on the march with friends following they will let them know the route by breaking off the branch of a tree and laying it with the broken end pointing in the direction they have gone. This is done about every half mile, and the trail is rarely missed.

I tried to find out their notion of a supreme being but they were very vague. They talked of the great Spirit, big fellow, Strong fellow, and such like, but of religious ideas they had little or none. They had no marriage ceremonies, but each man owned a gin, or female who was more of a slave or drudge than anything else, and for whom I never saw them show the slightest sympathy under any accidental hurt or illness.

A tribe of natives was encamped a short distance from the Station. The chief, named "Cannon" was distinguished by a brass plate, suspended by a chain round his neck engraved in large letters "King Cannon" of which he was very proud. He was an old man of great size, with a profusion of tangled hair and seemed to rule his tribe with great severity. He was known to always carry poison with which he did (not) scruple to quiet those who were in his way, but the day of vengeance came, and in a tribal fight he was speared through the lungs, and ripped open. Strange to say he was still alive and was carried on men's backs a days journey back to the camp where he died on November 20th and the night was made hideous by the women, who chopped and hacked themselves in the most dreadful manner, and howled and cried for their departed chief.

They bury their dead with a post stuck in the ground, the foot of the post being close to the head of the corpse. Tobacco and a pipe is placed here so that when they awake they may solace themselves with a pipe. About half way up some money is deposited, while on the top some more tobacco and matches are placed so that they may start comfortable on their new career. Thus they show their belief in a resurrection and they believe the way to heaven is from the top of the Glasshouse Mountains, and they imagine a vine is let down from above on which the souls of the departed ascend to the celestial regions, which they fancy is affording fine hunting grounds and swarming with Kangaroo.

During our stay on this elevated plain we found it very warm part of the time, this being the Australian summer. Temperatures of 95 in the shade were common, and for a week together the solar maximum rose to 140 every day, and twice 160 was registered. The ground swarmed with lizards, snakes, centipedes, scorpions etc and one day Mr. Peek shot a large brown snake over 6 feet in length and the iron fence, in the middle of the day was too hot to hold the hand on. We could well believe the tales we heard about bush fires for everything was like dry hot tinder and a great fire would have started from a mere spark. We saw several large flocks of sheep on the Downs, one day 25,000 were crossing the great plain. The heat was intense, and several fell down panting and exhausted while the birds of prey hovered over them waiting for the end, as nothing could be done for them. The long droughts are the much dreaded scourge of the Australian Settler, and many tales were told us of rich squatters, owners of immense numbers of cattle and sheep, who in a few short months or even weeks, have lost everything. To provide water for the cattle, wind engines are now being put up, and the tall triangular lattice frames carrying wheels of 12 and 20 feet in diameter are now familiar features of the landscape. They are very rarely still even in very light winds and are continually pumping water into a large concrete tank at the base of the tower. They require but little attention, but where a considerable number are scattered over a wide district, a repairing gang is kept, usually four men with a wagon and team to carry the necessary tools and spare parts, a team of horses and a tent, with supplies of food etc. It is a rough and hardy life but they were a jolly lot of men, and they came to Jimbour several times for supplies and outfit. It was quite a sight to see the drays loaded up for a long journey into the interior. The heavy goods were in the bottom, then came on sacks of flour, bags of sugar, a chest of tea, salt, pepper, matches, spades, crowbars, screw-jack, all had to be remembered, even to spare boots, as they expected to be gone two months. Needless to say several rifles and ammunition were included as they depended on animals and birds for food.

There were no roads, only a trail or track, generally from one water hole to another, and the end of a days journey is arranged whenever possible close to water. Sometimes the track goes through miles of Gum Scrub, where every tree is so like its neighbour that all notion of direction is lost and I used to smile at the tales of getting lost in the Bush till it was brought home to me in a very simple manner. I was out with Mr. Peek and a shooting party one day, and an old bushman promised to show them some snakes. We had not gone more than two miles before on turning over a slab of bark, a perfect monster of a snake was disturbed, fully 8 foot long and as large as a man's leg. He soon showed fight, but a shot from Mr. Peek's rifle broke his back; in its dying struggles it lashed the ground with such force as to send a cloud of sand, sticks and grass flying round and was altogether a formidable looking reptile. The next day, Jennings, the overseer of the station took me to see the dead snake, and dragged it near an ant-hill, telling me that in a few days time the ants would completely clear out the inside, leaving the skin intact, with the skeleton clean within. So a few days later I thought I would go out and find the snake which I thought it quite easy to do as I had noted its position. I walked on about the distance as I

judged, but no snake could I see, and after wandering around some time, I started to return but soon found I had lost my bearings, so before I got too far away I gave a few loud Cooe's, the well known Australian bush call, which I heard faintly answered, and guided by the sound I soon reached the Station. The old man smiled and said, "So you could not find the snake, now I will show you", and he went straight to it at once. One has only to read the history of some of the early exploring expeditions to realise the horror of being hundreds of miles from any settlement, with provisions gone and no water, and so being left to die of hunger or thirst. One of these men told me he was on the trail once with no food left but a little tea and sugar, and only three matches. When they halted at night a solemn council was held as to whether they should use one match that night or make shift without any tea as they were quite four days distant from any camp, and the last match was used the night before they got in. Here was clearly a case in which the native has the advantage, for they can always produce fire quickly by the well known friction of two sticks or pieces of wood. These men evidently had no natives with them.

When I returned to England in 1883, and mentioned the hideously debased animal instincts of the Australian aborigines, my accounts of what I had seen were received with considerable doubt, but this extract from Pulman's weekly news of April 5 1910 is complete corroboration, for although this refers to a black boy, there is no doubt many a white man has fallen victim to this lust for human flesh, and women and children are an especially tempting delicacy.

That cannibalism is still occasionally indulged in by the aboriginal tribes of the Northern Territory of Australia is generally accepted among the white inhabitants of the country. A trader named McPherson claims to have been an eye-witness of a gruesome incident during a recent trip down the coast. He states that while trepang fishing at Rolling Bay, one of his crew came off to the lugger with the news that a sick boy in the native camp ashore had died, and that the body was being roasted preparatory to a feast. He did not believe the story, but to satisfy himself went ashore and visited the camp.

There he witnessed with his own eyes the roasted body being dismembered and eaten as calmly as if it had been that of a kangaroo. Why the natives should indulge in so horrible a practice in a region abounding in fish, flesh, and fowl is a mystery. Mr. McPherson ascribes it to ingrained laziness rather than to any unnatural craving for human flesh. He is of the opinion that the natives preferred to eat the food thus provided to their hand rather than go to the small trouble of spearing a few fish or a kangaroo.

When a party of white men are on the trail accompanied by natives, it is a wise rule to always make them march in front, not only as guides to show the way, but simply because you must never trust them to come behind you. Their nature is so debased, and they have little or no perception of right or wrong, they only think of the strongest; therefore the sight of a gold chain, or a brass button, or silver ornaments, and particularly a gun, knife or axe, quickly excites the craving for possession, and if the owner is careless of his safety, or is caught alone or from behind, there is a sudden blow, swift and sure, and all is over.

When several white men are travelling with a number of natives, if prudent the whites never all sleep at once, one at least is always on the watch, and even then, so noiseless and cat-like are the steps of the native, that the watcher can be struck down in a moment. There is no doubt that cannibalism was frequent among the natives from time immemorial, and certainly some of the earlier settlers fell victims to this custom. The sight of a lonely white man, or of a white man with a woman and children, unarmed, and surrounded by a large number of natives, is sure to arouse the instinct of the mere animal nature, and the carelessness of some settlers almost tempts disaster. I met a very intelligent man employed in the gardens at Jimbour, who owned a Selection about 12 miles away. He had made a clearing and put up a wooden shanty on four stout corner posts, the floor being about 1 foot above the ground. Here lived his wife and two children, all alone from Monday morning to Saturday evening, as he went home every Saturday and returned on the Monday. She suffered agonies of fear, as the natives sometimes came up and looked at her through the window with hideous grins, and she rarely moved from the door of her hut while her husband was away, and every night well fastened up the door and window before she trusted herself to a little un-refreshing sleep, as she often heard the natives prowling round. One day to her horror the head of a large snake pushed up through a hole in the rough floor. She struck at it with a stick, and then set a box filled with anything handy, on the hole, and never opened the door again till her husband's return when the snake was hunted out and shot.

On Saturday afternoon about the time for her husband's return, she would say to the elder child, "now run along and meet daddy", and the little child, knowing no fear, would run along where the mother dared not go, though she never trusted it far out of her sight, for fear of it being lost in the bush; but the man was hoping for better times when he should have saved enough to enable him to stay at home and plant and work his own selection.

Another character I met was an old shepherd, he lived in the centre of what was called the "seven mile paddock", this was a square 7 miles enclosed with a very slight wire fence. The hut was very simple, two posts about 12 feet apart were joined by a cross beam about 7 foot high, and planks were simply leaned against this and fastened by a few nails. At the ground it was about 6 foot wide, and you could just stand upright along the centre; a few rough boards formed the floor. Here lived the man, with his wife, and a cat. They saw the boundary rider once a week and once a month a dray called with supplies. At one of the corners, on a post, a canvas bag was nailed, and the post rider passing once a week left letters if there were any, and once a year the shepherd went into town, which meant the township of Dalby about 25 miles distant. The woman told me once she never saw another white woman's face for 15 months. What wonder after a long term of such isolation if when they find themselves in a town they indulge in a little spell of dissipation.

There was a small mixed school on the Station, and the schoolmaster showed great interest in astronomy and the telescope. His house was a wooden building of two rooms, on the ground floor (no upstairs). One was the bed-room, the other the living room. The cooking was done at a temporary fire place out of doors, and owing to the rule, shifting schoolmasters every three years, the furniture was of the simplest as the next move might be hundreds of miles, and the difficulties and cost of transport enormous. I was always a welcome visitor in his house, there were only two chairs, the best arm-chair of course for the wife, and the husband occupied the other. A long packing case about 6 foot long was turned bottom up and covered by a few rugs forming a rough shake down if a traveller had to stay the night, and on this I generally sat when we had a chat about home and the Old Country, as they called England.

This was a fine place for sport, and Mr. Peek sometimes went out Turkey shooting. A drive of about 15 miles in the Buggy was so arranged as to bring us near to water, and while the gentlemen went along the banks of the creek for a shot, we made preparations for dinner. A fire was quickly made and our bushman soon set about making johnny cakes about 7 inches in diameter which were baked on the hot coals, and the billy can being filled with the not very clean water of the creek was set on to make tea. Bye and bye the sportsmen returning from a long ramble have got a splendid appetite to do justice to some of the sweetest cakes and best tea we ever had. After a smoke and a look round, the traps are collected and stowed in the buggy, and a careful note taken of the storms we see travelling round the timber belt on the horizon, where a bright streak of lightning and a long heavy growl of thunder makes us shape a course for home. As we ride over the plain we have a fine view of the Bunya Mountains, the long undulating outlines of which are seen sharp and clear against the sky. Occasionally obscured by passing thunderstorms, very curious effects of refraction are sometimes seen. The long belt of trees on the horizon appears considerably elevated and the outlines of cumulus clouds are seen below them, sometimes a sheet of ground mist looks exactly like a large lake or the ocean, and some distant object on the horizon might be taken for a sail, and I often noticed one or two wisps of clouds exactly like the smoke of a distant steamer. The thunder gradually got nearer and we reached home in pouring rain and having handed over the results of the day’s sport to the cook, we were quite ready for a good meal and a rest.

Mr. Peek wished to visit the Bunya Mountains, and as they lay a long days march from Jimbour it would be a three days journey. So preparations were made. A dray was loaded with provisions, a tent etc and several men with an old bushman named Thomson in charge set out one morning for the mountains. The gentlemen intending to follow the next day. For obvious reasons no spirits were included in the baggage, but as they were starting Mr. Peek gave old Thomson a bottle of whisky as a little solace on the journey. No sooner were they got outside the gates than the old man pulled out the bottle, drew the cork, and drank the entire contents at once, remarking with a wink, "That is much better carried inside". The next morning Capt. Morris, Lieut. Darwin and Mr. Peek followed and were absent about three days, and returned with two large kangaroo tails hanging from the saddle. These were handed to the cook, who was horrified and disgusted having never seen such things before, however one of the men skinned and cut them up, and the cook was bound to confess the resulting soup was excellent.

Mr. Peek said the Bunya Mountains were wonderful, the scenery was grand and near the summit of the range was the remains of a forest which had flourished in long past ages, the trees had fallen, and petrified into solid

stone. Long sections, several feet in length lay on the ground in which the grain of the timber and the rings from the centre showing successive years growth were quite distinct, but owing to the enormous weight could not be moved, and he had to be content with some smaller fragments.

As the date for the Transit of Venus drew near and the observations would have to be made when the sun had risen but a few degrees above the horizon, we observed the sun soon after rising on December 3, 4, 5, and 6th. The boiling of the limb, and distortion was so bad, that a solar spot which was on the disc was hardly visible, when an altitude of 6 degrees was reached, definition was better, and by the time 13 degrees was attained a fair limb could be seen with 150, the power intended to be employed for the transit. Venus was observed at the same times without difficulty, though getting very near the sun, the Crescent was very narrow and the horns extended like a silver thread nearly two-thirds round the planet, which of course now appeared of its largest possible diameter 66.5".

On (Wednesday) December 6th after a fine morning, clouds came on, with heavy rain, and on the morning of December 7th not a glimpse of the Sun or the Transit of Venus was visible. Telegrams were received telling of similar bad weather at Brisbane and Sydney, while at Melbourne, Hobart and New Zealand the weather was fine. The day wound up with the heaviest thunderstorm I ever saw.

Soon after sunset it became so dark, that objects even close at hand were quite invisible, except when it lightened, when every tree leaf and detail was beautifully seen; the thunder was tremendous and the rain a perfect deluge, everything movable was soon afloat. With the usual tantalising luck of astronomers the next morning was beautifully clear and bright. So we set to work to take down the equatorial and by Friday December 15 all the instruments were securely packed for the return journey but no transport to the railway station at McAllister was available, as this was just the height of the Hay-Making season here. So it was on December 20th that we left Jimbour after a stay of about seven weeks, which I will always remember with pleasure. Everybody about the place was so very kind, and the scenery and situation so beautiful, the semi-tropical plants, gorgeous butterflies and birds were all so different to what one sees in England. The most splendid peaches were as common as apples, and huge bunches of grapes weighing from 4 to 6 lbs flourished in the open air requiring very little attention. The sunsets were especially beautiful as the sun slowly descended to the horizon, the clouds were lighted up with a splendour and wealth of colour simply indescribable, and as night creeps on the stars shine out of the deep blue sky with a splendour never seen in England. At the same time I must confess to a feeling of disappointment at the first sight of the much vaunted "Southern Cross". The stars do not form a true Cross, and though the three stars A, B and C Crucis are plain enough, the star D makes a very small fourth, and it is a very small and insignificant asterism compared to our widely extended and conspicuous Ursa Major - the Great Bear of the Northern sky. Neither is there any bright Star near the South Pole like Ursa Minor, the Pole Star of the Northern sky, a star which is constantly being observed for all sorts of purposes connected with surveying, navigation and exact astronomy. The attraction of the Southern Heavens is the wonderful brilliance and structure of the Milky Way, and the vast array of clusters and nebulae of which nothing like it exists North of the Equator, a very large number of these and also numerous double stars were observed under the most favourable atmospheric conditions.

As we could not leave Brisbane until January 3rd 1883, there was ample time for a good look round. This is one of the youngest of the Australian towns, and considering the few years that have elapsed since the site was only wild scrub it has made wonderful progress. Queen Street is quite a fine thoroughfare with many fine shops and business premises where I found everything was to be bought as good and as reasonable as in London. It leads straight up to the river which is crossed by a fine Iron Bridge, a section of which swings open for the passage of shipping. It was at that time the only iron bridge of any size in the colony and was regarded as a wonder, every stranger being sure to be asked "have you seen the iron bridge?" this became such a bore that the Captain of a little craft on the river painted on his sail in large letters: "All Well - have seen the Iron Bridge"

The Electric Light was then just introduced and was first turned on on (Saturday) December 23rd. A Band paraded Queen Street playing favourite English airs with uncommon vigour, and the number of people was something wonderful, they had flocked in from all the surrounding country and as this was regarded as Christmas Eve, money seemed particularly plentiful.

The Church, sometimes called the Cathedral is a good looking stone building exactly like an English church at home. It had no tower, but a large and massive timber frame carried a peal of 8 bells, and I never thought church bells sounded so beautiful as when I heard this peal on Christmas morning, and the day was ushered in by the chimes playing the well known "Hark the Herald Angels Sing".
The Church was well filled at Morning Service, evidently a wealthy and well to do congregation, and being the height of summer and very warm, a decided contrast to Christmas at home. The ladies dresses, hats and jewelry were quite splendid, and with the abundant floral decorations of the church, presented a very beautiful scene.

A considerable number of natives came into the town, and I saw one man with a large brass plate suspended round his neck by a chain, with the inscription, "King George and Queen Helena, presented by Jas Campbell". His majesty was holding his hat for coppers, and the queen with one of the royal children in a bag at her back stood close by. Her Majesty was rather short and better looking than most of the black ladies, but yet by no means handsome, and her hair looked as if a comb had never been invented. The king's suit was very dilapidated, in fact the pair were dressed in a few old clothes they had had given them.

Among the people here I met several from Jimbour, one man told me he was employed with the others on a border station, during the whole year only two travellers passed that way. They never saw the face of a woman, and for five months had neither letter nor newspapers, and I met many similar cases. It often happens that a man and his wife are settled in a lonely station many miles from the nearest habitation and the effect of this isolation is very bad for the rising generation, the children grow up without a sight or knowledge of anything civilised, they are regular little bushmen and women, strong and hardy, and expert in all that relates to bush life. Many girls I saw could ride a horse, catch fish or shoot as well as the men, and never having known any of the refinements or luxuries of life, never miss them.

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Originally transcribed by John Grover, (Great grandson)
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