

SCORPIO

Journal of the Astronomical Society of Frankston Inc

Vol 3, No.4

P.O.Box 596, Frankston Victoria 3199

July/Aug 1994

25 YEARS

25 YEARS

FUTURE EVENT

GENERAL MEETING

17th August 1994

Topic - Open Forum questions and answers from lecture series.

Come armed with questions.

21th September 1994

Topic - Astro photography

{The talk on astrophotograph will suppliment a photography night at The Briars on 8th Oct}

VIEWING NIGHTS

See Page 2

COMMITTEE MEETING

The committee will be held at the Brown's residence on:-

25th Aug 1994

29th Sept 1994

The Astronomical Society of Frankston was founded in 1969 with the aim of fostering the study of astronomy by amateurs and promoting the hobby of amateur astronomy to the general public. The society holds a General Meeting each month for the exchange of ideas and information. Regular observing nights, both private and public are arranged to observe currently available celestial objects. In addition the Society provides the services of its members for educational presentations or observing nights for schools and local community groups.

25 Year Dinner

Don't forget the 25 year dinner being held at The Baxter Tavern on Saturday 6th August. Start 7pm.

We have booked the Tavern Function room for the dinner. Members can book and pay for their meals on the night and they will be delivered to the function room. We felt this was the easiest way to meet everyones needs.

Those who went to last years Society dinner will remember the great time we had so lets make our 25th anniversary dinner equally great.

Baxter Tavern Melways Map 107-B4

Editors Notes:

I would like to apologies for the very late issue of Scorpio. We have been so busy preparing lectures and getting involved with the Jupiter/Comet impact that the Scorpio has taken a low priority. This issue of Scorpio is a short issue to get something out but I'll try to make up for it in the next issue. As always we need contributions from members and if you have something you want to publish please sent it in.

It helps if contributions are provided on computer disk and files are in text or ASC format. Of course hand written contributions are also accepted.

FOR SALE

AT GENERAL MEETING

Society Badges \$5

Planospheres \$8

Telescope Making Equipment

Mirror Blanks, Grinding & Polishing Compounds, Spherometers, Eye-pieces, Secondary Mirrors, Spiders

Meeting Venue:

The Peninsula School

Wooralla Drive, Mt Eliza

(Melways Map 105, F5)

Room F6 at 8.00pm on the third Wednesday of each Month

Visitors are always welcome

Annual Membership Fees

Full Members	\$20
Concession Members	\$15
Family Members	\$30
Family Pensioners	\$25

Membership Fees due 1st January each year

President

Peter Lowe 018 318 920

Vice President

Peter Skilton (03) 776 5898

Treasurer

Peter Brown (03) 789 5679

Secretary

Don Leggett (059) 85 4927

Committee

Ros Skilton (03) 776 5898

Tony Hales (03) 781 3251

Laurie McIntyre (03) 786 6120

Steve Malone (03) 789 6239

Don't forget if you have any comments or contributions - please contact the Editor

COMMITTEE NEWS

The committee has been quite active in recent months. The lease agreement about The Briars observing site has been agreed and just awaits final signatures. We are now at the stage of putting details to our plans regarding buildings and instruments. A small committee is being formed to establish these details. Anyone wishing to get involved please contact a committee member.

The winter lectures have been highly successful and greatly enjoyed by all. I would like to thank everyone involved. It was a pity Peter Skilton could not present his lectures because of his health. I am told he is back at work but still has a period of recuperation

Planning for the Silver Jubilee dinner have gone well. Interest in the T-Shirts was abysmally low and we have not proceeded. I'm still looking forward to a great celebration dinner.

On behalf of the ASF we have approached the Department of Conservation and Natural Resources with the view of obtaining a long term lease of crown land near Tyabb for another observing site. This application is being considered by the Land Conservation Council and we are hopefully that some land will be made available.

We will be starting to plan the Society activity for the next year soon and would welcome any comments or ideas from members. If there are any particular issues or requests for Society activities please tell us. If not direct to a committee member then put them into the suggestion box at the next meeting.

JUPITERS BIG BANG

Wow, what a week!

Comet Shoemaker-Levy 9 is no more. We witnessed its plunge to destruction last week right on schedule and what a plunge. I must admit, although prepared for the event, I fully expected it would be a bit of a flop only visible in professional instruments.

The long awaited destruction of the comet surpassed everybody's expectations. While the impacts were not visible in the telescope, the fireballs associated with each impact were observed in the visible and infrared. I don't know of any amateurs seeing fireballs but have heard that some NSW amateurs claim to have seen some.

The impact damage in the atmosphere is plainly visible even in small telescopes. Impact sites are seen a "small" black dots in the Southern hemisphere. I have taken videos of the planet and the black dots show clearly.

The mystery now is why is the damage area so large compared to the impact body sizes. While the impact bodies were a few kilometres across, the impact damage is Earth sized. A further mystery is why is the damage persisting. More than a week after the last impact, the impacts are still easily visible and seem to have not changed significantly.

I don't have a results from any professional observatories yet but will no doubt have plenty of preliminary results for the next Scorpio. In the meantime happy observing of the this once in a lifetime event.

Event Calander

6th Aug - The Silver Jubilee Dinner at The Baxter Tavern {see page one for details}

11th Aug - School Viewing night Mt.Eliza Primary school. Telescopes demonstration help needed. See Tony Hales.

13th Aug - Public viewing night at Ballam Park. Help needed. See Steve Malone.

17th Aug - Monthly General Meeting

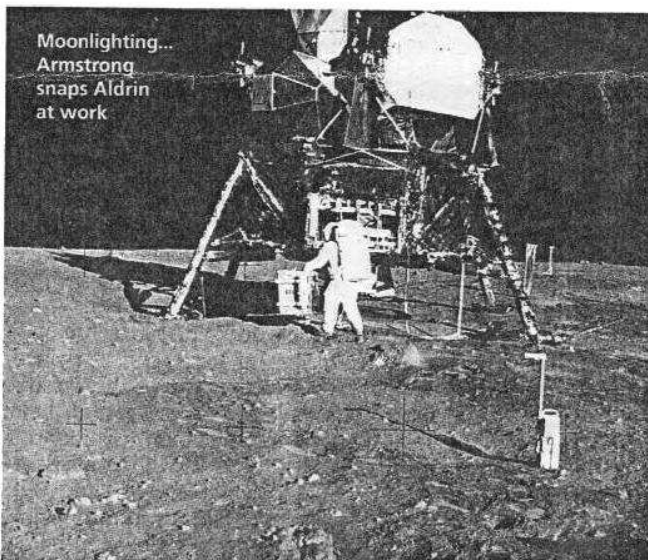
10th Sept - members viewing night at The Briars. BBQ before sunset (BYO everything). Observing at the hill site. A warming fire will be available thanks to Don Leggett.

21st Sept - Monthly General Meeting

8th Oct - Members viewing night at the Briars. As usual there is a BBQ prior to the viewing. {BYO everything}.

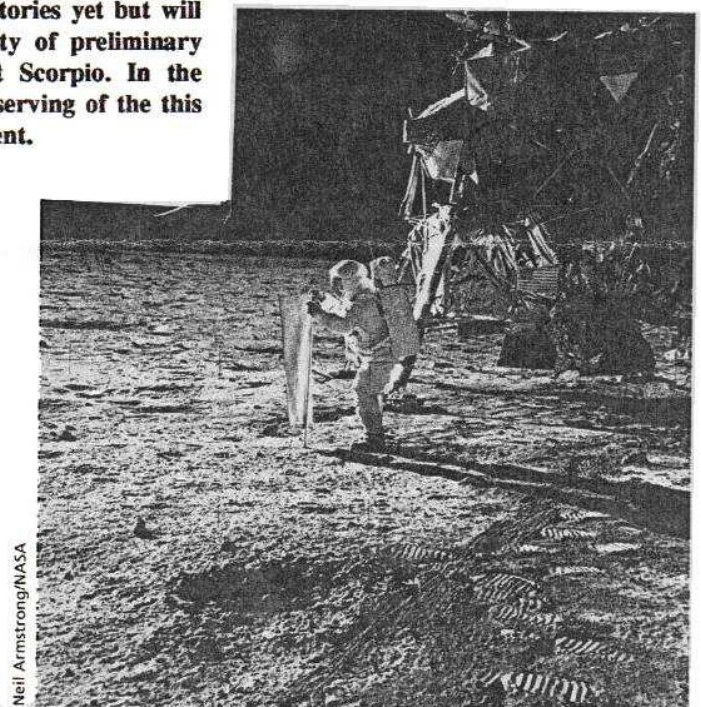
This is an astrophotography night so you can try your hand at the various types of photography. Telescopes will be available for members to test their photographic skills.

19th Oct - Monthly General Meeting



Moonlighting...
Armstrong
snaps Aldrin
at work

USA



Neil Armstrong/NASA

25th Anniversary of First Man on the Moon

Most people can tell you what they were doing the day mankind first set foot on the Moon.

A quarter century ago, a million people jammed into the Cape Kennedy space centre to watch a giant Saturn 5 rocket lift Apollo 11 and its crew of three astronauts off the launch pad with a deafening roar.

Four days later, on 21st July 1969 (Australian Eastern Standard Time), the words "Houston, Tranquillity Base here, the Eagle has landed" were beamed back from the Moon, signalling mankind's imminent first steps on a world a quarter of a million miles away.

The landing was not without its drama, where manual control of the craft had to be taken in the last 20 or so seconds in order to prevent it from landing in a crater filled with large rocks which might stop the later lift-off back to orbit.

Six hours after landing, mission commander Neil Armstrong came down the ladder of the Lunar "Eagle" Module and cautiously planted his footprint on the surface. The immortal words, "That's one small step for a man, one giant leap for mankind" were heard live by over a quarter of the world's population, and signalled the dawning of a new era in space achievement. Nineteen minutes later, Aldrin also descended the ladder.

Armstrong described his first impressions of the grey lunar surface as being fine and powdery, and that he was able to pick it up loosely with his toe, though it adhered in layers like powdered charcoal to the sole and sides of the boot. When standing on the surface, he only sank in about 3 millimeters (an eighth of an inch). Prior to the landing, it had been feared that the men might have to wallow around in several feet of dust. As it turned out, they only left shallow

footprints leaving an impression of the tread in their soles.

The footprints left on the Moon are still there today. Unlike the Earth, the Moon has no atmosphere and weather to erode these markings, and amazingly they will remain untouched for many millions of years from now. Both Armstrong and Edwin "Buzz" Aldrin set foot on the Moon in the area known as the "Sea of Tranquillity", near the Moon's equator. This area is visible in small telescopes as a barren desert-like region, but contains no water as might be suggested by the name.

One reason for landing near the Moon's equator was to make later liftoff easier since the craft would receive an extra centrifugal push by the Moon itself at this point. (For the same reason, Cape Kennedy is situated about as far South as practical in the USA so that launch is aided by the spinning Earth itself. For a similar reason, Cape York in Australia has been suggested as the place to build an Australian Space Launch facility as it would be closer to the equator than any other launch site in the world).

Because the Moon is not as massive as the Earth, its gravity is weaker and so everything weighs 6 times less than on Earth. The astronauts were therefore able to easily carry 250 kilograms of equipment on their backs, and found that when they tried to walk it was hard not to lightly bounce around like kangaroos.

Special protective space suits not only provided air for the astronauts to breathe, but also importantly guarded them from the temperature extremes on the Moon. Due to the absence of any atmosphere to transfer heat, an astronaut standing with one leg in a shadow and one leg in the sunlight would have uncomfortable problems. The shaded area can be 150 degrees Celsius below zero, while the lit area

is well above the boiling point of water!

The Apollo 11 astronauts left many items behind, including scientific equipment, a flag, a golden olive branch symbolising peace, momentos of both US and Russian astronauts who had lost their lives in the space race, and a small plaque inscribed "Here men from the planet Earth first set foot upon the Moon July 1969 AD. We came in peace for all mankind". All will remain in mint condition.

Amongst the scientific equipment was a very sensitive seismometer to measure moonquakes (the lunar equivalent of earthquakes) and a retroreflector array to enable Earth-based scientists to measure the distance of the Moon from the Earth to within 2 centimeters.

The seismometer was so sensitive that it was claimed to be able to detect a pea drop at a kilometre distance, and so was most suitable for counting meteorite impacts on the Moon.

The retroreflector array is composed in essence of corner cube mirrors which have the unusual property of reflecting any light back to exactly the point it was sent. Therefore a powerful laser on the Earth could send a pulse of light to the array, then time how long it takes for a pulse to return, thereby enabling the distance to be measured since the speed of light is well known.

Over the years since 1969, this enabled us to determine that the Moon is slowly but surely moving away from the Earth at a few centimeters per year, with an associated effect on the length of our day. You can make a crude corner array yourself from 3 small mirrors arranged so as to form a corner of a cube shape, with the mirrored sides pointing inside the cube. If you look at the corner you will always see a

reflection of your eye, no matter in what direction you point the cube.

In what is undoubtedly the most expensive and most eavesdropped long distance phone call ever made, the astronauts spoke with then US President Nixon who congratulated them on their success and wished them a safe return.

It is not well known that disaster nearly struck the mission on the Moon, stranding the astronauts without hope of rescue. When reentering the lunar module, Buzz Aldrin's large and cumbersome backpack (undoubtedly full of lunar rocks) had trouble fitting through the hatch, and smashed an exposed circuit breaker. This circuit breaker had to be functional in order to arm and fire the ascent rockets to lift off the Moon. Fortunately, every system on the craft was at least doubly redundant, with backups in place. This circuit breaker was fortunately no exception. It is sobering to note that NASA's views of redundancy for all systems have changed considerably since then, leading in part to the Challenger Shuttle disaster.

After almost exactly a day of collecting rock samples, conducting scientific experiments, and then resting, the astronauts blasted the Eagle off the lunar surface to dock with the Command Module Columbia orbiting high above. Under the piloting of Michael Collins, this vehicle was to be used for the long journey home, with the Eagle module being discarded into a lunar orbit where it was expected to stay indefinitely. Had the ascent engines not fired, both Armstrong and Aldrin would have perished on the desolate surface of the Moon, with no hope of rescue. However, all equipment worked according to plan, and the long journey home began.

Crossing the void back to Earth took under 3 days and was uneventful. Your family car would take over 5 months travelling day and night at high speed to do the same distance!

Upon reaching Earth, the re-entry

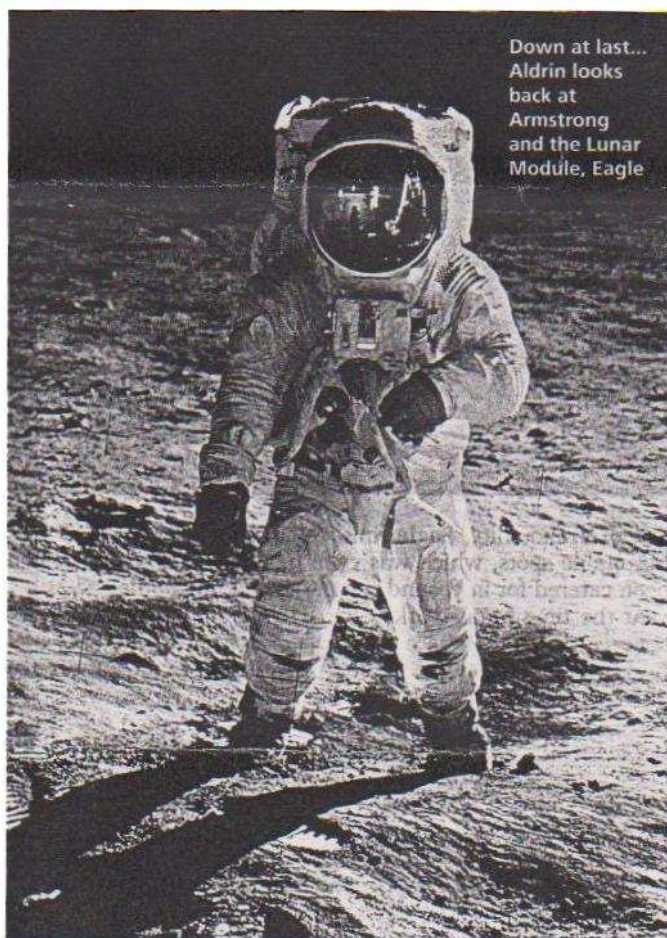
section of Columbia holding the astronauts separated then plunged into our protective atmosphere, glowing orange hot from the friction. The unneeded portions of Columbia were discarded to later disintegrate in our atmosphere. The orange fireball containing the three astronauts flashed across the sky like a shooting star, before releasing parachutes to slow its descent and cushion splash down into the Pacific ocean.

The astronauts, wearing coveralls and gas masks were immediately placed into quarantine due to early fears of possibly bringing back harmful organisms to Earth. In fact no organisms whatsoever were detected on either the brave astronauts, or the scientific samples they returned for study. However, much knowledge unobtainable from Earth was gained about the history and origin of the

Moon from the 20 kilos of rock specimens brought back. Apollo 11 was the first of several missions to explore the lunar surface, though not all planned missions went ahead.

Apollo 11 also marked the 40th anniversary of the first experimental rocket flight by Robert Goddard, a magnificent achievement in such a relatively short time period. The mission to the Moon tied up 20 thousand contractors for a decade, producing 20 million pages of technical manuals. When you consider the spacecraft were composed of over 5 million working parts, and functioned successfully as a whole, it makes the whole mission all the more miraculous even now a quarter of a century on.

Peter Skilton



Down at last...
Aldrin looks
back at
Armstrong
and the Lunar
Module, Eagle

Neil Armstrong NASA/SPL

DISCUSSIONS - MORE ABOUT N.A.C.C.A.

As most established members would know, the 16th National Australian Convention of Amateur Astronomers (NACAA) was held in Canberra at the Mount Stromlo Observatory over Easter this year. The Astronomical Society of Frankston was well represented with 8 members attending, the youngest being content to systematically ring bark a specimen tree outside the lecture theatre.

The ASF presented a poster which was well received at the conference, though the customary award for Best Poster was dropped this time round for some inexplicable reason. I have included photos of the poster which were taken in the entrance foyer to the Duffield Building at Mt. Stromlo where the lecture sessions were held. Upon arriving we discovered that the organizers had provided insufficient room for all the posters to be presented, and it was therefore a first come first served scramble to find sufficient room.

The poster was sizeable measuring about 2 metres tall by about 3 metres wide in 3 panels. Steve Malone kindly shipped these poster boards up to Canberra on his roof rack. As it turns out it is just as well he did, otherwise the poster would have been taped to the brickwork otherwise! The left poster panel featured the history of the Society from its inception in 1969, coinciding with mankind landing on the Moon, and featuring photos taken over the years as well as a timeline of significant astronomical events that have occurred in the last 25 years. It really is amazing how far the science of Astronomy has come in this time. Special thanks go to Ros' Dad George Fowler for doing most of the research into this timeline.

The centre panel concentrated on the activities in which the ASF engages, from viewing nights for the public and schools, to mirror and instrument making, with the Society logo prominently displayed on the board. Finally, the right hand panel showed a

selection of achievements that members of the Society have obtained over the years in the areas of Variable Stars, minor planet and Jupiter moon occultations. Some of these have appeared in previous editions of the newsletter, and others will be written up in the future.

On the final night of the conference, all attendees had the opportunity to visit the Canberra Astronomical Society's observatory in the centre of Canberra. A VERY impressive achievement. A picture I took of the Observatory domes from the car park shows that this is no roll-off roof affair, but a structure costing hundreds of thousands of dollars, and extremely well decked out inside for educating members of the public.

Although the CAS does not own the observatory, the club next door does - as in gambling, drinking and pub lunches - and the CAS provides demonstrators to use the instruments and gets an hourly fee for their services in return. This apparently gets around the problem of an amateur society not being able to run at a profit.

I was fortunate enough to stay behind later that night and had a guided tour of the facilities until about midnight when the club closed. One of the domes housed a large reflector (16 inch if my memory serves me faithfully), and it was dutifully aimed at Jupiter. It was gratifying to know that I have a better view of the giant planet with my 6 inch portable reflector in my backyard at Frankston than they do with their computer guided instrument. I didn't have the heart to mention it to them.

The last day of the conference involved a half day field trip to one of three Astronomical facilities: either the Orroral Valley Geodetic Observatory, the Molongolo Synthetic Aperture Radio Telescope, or the Tidbinbilla NASA Deep Space Tracking station.

The first two venues are closed to the public, while the Tracking station is open to all and is nearby the centre of Canberra. Some members chose to visit the Molongolo site, while Ros, Cassandra, Steve Malone and I selected Orroral Valley. Tidbinbilla was visited in the afternoon on our own.

The road to the Orroral Valley was rough and steep. Basically, wind swept, rain channelled unsealed bush track for the last part, about an hour and a half drive from Canberra. It is no wonder the public don't go there.

The Observatory itself is perched on top of the 1350 metre high Mount Orroral in the Namadgi National Park, and houses a 1.5 metre telescope in a typical astronomical looking dome. It also houses a powerful pulsed Neodymium YAG laser that they fire into where the eyepiece would otherwise sit. The telescope is aimed at passing satellites and at the Moon. The aim is not to shoot these satellites down in some Star Wars scenario, but to accurately determine the distances and orbits of the satellites passing overhead. While we were at the dome, several satellites came into view (totally invisible to us as it was midday and very bright) and all were tracked by the instrument from horizon to horizon. The flash of light from the satellite is detected by a micro channel plate detector, capable of registering a single photon of light.

Retroreflecting mirror arrays were placed on the surface of the Moon by the Apollo astronauts, and most satellites have them fixed to their exterior. These are special mirrors to reflect laser beams fired from the Earth directly back to their origin on the Earth, enabling the distance to the reflectors to be measured very precisely since the speed of light is known very accurately. The time taken between firing a laser pulse out of the telescope, and the telescope viewing the reflected flash from the satellite is measured very accurately with respect to atomic clocks. The time delay is of

course the time taken for light to travel from the telescope to the satellite, bounce off the mirror on the satellite, and travel back down to the telescope and be detected.

These measurements are necessary for several globally co-ordinated programs, and are very important in the Southern hemisphere due to the low abundance of suitable sites. Australia in fact has another laser ranging facility in Western Australia. Both are run by the Federal Government under the Department of Administrative Services.

It is claimed that the measured distances from the Orroral Observatory are accurate to better than 10 millimetres at the moment, though planned upgrades to perform the ranging in two different colours simultaneously will reduce this by a factor of ten.

The Observatory also coordinates precise national time signals throughout Australia on behalf of the National Standards Commission, and has a marker embedded in the rock that marks the primary point in Australia relative to which all latitudes, longitudes and elevations are measured. A permanent Global Positioning System instrument is housed on the site.

This spot is a small plaque attached to a large boulder imbedded into Mount Orroral. However, over the years a sizable crack has developed in this boulder which means that the primary marker is moving! Egads, so much for primary standards! It has even been necessary to tape a marker on either side of the crack to monitor the slippage with time.

The Observatory is manned pretty much around the clock with only cloud cover providing an obstacle. Daylight does not interfere since the lasers provide light at a single wavelength (colour) and the detectors are filtered only to register changes at this wavelength. The intensity of the laser was demonstrated shortly after we arrived when the telescope was aimed at a boulder several kilometres away on the mountain. The green spot of

light from the laser was clearly visible to the naked eye - no the boulder did not shatter in a shower of rubble as this would require a more powerful version.

Incidentally, the skin of the astronomical dome was marked with several scorch burns on the inside and repaired punctures through the steel. However, the laser was apparently not to blame, but rather lightning strikes which have occurred from time to time due to the altitude of the structure. It makes a good story for visitors though.

The visit was certainly interesting and a good choice as it is not open to the public. All in all a most enlightening experience.

Peter Skilton

