The Great Melbourne TELESCOPE

Phoenix

Astronomical Society of Victoria (A.I.N. A0002118S)

DECEMBER 2024

Bob Crosthwaite

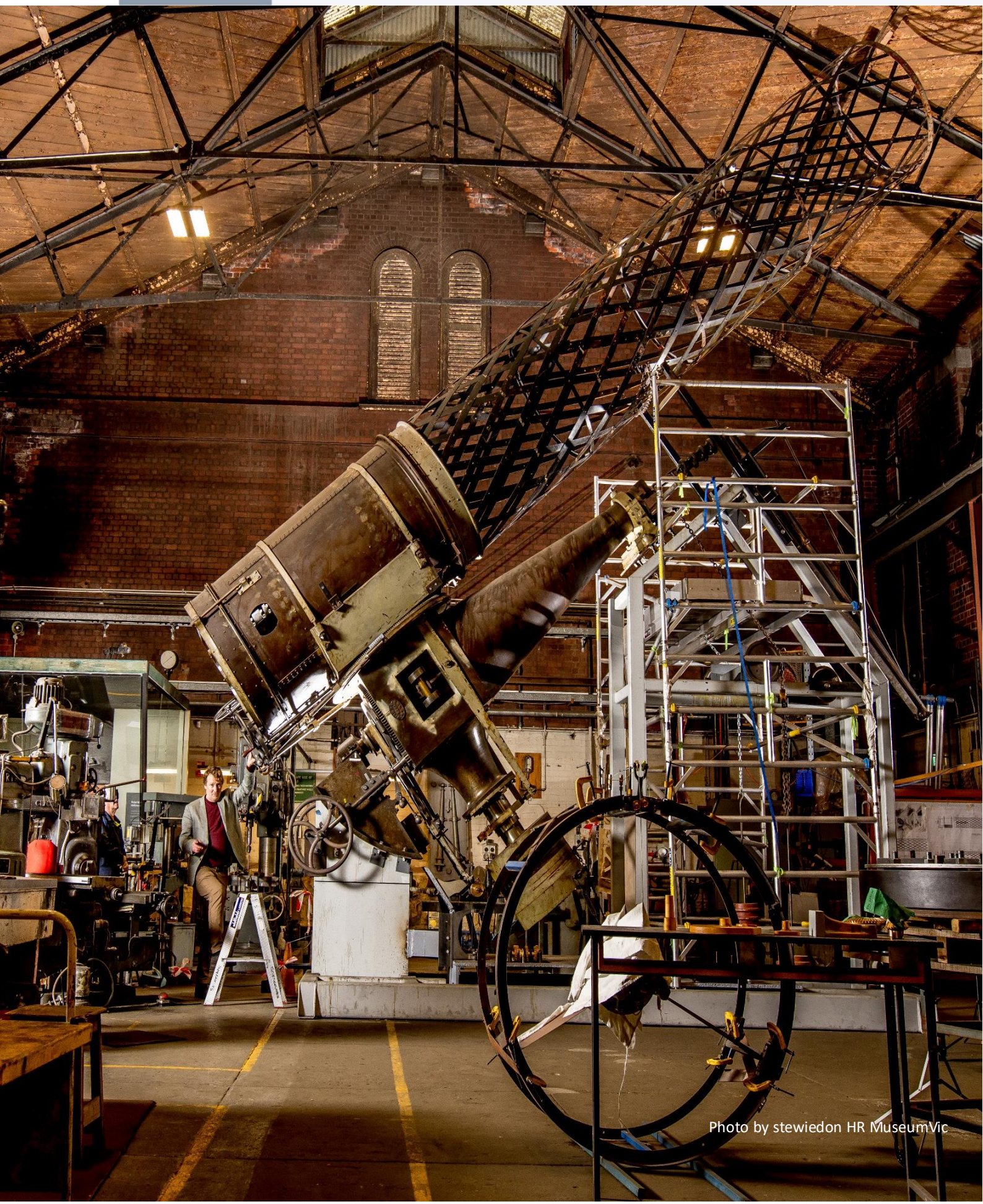


Photo by stewiedon HR MuseumVic

Thousands of hours have been painstakingly taken, by dedicated volunteers and Melbourne Museum staff, to restore the magnificent and historic Great Melbourne Telescope.

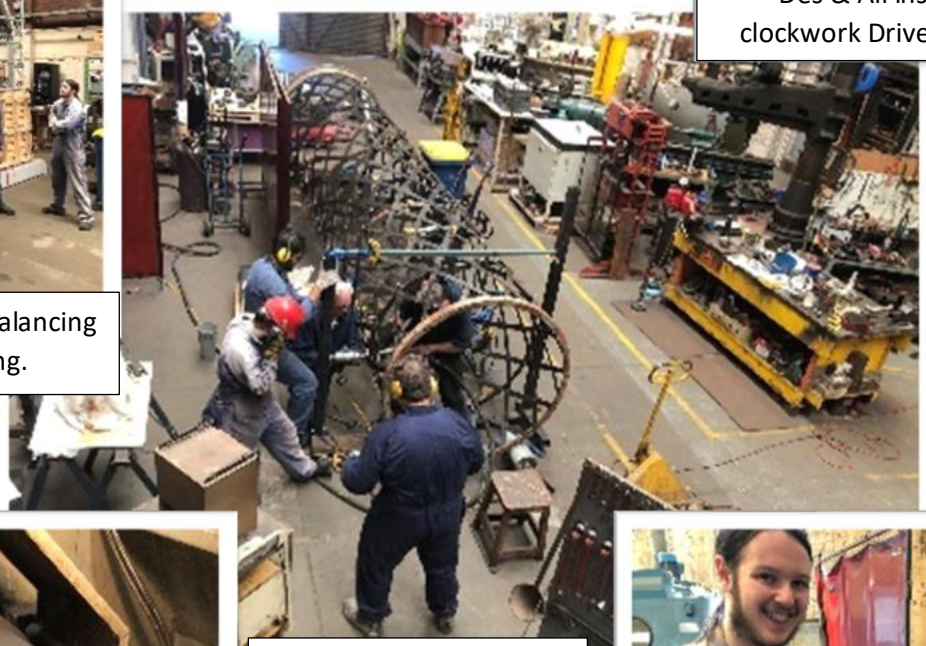
Phoenix, highlights those 2024 volunteers from diverse backgrounds, who have given freely their time and expertise, to restore one of the 19th. Century's remarkable scientific instruments – The Great Melbourne Telescope.

JAN
2024

Riveting of the secondary ring to the lattice tube.

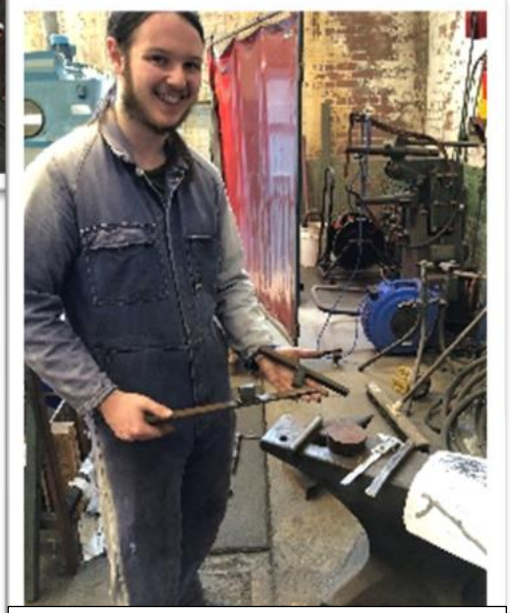
Des & Ali inspecting the clockwork Drive governor ball.

The Boiler Plate Tube balancing for dynamic testing.



Overhead view of the riveting team at work.

The Clockwork Drive drum beginning to be machined.

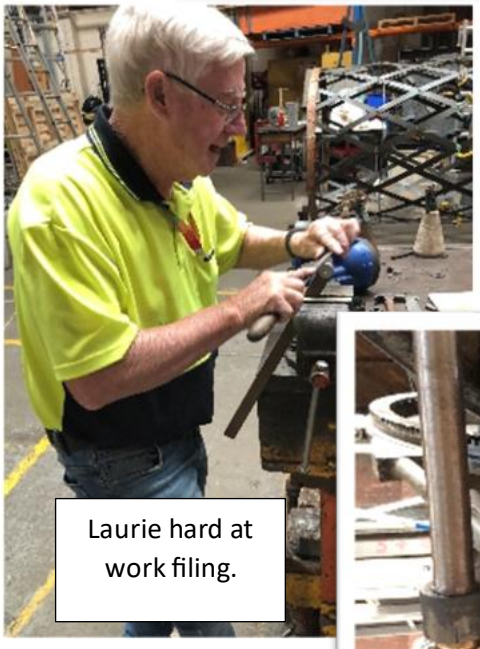


Oscar at the forge working on the Sidereal / Lunar clutch lever.

FEB
2024

Bob, Frank & Mal working on the manual Drive Universal Ring.

C-Bracket assembly now completed.



Laurie hard at work filing.

Nick Lai using the sand blaster.

DAMFC Indicator Panel fitted by Laurie.

FEB
2024

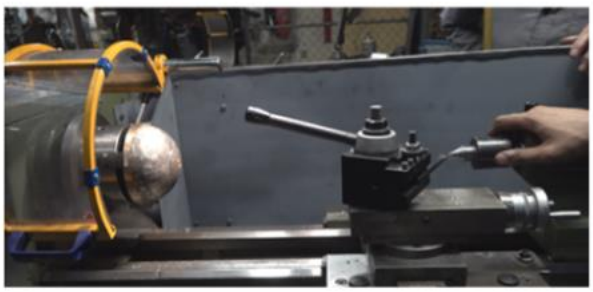
The clockwork drive starts to take shape.

Mal working on the control cabling.

Steve and Mukul work on the electronics

Tom and Ali preparing the mandrel for machining the clockwork drive governor balls.

The rest stop for the governor balls in the clockwork drive is set up for machining.



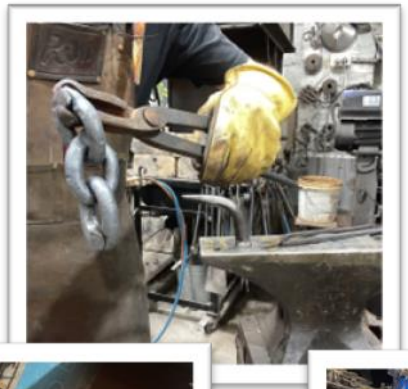
One half of the shell for the clockwork drive governor balls ready for machining.

FEB
2024

MYSTERIES OF THE FORGE REVEALVED AT SCIENCEWORKS ...




... AND EXTERNALLY



Forged chain links.

FEB
2024

The stone piers have found a home in the GMT House

Barry Clark

I Started making telescopes when I was 14 and was expecting to follow my father's first occupation as a blacksmith. I worked for 4 months in machine shops while doing a mechanical engineering course, then did physics and joined the Defence Science and Technology Organisation, specialising in optics, vision and human factors, retiring in 1996. All the while I have been an ASV Demonstrator. In 2005, I drafted the ASV letter to Mt Stromlo Observatory that started the process of getting the fire-exposed GMT remnants back to Melbourne. My main tasks in the GMT project since 2008 have been optical system redesign, reverse engineering the lunar-sidereal gearbox, speed control of the clockwork drive, and investigation of the axial runout of the polar axle.

MAR
2024

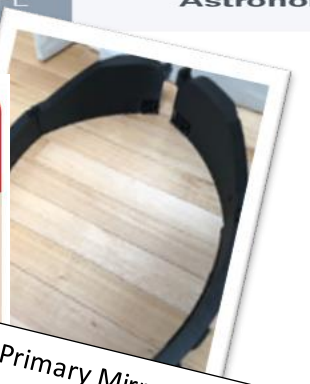
PREPARATION FOR THE DISMANTELING OF THE GMT IN APRIL.

THIS WAS TO ALOW REBUILD OF THE DECLINATION AXIS AND MACHINING OF THE POLAR AXIS PARTS TO CORRECT ALIGNMENT.

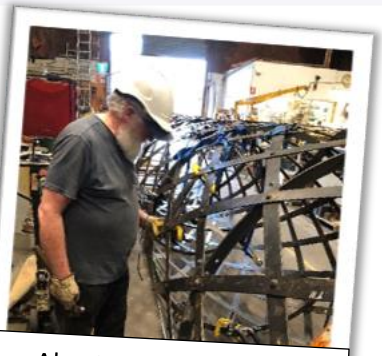
Alan Watson

Early interest in astronomy and was a ASV member in my teens.
After a 30 year Big IT career, found myself volunteering at Scienceworks where I heard of GMT project.
I am now having lot's o' fun working through the Secondary Mirror Cell construction and assembly.
My current interest is in comet discovery using solar satellite public image data.

MAR
2024

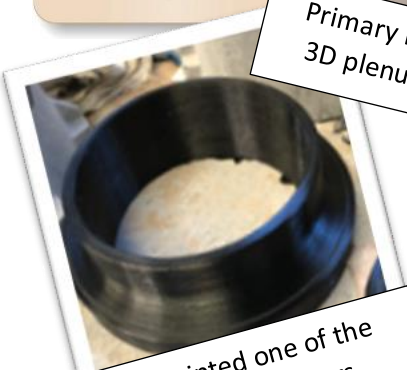


Primary Mirror Cell 3D plenum prints.



Alan W. inspecting the Lattice Tube, post to the riveting in February.

Counterpoise lever being removed from the South Cone.



3D printed one of the parfocal adapters.

The two hemispheres welded together waiting to be filled with lead.

Ross assisting with disassembly preparations.

Peter heating one of the Clockwork Drive gears, to create a firm fit onto the

Steve Bentley

68

Electronics and Radio Communications engineer. I had careers with Philips mobile radio as a design engineer and Optus mobile phone company as a network design engineer.

I heard about the GMT via the ASV and was nearing my retirement and thought working with the MV as a volunteer was a great thing for me personally as well as contributing to a worthwhile project to restore the historic telescope.

I began as a volunteer in 2009 and have been involved to the present. I was originally involved in managing the volunteer team, as well as measuring and documenting the historic parts of the GMT. I also prepared the design of the many missing parts. Currently I am involved in the design and construction of the GMT electronics which will help stabilise the mirror temperatures for an optimum viewing performance.

APR
2024

THE DISMANTELING OF THE GMT BEGINS.

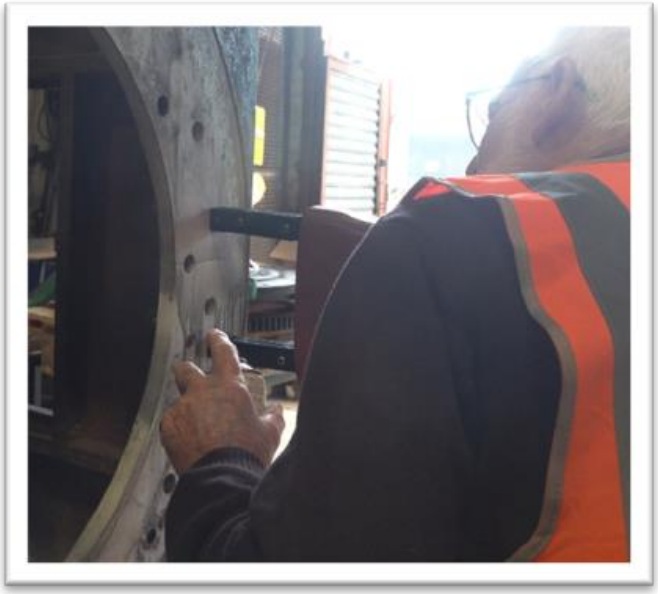
APR
2024

THE DISMANTELING ALL DONE IN ONE DAY.
WELL DONE GUYS.

APR
2024

MECHANICAL SYSTEM TESTING

Ken Woolhouse inspects the cube for cracks.

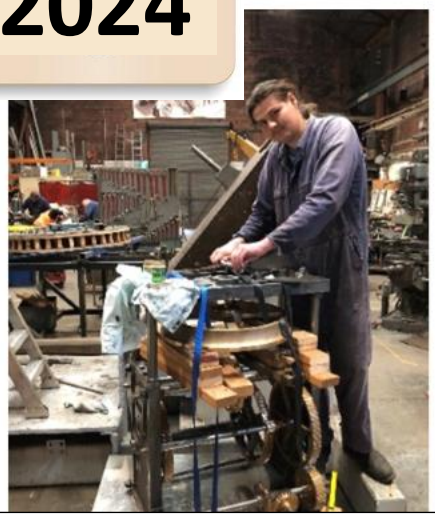


Cracks identified and remedied.

Tom Miller
78

Born and raised on a farm in Swift Current, Saskatchewan, Canada. Worked in the oil industry moving oil drilling rigs and after being married and in 1771 graduating from the University of Saskatchewan as an engineer. Worked for Schlumberger of Canada an organisation focused on all aspects of the oil industry. Came to Australia on a working holiday in 1972, and still on holiday, but not working,

APR
2024



Horatio tapping holes in the clockwork drive top plate.

Des using the big radial drill.

Navdeep just finishing another GMT part.

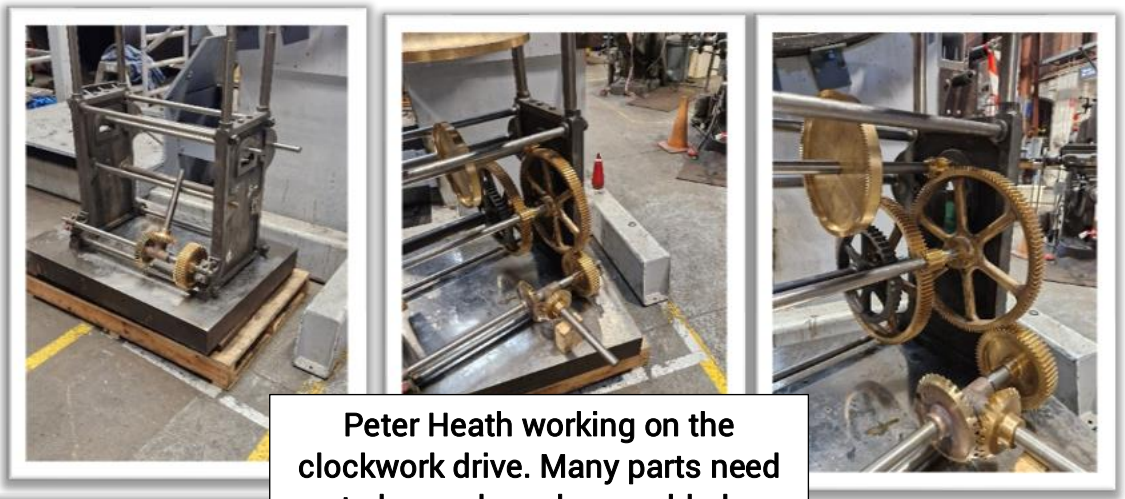
Des & Laurie disassembling the declination axis.

Oscar forging the Sidereal / Lunar gearbox clutch lever yoke.

Horatio Yen
22

My dad has been a member of the ASV for many years and encourage me to join the ASV when I was 5.
I first encountered the GMT when I visited the Stromlo Observatory just after the disastrous bushfires.
I joined the restoration team 3 years ago when I was undertaking an internship as part of my studies in Engineering Mechatronics and Computer Science.
I have been working on the clockwork drive, the eyepiece turret, and a range of other tasks. I'm learning heaps and enjoy my role as a volunteer.

APR
2024



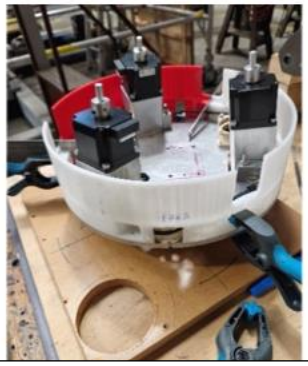
Peter Heath working on the clockwork drive. Many parts need to be made and assembled.

Peter Heath
71

Fitter & Turner/Boiler Maker/welder/farmer.
I came to Scienceworks August 2022 after hearing Ian McNamara on "Australia All Over" (ABC radio).
Firstly, working on the Polar Fine Control but now I have moved onto The Clockwork Drive.
I am finding this a most interesting challenge and looking forward to having the GMT up and running by mid-2025.

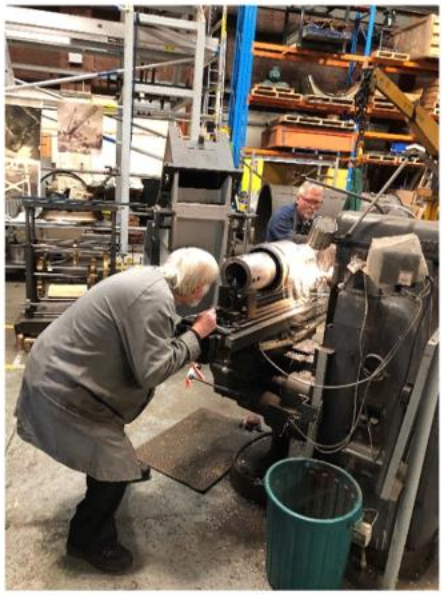
MAY
2024





Secondary Mirror cell components.

Secondary Mirror Cell being assembled.



Declination Extension Tube – Eric machining slot for Encoder Cabling.

Peter happily working on the focusing handwheel bearing.

Oscar, Daley
20.

I joined the project as a volunteer in early 2023, working on the telescope along with my mechanical engineering degree.

I do various small design and manufacturing work, with a focus on blacksmithing.

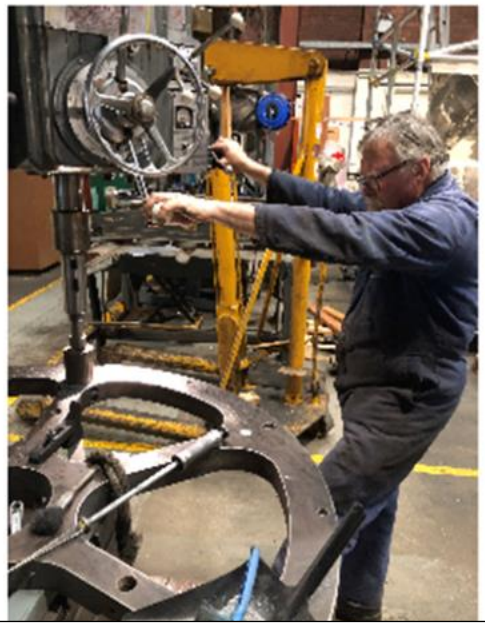
I've tinkered with blacksmithing as a hobby for a few years, but with the GMT project I've had a chance to work a forge almost a century old!

MAY
2024

Ross fitting Sidereal/Lunar gearbox caps to base.

Speed Control needle and indicator panel casting.

Ryan thread cutting.



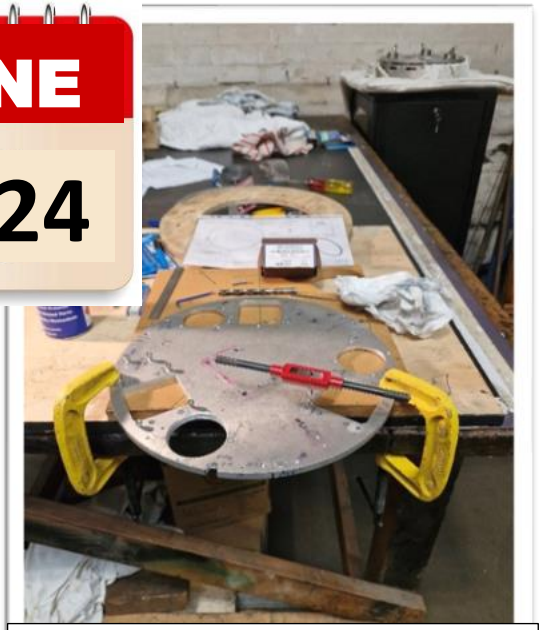
Des working on the Primary Mirror Cell Set Downs for lifting frame attachment

Dr. Tim Davis

Retired Senior Principal Research Scientist from CSIRO with expertise in physics, electronics and computing as well as project management.

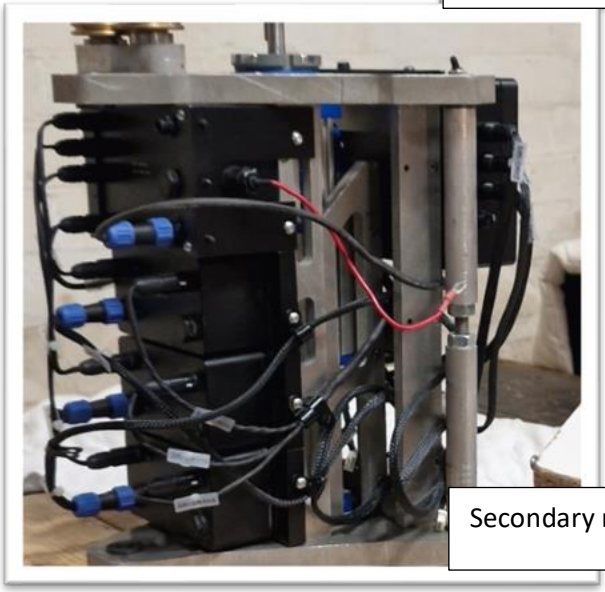
I have been working on the project since early 2023 and am currently leading the software development and creating the master control system that interfaces with the web-based user console and the microcontrollers on the telescope. This involves working with students to decide on the best ways of implementing the software systems as well as coordinating the code development and integrating the various subroutines.

JUNE
2024



Secondary mirror collimation plate.

Tom working on the secondary mirror frame.



Secondary mirror cell with electronics installed.

Tom King
16

I'm still at school and about to enter year 12 in 2025. My father was interested in the restoration and encouraged me to volunteer. I have undertaken a variety of tasks, ably assisted by the other members of the restoration team. Some of the tasks included the Secondary Mirror Cell, Finder Scope and learning the 3D Onshape drawing package

JUNE
2024

Ken admiring his handy work on the plastic test piece for the secondary mirror baffle.

Test baffle connected to secondary mirror cell.

John Dardemann,
78

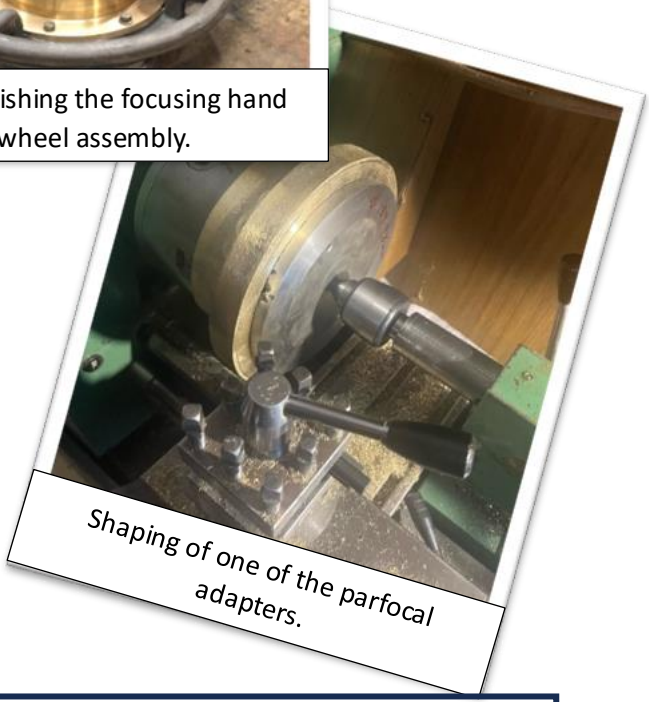
I am a control systems engineer and retired 4 years ago. Born in Germany I became an instrument maker and studied automation and controls. My work brought me to Australia, got married and after retirement joined the ASV. Jim Pollock introduced me to the GMT project and then I broke my ankle and could do only work on the computer.
Since then, I am busy writing editing assembly manuals and will later add operations and maintenance manuals to it.
It keeps me busy in average for 10 to 20 hours a week, mainly generating and editing drawings for the manual (and sometimes understanding how the hell did they do it).

JULY
2024

Ross machining Sidereal / Lunar gearbox cap bolts.

Peter finishing the focusing hand wheel assembly.

Des cutting grooves in the primary mirror cell for the power cables.

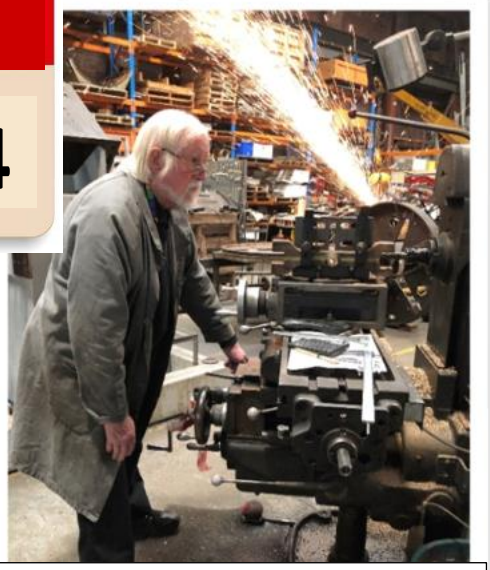


Shaping of one of the parfocal adapters.

Campbell Johns
77

Mechanical Engineer, completed a lot of project work in SE Asia mid 70ties to 2005. Having retired 2008 looking for something to do, stumbled over an article in "The Age" seeking volunteers to restore a telescope. Having never been and still not, a "stargazer" I'm not sure what the attraction was. However, joined the ASV in 2008 and quickly learnt what the GMT was to become. Initial works were just identifying what parts we had. This quickly led to my producing numerous ACAD drawings of the parts. Completing works on replacement of various bearings, design and drawing of the temporary steel support frames. I'm enjoying being involved in such a great project for the benefit of Victoria.

JULY
2024



Eric machining the governor pivot arm. For the clockwork drive.

Ken, Stewart, and Bryan inspecting the secondary baffle mould.

Alan W. grinding the secondary mirror baffle mounting ring.

Steve making adjustments to the collimation plate.

Oscar grinding the Sidereal / Lunar clutch lever plate.

Frank Marian.

I was a ASV Council member in 2008 when the initial proposal to bring what was left of the Great Melbourne Telescope back home from Stromlo after the tragic bushfire.
I volunteered in 2010, and began working a few Sunday mornings at Moreland then in mid-2016 I retired from work, and became seriously involved in the project, I worked most Wednesdays at the Moreland workshop, and in more recent times at Scienceworks.
I was trained as a toolmaker so I am on the machines manufacturing the missing parts.
My particular love is the comradery among the team that I work with on Tuesday.

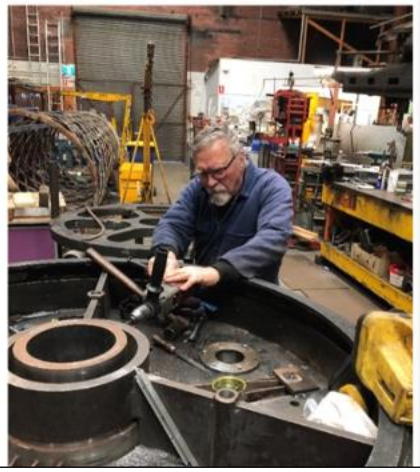
AUG
2024

Peter machining the clockwork drive drum.

Ross showing his sidereal/lunar cap bolts.

Laurie hard at work on the lathe.

Horatio and Laurie completing the Declination axle rebuild.



Des installing the access for the optical tube counterweight cabling.

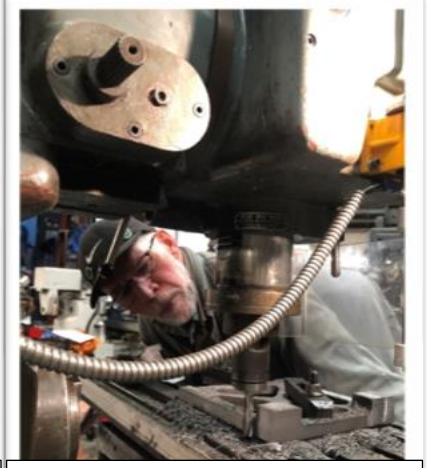
Ali working on the clockwork drive ball arms.

Ross Bencina

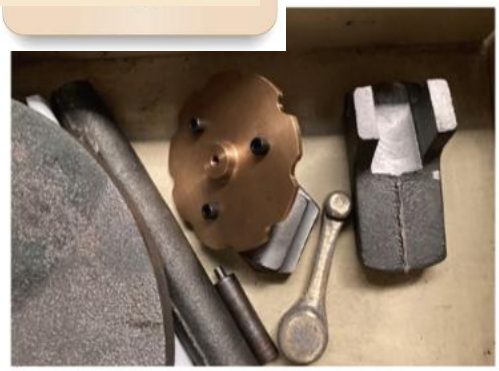
I originally trained in music composition, then developed computer software in my own business, as a freelancer, and in academic R&D. More recently I studied pure mathematics. Then after too many years sitting in front of computer screens creating "virtual" things I decided that it was time to make physical things. So, I volunteered on the GMT restoration and got a Cert II in fabrication and machining.

AUG
2024

Eric machining governor pivot block.



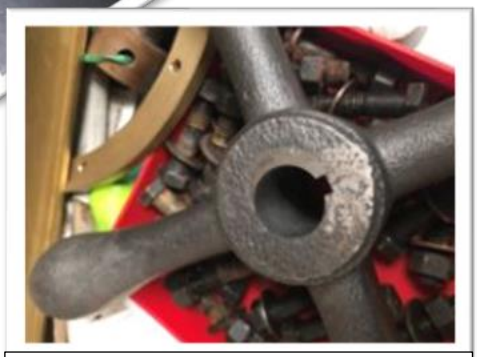
Peter milling one of the clockwork drive frames.



Bell ringer components.

Parfocal Adapters.

Turret ready for the installation of the new eye pieces.



Declination clamp handle finished.

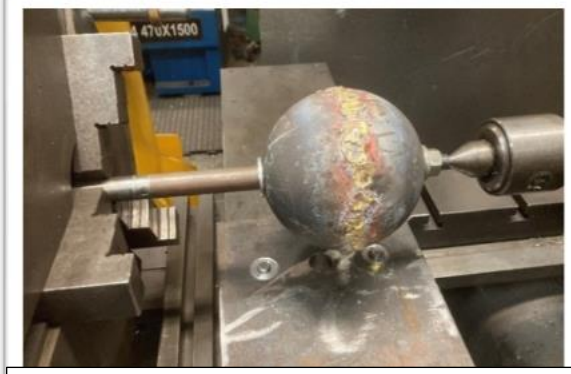
Mal Poulton.
78

I've been working on the project since 2010.
I retired in 2007 and I was looking around for an interest to keep me active. GMT has certainly done that. Not a great call for my electrical engineering experience but have been actively involved in the mechanical design and Autocad presentation of the drawings. Hands on also at Science Works with the assembly.

SEPT
2024

Part of Tom's secret method of turning the governor balls

Tom making machining tools for the clockwork drive governor balls.



The secret method up close.

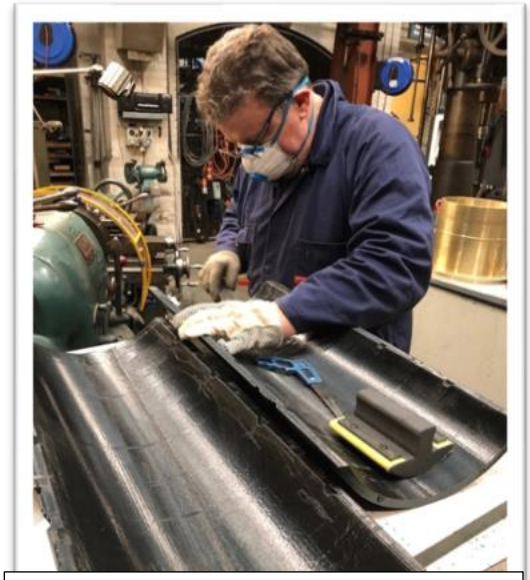
Stewart finishing off the support disks for the secondary baffle mould.

Stewart Beverage

After 40 years being a Telecommunications Technical Officer with Telstra, I retired and in March 2023, became a volunteer to work on the GMT restoration.
After working in the field of electronic I decided to join the mechanical workshop. I am currently enjoying being part of team involved in a variety of tasks, including making spare edge supports, plenums and floating parts for the Primary Mirror, hot riveting on the lattice tube ring, making Boiler Plate Tube hatch covers and creating the setup for the Secondary Mirror Cell mould for the carbon fibre baffle.
I have always had a keen interest in telescope making and have been a ASV member for 35 years.

SEPT
2024

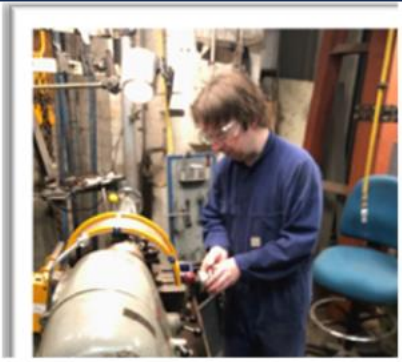
Barry and Des re-machining the mounting stub for the turret.



Stewart preparing the mould for the carbon-fibre baffle.

Slide mechanism for clockwork

Peter machining the slide mechanism for clockwork drive.



Allan Davies,
42

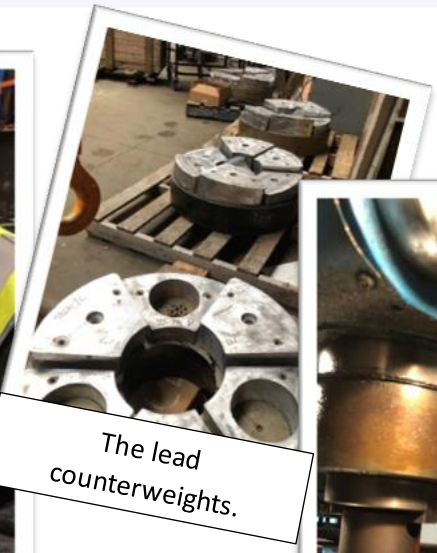
After completing a Advanced Dip. Eng (Mech.) and prior to joining the GMT, I started a Bachelor of Engineering at Swinburne University.

Having an interest in astronomy I wanted to join the GMT Restoration as I had always wanted to work on a large restoration project and apply my skills.

I've been working on the project for just over five years on various areas from the Sidereal/Lunar Gearbox and mechanical controls to the cycloidal gear design and currently on the commissioning of the clockwork drive.

OCT
2024

Barry re-machining optical flat bearing for turret

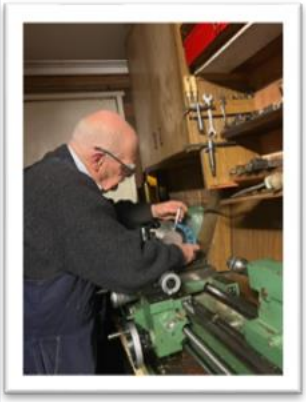


The lead counterweights.

Ken at the milling machine.

Alan W. machining the upper focusing bracket.

Peter replacing a new cutting tip before machining the clockwork drive braking disc.



Barry Adcock
79

I have been a telescope maker since 1958, aged 13 and I have continued that interest and a deep interest in Astronomy to the present time.
I joined the project in 2006, when I was President of the ASV, and have continued working on the restoration to the present time. At that time, we started negotiations with Mt Stromlo Observatory and Museum Victoria for the return of the telescope. Since then, I have been involved in a wide variety of aspects of the project.
More recently I have helped to design a new set of eyepieces to be used at public demonstration nights. I have manufactured and tested the eyepieces including the optical elements.

OCT
2024

Frank finishing the east side cable lug

Laurie proudly showing his part of the declination clamp universal joint.

Mal checking the new castings

Quality control meeting between Frank and Tom

Tom showing off a secret method of machining the clockwork drive governor balls.

Ken Woolhouse

I was employed as a Engineering metallurgist in the R & D Department of the SECV. I performed Remaining Life Evaluations and prepared Life Extension Programs for high temperature steam generation equipment. I also conducted failure investigations relating to this equipment and other mining and electricity transmission plant of the SECV.
After leaving the SECV I became a consultant to private companies.

I started on the GMT restoration program in 2019.

NOV
2024

Bryan and Steve working on the rear fans and electrical cabinet cabling.

Ross preparing the Sidereal/Lunar gearbox clutch lever for machining.

John and Tim discussing the progress.

Ross and Peter considering the machining set-up for the sidereal/ lunar gearbox shaft bores.

Bob Crosthwaite
84

Product of a Technical School education and graduated as an Electrical Engineer in the 60's. Worked in industry before venturing overseas working in South Africa, Ghana, and Hong Kong. Joined the volunteers back in the Moreland days and have, since then, been at Scienceworks. I have been working on most of the machines, being assisted by fellow volunteers.
My wish, is that I will see the Great Melbourne Telescope, back in its old home

NOV
2024

Oscar's forged strap for lower sight.

Alan W. drilling the secondary mirror cell balancing weight.

Eric continuing machining of the north bearing support

Peter milling the clockwork drive backplate.

Oscar, again at the forge producing the bell striker rod.

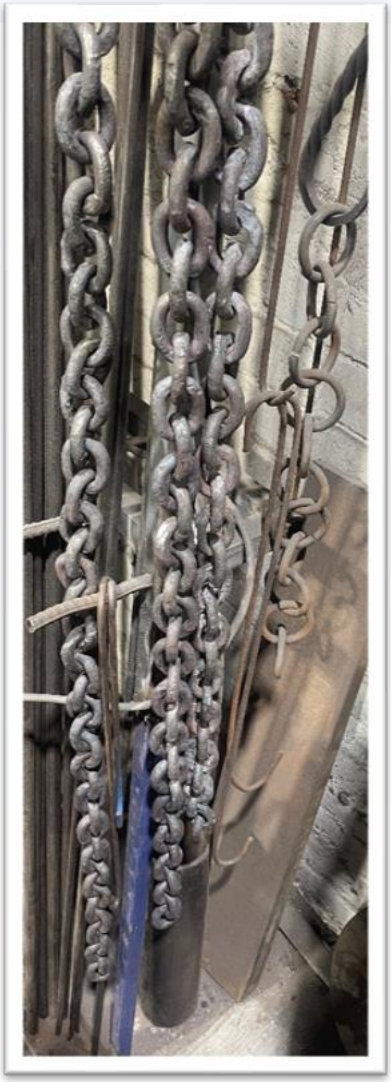
Pawls installed into gear.

Alan D. drilling repositioned holes for the clockwork drive ratchet pawls into one of the large 120 teeth gears.

Steve Roberts

ASV member and occasional secretary since 1985. I saw the incinerated GMT at Stromlo, and worked on it in the early days, cleaning, identifying, and labelling the parts. Hanging around the GMT project now, but I am a computer nerd without much hands-on engineering skills.

NOV
2024



Completion of the final links in the east side chain, the third of three chains made.

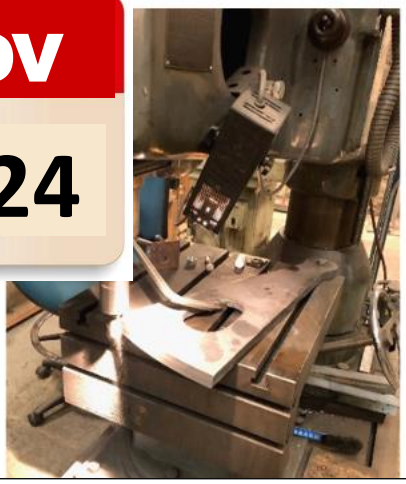
- Over 15 blacksmiths contacted – just about all in Victoria - who weren't able to assist.
- Unable to get a cast or fabricated chain made as the link length is too short.
- Finally found Ron, who has done a fantastic job!!!

Bryan Mooney
68

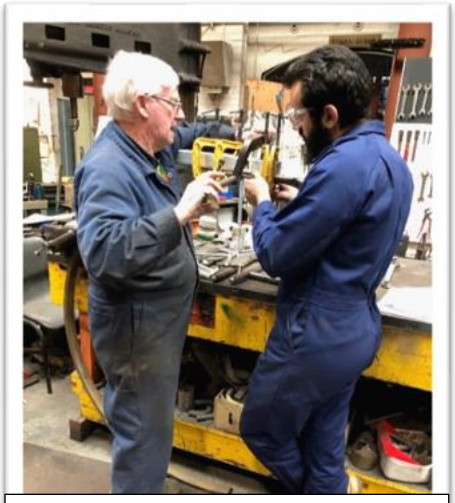
I retired after 37 years as an Electrical Design Draftsman and having a bit of an interest in astronomy since childhood I came across an advertisement for volunteers, in the ASV Crux magazine, to work on the restoration of the GMT.

I joined the project in 2016 and have worked on documentation and modification of the original components, preliminary design of new components, such as the new primary mirror cell, new secondary mirror cell, dec shaft counter weights, new eyepiece drawings and new electrical and electronic systems. I have also been involved designing and 3D printing parts when needed.

NOV 2024

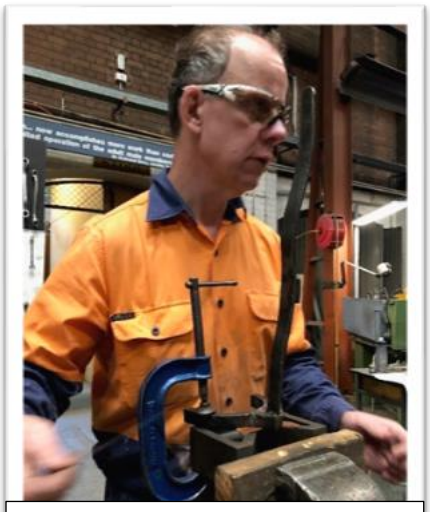


Des machining the replacement load relief segment.



Laurie and Hamza preparing the new cradle straps for welding.

Eric machining fillets on the north bearing support.



Ross machining the Sidereal/Lunar clutch lever.

Des Lang
(MV Staff member)

My working life started in 1963 at a Bowling Club, as an assistant Greenkeeper
I took up an Apprenticeship in Engineering in 1966, and over the years this has led me in a variety of directions, eventually ending up for 13 years at Pentridge Prison.
I joined Scienceworks in 1990, where I have worked with many volunteers, restoring 4 of the Pumping Engines in the Pumping Station including the Cowley Traction Engine and Steam Roller.
Over the past 34 years, I have been involved in the restoration of many of the machines held within the Scienceworks collection.

More castings, means more work for the volunteers.

Alan D. showing the slotted cheese head screws he made for the clockwork drive upper bearing.

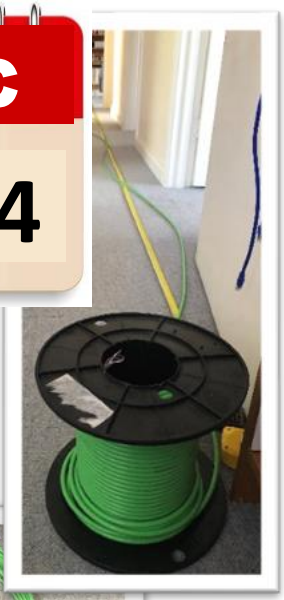
Lead counterweights.

The "lead team" shaping the counterweights.

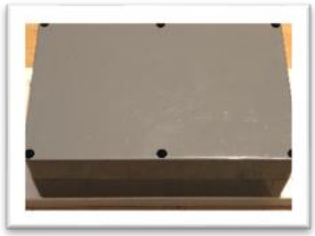
Eric McCallum

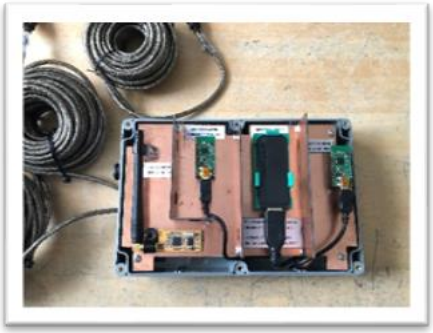
I was apprenticed at the Hobson Bay Dock and Engineering in Williamstown. I focused on Fitting, Machining, and Marine Engineering, specialising in Horizontal Boring machines.
I later worked in the steel making and heat treatment section at BHP Melbourne Research Laboratory.
Before I retired, I was the Engineering Estimator for HBE Engineering and W.G. Goetz Engineers and Toolmakers.
I joined the restoration team about a year ago and have enjoyed working on the variety of tasks.

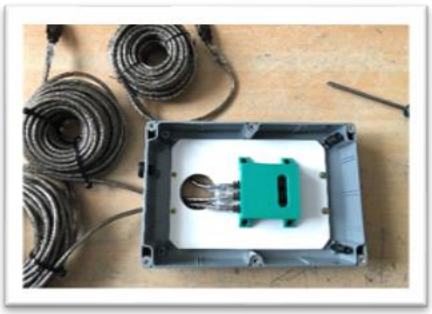
DEC
2024



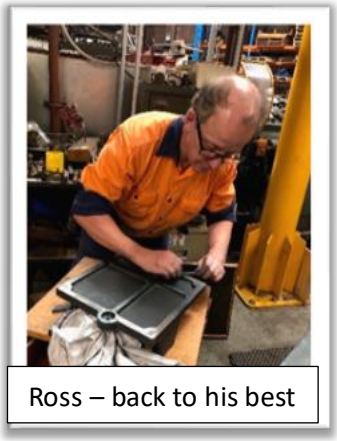
Steve sitting next to his control cabinet and surrounded by his electronic handy work.







Some new members about to start the internship program.



Ross – back to his best

Tom finishing the second governor ball.

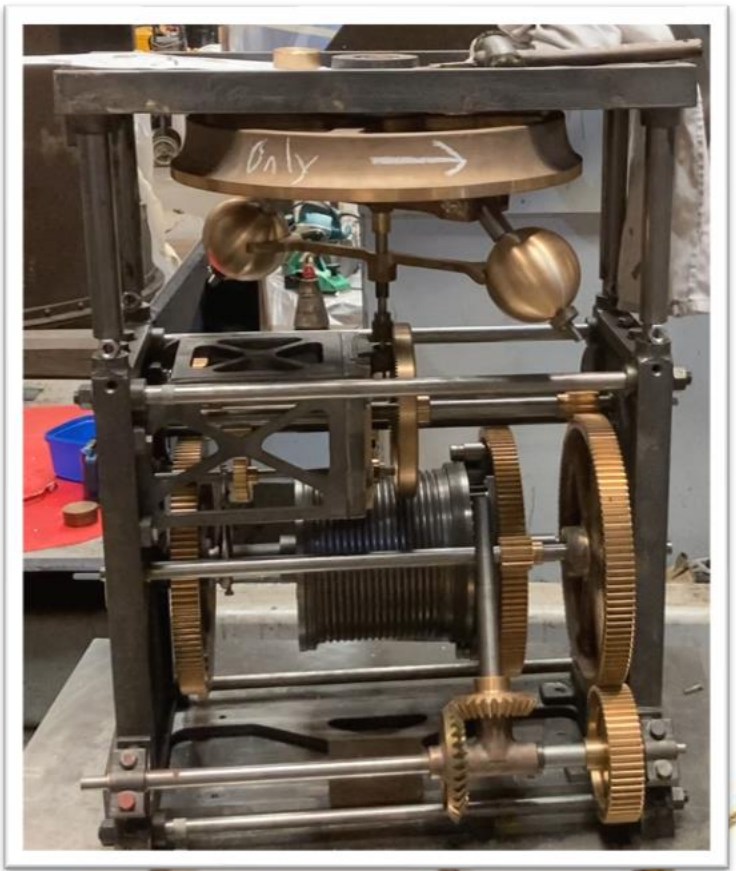
Eric and Des testing the new earthquake detection device.

Bob pondering, is it fact or fiction?

The saddle was checked for cracks, we held our breath, and it came out with flying colours.

DEC
2024

Look what Santa has brought us this year.



A lot of skilled work, from many members of the team, to bring the CLOCKWORK DRIVE up to this stage.

Some of the patterns and castings made this year

Great Job Noel

STEVE BENTLEY, IN A LIGHT HEARTED MOOD, SHOWING OFF HIS LATESST RANGE OF FASHION ACCESSORIES USING CABLES HE HAS PRODUCED.

On Wed. 26th June a small milestone was achieved on the GMT restoration project. For the first time, development of aspects of the GMT electronics was performed on-site at MV Scienceworks. A data wiring cable for the digital position encoder on the declination shaft, needed to be terminated into a connector.

Seen in the photos below, is Steve Bentley at a workstation separating the individual wires of a rainbow ribbon cable, stripping the insulation, solder tinning each end then soldering each wire to a custom connector. The connector will plug into a small circuit board which contains a voltage regulator to provide the main power supply to the digital position encoder. The other wires in the cable will carry the 2-way data communication between the master computer of the Operator's console.

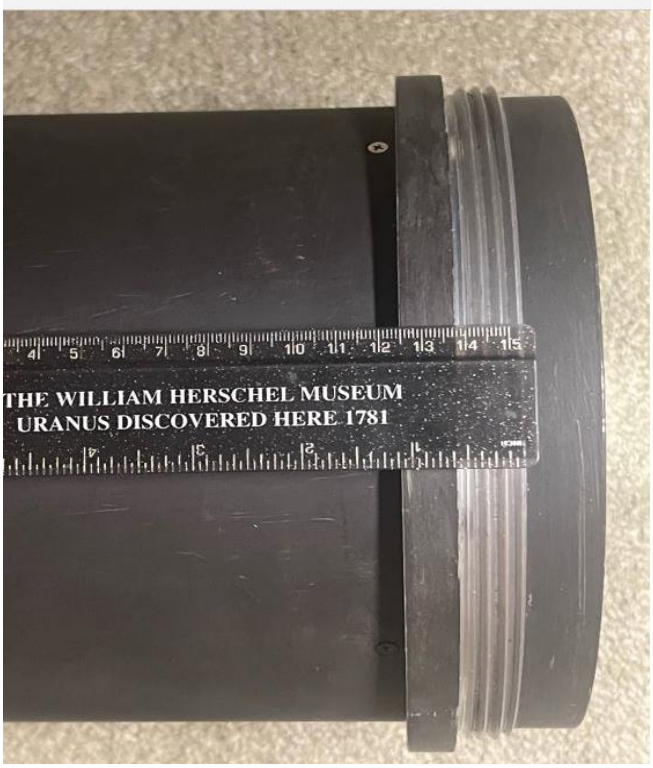
The GMT electronics have basically been designed and built and 99% of the components are in hand. We are currently fabricating the electrical wiring which needs to interconnect all the items on the telescope

PROGRESS AT THE EYEPIECE END OF THE GMT

By BARRY ADCOCK

In previous issues of Phoenix, we have discussed the need to preserve the original GMT Huygenian eyepieces and to protect them from any damage. Their value is highlighted by the fact that we do not know the original designer or maker of the eyepieces nor do we know where they were made. They may be the largest eyepieces ever made. Our decision was to make a new set of three Huygenian eyepieces at the long focal length end of the existing scale. The new set will provide the lowest powers possible within the mechanical restraints of the telescope.

An eyepiece for any telescope is not just an assembly of glass lenses. There is a lot of work on a lathe and milling machine to produce a metal infrastructure to hold the lenses accurately in their design positions. In order to maintain the heritage values of the instrument we were compelled to adhere to the imperial dimensions of the components. In doing this the original eyepieces could still be mounted in the telescope and used perhaps in a celebratory event at some future time. However, it did make the fabrication process more difficult. The photograph below shows the field lens end of the longest focal length eyepiece and the 8 inch diameter.



PROGRESS AT THE EYEPIECE END OF THE GMT (CONT.)

Barry Adcock

The table below lists the focal length of the original Huygenian eyepieces together with their corresponding magnifications.

Remember that the original GMT operated with an f- ratio of 41.54 giving a focal length of approximately 1, 994 " (50,650mm).

Focal Length (mm)	Magnification
216	234
196	258
153	330
120	420
97	520
57	881
51	1000

The next table gives a list of the new eyepieces and their magnifications when used with our redesigned optical configuration of f/31.2 giving a new reduced focal length of approximately 38,000mm.

Focal length mm	Magnification	Field of View (degrees)
211	180	0.32
150	253	0.22
105	362	0,15

RENEWING THE CRADLE STRAPS

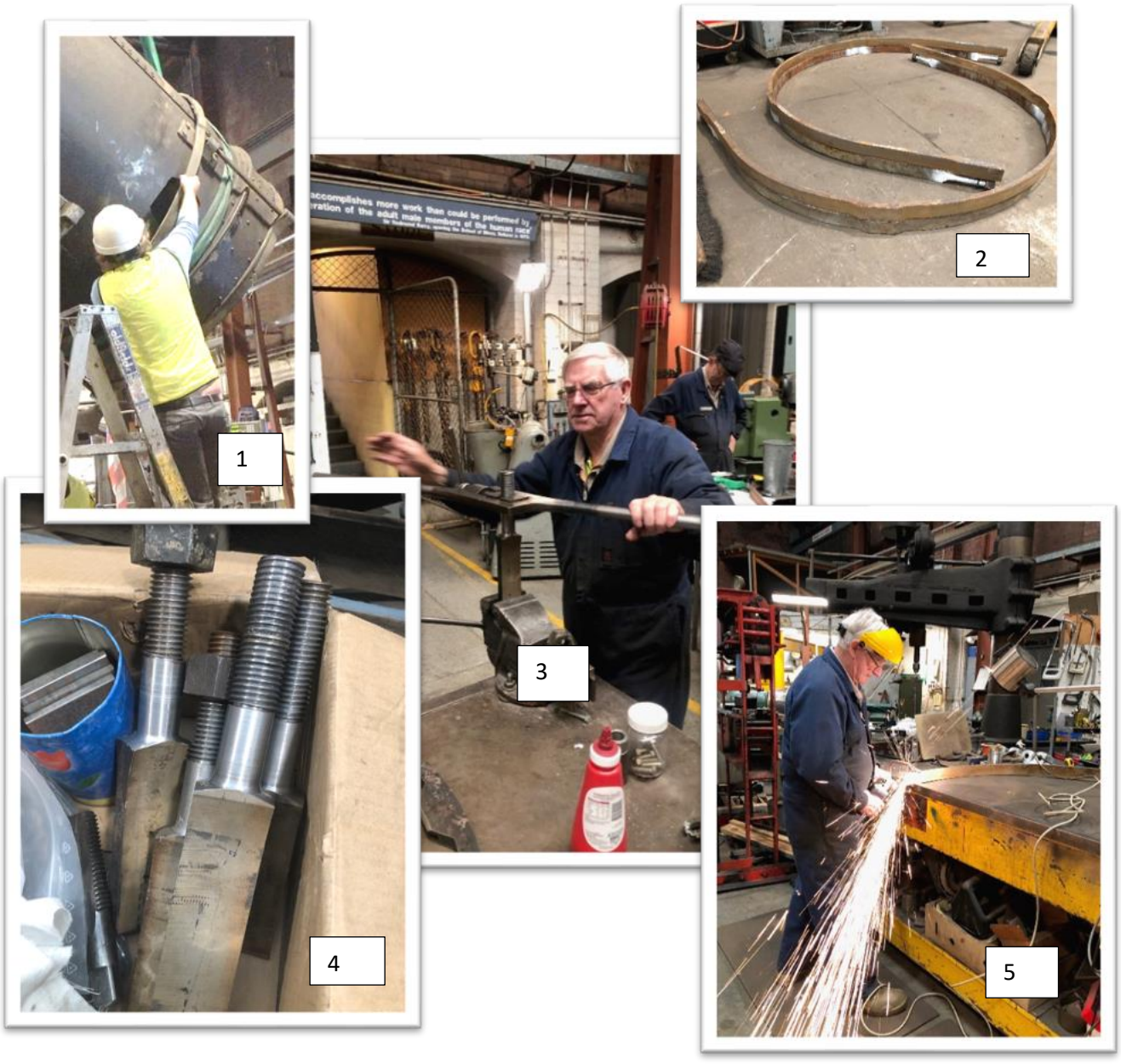
The cradle straps hold the boiler tube and lattice tube to the cradle. When the original straps were removed (Photo 1) it was found that they were somewhat compromised and needed to be replaced.

New straps were cut out of steel, Photo 2 shows the new straps placed on top of the originals. but their ends needed to be machined and a screw thread cut

The ends of the straps were cut off because they were too big to be machined safely.

Photos 3 &4 show Laurie Goodson finishing the screw cutting and the completed ends.

Photo 5 sees Laurie preparing the ends for welding to the main cradle strap, ready welding set up.



Filling the clockwork drive governor balls with lead






The clockwork drive governor balls will each weigh 10 kg. The LG2 gunmetal shell is made of two pieces which are welded together. To achieve the required weight, and to be consistent with historical records, each shell needed to be filled with lead.

Tom, wearing suitable protection from the lead took on this task. As the shell and the lead needs to be at a similar temperature. (Melting point of lead is aprox. 330^0 C.) both were heated and checked with a laser infrared thermometer

Tom then carefully poured the molten lead into the shell and when cold finished by polishing the balls.

Great Grubb Refracting Telescopes

By Jim Pollock

The Grubb Telescope Company of Dublin is famous as the manufacturer of the 48-inch (1.2 metre) Great Melbourne Telescope. The company and its successor, the company of Sir Howard Grubb, Parsons & Co Ltd. (Grubb Parsons) also made refracting telescopes.

Large refractors made by Grubb included the 28-inch telescope for Greenwich Observatory in 1893, the 27-inch Groβer Refraktor (Great Refractor) at Vienna Observatory in 1880 and the 26.5-inch Innes Refractor at Johannesburg Observatory, South Africa in 1909.

The mounting of the Great Melbourne Telescope at Moreland in 2014. Note the "cube" and the adjustable levers which could reduce the friction on the declination axle.

The Grubb 27-inch (69 cm) Vienna Refractor. Again, note the similarities in the mounting to the Great Melbourne Telescope.

Even larger refractors had been built. These included the 36-inch Lick telescope, installed in 1888 at Mt Hamilton, California. There was also the Grande Lunette (Great Telescope), a double telescope of 33-inch and 24-inch apertures at Paris Observatory at Meudon in 1891 and the 40-inch refractor at Yerkes, at Williams Bay in Wisconsin, USA in 1897.

One of the reasons of the great upswing in large refractors in the last two decades of the 19th century was that reflectors fell out of favour following the unfair criticism of the Great Melbourne Telescope (GMT) by George W. Ritchey.

Ritchey was director of the Mount Wilson observatory located near Los Angeles, California.

Ritchey declared that the GMT was" one of the greatest calamities in the history of instrumental astronomy for, by destroying confidence in the use of great reflecting telescopes, it has hindered the development of this type of instrument… for nearly a third of a century."

The GMT was a good instrument which had been designed for visual use as photography had not been sufficiently developed at the time. As far as can be determined, Ritchey never came to Australia[1] and as a result never looked through the GMT. Apparently, because few of the observations that were made using the GMT were actually published and because Melbourne Observatory's observing programme changed, the GMT was rarely used after the beginning of the 20th century, Ritchey therefore assumed that the telescope was a failure.

Ritchey was never in favour of reflectors until he built the very successful Mount Wilson 60-inch reflector. This was commissioned in 1909. Then reflectors became the way of the future, even for Ritchey. A few years later, he went on to champion the Mount Wilson 100-inch telescope, the mirror of which was financed by businessman John D. Hooker.

But the age of large refractors was not quite over.

A little-known but even larger refractor, was attempted by Grubb in the 1920s. It was to be the biggest equatorially-mounted refracting telescope in the world with an aperture of 41-inches, slightly larger than the 40-inch Yerkes telescope,

the objective of which had been made by Alvan Clark and Sons.

The 41-inch telescope had originally been ordered by the Russian government before World War I for the new Nikolaieff Observatory in the Crimea. Unfortunately, the war intervened so work on the telescope was delayed. Also, the Grubb Telescope Company was in financial difficulties and was eventually purchased by Sir Charles Parsons[2] in 1925.

In the 1920s, work on the telescope and its mounting commended and were completed. The glass blanks for the crown and flint components of the 41-inch objective lens were cast and by 1928 the rotating dome was under construction.

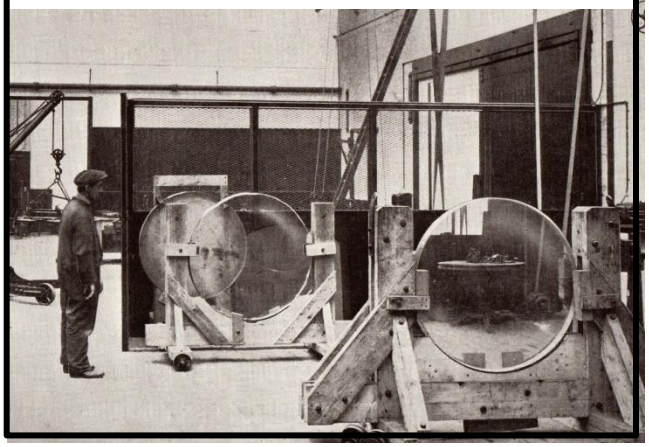
Sadly, the government of the USSR cancelled the project. The glass blanks were never ground and polished to a finished objective. They are now on display at the Science Museum in Newcastle-upon-Tyne in England, the city where the headquarters of Sir Howard Grubb, Parsons & Company were located.

[1] According to the imigration records for Victoria and New South Wales.

[2] Charles Algernon Parsons was the youngest son of Lord Rosse (William Parsons, 3rd Earl of Rosse) who built the 72-inch reflecting telescope and erected it at Birr Castle in Ireland in 1845. Charles invented and improved the Parsons marine turbine. He was knighted in 1911.

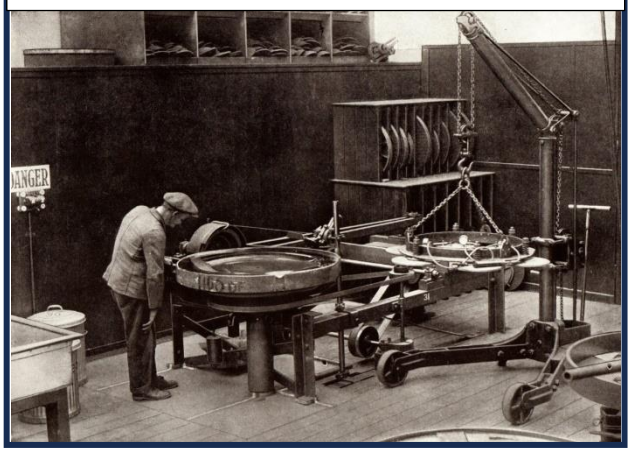
A view of the Optical Shops of Sir Howard Grubb, Parsons & Co.

showing the 41-inch crown and flint glass discs.



The dome for the 41-inch Grubb-Parsons refracting telescope under construction in Newcastle upon Tyne, England in 1928

The Flint Glass Disc of the 41-inch objective being edged at Grubb Parsons' Optical Works at Newcastle-upon-Tyne, England.



The author greatly appreciates the assistance of Honorary Professor Fred Watson in preparing this article and for supplying the two photographs of the Optical Shops of Sir Howard Grubb, Parsons & Co. Honorary Professor Watson is the First Australian Government Astronomer-at-Large.

Reflections on 2024 – The Primary Mirror Sees the Light (just about in focus)

Simon Brink, Great Melbourne Telescope Restoration Project Manager

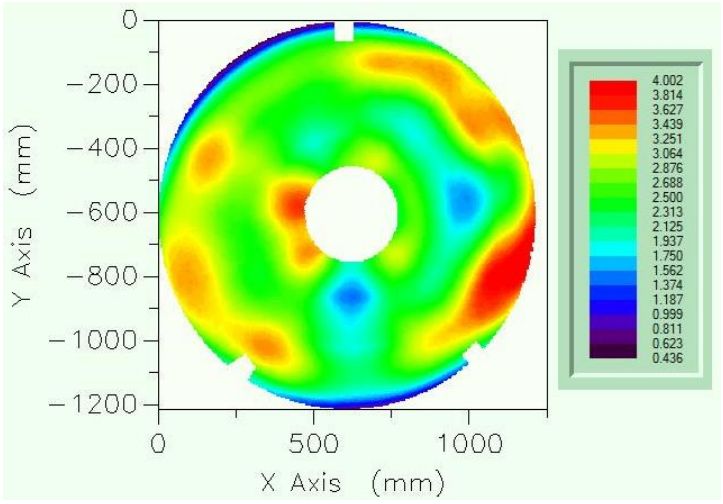
The prowess of a reflecting telescope is often measured by the size of it's primary mirror, which defines it's maximum light capture potential. The Great Melbourne Telescope's primary mirror was at the time of its casting, the second largest mirror in the world, exceeded only by the Lord Rosse 6 foot speculum. *The GMT was of course a far better telescope mechanically, having close to full sky observation capability, tracking functionality via the clockwork drive and a view of the majestic southern skies!!!*

The restored GMT will feature a new 48 inch two layer borosilicate glass primary, replacing the original speculum mirror, one of which is still in the Museums Victoria collection. The mirror blank construction method is unique as the top and bottom mirror layers are joined by around 250 connection columns *(no I haven't counted),* then fused in a high temperature oven.

The making of the new primary mirror has been an epic saga, including: in-house concept designs (2015), Expressions of Interest (2017), consultant designs with ZMAX (2019), tender submissions (2020), first efforts at figuring (2021), contractor abandonment of works (2022), recontracting (2023) and refiguring (2024).

The good news is that recent figuring works are now progressing very well (after some delays!!!) and we appear on track to see a good quality completed mirror in 2025.

Hand polishing of the GMT primary mirror to locally correct astigmatism, by KiwiStar, NZ.



Latest Primary Mirror Surface Map

Units: Waves. Reference wavelength 632.8 nm. RMS Error 0,55 waves.

AROUND THE WORKSHOP

1. Ali Kahn, 2. Mal Poulton, 3. Stewart Beverage, 4. Horatio Yen & Oscar Daley, 5. Navdeep Singh, 6. Eric McCallum, 7. Hamza Nasser, 8. Alan Davies, 9. Frank Marian, 10. Tom King, 11. Laurie Goodison, 12. Des Lang, 13, Ken Woolhouse, 14. Bob Crosthwaite, 15. Peter Heath, 16. Barry Adcock, 17. Ross Bencina, 18. Bryan Mooney, 19. Steve Bentley, 20. Alan Watson, 21. Tom Miller, 22. Campbell Johns, 23. Nick Lai, 24. John Dardemann & Tim Davis

Seasons Greetings

We will be back next year, to work on the GMT Restoration.