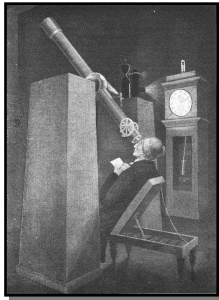
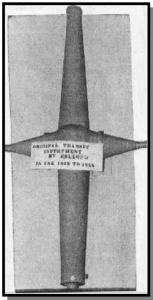


Finding the positions of the stars

Finding accurate positions for the southern stars and the planets was one of the primary reasons for setting up the Royal Observatory. This task was completely dependent on knowing the exact time (see the accompanying poster “Time at the Royal Observatory”).

The position of an object in the sky is defined by two numbers similar to longitude and latitude on the earth, called Right Ascension and Declination. The Right Ascension is the sidereal time at which the object reaches its highest point. The Declination is its angle from the celestial equator towards the celestial pole, negative towards the south and positive towards the north.

First Instruments

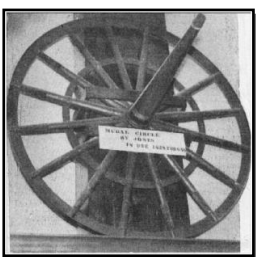
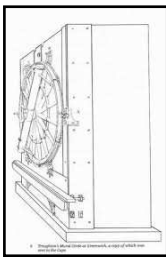


One of the first instruments in the Royal Observatory was a **Transit**. Its tube is shown on the left and the image on the right shows how such a telescope was mounted.

The Transit was used with this astronomical regulator clock, by Hardy, made before 1820. It is still in existence.



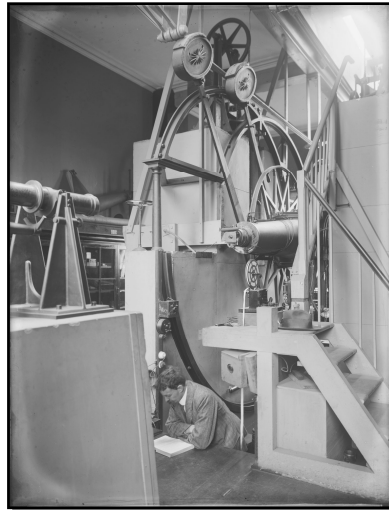
The observer needed to count the loud ticks of the clock as he watched the star cross a fine wire in the eyepiece. Afterwards he looked at the clock and wrote down the sidereal time.



To measure the declination a large **Mural circle** (wall-mounted) **circle** with a telescope and six microscopes to read the scales were used.

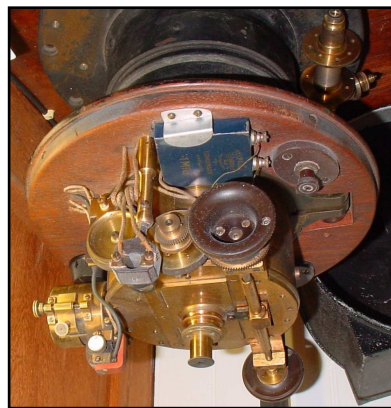
These instruments were located in the central rooms of the main building, today part of the library. The walls and ceilings had openable shutters so that they could look out. Some parts of the shutter frames are still visible. The telescopes themselves could only be moved north-south as they were solely for observing stars as they crossed the meridian. Objects in other parts of the sky could not be studied until about 1849 except through small portable telescopes.

Airy Transit Circle



In 1855 a **Transit Circle** (above) designed by the Astronomer Royal at Greenwich, G.B. Airy, was acquired to take the place of both the Transit Telescope and the Mural Circle. One observer could now determine both Right Ascension and Declination. This was a copy of a similar instrument installed at Greenwich in 1851. The manufacturer was Ransomes and May, who usually built agricultural machinery!

As before, the Right Ascension was given by the moment in sidereal time when the star crossed a line in the eyepiece. The chronograph recorded it automatically when a button was pressed.



This is the eye-end of the Airy Transit Circle, today in the Astronomical Museum with the main lens of this telescope.

The ‘chases’ of the Main Building



The Transit and the Mural Circle could only move along the north-south direction (called the Meridian). Shutters or ‘chases’ in the Main Building opened to allow the telescopes to see out. The end of the Airy Transit Circle can just be seen.



Chronograph

The astronomer pressed a button when the star passed a crosswire in the eyepiece and the time was recorded automatically on paper tape by the chronograph shown above. This particular example was probably a modified Morse code printer. One track recorded time pulses from the observatory master clock and another recorded the signal from the observer..

The instruments shown here were replaced in 1905 by the **Reversible Transit Circle** which still exists in its own building.