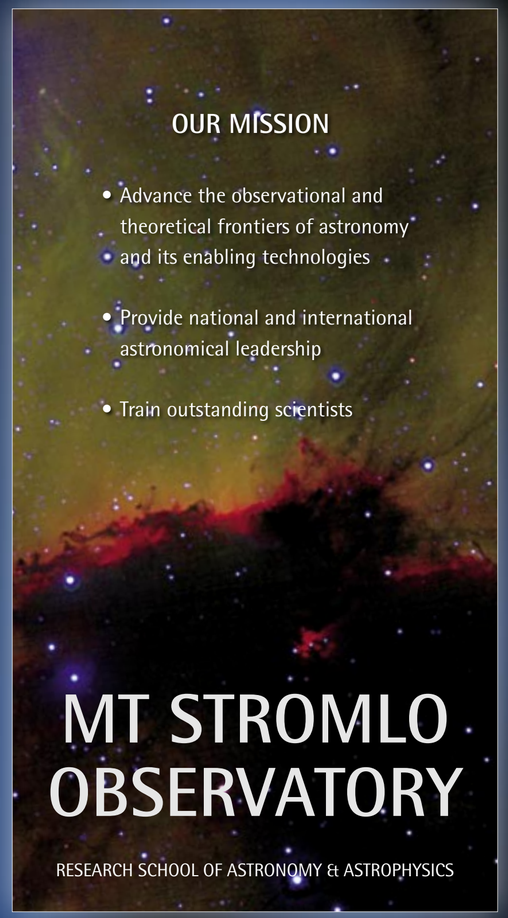
THE AUSTRALIAN NATIONAL UNIVERSITY

VISITORS' CENTRE



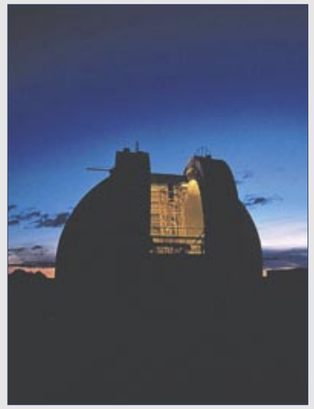
Welcome

Mt Stromlo Observatory is the headquarters of The Australian National University's Research School of Astronomy and Astrophysics. The University operates two observatories, Mt Stromlo, west of Canberra, and Siding Spring, in the Warrumbungle Mountains near Coonabarabran, NSW.

The administrative centre, the offices of the astronomers and students, the mechanical, electronic and optical workshops, and the computer laboratories are located at Mt Stromlo. The telescopes and associated maintenance facilities are located at Siding Spring. Siding Spring also hosts telescopes of the Anglo-Australian Observatory, the University of NSW, and the Faulkes Telescope Project.

Mt Stromlo Observatory began operation as the Commonwealth Solar Observatory in 1924. During the Second World War, it was the design and prototype centre for the Australian Optical Munitions Factory. After the war, the Observatory changed from solar to stellar astronomy and in 1957 became part of ANU. Today, Mt Stromlo and Siding Spring Observatories comprise Australia's premier university centre for astronomical research.

Mt Stromlo was severely damaged by the firestorm of 18 January 2003. All the workshops, design offices, administration, library, archives and telescopes (with the exception of one) were destroyed. Fortunately, the offices of astronomers and students, the lecture rooms and the computer laboratories survived, so staff were able to be back on site two weeks after the fire. Mt Stromlo is now in the process of rebuilding.



MT STROMLO OBSERVATORY VISITOR GUIDE

1 74" Reflector
2 Old Workshop Site
3 Uppsala Dome
4 Director's Residence
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6 Original Commonwealth Solar Observatory Building
7 The Heliostat
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12 9" Oddie Refractor
13 W G Duffield's Grave
14 Advanced Instrumentation & Technology Centre
15 Temporary Engineering Offices
16 Temporary Mechanical Workshop (*The Barn*)
Ø Residential Area — NO ADMITTANCE

Watch the progress of the rebuilding: **www.mso.anu.edu.au**

THE AUSTRALIAN NATIONAL UNIVERSITY

SITE 1:

74" REFLECTOR

The 74" Reflector

Built by Grubb-Parsons in the UK and erected at Mt Stromlo between 1954 and 1956, this was for a few years the equal fourth largest telescope in the world. Until 1974, it was equal largest in the southern hemisphere, with a 'twin' in South Africa. Before coming to Australia the unfinished telescope was exhibited in the 1951 Festival of Britain.

In its original form, the telescope had 3 focal arrangements. The Newtonian focus was on the side at the top of the telescope tube. This was used for photography and some photometry and low-dispersion spectroscopy. The Newtonian was removed during a major rebuild of the top end of the telescope in the late 1970s.

The Cassegrain focus was at the back of the telescope, behind the main mirror. This was used for medium-dispersion spectroscopy and CCD imaging. The Coudé focus used a system of 4 mirrors to send the light through the polar axis of the telescope to focus behind the north pier. One of the most powerful high-dispersion spectrographs in the world was permanently mounted at this focus, in a specially designed air-conditioned chamber.

When new, the telescope needed two operators, the astronomer who operated the instrument attached to the required focal position – and the night assistant, who drove the telescope and dome and monitored the weather. By the early 1980s technology had developed to the point where the telescope and instruments could be operated by a single person, from a warm, well-lit control room.

With its spectrographs and advanced CCD cameras, the 74" was one of the most powerful instruments for investigating the chemistry and physics of astronomical objects. It contributed immensely to our knowledge of the life-cycles of stars and galaxies. At various times it held the records for identifying the oldest, the youngest and the most distant objects known.

During its lifetime the 74" was the 'work horse' of the Observatory, our prime research telescope.

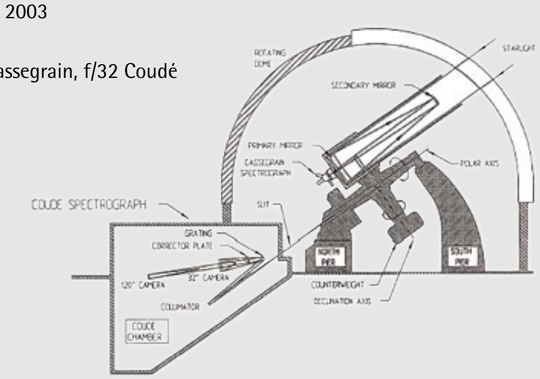
It was damaged beyond repair in the firestorm of 18 January 2003.


The 74" reflector, 1985


The 74" reflector at dusk, Mt Stromlo

CONSTRUCTION

- **Built:** 1952
- **Erected on Mt Stromlo:** 1954–56
- **Destroyed in firestorm:** 18 January 2003
- **Mirror:** 74" diameter, pyrex
- **Focal ratios:** f/5 Newtonian, f/18 Cassegrain, f/32 Coudé
- **Mount:** English equatorial
- **Drive:** computer controlled



INSTRUMENTS

- Photographic plate camera
- Polarimeter
- Image-tube camera
- CCD imagers
- Spectrographs
- Spectral scanners

SOME RESEARCH PROGRAMS

- Structure and dynamics of the Milky Way and the Magellanic Clouds
- Chemical evolution of the Milky Way and the Magellanic Clouds
- Magnetic fields in stars and galaxies
- Identification and study of quasars, black holes and peculiar stars
- Astroseismology
- Search for planets around other stars


The 74" reflector after the firestorm

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SITE 2:

THE WORKSHOPS

The Workshops

The workshop complex was built in 3 stages between 1950 and the late 1970s. It contained three sections — electronic, optical and mechanical.

The original mechanical workshop was housed in the west wing of the Commonwealth Solar Observatory building. This was destroyed in a bushfire on 5 February 1952. The optical shop replaced a much smaller building which was removed in the mid 1950s.

Workshop staff carry out all maintenance of observatory equipment at Mt Stromlo and at Siding Spring. They also design and build new instruments for our own observatories and for observatories worldwide.

Significant instruments produced by the workshops include several generations of photoelectric photometers, image tube and CCD imagers, and spectrographs. The complete instrument suite for the ANU 2.3m Advanced Technology Telescope at Siding Spring Observatory was designed and built here.

At the time of the fire a revolutionary new instrument, the Near-Infrared Integral Field Spectrograph (NIFS) being built for the Gemini South Observatory in Chile, was nearing completion. Along with the rest of the machinery, tools and instruments in the complex, it was totally destroyed. A replacement, *NIFS II*, was built in collaboration with Auspace Limited and delivered to Gemini in 2005.

Until the temporary workshop (*the Barn*) was built and fitted-out, the workshop staff were kindly provided with facilities at The University's Research School of Physical Sciences and the Physics School of the Australian Defence Force Academy (ADFA)

The workshops are replaced by the Advanced Instrumentation and Technology Centre, on the other side of the Stromlo ridge.


The workshops in 1967


The electrical workshop

CONSTRUCTION

Built: 1950-75

Destroyed in firestorm: 18 January 2003

SOME OF THE INSTRUMENTS DESIGNED & BUILT IN THE WORKSHOPS

- Photoelectric photometers
- Image tube cameras
- Photon counting arrays
- CCD imagers
- Spectral scanners
- Spectrographs
- Adaptive optics systems
- Cryogenic array spectrometer/imager
- Near-Infrared Integral Field Spectrograph
- Optical components of all types
- Telescope control systems


The workshops during the firestorm of 18 January 2003


The mechanical workshop

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SITE 3:

UPPSALA DOME

The Uppsala Dome

Between 1957 and 1983, this dome housed the 20" Uppsala Schmidt telescope, the southern station of the Swedish University of Uppsala. The Uppsala is a very fast wide-angle survey camera, and in its original form was purely photographic.

While at Mt Stromlo, it did many of the initial surveys of the southern Milky Way and the Magellanic Clouds, taking over 2,000 photographic plates. These surveys were used to study the distribution of different types of astronomical objects and to select particular examples for further study with larger telescopes. It also took the first photograph of *Sputnik1* in orbit.

The telescope was moved to Siding Spring Observatory in 1983. It has been upgraded to have a CCD camera and computer control. Its main program is searching the southern sky for potentially hazardous asteroids and comets.

At the time of the 18 January 2003 firestorm, the dome and office were the headquarters of the Canberra Astronomical Society. They lost their library, computers, records and telescopes.

The copper dome collapsed and the building was damaged beyond repair in the firestorm and has been demolished.

CONSTRUCTION

Built: Uppsala Observatory workshops, 1955-56
Erected on Mt Stromlo: 1957
Telescope moved to Siding Spring Observatory: 1983
Destroyed in firestorm: 18 January 2003
Mirror: 26" diameter, pyrex
Focal ratio: f/3.5
Mount: English equatorial
Drive: originally electronic, now computer

INSTRUMENTS

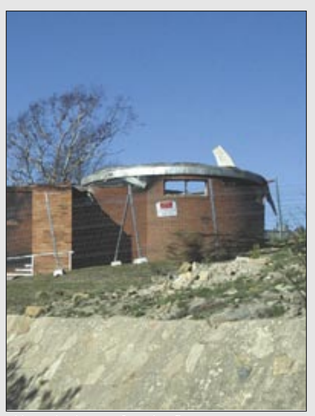
Photographic plate camera
CCD camera

SOME RESEARCH PROGRAMS

Multi-colour surveys of the southern sky (at Mt Stromlo Observatory)
Identification and orbits of Near-Earth Objects (at Siding Spring Observatory)


The Uppsala Schmidt telescope


The Uppsala dome in 1964


The Uppsala dome after the firestorm


The Uppsala dome at Siding Spring Observatory

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SITE 4:

DIRECTOR'S RESIDENCE

The Director's Residence

This building was designed by Henry Maitland Rolland, the Supervising Architect for the then Federal Capital Territory. Built between 1925 and 1929, it was originally known as Observatory House. It has been home to most of the Directors of the Mt Stromlo Observatory and their families.

Observatory House was the only two-storey house on Mt Stromlo. It was placed at the other end of the ridge from the staff housing built in the same period. It was a superb example of a small federation style mansion.

The Residence was part of the social activity on the mountain. Staff, politicians, captains of industry, and even royalty have all been to dinners and functions in the residence.

In the early years, the Duffields hosted musical evenings for staff and visitors. The Woolleys, Boks and Mathewsons hosted staff Christmas parties on the lawn. Eggen reinstated the croquet lawn, originally laid down by Mrs Duffield.

The Residence was damaged beyond repair by the firestorm of 18 January 2003.

Also destroyed were 6 other houses – 3 of which dated back to the very early days of the Observatory.


The Director's Residence at Mt Stromlo, 1957


The Director's Residence at Mt Stromlo, 2000


Floor plan of the Director's Residence


The Director's Residence after the 18 January 2003 firestorm

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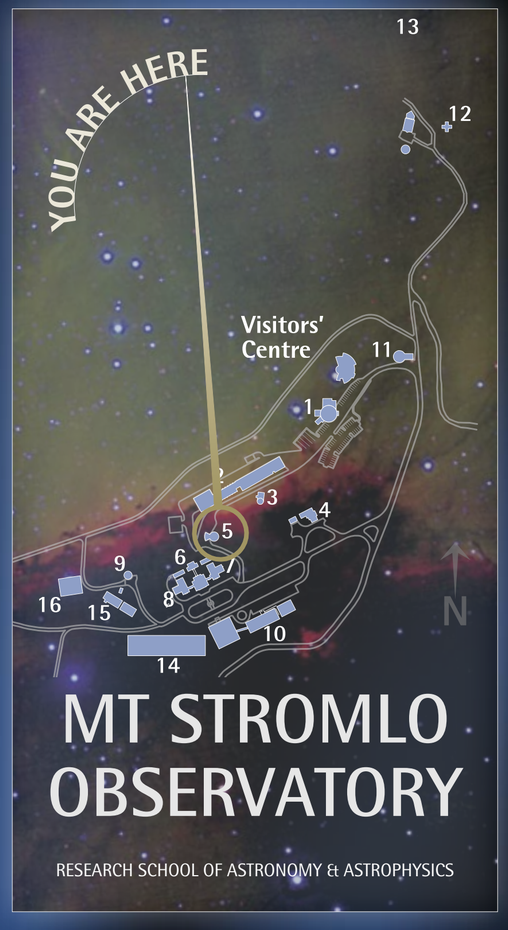
THE AUSTRALIAN NATIONAL UNIVERSITY

SITE 5:

50" REFLECTOR



The 50" Reflector

This was formerly the Great Melbourne Telescope (GMT), built by Grubb of Dublin in 1868 for the Melbourne Observatory. At the time, it was the largest fully-steerable telescope in the world, and up to the early 1950s it was the largest in the southern hemisphere.

The telescope suffered from being designed at a time when the technology of large mirrors was changing rapidly. Instead of using a 'new' silvered glass mirror, Grubb used a mirror made of speculum, an alloy of copper and tin. This tarnishes quickly, is very difficult to work with and is 6 times heavier than glass, making the telescope much heavier, costlier and harder to balance.

Another problem was that the telescope was designed for visual (look and sketch) observation. This meant a very long focal length, hence a very long telescope. The GMT was housed at Melbourne in a building with a roll-off roof. This exposed the telescope to the wind, causing vibration. This building can still be seen in the Melbourne Botanic Gardens.

The combination of vibration and optical design made the GMT useless for the new technique of photography. It was used only from 1869 to 1893 and then remained out of use for over 50 years.

Mt Stromlo Observatory purchased the telescope after the closure of Melbourne Observatory in 1944. The telescope was drastically re-engineered to a shorter focal length. A new 50" pyrex mirror was installed, the drive and mounting were rebuilt and the telescope was housed in a dome. This solved all the problems that the telescope had in Melbourne.

Between 1956 and the late 1970s it was used extensively for spectroscopy and photometry. Most of the PhD theses produced by ANU students at Mt Stromlo during this time depended on data from this telescope. In the late 1970s, advancing age led to catastrophic failure in the bearings and the telescope was decommissioned.

The telescope was rebuilt again in the late 1980s for the MACHO project. This was an international project which used gravitational micro-lensing of starlight to search for 'dark matter', the 90% of the Universe that is invisible. MACHOs are Massive Compact Halo Objects in galaxies. The results showed that some of the material is in the form of compact dark objects, probably burnt-out stars and loose planetary-sized bodies.

The 50" reflector was completely automated in 2000 and began a search for small Solar System bodies beyond Neptune. At this time it was one of the most technically-advanced and productive telescopes on Earth.

The 50" reflector was damaged beyond repair in the firestorm of 18 January 2003.


The 50" reflector being erected in Melbourne

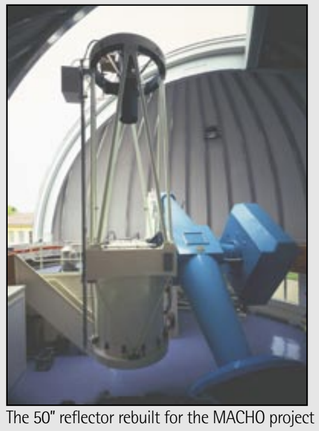

The 50" reflector at Mt Stromlo in 1960

CONSTRUCTION
- Built: Grubb of Dublin, 1868
- Erected on Mt Stromlo: 1952-55
- Destroyed in Firestorm: 18 January 2003
- Mirror: 48" diameter, speculum metal (at Melbourne); 50", pyrex (at Mt Stromlo)
- Focal ratios: f/42 (at Melbourne); 1955-80 f/18 (at Mt Stromlo); f/5.6 (MACHO)
- Mount: English equatorial
- Drive: clockwork (at Melbourne); electronic (at Mt Stromlo), then by computer

INSTRUMENTS
- Photographic plate camera
- Photoelectric photometers
- Polarimeter
- Spectral scanner
- CCD camera

SOME RESEARCH PROGRAMS
- Visual observation of southern nebulae
- Photometry of southern stars
- Spectroscopy of southern stars
- Magnetic fields in the Milky Way
- MACHO program: the search for dark matter
- Search for Trans-Neptunian Objects


The 50" reflector after the firestorm of 18 January 2003


The 50" reflector rebuilt for the MACHO project

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THE AUSTRALIAN NATIONAL UNIVERSITY

SITE 6:

COMMONWEALTH SOLAR OBSERVATORY BUILDING

Original Commonwealth Solar Observatory Building

The Commonwealth Solar Observatory (CSO) building was designed by John Smith Murdoch, the government architect who also designed Old Parliament House. For the next 80 years the building was the focal point, the administrative centre and the social heart of the Observatory. The building included two hexagonal towers – one at the eastern end carried the Heliostat (Sun telescope) and one at the western end carried the Farnham refractor.

The main building was constructed between 1924 and 1926. Work on the solar laboratories, including a long tunnel to house a spectrograph, took another 2 years to complete due to the blasting needed to excavate the basement and tunnel. During this period the Observatory was based in a wing of the Hotel Canberra, now named the Hyatt.

During the Second World War the smaller blocks at the rear of the building were added and the courtyard was enclosed. At this time the building was the design and prototyping centre of the Australian Optical Munitions Factory. During the war, 43 different types of optical instruments were designed and tested. Over 26,000 items were manufactured for the Australian military forces from the designs – some were exported to the USA.

After solar observing ceased in 1950, the basement laboratories were deserted. In the late 1960s they were refurbished to be the observatory computer laboratories. The mainframe computers of the 1970s and 1980s were housed in the old solar spectrograph tunnel. With the shift to office workstations in the 1980s the basement again fell into disuse.

The SuperConducting Gravimeter of the Research School of Earth Sciences and the National Astronomical Observatory of Japan was operating in the tunnel at the time of the firestorm. It was not damaged and is still monitoring small changes in gravity caused by processes deep in the Earth's interior.

At the time of the 18 January 2003 firestorm, the building was the Observatory's administration centre. It also housed the mechanical design section, the library and archives. All were totally destroyed in the firestorm.


CSO building in 1957


CSO building in 1999


Plan of the CSO building


CSO building after the 18 January 2003 firestorm


CSO building burning during the firestorm

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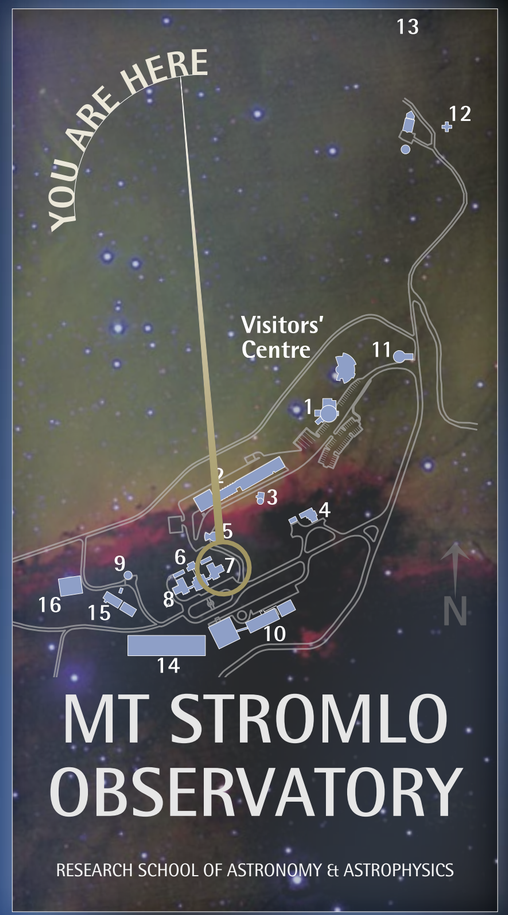
THE AUSTRALIAN NATIONAL UNIVERSITY

SITE 7:

HELIOSTAT



The Heliostat

The Heliostat was the main instrument of the Commonwealth Solar Observatory from 1931 to 1946. It was housed in a small dome on the east wing of the observatory building, above a hollow vertical tower, which led to the solar laboratory in the basement of the building.

The Heliostat used two flat mirrors inside the dome to track the Sun and pass its light down the tower through a 12" lens. At the bottom of the tower, the light beam was reflected from another flat mirror to focus in one of the measuring instruments.

The main instrument was a 3-prism spectrograph — one of the best in the world. Using this instrument, Dr Cla Allen produced the Atlas of the Solar Spectrum. This became the prime reference in the field of solar research for many years.

Research was also carried out on the interaction between solar flares, sunspots and their effects on the Earth, particularly the upper atmosphere. Daily sunspot photographs were taken — this archival material was lost in the firestorm.

After the Second World War the research efforts of the Observatory changed from solar to stellar astronomy and the Heliostat gradually fell into disuse. The last observations were made at the transit of Mercury in 1957.

The 12" diameter lens from the Heliostat was removed in 1995 — for use in the heliostat in the Mt Stromlo Visitors' Centre.

The structure of the Heliostat was badly damaged by the firestorm of 18 January 2003.


Dr Cla Allen adjusting Heliostat mirrors


The Heliostat dome before the firestorm

CONSTRUCTION

Built and erected on Mt Stromlo: 1925-29
Badly damaged in firestorm: 18 January 2003
Lens: 12" diameter doublet
Focal ratio: f/48
Mount: 2 flat mirrors on coelostat mounting, fixed lens
Drive: electrical

INSTRUMENTS

3-prism spectrograph
Camera

SOME RESEARCH PROGRAMS

Intensity of absorption lines in the solar spectrum
Sunspots and solar flares
The effect of solar phenomena on the upper atmosphere


The Heliostat dome after the firestorm of 18 January 2003

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THE AUSTRALIAN NATIONAL UNIVERSITY

SITE 8:

6" FARNHAM TELESCOPE

The 6" Farnham Telescope

Built by Grubb of Dublin in 1886, the telescope was donated to the Commonwealth by the estate of Lord Farnham in 1907. It was installed at Mt Stromlo in 1928, in a small dome on the west wing of the Commonwealth Solar Observatory Building.

Because of its small size, the Farnham has had only limited use.

Some of the earliest spectroscopic classification of southern stars was done using an objective prism spectrograph. In the 1940s, it was used to investigate variable stars. In 1957 an 8" Schmidt camera was attached to the telescope.
The Farnham acted as a guide telescope for the Schmidt, which made the first deep photographic survey of emission nebulae in the southern Milky Way. This survey was extended to cover the whole of the southern sky in the 1970s.

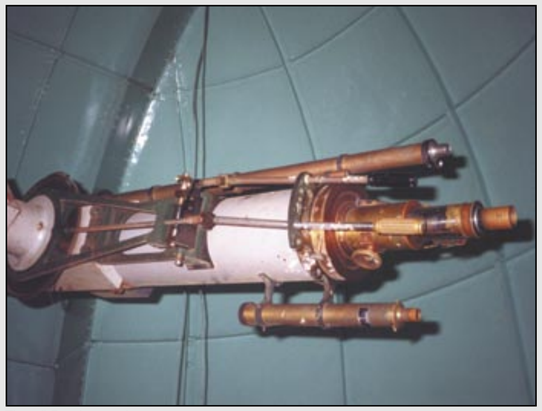
The Farnham is a real survivor. On 5 February 1952, a bushfire destroyed most of the western wing of the building below the Farnham. Although the offices and workshop were lost, the telescope was not harmed. Again, on 18 January 2003, the Farnham survived with minimal damage. It was removed from the dome and relocated for use as a public outreach telescope.

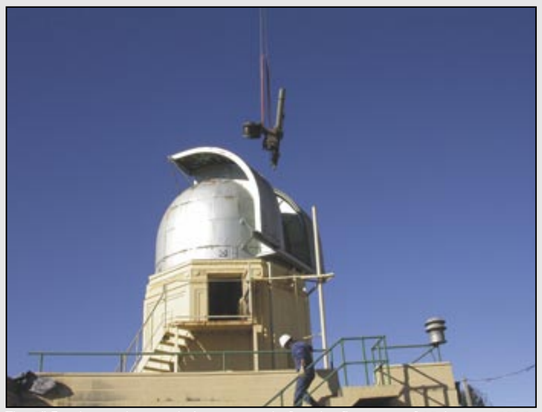
CONSTRUCTION
- **Built:** Grubb of Dublin, 1886
- **Erected on Mt Stromlo:** 1928
- **Survived Fires:** 5 February 1952 and 18 January 2003
- **Lens:** 6" doublet, optimised for visual observation
- **Focal ratio:** f/12
- **Mount:** German equatorial
- **Drive:** clockwork

INSTRUMENTS
- Photoelectric photometer
- Objective prism
- 8" Schmidt camera

SOME RESEARCH PROGRAMS
- Spectral classification of southern stars
- Photometry of southern stars
- Southern variable stars
- Emission nebulae in the southern Milky Way
- High-latitude emission nebulae


The Farnham dome


The 6" Farnham telescope


The 6" Farnham telescope being removed after the firestorm of 18 January 2003

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THE AUSTRALIAN NATIONAL UNIVERSITY

SITE 9:

30" REYNOLDS REFLECTOR

The 30" Reynolds Reflector

The telescope was donated to the observatory in 1924 by British industrialist and amateur astronomer John Reynolds. It was erected between 1927–29 and was the first reflecting telescope on Mt Stromlo. Until the 1950s it was the largest operational telescope in the southern hemisphere.

During the 1940s and 50s, the Reynolds reflector was used for some of the first detailed surveys of southern stellar types and of galaxies. Studies of Cepheid Variable stars in the Magellanic Clouds carried out in the 1950s proved that the Universe was twice as big and twice as old as previously thought.

The telescope was completely renovated in the early 1970s.

During the 1990s the telescope was used by local amateurs, helping Mt Stromlo staff monitor supernovae and microlensing events. The supernova results helped prove that the Universe will expand forever and that the expansion is accelerating over time.

The Reynolds reflector was severely damaged in the firestorm of 18 January 2003.


The 30" Reynolds telescope in 1952


The 30" Reynolds telescope in 1977

CONSTRUCTION

- **Built:** ca. 1910
- **Erected on Mt Stromlo:** 1927–29
- **Severely damaged in firestorm:** 18 January 2003
- **Mirror:** 30" diameter, pyrex
- **Focal ratios:** f/4 Newtonian (removed during renovation in 1970s); f/18 bent Cassegrain
- **Mount:** Equatorial Fork
- **Drive:** electronic

INSTRUMENTS

- Photographic plate camera
- Image tube camera
- CCD camera
- Spectrographs

SOME RESEARCH PROGRAMS

- Spectroscopy of southern stars
- Photoelectric photometry of southern stars
- Photometry of Cepheid Variables in the Magellanic Clouds
- Photographic survey and classification of southern galaxies
- Photometry of distant supernovae
- Photometry of micro-lensing events


The Reynolds dome after the 18 January 2003 firestorm


The Reynolds dome in the 1960s

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THE AUSTRALIAN NATIONAL UNIVERSITY

SITE 10:

DUFFIELD & WOOLLEY BUILDINGS

The Duffield & Woolley buildings

One of the miracles of the 18 January 2003 firestorm is that these two buildings survived intact. Between them they contain the offices of the astronomers and students, the lecture theatre, seminar room and the computer facilities. Their survival meant that research suffered minimal disruption – astronomers were back on the mountain within a fortnight.

The Duffield Building is named after the first director of the Mt Stromlo Observatory, Dr Walter Geoffrey Duffield (1879–1929). The very existence of Mt Stromlo Observatory is due to the efforts of Duffield.


Dr Walter Geoffrey Duffield

In 1905 he began campaigning for the establishment of an Australian solar observatory, to plug the latitude gap between the USA and India, allowing the Sun to be kept under constant observation. Mt Stromlo was selected as the site in 1910. Duffield was appointed director of the Commonwealth Solar Observatory in January 1924 and solar observations commenced in 1931.

W G Duffield died in 1929 and is buried on the ridge of Mt Stromlo, overlooking the Observatory and the Murrumbidgee Valley.

The Woolley Building is named after Mt Stromlo Observatory's second director, Sir Richard van der Riet Woolley (1906–1986).


Sir Richard van der Riet Woolley

Woolley became director in December 1939. During the war years he was instrumental in setting up the Optical Munitions Panel and Stromlo became the design and prototyping centre for the Australian Optical Munitions Factory.

After the war Woolley changed the focus of the observatory from solar to stellar research. The name was changed from the Commonwealth Solar Observatory to the Commonwealth Observatory. During the 1950s four new telescopes were installed on Mt Stromlo; the 74", 50", Yale-Columbia and Uppsala. Woolley also campaigned to have the Observatory transferred from the Department of the Interior to The Australian National University. This transfer occurred in 1957, and the name changed again, to Mt Stromlo Observatory.

Woolley left Stromlo in 1955 to become the eleventh Astronomer Royal. He was knighted in 1963. In 1971 he became the foundation director of the new South African Astronomical Observatory. Sir Richard retired in 1976 and died on Christmas Eve 1986.

The Duffield Building was built in 1964 and the Woolley Building in 1995.


The Duffield building after the firestorm


The Woolley building after the firestorm


The Woolley & Duffield buildings on 19 January 2003

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SITE 11:

26" YALE-COLUMBIA REFRACTOR

The 26" Yale-Columbia Refractor

Built in the USA in 1923-24 for the Yale Observatory, this was the largest refracting (lens) telescope in Australia. The lens was made by James McDowell of Pittsburgh, and the telescope tube and mount were made in the Yale workshops during 1924.

In June 1925 the telescope commenced operation near Johannesburg, South Africa, as the Yale Southern Station. Columbia University joined the program with Yale in 1943 and the telescope became the Yale-Columbia Telescope. The growth of Johannesburg eventually made the sky so bright that observing had to stop. The telescope was moved to Mt Stromlo in 1952 and recommenced operation in 1955.

The telescope was designed to measure the distances and motions of southern stars. This was done by measuring the parallax of the star (angular movement of the star), measured on photographic plates taken six months apart. By the time the program finished in 1963, the telescope had taken over 70,000 plates and measured over 2,000 parallaxes. The telescope was donated to the then Commonwealth Observatory and the Yale-Columbia Southern Station moved to Argentina.

In the mid-1960s and early 1970s the telescope was used for time-lapse photography of the moons of Jupiter and Saturn. The images were used to determine the precise orbits of the moons to help plan the Voyager missions to the outer planets.

Parallax observing began again in 1977, carried out by observers from the University of Virginia. These observations finished in 1992, following which the telescope was largely unused. Final use of the Yale-Columbia was by the Canberra Astronomical Society, who used it to video the impact of Comet Shoemaker-Levy 9 with Jupiter, in July 1994.

The Yale-Columbia refractor was totally destroyed in the firestorm of 18 January 2003. The badly-shattered objective lens and part of the telescope tube were saved for display. The setting circles and part of the main axis have been incorporated into a commemorative sculpture.


The 26" Yale-Columbia telescope


The 26" Yale-Columbia dome in 1965


The 26" Yale-Columbia dome burning during the 18 January 2003 firestorm

CONSTRUCTION

- **Built:** 1923–24
- **Commenced operation on Mt Stromlo:** 1956
- **Destroyed in firestorm:** 18 January 2003
- **Lens:** 26" diameter doublet, corrected for photographic observation in blue light
- **Focal ratio:** f/16
- **Mount:** English equatorial
- **Drive:** originally a precision clock drive, later electronic

INSTRUMENTS

- Photographic plate camera
- Video camera

SOME RESEARCH PROGRAMS

- Distances and motions of southern stars
- Membership of southern star clusters
- Orbits of moons of Jupiter and Saturn
- Video of Comet Shoemaker-Levy 9 collision with Jupiter

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THE AUSTRALIAN NATIONAL UNIVERSITY

SITE 12:
9" ODDIE REFRACTOR

The 9" Oddie Refractor

Donated to the Commonwealth in 1910 by James Oddie of Ballarat, this was the first telescope on Mt Stromlo. The telescope was built by Grubb of Dublin in 1888. It was first tested at Melbourne Observatory and installed on Mt Stromlo in 1911, to check the suitability of Mt Stromlo as a site for a Commonwealth Observatory.

The Oddie building and telescope was the first permanent Commonwealth building and scientific instrument in the ACT.

The Oddie was occasionally used by astronomers from Melbourne Observatory until the Commonwealth Solar Observatory officially came into being on 1 January 1924. The first stellar research program of the observatory began in 1926, to photograph and classify the spectra of southern stars. A star's spectrum indicates its temperature, age, size and chemical composition.

During the 1940s the Oddie was used to measure the orbits of binary stars, a vital step in determining the mass of stars in the binary system. The mass of a star determines its life cycle, so these measurements were very important to the emerging theories of stellar evolution. The last research program took place in the early 1970s when one of the first image-tube cameras was used in a search for supernova remnants in the Milky Way.

From the mid 1970s the Oddie was the prime public outreach telescope of the observatory, introducing thousands of people to the Universe. Local amateur astronomers also used it for a wide range of projects.

The telescope was restored to almost original condition in the early 1990s, thanks to an ACT Government heritage grant.

The Oddie was damaged beyond repair in the firestorm of 18 January 2003.

CONSTRUCTION

Built: Thomas Grubb of Dublin, 1888
Erected on Mt Stromlo: 1911
Damaged beyond repair in firestorm: 18 January 2003
Lens: 9" diameter doublet, corrected for visual observation
Focal ratio: f/15
Mount: German equatorial
Drive: clockwork

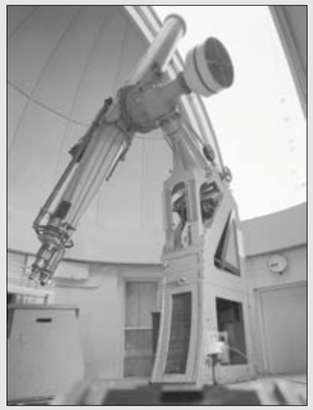
INSTRUMENTS

Zeiss photographic plate camera
Prism spectrograph
Filar micrometer
Photoelectric photometer
Image tube camera

SOME RESEARCH PROGRAMS

Spectral classification of southern stars
Parameters of southern binary stars
Photometry of southern stars
Emission nebulae in the Magellanic Clouds
Search for supernova remnants in the Milky Way


Oddie dome at Mt Stromlo, 1960


Oddie in 1966


Oddie after the 18 January 2003 firestorm


Oddie at Melbourne, 1901

Watch the progress of the rebuilding: **www.mso.anu.edu.au**

THE AUSTRALIAN NATIONAL UNIVERSITY

SITE 13:

DUFFIELDS' GRAVE

The Duffields' Grave

Dr Walter Geoffrey Duffield was the founder and first Director of the Commonwealth Solar Observatory. He began lobbying for a solar observatory in Australia in 1905, and had obtained Federal government agreement as the First World War broke out. It was 1924 before the Observatory began operation.

The Duffield family moved to Canberra in December 1923. They were the first guests of the new Hotel Canberra, where the Observatory was based until 1926, when the main building on Mt Stromlo was completed. In 1928 they moved into the Director's Residence.

Duffield died of pneumonia on 1 August 1929 and was buried where he had requested, on a ridge of Mt Stromlo overlooking the Murrumbidgee Valley. His wife, Doris, died in 1956 and her ashes are buried here with him.

At the top of the grave is a white cross with the inscription *Per ardua ad astra* (through toil to the stars) and Duffield's monogram made from his initials, WGD.

The inscription on the gravestone reads:

"In loving memory of W.G.Duffield
Aug. 12, 1879 – Aug. 1, 1929
Pioneer Director of this Solar Observatory 1924–1929

Take thou the torch.
Carry it out of sight,
Into the great new
age I must not know.
Into the great new
realm I must not tread."

The gravesite was badly damaged in the firestorm of 18 January 2003. The fence and cross were burned and many of the lead letters on the gravestones melted. The site was fully restored during 2003.


The Duffields' Grave in 1989


Miss Joan Duffield inspecting the restored site


WG Duffield's gravestone

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