

GLAD TIDINGS!

This issue #5 of *Phoenix* is a special brief but FESTIVE EDITION to convey the Season's Greetings to all our readers, and to urgently report some Glad and Joyous Tidings which the team of ASV volunteers would like to share with the world. Other news will follow early in 2011.

JIM FLIES AROUND ROOM

Our recent discovery was laid out, in rather poor taste really, on a pallet in the room where we work. I was first in and after I came down from the ceiling, I was able to note, and can now report with all my journalistic integrity, how those who entered the room reacted in their respective ways.

Steve Bentley seized the project's camera and took the photo on page 2.

Barry Cleland said "Oh that's nice".

Barry Clark showed a hint of a smile and looked positively cheerful for the rest of the morning.

Campbell Johns prepared to draw it.

Arthur Coombs began to clean it.

I looked in the Parts Catalog and dug up its part number (it is part 408, a "missing part" until now).

Jim Pollock, arriving last on that day, exclaimed, in a voice 2 octaves higher than usual "Where did THAT come from!!?" and proceeded to fly around the room, finally coming to roost on top of a cupboard to get a better view, and crowing with delight.

- Steve Roberts
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No, it is not something from WikiLeaks, but it does bear similarity in that something from a long-lost archive has now come out into the known world. The other day, in a general tidy-up session, a couple of MV staff found a crate containing some Mysterious and Unidentified Items. If they'd been shepherds watching their flocks, they would have sent for three wise men, but instead they asked Neville Quick, MV Storage Manager, to come and take a look.

Neville gazed into the musty old crate, where the Items lay, resplendent under the sudden glare of fluorescent and tungsten lights. Now, some things remain forever mysterious, such as the Star of Bethlehem, but other things, with the advent of scientific knowledge and understanding, eventually become fully understood by mankind. And, we are glad to report, the contents of the crate are now in this second category.

Gazing upon the black steel items in the crate, but without noticing the Choir of Heavenly Angels which had manifested itself above the scene, the neurones of Mr Quick's brain began to formulate a familiar pattern. "H'mmm", he thought - being a man often given to reflective contemplation, although usually concerning lunch - "this looks like - wait for it <drum roll> - **this looks like something I saw in the last issue of *Phoenix* magazine**".

And, upon removing the parts from the crate and reassembling them on a pallet - because everything in the MV store should be on a pallet - all was made clear. There lay the "**Missing**" Part 408, in all its historic glory and magnificence. Neville was stunned to see what you are about to see, when you turn the page....



The Original Mirror Support Mechanism

Behold ... the original 48-point floating support apparatus for the GMT Primary Mirror!

The load-bearing points are in six groups of 8, arranged such as to support the mirror evenly wherever the telescope may be aimed. The three stainless steel sheet triangles are a Mt Stromlo replacement for the original six-pointed star in the middle, to keep the 48 points in proper alignment.

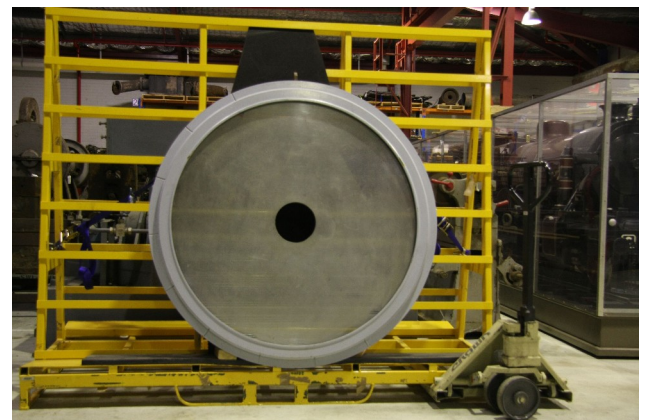
The original 1400-kg mirror sat on top of 48 cast-iron balls, diameter 1.25 inches, each of which sat in one of the 48 cups you see in the apparatus here. If the mirror moved slightly, the balls could roll by a millimetre or two within the cup. The whole kit & caboodle was supported by the three collimating screws that are visible in the picture.



We were on the verge of developing CAD drawings to reconstruct this hitherto “missing part” from scratch, based on the available journal articles and technical memoranda from 1868, such as the “Figure 14” shown in the previous *Phoenix* (issue #4). We were then going to commission a new apparatus, at a cost conservatively estimated at \$27,000 and a timescale of 12 months.

The original speculum-metal mirror (below) is in the MV collection, but it is not feasible to use it in a restored GMT. Its focal length is wrong for what we want to achieve, and there were problems with its use which we don't need now. Foremost among these was that its surface was prone to oxidation (as you can see by the reflection in the

mirror - there isn't one) and every time it was cleaned, the figure of the curved surface was altered and it had to be precisely reground and polished. I suppose an advantage was that it could be re-ground thousands of times - a prospect that does not bear thinking about. A modern ceramic or glass mirror would be 1/4 of the weight, would have a far more accurate figure, and could be cleaned and re-aluminised without altering the mirror surface. However - we can use the newly-discovered historical support mechanism to support *any* replacement mirror, so we were delighted when MV discovered it!

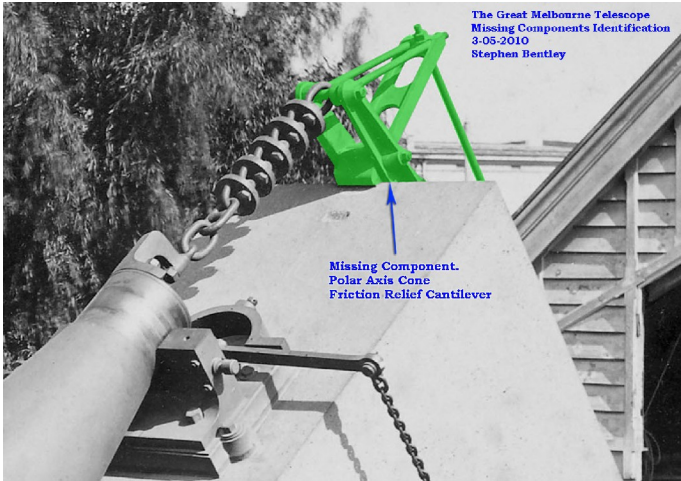


This mechanism was high on our Wish List of “most important missing items” (see next page), and its discovery will not only reduce the cost and effort required to restore the Great Melbourne Telescope, but also slightly shorten the timescale of the project.

Missing Parts of the G.M.T.



Of the 600 or more parts of the GMT now identified, about 150 minor parts are “missing” and are known to us only through photographs or deductions, plus the fact that we don't have the physical part.



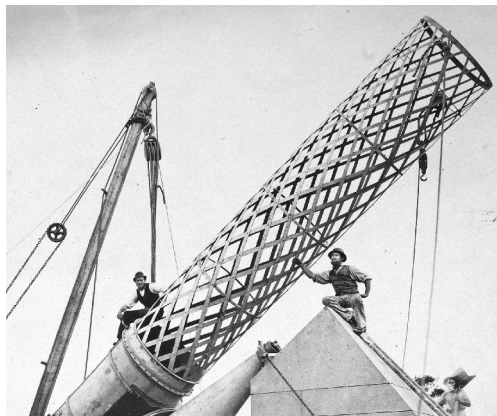
An example is the cantilever for the polar axis friction relief mechanism (part 335) - coloured green on the historical photo shown here.

We have no idea where this assembly of cast-iron parts is, or even whether it still exists at all, so we will just have to gird our loins, develop some technical drawings, and make a new one.

Unless, of course, the Good Museum Fairy finds some more mysterious boxes

The exact choice and ordering depends on the obsessions of individuals, but generally, the major **Missing Items at the Top of Our Wish List** are -

- The Optical Train - primary and secondary mirrors - maybe \$300,000 commercially



- The upper section of the Lattice Tube - but this will be easily made from metal strips, modelling from the section that we do have
- The primary mirror support mechanism - but ah, we just found this!
- The Clock Drive for the polar axis. A local Horological Society is most interested in this, being a sidereal clock (running at 23h 56m per day) and may be prepared to help



- We need a mounting frame to hold the GMT while in the workshop; and this could be integrated into new North and South Piers to hold the installed GMT at the Melbourne angle of latitude ($37^{\circ} 50'$) - the original piers having been destroyed long ago
- Electrical motion controls for RA & Dec slewing and fine control, the associated mechanical parts to impel the two drives, and a software interface - needs a lot of careful design work
- Focussing apparatus, at the eyepiece and at the secondary mirror - only small parts
- Some or all of the bearings were damaged in the bushfire and need to be replaced. For one particular large bearing, on a face of the Cube, there is only one correctly-sized spare bearing left for sale in the whole world, and we need to get our hands on it!

The above list must be seen in context:

**We already have 90% of the major components of the GMT to hand;
Most of the missing parts are simple one-off pieces of metal.**



Sundry volunteers and the Mirror Support Mechanism, part 408.

(I shouted "Look at the camera" but some people just could not take their eyes off the darn thing)

We now have to wear these yellow jackets at all times at MV, but we turned them inside-out for the photo. Otherwise the flash shows only the reflective stripes on the jackets and you get a picture looking like a zebra in a cave.

Without a yellow jacket, some of the slower-moving team members might be mistaken for an Ancient Heritage Artefact, especially if they happen to be standing on a pallet at the time, and risk being exhibited in a glass case.

Steve's Adventures in Moreland



At one Wednesday workshop, we emerged, seeking lunch, to find a tram parked right across the road! Evidently it had jumped out of its tracks while negotiating the corner. Or perhaps somebody was told "Take the tram to the pub". One imagines the policeman speaking to the tram driver with exemplary police patience - "in a hurry, were we, sir?"



As the next picture shows, the tram made a nice new, beautifully straight, parallel pair of tracks in the Republic of Moreland's tarmac before being pulled back into place, with several engineers now on-site to verify that it really *was* on the tracks this time.

The sign on the pole says "Walk with care" and now I understand why.

