

## Historic telescopes at the University of Aberdeen

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Astronomy has always fascinated people of vision and imagination and it is both appropriate and fitting that some aspects of astronomy have been taught to students at the University of Aberdeen for many centuries. We have never had a separate Department of Astronomy but astronomy still forms a significant element of our degrees in Physics. Courses are also given at both levels 1 and 2 that are aimed at a wide range of BSc students and scientifically interested MA students. There are records over the centuries of interested staff acquiring telescopes on behalf of the University, extending right back to the early days in which telescopes could be purchased, namely the first quarter of the 18<sup>th</sup> century. We still possess and treasure a significant collection of historical telescopes. Not all of the recorded telescopes survive but we have by way of 'compensation' three late eighteenth century and nineteenth century instruments for which no acquisition records have yet been found.

Over the centuries many observations have been conducted from University grounds, windows and rooftops but the University has built three observatories in the past two-and-a-half centuries. Only one survives, that on the roof of the Cromwell Tower of King's College. The first observatory was built by Marischal College at the Castlehill in the final quarter of the eighteenth century using funds raised by public subscription. We still have two of the telescopes that furnished this observatory. An account of the Castlehill Observatory appeared some years ago in the *Journal for the History of Astronomy* (Reid, 1982). Unfortunately before the end of the century the land at the Castlehill was requisitioned by the Government for military use and as a consequence a replacement observatory was erected on the roof of Marischal College in the late 1790s. Some significant positional astronomy was conducted here, establishing among other things the latitude and longitude of Aberdeen to high precision. This second observatory lasted only about 40 years before the whole of the old Marischal College building was razed to the ground and replaced by some of the building we now see, with no observatory. Curiously enough, just as the new building was being fitted out with no observatory, Sir John Herschel was voted as rector of Marischal College in 1842! By this time, however, King's College had built the Cromwell Tower observatory with its still familiar small twin conical domes, though they had not yet equipped it with a set of working instruments. A short history of the Cromwell Tower Observatory has been written for the web on <http://www.abdn.ac.uk/physics/astro/cto/histcrom.htm>.



As early as 1701 there is an account for 'leading and caiking' Marischal College roof, apparently to make it suitable for astronomical observations, but the earliest mention of a telescope I have found in College records was one purchased by Marischal College in 1718, after what amounted to a revolution following the 1715 uprising. Almost all the College staff were replaced and a conscious effort by the new incumbents was made to look to the future. A plea was made in 1717/18 to recover unused salaries, for putting towards 'experimental philosophy' and the money was partly used to purchase a telescope for £48. This is likely to have been a long refracting telescope but no further mention of it has been found.

The first telescope that survived at least into the next century was a reflector of 5 feet focal length by the notable instrument maker George Hearne, who flourished in London in the second quarter of the eighteenth century. This instrument was a gift to the College in 1732

from Lord Aberdour, son of the Earl of Morton who inherited his father's title in 1738. Morton would later become President of the Royal Society. The Hearne telescope was a Newtonian instrument, following a similar design to Haldey's pioneering instrument of the early 1720s. This instrument is mentioned in the 1823 inventory of Marischal College as being 'in complete order' but it has not survived. In appearance it looked like a product of the cabinet-making trade (which in essence it was, for Hearne was a cabinet-maker by trade) and even by 1823 would have seemed old-fashioned. The Hearne telescope is the now vanished foundation piece that set the precedent for future telescopes in the University. Its absence is also a reminder that there are always pressures in a University to replace the old by the new. This of course has to be the general rule but there are many good cultural and historical reasons for selective retention of artefacts and with hindsight the Hearne telescope was a strong candidate for retention. The trick today is to make our foresight as good as our hindsight!

Our earliest extant instrument dates from 1740 and is a small reflector by the very famous James Short. The following list summarises the important historical telescopes in our collection, approximately in date order.

1. *12" focal length reflector by James Short dated 1740.* This instrument was actually purchased second-hand by Marischal College in time for the 1769 transit of Venus observations. It is on semi-permanent display in the Fraser Noble building. Short's telescopes were sold around the world and popularised the Gregorian optical configuration, the first reflecting telescope design ever made that was originated by James Gregory, one of Marischal College's most famous alumni. Inventory No. ABDNP200002a



2. *Mid 18<sup>th</sup> century Gregorian telescope.* This item is in the Marischal Museum and has a terrestrial eyepiece. The maker and origin are unattributed. Inventory No. ABDUA 18597



3. *Universal equatorial by Sisson and Ramsden* gifted to the University in 1781 upon the establishment of the Castlehill observatory by the Chancellor of Marischal College, the



Earl of Bute. Although missing its optics, this piece is highly significant for its construction and its precision scales. Indeed it is probably unique in that the hand-divided scales by one of the finest craftsmen of the 18<sup>th</sup> century were re-divided by Jesse Ramsden, the master craftsman of that century who had devised a precision scale-dividing engine. This telescope was on display at King's College visitors' centre but is now in store. Inventory No. ABDNP200001a

4. *Dollond's 2<sup>3</sup>/<sub>4</sub>" aperture polar axis refractor from the Castlehill Observatory.* 1781 telescope by the pioneer of the achromatic objective lens, the key component in all refractors built since then. This telescope also has the divided object glass micrometer invented by Dollond for precision fine angular measurements. The mahogany stand was restored in 1981. Inventory No. ABDNP200006a



5. *Dollond's 3<sup>5</sup>/<sub>8</sub>" aperture refractor on braced alt/az tripod stand.* First half of 19<sup>th</sup> century example with wooden barrel. Unknown provenance. Inventory No. ABDNP200007a

6. *Terrestrial refractor of 2<sup>1</sup>/<sub>2</sub>" aperture by Berge (late Ramsden) on short brass tripod stand with steadying arms.* A nice example of a widow-sill instrument circa 1800. Provenance unknown. Inventory No. ABDNP200003a



7. *Thomas Jones 2" aperture all-purpose telescope on short tripod base with astronomical and terrestrial eyepieces, circa 1812.* Preserved in good condition in its original box. Inventory No. ABDNP200737a (for box),

8. *Thomas Jones' transit instrument, circa 1820.* I hesitate to mention this since all we have is the empty body, the supporting frame removed from the North dome of the Cromwell Tower Observatory, level and the precision altitude scale. However I believe these are the remains of the first instrument installed in the Cromwell Tower Observatory in the late 1820s. Inventory No. ABDNP200436a, ABDNP200169a & ABDNP200009a



9.  $3\frac{5}{8}$ " refractor by Ross of London on wooden tripod stand with wheeled base by W. Archer (London). Example of a mid 19<sup>th</sup> century astronomical telescope that is rolled out onto the roof or patio for use. Inventory No. ABDNP200005a



10. Pillar mounted equatorial refractor of  $3\frac{3}{8}$ " aperture and 4 foot focal length by A. Ross, with clockwork drive. The first telescope mounted under the South dome of the Cromwell Tower Observatory, in about 1863. Installed by Professor David Thomson and David Gill (later to become one of the 19<sup>th</sup> century's most famous observational astronomers). Purchased second-hand in the early 1860s. Currently on display in the Fraser Noble building. Inventory No.



11. A.J. Frost's portable transit telescope of 1882. Inventory No. ABDNP200074a

12. Transit telescope with lamp, level, precision silvered scale with micrometer, all in excellent order but no maker's name or provenance, probably circa 1900. Inventory No. ABDNP200806a

13. Portable transit telescope, lamp, level and accessories, by Dollond, in original wooden carrying case, estimated 1870 – 1900. Inventory No. ABDNP201568a



Two 20<sup>th</sup> century telescopes continue the sequence above, though they have no rarity value. Charles Frank of Glasgow manufactured a range of very affordable reflecting telescopes in the mid 20<sup>th</sup> century at a price that made complete telescopes popular at a time when it was still customary for keen amateurs to grind their own mirrors. We have one of Frank's 6" diameter Newtonian reflectors on a counterbalanced alt/az mount from the late 1950s or early 1960s that is still used on occasions. This is representative of the coming of age of mass produced astronomical telescopes of good quality, at least in the UK. From the 1980s, we have an example of the successor to the centuries' old Newtonian design, namely the compact Schmidt-Cassegrain. Similar telescopes are now standard and bring the advantages of short physical length, light weight, ease of use and comparatively wide angle of view. The key to their design is the mass production of an aspheric correcting plate and our 8" aperture Cosmotron represents the UK version of this design in the mass market, based on the famous Celestron range. The telescope currently in the Cromwell Tower Observatory (not classed as a 'historic telescope' yet!) is an electronically controlled Meade LX200 of 10" aperture and 2.5 m equivalent focal length.



A novel ending to this list is that our collection includes the key parts of what I believe was the earliest radio telescope in Scotland, erected on the roof of the Fraser Noble building in the second half of the 1960s. The parabolic dish was mounted on a converted German search-light turret, war reparation salvage. The millimetre-wave receiver was designed and built in-house by the radio astronomy research group in the Department of Natural Philosophy. The research group became known for their polarisation studies of the radio emissions from the Crab nebula. They went on to build a larger telescope located North of Aberdeen (the dish of which is now in the National Museums of Scotland) and finally to use a national facility in the South of England.

The collection taken as a whole is a nicely balanced representation of the diversity and evolution of telescope designs over two and a half centuries, within the constraints of a collection of small-sized instruments. The historic telescopes 1, 3 - 10 are from makers who were well-known on the world stage. Items 1, 3 and 4 are certainly of international significance while item 10 is a particularly early example of a telescope with clockwork drive. Any early telescope by Dollond even without provenance (item 5) is significant and the two instruments by Ross (9 & 10) are representative of the work of one of the very best optical instrument makers of the mid-nineteenth century. All the items are further united by the commonality of purpose for which most of them were acquired, namely teaching, research and scholarship into astronomy.

Astronomy is not, of course, just about the planets and stars. Until the second half of the twentieth century time was defined relative to astronomical observations and until the advent of GPS, navigation was based on astronomical observation. Our collection of historic telescopes is supplemented by other equipment one would expect to be associated with an

historical observatory, namely precision timepieces and some instruments relevant to navigation. The North-East of Scotland has produced some famous names in astronomy too, as I outlined in the article on <http://www.abdn.ac.uk/physics/astro/starsne.pdf>. I personally look forward to the day when the University can use its historical collection to tell some of our local history of astronomy, and some of the story on a wider scale. There is no museum of astronomy in Scotland.

*JSR*

January 2006/ updated February 2009

*Reference*

(Reid, 1982) [\*The Castlehill Observatory\*](#) in *Journal for the History of Astronomy*, vol. xiii, pp 84 - 96.