

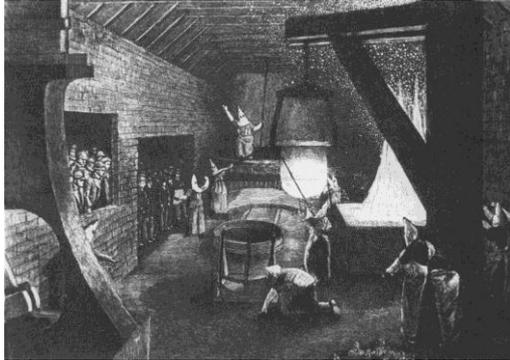
The Great Melbourne Telescope Project

A Joint Venture by Museum Victoria, The Royal Botanic Gardens and the Astronomical Society of Victoria

6. The Great Melbourne Telescope Primary Mirror Construction

The design and construction of the Great Melbourne Telescope (GMT) was a major feat of engineering for its time in 1866.

The telescope was constructed at the Thomas and Howard Grubb engineering works in Dublin Ireland. In keeping with the technology of the day, the instrument's 1.2 meter (48 inch) diameter main primary mirror was made of speculum metal.



An artist's impression of the casting of the speculum mirror at the Grubb foundry.

Speculum is a bronze alloy with 4 parts copper and one part tin. The mirror had to be cast, annealed, ground and polished to a high degree of optical perfection. A second mirror was also built to allow one to remain in service while the other periodically underwent cleaning, removal of tarnish and re-polishing.

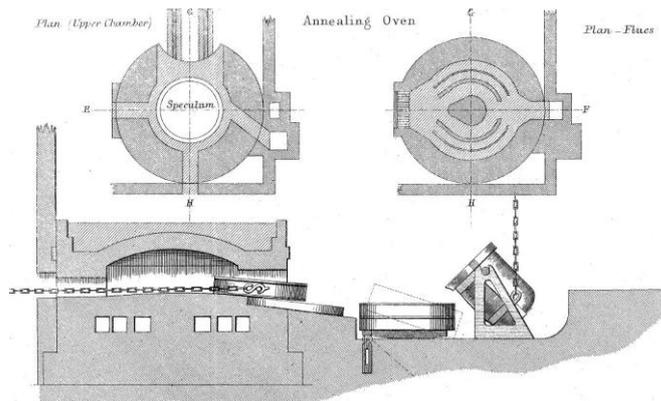
One of the two mirrors was unfortunately broken at Mt Stromlo in the 1950's but fortunately the spare remains intact as a potential museum display piece.



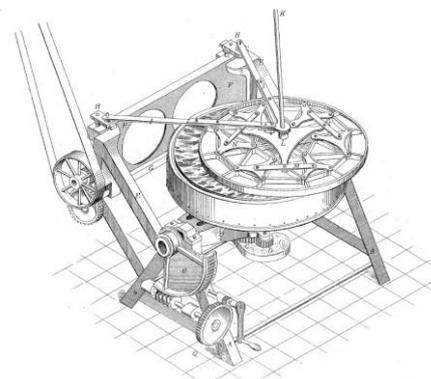
The GMT spare speculum mirror remains intact.

Each mirror weighed more than one tonne. The first attempt to cast the mirror in July 1866 failed but two successful castings were made in September and November 1866.

The speculum material required annealing (careful cooling) over a period of 23 days to ensure internal stresses did not affect the precise shape of the surface. Following the casting and annealing stage was the grinding and polishing process that was completed in 1,170 hours or approximately 49 days, to obtain the required accuracy for the mirror.



The GMT mirror casting and annealing oven design drawings.



The GMT mirror grinding and Polishing machine.

The Great Melbourne Telescope Project Information Fact Sheet

This fact sheet is one of a series providing information on the GMT historical background, technical details of the instrument and the efforts to reconstruct this magnificent telescope for use by the public.