# SCORPIUS

## The Journal of the Astronomical Society of Frankston Inc.

P.O. Box 596, Frankston, Victoria 3199

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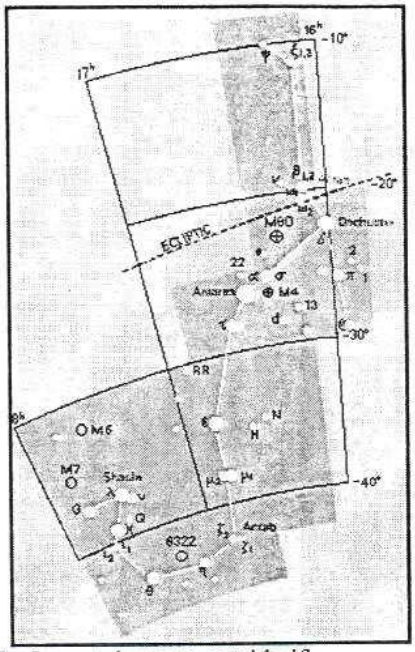
( Sep - Oct )

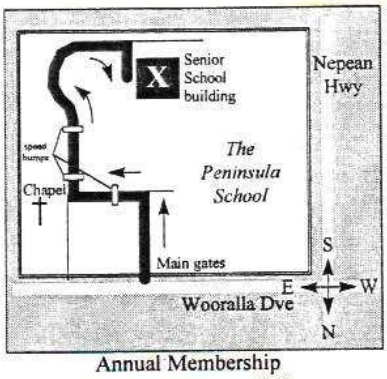
The Astronomical Society of Frankston was founded in 1969 with the aim of fostering the study of Astronomy by amateurs and promoting the hobby of amateur Astronomy to the general public. The Society holds a General Meeting each month for the exchange of ideas and information. Regular observing nights, both private and public are arranged to observe currently available celestial objects. For decades the Society has provided *Astronomy on the Move* educational presentations and observing nights for schools and community groups exclusively in the Peninsula and surrounding regions to Moorabbin, Dandenong & Tooradin.

Meeting Venue: *Peninsula School*, Wooralla Drive, Mt. Eliza (Melways map 105/F5) in the Senior School at 8pm on the 3rd Wednesday of each month except December.

Internet: http://www.peninsula.starway.net.au/~aggro/index.html

Email: aggro@peninsula.starway.net.au

*Visitors are always welcome!*




Annual Membership

| | |
|---|---|
| Full Member | $30 |
| Pensioner | $25 |
| Student | $20 |
| Family | $40 |
| Family Pensioners | $35 |
| Newsletter Only | $15 |

**DUE 1ST OF JANUARY EACH YEAR**

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President & Editor
Peter Skilton (03) 9776 5898

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Vice President & Briars Co-ordinator
Ian Porter (03) 5985 4203

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Treasurer
Bob Heale (03) 9787 1748

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Secretary & Loan Telescopes
Richard Pollard (0419) 100 802

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Committee
John Cleverdon, Roger Giller, David Girling, Don Leggett, Peter Lowe

All phone calls before 8:30pm please.

## FUTURE EVENTS

### *General Meetings:*

**Wed 15th Sep '99**
Session 1: Multiple small talks from several members on astronomically interesting topics.
Session 2: Video on *Electric Skies* for those who requested it from April.
Session 3: Session for prospective users of the Loan Telescope, lead by Richard Pollard & Ian Porter.

**Wed 20th Oct '99**
Session 1: To be finalised.
Session 2: Video on *The Great Pyramids - Gateway to the Stars?*
Session 3: Loan telescope outside if weather is clear.

**Wed 10th Nov '99**
***This is the Annual General Meeting and NOTE THAT THE DATE HAS BEEN MOVED FORWARD 1 WEEK TO ACCOMMODATE LEONIDS METEOR STORM OBSERVERS.***
*Session 1: A Primer for the Leonids Meteor Shower on 17th Nov, and for the Transit of Mercury on 16th Nov.*
Session 2: Video on *Fingerprints of God.*
Session 3: Loan telescope outside if weather is clear.
*PLEASE REMEMBER THERE IS NO MEETING HELD IN DECEMBER.*

### *Viewing Nights:*

*Members Only:*

Sat Sep 4/11, Oct 9/16, Nov 6/13, Dec 4/11 all at *The Briars*, Nepean Hwy, Mt.Martha (Melways 151/E1).

If weather forecast for the Saturday looks bad, the Friday before may be used instead. New attendees must always confirm with **Ian Porter** on 5985 4203 before attending. Remember for security reasons you can only attend on planned Members' Nights, unless by prior arrangement with Ian who will liaise with *The Briars* accordingly. Last person out must switch on the shed security light.

*Public, School & Community Groups Viewing/slide nights:*

If you can assist, please contact the Secretary.

- The once-a-month basic public viewing nights at *The Briars* will continue on the first Friday of each month. The next nights are on Fri 3rd Sep and 5th Nov (Guy Fawkes night) all at 8pm. NOTE THAT THERE IS **NO PUBLIC NIGHT IN OCTOBER** DUE TO *VASTROC* BEING THE NEXT

TWO DAYS. Assistants are required. Please contact Richard on (0419) 100 802.

- Black Rock Primary will have a viewing evening at 8pm on Mon, 6th Sep at *The Briars Education Centre*. 55 grade 5 pupils expected, Melways 151/E1.
- Kunyung Primary School will have two viewing nights on Fri 15th Oct and Mon 18th Oct, both at 8pm. 100 grade 5/6 pupils plus parents are expected over these two nights. Kunyung Rd, Mt.Eliza, Melways 105/C2.
- We are starting to get bookings up to March next year already for school nights. If you have a child or grandchild whose school might be interested in a viewing night, please see Richard Pollard for a brochure and details.

## Phenomenal Events:

- Predictions for asteroid occultations of background stars are available, as are predictions for eclipses of Jupiter's moons for 1999/2000. If you're interested in doing this work for NASA please contact the editor.
- **VASTROC**, the *Victorian Astronomy Conference* and premier gathering of backyard astronomers in Victoria, will be held once again by our Society on the Labour Day weekend of NSW/SA this year on **Sat/Sun 2nd & 3rd Oct**. The venue is Norwood House Reception Centre, Mt.Eliza, with its adjacent hotel rooms for those who wish to stay on-site. Booking will be on a first paid, first served basis. The 10% discount period has now passed. Registration for one or both days will be possible. The theme of the conference is **"Epoch 2000"**. Registration to the Secretary or Treasurer is $80. This cost includes a Saturday night dinner, 2 lunches and morning and afternoon teas as well as the astronomy sessions. Registration for one day only for those unable to attend both days is $30, plus $25 if you wish the dinner included. This will be filled on a first-pays, first-in basis. Vacancies on the day are possible, but not guaranteed.

## Talk, Talk, Talk:

- Dr. Brian Schmidt from Mount Stromlo and Siding Springs Observatory will give a free public lecture on "The Accelerating Universe" on Tue 24th Sep at 5pm in Science Lecture Theatre S5, Monash University, Wellington Rd, Clayton. The talk will look at recent Australian work with supernovae that attempts to answer how the Universe will end.

## Social Events

- This year is both our Society's 30th anniversary, and the 30th anniversary of the Murchison meteorite fall. Stay tuned for an upcoming trip to see *Blue Planet* at the giant IMAX cinema in Carlton, and a trip to the newly opened digital Planetarium at Science Works in Spotswood.

# YOUR SOCIETY

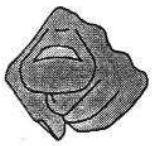
## NEW MEMBERS

Welcome to the following new Society members:

*Steven Boyle*
*Rod Brackenridge*
*Mandy & John Godwin*
*Gareth Moore*
*Les Raynes*
*Nathan Wood*

The ASF is one of the largest groups in Australasia. Membership is currently at 157. Please feel free to say hello at general meetings. Specialised badges, windcheaters, T-shirts, books & posters are available at meetings. Society name tags are free to new members who attend meetings. Members are able to borrow library books, binoculars and telescopes and are entitled to attend special viewing nights at *The Briars* where you can discover the secrets and glories of the night sky.

## HELP NEEDED



Articles, features, book reviews, member observations and points of general interest for this journal are always welcome. New contributors are encouraged. For example do a bit of reading and pass on some information, but remember not to plagiarise. Hand written material is fine; computer text files are perfect. The editor will even correct any mistakes you might make, so don't be bashful.

We immediately need 30 one litre rocket-bottom plastic drink bottles, with lids, for use in watering the 30 native shrubs at *The Briars* on our site. In addition we need 30 stout rubber bands to hold these to one of the stakes around each native. In particular, we also need these shrubs watered at least weekly by one or more members who pass that way, otherwise they may die (the shrubs that is). Despite the rains recently, the ground is still dry below the surface. Please offer your time, especially if you pass the site or are retired. Does any member have any wood working skills and/or timbers to help make some picnic tables (like those in public parks) for *The Briars* site? Don Leggett, when not selling refrigerators to Eskimos, has managed to sell the historical water tank stand on our property to the Railway Preservation Society (the historical society was not interested). Also the large tree on the property is being systematically chopped up and removed by member Max Perrott. Some still remains if you are interested in partaking in the free wood. If so, just phone Ian Porter to let him know you'll be up on the site.

## FEDERATION GRANT

Several members have asked how our substantial application for a *Federation Centenary Grant* to build the Federation Star Centennial Observatory and/or Orrery went. The grant is intended to mark some historical aspect of Federation for each Federal Electorate, or as something symbolic to mark the current centenary in 2001. Each electorate receives $200,000 to divide up as it sees fit. If you recall we were apparently in the shortlist of the top five after having drawn interest on many aspects of our proposal, but seem to have been pipped at the post for unknown reasons - I leave it to you to speculate. We are naturally very disappointed as a great deal of effort went in to the proposal, as well as being one of the few in our electorate with any links to Federation. However, the selection committee in our federal electorate chose the following projects as being better able to mark the centenary:

- Rye foreshore Lime Kiln Interpretation project by Mornington Peninsula Shire Council.
- Balcombe Estuary Project by Mt.Martha Rotary Club.
- First Settlement to Federation Costume Display by Sorrento Rotary Club.

- First Aid facility by Sorrento Surf Life Saving Club.
- Grantville Recreation Hall Kitchen Extensions.
- Memorial Clocktower by Cardinia Shire Council.
- San Remo Resources & Equipment Project by San Remo Lions Club.
- Latrobe Reserve Scenic Walkway by Dromana Foreshore Committee.

However, not all is doom and gloom in Victoria on the astronomy front. The *Ballaarat Astronomical Society* in Victoria had the great fortune to secure a $20,000 federation grant in their electorate to build a telescope for their observatory near Sovereign Hill, which is owned by their local council. We offer our hearty congratulations on their success and look forward to seeing the fruits of their labour in 2001.

## RECENT MEETINGS

June's meeting was chaired by the Vice-President and saw about 50 turn up for their "monthly dose of astronomy". The evening started with the usual round up of society events and notification of the 30th anniversary dinner at the Baxter tavern. Of particular interest in member observations was Martin Rudd's pre-discovery image of Nova Velorum. Several members spoke of observations and tidbits from the internet and other sources. Bob Heale presented the traditional *Sky for the month*, describing the current show from Venus, among other astronomical treasures available in July. After the break, several members displayed astronomical software on a number of laptop computers to the assembled group. Meeting closed at 10:15pm.

July's meeting celebrated the 30th anniversary of the Astronomical Society of Frankston. The meeting was held at the Baxter Tavern and was chaired by the President, with over 65 in attendance. Despite the night being rainy, the attendance was excellent. After most people had completed their meals, the meeting began. The initial loud three rousing hip-hip-hoorays for the Society must have made the proprietors wonder who had turned up. Original founding member, Bruce Tregaskis, reported on a recently discovered binocular comet and related a few anecdotes about the early days of the Society, including its formation. Bob Heale presented a racey *Sky for the Month*, providing advice of the lunar eclipse later in the month, and Ian Porter outlined the many rocket launches recently, including the revelation that the Iridium satellites venture may be about to go out of business. The meeting then adjourned as complementary champagne and orange juice were served, and the two birthday cakes, kindly arranged by Ros Skilton and Bob Heale, were lit. Following the extinguishing of the candles by two groups of children, the cakes were cut and served. Then, to mark the fact that the evening was also the exact 30th anniversary of mankind stepping onto the Moon, Peter Skilton gave a detailed talk on the space race and the Apollo 11 mission itself. This was supported by not only slides, but also a 3 feet high Saturn V rocket replica able to be disassembled to demonstrate each stage of the mission. The model of both the Saturn V and Space Shuttle proved very popular with young and old alike, and the model clearly showed how big the Moon rockets were compared to the height of a man. Many secret and unreported aspects of the mission were revealed, as well as many Trivial Pursuit topics. Then followed a rundown of what had been learned about the Moon from all the Apollo spacecraft sent there. Suitably inspired and champagned, with memories stoked for those alive at the time, the assembly then departed. Meeting closed at 10:40pm with the tavern left to clear up.

August's meeting was chaired by the President and saw 46 in attendance on a windy evening, including several visitors. Some members were still overseas after having gone to see the August 11 total solar eclipse in Europe. Many closer to home witnessed the recent lunar eclipse, with Neil Hewson and Bob Heale showing some excellent photos of the phenomenon to the meeting. David Girling reported on the successful *Briars* night he organised on the evening of the lunar eclipse, and reported on a recent meteor observing session there in the early morning where it rained on the prostrate observers. Bob Heale presented *Sky for the Month* indicating that Venus would shortly disappear behind the Sun, then Ian Porter presented *What Goes Up*. The saga of Mir's future continues, with the fate of the space station still literally up in the air. The huge Iridium consortium of communications satellites was declared bankrupt on 13/8/99. Analysts give it a 10% chance of being just switched off, 30% chance of reemerging as an independent company, and 60% chance of Motorola seizing control and using it for US Defence purposes only. The Chandra X-ray telescope has finally been launched after many years' delay, and the plutonium-carrying Cassini spacecraft has recently skimmed past Earth on its path from Venus to Saturn. The recent Space Shuttle was reported nearly lost during ascent due to a liquid hydrogen leak in an area known to have electrical sparking problems - a close call for the astronauts. Following the break, the group divided into two, with about half opting to view the videos on Apollo 11 and on the history of rocketry over the years. The others informally continued their tea break chatting in the adjoining area. Meeting closed at 10:20pm.

Thanks to the following members who participated in one or more of the viewing nights below: Ken Bryant, John & Roger Cleverdon, David Girling, Bob Heale, David Huby, Don Leggett, Richard Pollard, Ian Porter, Peter Skilton, Wernert family. Thanks also to Richard Pollard for organising these, and Bob Heale for supper.

The July 2nd Briars public viewing night saw astronomers out-numbering members of the public, with only five of the bookings turning up. One of the visitors was a recent arrival from the USA, who had been an active amateur and expressed great interest in the southern sky and the society. The visitors were able to view in good conditions for about 30 minutes only before the clouds rolled back in and the slide presentation was made. An enjoyable evening was had by all.

The public night on August 6th was attended by 40, including some visitors from the USA who had heard about us on the internet. The evening was clear and cool, with lots of sky fare on show and much interest abounded in the evening's proceedings.

## AURORA NETWORK

Last newsletter reported that we were setting up a network of people keen to be told when an aurora was visible in our night skies. Because this phenomenon cannot be predicted well in advance, your only real chance of seeing it is either by luck or by someone else telling you when one is occurring. On the peninsula and surrounding regions, the southern lights are readily seen by eye, and are due to increase substantially in number in the next 12 months as our Sun enters its active phase. If you are interested in finding out more about this network for members, please contact Roger Giller on (03) 9702 2685 who is coordinating.

## SECRETARY'S JOTTINGS

A new link has been added to the ASF homepage pointing to an Astrophotography page being developed by member Phillip Holt. Richard Pollard and Bob Heale are purchasing a whiteboard from our grant for this purpose. The CCD camera has arrived for the telescopes, and is being assembled by Ian Porter in his spare time. Richard Pollard has acquired two quality binoculars for the Society, one of which is for loan to members, the other for use at viewing nights. The second and third circulars about VASTROC have been sent to all societies and organisations as per the first. The society is investigating the purchase of another loan telescope for members, to alleviate the waiting list. In the absence of the Federation Grant, the Committee is now considering other options for proceeding with the Observatory.

There are a few society "blue logo" windcheaters available in sizes L or XL and are priced at $20 to clear. If interested, please see the Treasurer.

## LIBRARY MATTERS

The library has acquired some more material that is available for borrowing. Our librarian, Kathy Stabb is more than willing to show you what is available. Members are reminded that borrowings are for a period of **one month only**, and can be reissued if necessary if you take the courtesy of phoning Kathy or any of the committee members who will relay the request.

*Burnham's Celestial Handbook Volume 3* by the late Robert Burnham Jr, who died penniless despite this book being one of the most popular all-time astronomy texts that included his life's work in observing the night sky. The acquiring of this volume now makes the full set of volumes for the library.

The library would like to own a copy of *The Planets*, being the book of the current TV series on the ABC each Wednesday night. Does any member wish to have their name immortalised in the society library by donating a copy from the ABC Shop? It's the next best thing to discovering a comet!

# IN THE NEWS

## LAST TOTAL SOLAR ECLIPSE OF MILLENNIUM

On August 11, just after 8pm Melbourne time, the shadow of the fully eclipsed moon swept West to East across the Cornwall region of UK. A couple of members were lucky enough to be present in the region to observe the spectacle through clouds. Those in Europe were more fortunate with the weather being clearer, with maximum duration of the eclipse being 2 minutes and 23 seconds near the Black Sea and Romania.

The shadow touched the Earth first in the North Atlantic, crossed the UK, France, Germany, Austria, Italy, Yugoslavia, Hungary, Romania, Turkey, Iran, Iraq and Pakistan, before leaving the Earth in the Bay of Bengal.

In Britain, about a quarter of the population were supposedly on the 100 kilometre wide eclipse path to see this once in a lifetime event, or at least experience its darkening and the impact on surrounding wildlife and drop in temperature. London experienced 97% totality with criminal trials in the Old Bailey adjourned to allow all but the defendents to witness the sky show. Roads were reportedly choked. Two hundred lucky passengers used the Concorde to race after the shadow high above the clouds across Europe. However, the supersonic speed of the sleek airliner was still about 500 km/h too slow for the Moon's shadow which was racing along at 2450 km/h.

## COMET LYNN

In mid July, Victorian amateur, Daniel Lynn at Kinglake discovered a comet near Hydra, using only hand-held 10x50 binoculars - a truly impressive feat that demonstrates that even modest instruments can make worthwhile contributions to astronomy. The object is called Comet 1999N2, or simply Comet Lynn. Comets are the only astronomical object on which your name can become immortalised.

## THIRD MAN TO WALK ON MOON DIES IN ACCIDENT

The third man to walk upon the Moon, Charles "Pete" Conrad, died recently of internal injuries received in a motorbike accident at the age of 69. Conrad was a former Navy test pilot and commanded the all-Navy crewed Apollo 12 mission in 1969 that set up experiments on the Moon's *Ocean of Storms*, collected 34 kg of lunar rocks, and retrieved a camera from the Surveyor 3 probe near which the lunar module had landed. Conrad left NASA in 1974 and became Vice President of a US Television and Communications cable company. In 1976 he became Vice President of McDonnell Douglas and worked on commercialisation of space and the exploration of Mars.

## BURIED ON THE MOON

On the evening of July 31 at 7:51pm, NASA's 161 kilogram Lunar Prospector space probe was commanded to crash dive at maximum speed into a 5 kilometre diameter crater on our Moon's South Pole. The aim of the exercise was to create a huge cloud of debris from the impact crater, and determine if any water vapour was released, thereby conclusively showing the presence of frozen water on the Moon. This is not an unreasonable possibility as some craters near the Moon's poles are in perpetual shadow, and hence at a permanent temperature of less than 150 degrees Celsius below zero. Confirmation of water on the Moon is vital if colonisation is ever to have a realistic chance of proceeding. The impact has been likened to crashing a 2 tonne car into the Moon at a speed of 1,800 km/hr. Even so, the current impact is only given a 10%

chance of being able to detect water even if it is present.

Earth-based telescopes, including the Keck in Hawaii, and the Hubble Space Telescope saw nothing from the impact in visible wavelengths of light, with studies in other wavelengths yet to report their findings. Lunar seismometers detected the instant of the impact at 6,000 km/hr.

The Lunar Prospector craft, launched on January 6, 1998, also carried a small capsule the size of a lipstick case containing 28 grams of the ashes of Gene Shoemaker, the planetary geologist who died two years ago, at the age of 69, in a car crash in the Northern Territory's outback and who was the person responsible for training all of the Apollo astronauts in geology. He always carried a hope of some day going to the Moon himself, after applying to be an astronaut in the 1960's but being rejected for medical reasons. Now that wish has been finally fulfilled.

## LOVE THAT MARS

First, Mars seemed to be greeting the Mars Global Surveyor spacecraft with a Happy Face. Now, it seems as if the planet is sending its love with the latest picture. This valentine from Mars is actually a pit formed by collapse within a straight-walled trough known in geological terms as a *graben*. Graben are formed along fault lines by expansion of the bedrock terrain. The heart-shaped pit is about 2.3 kilometres at its widest. It is located on the east flank of the Alba Patera volcano in northern Tharsis

## NOW YOU SEE IT, NOW YOU DON'T

On July 29, the NASA Deep Space 1 space probe encountered asteroid 1992KD, now called (9969) Braille. It was so named by The Planetary Society after a competition that decided to honour Louis Braille (1809-1852), the blind French educator who developed the system of printing and writing named for him and used extensively by the blind. The craft skimmed by at a paltry 26 kilometres above the asteroid's centre at a relative speed of 56,000 km/hr, and was the closest ever flyby of an object other than a lander. In fact, in reality the asteroid actually zipped past the spacecraft which was in the ecliptic plane, and not the other way round.

What made this 5 minute flyby unique was that it was totally under the control of the spacecraft itself, with no Earth intervention or commands being involved. The aim was to test these new navigational computers (called AutoNav) for use in later missions (the days of HAL in 2001 are indeed approaching). While the flyby went flawlessly, unfortunately the craft's black and white cameras ended up being pointed in the wrong direction, thereby taking snaps of deep space rather than the approaching asteroid!

Nevertheless the craft did determine that the minor planet was 2.2 kilometres long and 1 kilometre across about 15 minutes after passing the asteroid, when it came into view. The spacecraft's infrared sensor confirmed that the small asteroid is similar to *Vesta*, a rare type of asteroid and one of the largest bodies in the main asteroid belt, which lies between Mars and Jupiter.

This craft was also the first to trial the revolutionary Xenon ion propulsion engines, not using conventional rocket fuel. These engines only function in the vacuum of space and provide a tiny, but continuous thrust over a long period of time. To date, the ion engines have been running continuously for 1,800 hours. The navigation computer of the craft used live pictures of the approaching body to make its own command decisions during the encounter. Even with this the asteroid was only one pixel across one hour before flyby. Deep Space 1 is now on route to encounter comet Wilson-Harrington and comet Borrelly in 2001. Incidentally, Braille's orbit is now known to intersect Earth's orbit in about 4,000 years from now.

## STUDYING THE HEAVENS

In a skier's nightmare in July, 20 radio astronomers in the French Alps experienced weightlessness and plunged to their death when the cable-car they were travelling to work in fell 80 metres to the ground. The group was headed for an array of five 15 metre radio telescopes, 2650 metres up in the French Alps. The cable-car was the only means of reaching the facilities other than by helicopter. The cause of the accident is unknown yet.

**FEATURE**

## 30 YEARS AGO - ONE SMALL STEP .....

In July 1969, at the time of the first manned landing on the Moon, a group of aficionados in our community formed the Astronomical Society of Frankston (ASF) to cater for all with an interest and excitement in our skies, and who wished to share their passion for exploration and discovery.

As we celebrate the 30th anniversary of Neil Armstrong stepping upon the Moon's surface, the ASF, too, is celebrating the exact same birthday on July 21st, 1969.

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

Thirty years ago, a million people jammed into the Cape Kennedy space centre (formerly called Cape Canaveral before JFK's assassination) to watch a giant Saturn V rocket lift Apollo 11 and its crew of three astronauts off the launch pad with a deafening, gut-wrenching roar. The product of the labours of half a million engineers and scientists, the mighty Saturn V was the most complex machine ever built.

Four days later, in the early afternoon of 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 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. The onboard computer had overloaded at the last critical moment. When the "Eagle" lunar module finally landed it had less than 20 seconds of spare fuel left.

*The Saturn V lunges skyward, as captured by the high speed gantry tower cameras used to ensure that nothing unexpected drops off or leaks from the rocket during launch.*

Six hours after landing, mission commander Neil Armstrong came down the ladder of the lunar module and cautiously planted his footprint on the surface, under the watchful eye of a television camera strapped to one of the legs of Eagle. The television pictures beamed to the world were received at Parkes and at Tidbinbilla in Canberra then relayed by satellite to Houston. The Parkes images were the better quality of the two and so were the ones beamed to the world.

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. Immediately he scooped up a sample of lunar soil just in case the mission had to be aborted in an emergency. Nineteen minutes later, Aldrin also descended the ladder once it was clear that a human being could survive on the Moon's surface outside of the craft.

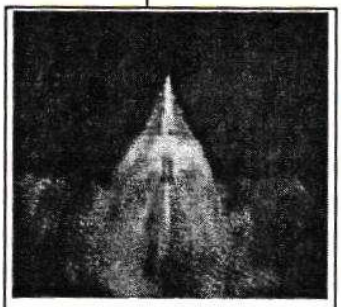
Armstrong described his first impressions of the grey lunar surface as being fine and powdery, and that he was able to pick it up loosely with his toe, though it adhered in layers like powdered charcoal to the sole and sides of his boot. When standing on the surface, he only sank about an eighth of an 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. From the dust on their spacesuits, the astronauts reported that the Moon smells like gunpowder.

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 lift-off easier since the craft would receive an extra centrifugal push by the Moon's spin itself at this point. For the same reason, Cape Kennedy is situated about as far South as practical in the USA so that the launch was aided by the spinning Earth.

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.



*The rocket rapidly exceeds the sound barrier, with the supersonic shock wave clearly visible.*

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 a freezing 150 degrees Celsius below zero, while the lit area is well above the boiling point of water!

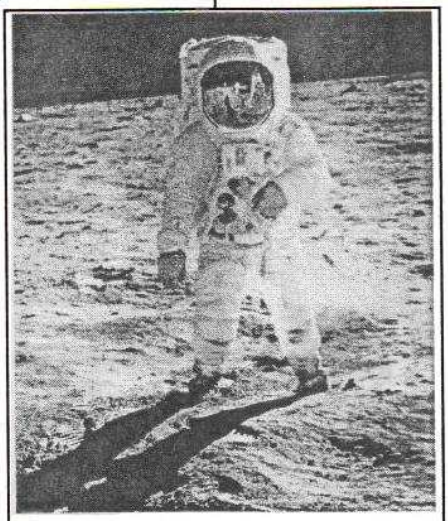
The Apollo 11 astronauts left many items behind, including their Hasselblad camera, scientific equipment, a flag, a golden olive branch symbolising peace, mementoes of both US and Russian astronauts who had lost their lives in the space race, and a small plaque attached to the ladder leg of the lower part of the lunar module. The plaque was 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 for a billion years.

Amongst the scientific equipment was a very sensitive seismometer to measure moonquakes (the lunar equivalent of earthquakes). The seismometer, powered by a solar cell, 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. Also left behind was a retroreflector array of mirrors to enable Earth-based scientists to bounce laser light off them and thereby measure the distance of the Moon from the Earth to better than an inch accuracy by timing the round-trip time for the light. Over the years since 1969, this enabled us to determine that the Moon is slowly but surely moving away from the Earth at about an inch per year, causing the length of our day to increase.

In what was undoubtedly the most expensive and most eavesdropped long distance phone call ever made, the astronauts on the Moon spoke with then-US President Richard Nixon who congratulated them on their success and wished them a safe return. This latter point was by no means certain as the only part of the entire mission that had never been tested previously was the lift-off from the Moon. This was because the Eagle was built for the Moon's level of gravity and would have collapsed under its own weight on Earth. Nixon also had a very different speech prepared just in case the astronauts were marooned on the airless surface for eternity - a very definite possibility for them.

It is not well known that disaster nearly struck the mission on the Moon, stranding the astronauts without hope of rescue. When re-entering the lunar module, Buzz Aldrin's large and cumbersome backpack (undoubtedly full of lunar samples) had trouble fitting through the knee-high 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 on system redundancy have changed considerably since then, leading in part to the Challenger Shuttle disaster many years later.

After almost exactly a day of collecting rock samples, conducting scientific experiments and then sleeping, the astronauts blasted the Eagle's upper section off the lunar surface to dock with the Command and Service 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. Later missions crashed the empty craft back to the Moon to enable the seismometers to probe the Moon's interior structure. 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.



*Contender for photograph of the 20th century. Buzz Aldrin stands surrounded by the magnificent desolation of the Moon's surface, with his gold coated sun visor reflecting the Eagle and Armstrong. After leaving the Moon, it was realised that few photos had been taken of Neil Armstrong.*

Crossing the void back to Earth took under 3 days and was uneventful, though uncomfortable. It has been likened to sitting 3 adults strapped into the front seat of a family car for 3 days with no bathroom or kitchen facilities available. Your family car would take over 5 months travelling day and night at high speed to do the same distance!

Upon reaching Earth, the conical Command Module holding the astronauts separated from Columbia. The discarded Service Module is still in orbit around the Sun to this day. The Command Module then plunged flat side down into our protective atmosphere, glowing orange hot from the friction encountered.

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 in the Pacific ocean. The danger was still not over as a previous splashdown had nearly drowned the astronauts when the Command Module began to sink in the water. A speedy Naval recovery was therefore vital.

The astronauts, wearing coveralls and gas masks were released from the capsule and 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 adventurers 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 kilograms 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.

*Official first footprint on the Moon, being Armstrong's left boot impression. Note the flour-like texture of the surface necessary to give the sharply defined lines within the boot tread.*

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 an average of 20,000 contract companies for a decade, producing some 20 million pages of technical manuals alone. When you consider the spacecraft was composed of over 5 million working parts, and functioned successfully as a whole, it makes the whole mission all the more miraculous even now 30 years on.

Peter Skilton

## THE APOLLO 11 MEMO

Those who attended the 30th anniversary dinner in July would have heard all about the Apollo 11 mission and some of the lesser known details. Under the USA's 30 year rule, archived material about the landing have just been released for public perusal. Included in the bounty of information was the procedure that the US President, Richard Nixon, would have followed should the mission not gone according to plan and the astronauts were left stranded on the surface. It is important to realise that the Lunar Module ascent from the Moon's surface had never actually been tested before - only simulated by Apollo 10 in lunar orbit.

In the event of the unthinkable, Nixon was going to advise the widows-to-be by telephone, before reading a

specially prepared memo to the world on television. The memo, dated July 18, 1969, read:

*Fate has ordained that the men who went to the Moon to explore in peace will stay on the Moon to rest in peace.*

*These brave men, Neil Armstrong and Edwin Aldrin, know that there is no hope for their recovery. But they also know that there is hope for mankind in their sacrifice.*

*These two men are laying down their lives in mankind's most noble goal: the search for truth and understanding.*

*They will be mourned by their families and friends; they will be mourned by their nation; they will be mourned by the people of the world; they will be mourned by a Mother Earth, that dared send two of her sons into the unknown.*

*In their exploration, they stirred the people of the world to feel as one; in their sacrifice, they bind more tightly the brotherhood of man.*

*In ancient days, men looked at stars and saw their heroes in the constellations. In modern times, we do much the same, but our heroes are epic men of flesh and blood.*

*Others will follow, and surely find their way home. Man's search will not be denied. But these men were the first, and they will remain the foremost in our hearts.*

*For every human being who looks up at the Moon in the nights to come, will know that there is some corner of another world that is forever mankind.*

*Aldrin descends the Eagle ladder from the craft's "porch". The small hatch of the LEM is visible to the upper right of him, and considerable dexterity was needed to exit and enter it with the bulky packs on.*

Immediately following the completion of reading the above memo to the world, NASA was going to cut communications with the stranded Apollo 11 astronauts, and Michael Collins in the Command Module was to be ordered out of lunar orbit to head back home, removing any last hope of their survival. Whether he would have automatically complied is open for speculation. At that time, a clergyman was to carry out the procedure of burial-at-sea, commending their souls to the deepest of the deep, before concluding with the Lord's Prayer.

As it turned out, this contingency plan was never needed, but nevertheless it was in place, just in case.

Peter Skilton

## TELESCOPE MINIREVIEWS

At the last few meetings, the subject of many informal chats at tea-break has been, naturally enough, about telescopes. On this subject, I came across a most interesting and mind boggling site on the Internet at *www.weatherman.com/scopes.htm#Five* by a person I wish had been at our meetings. He has owned or used 42 different telescopes, and he gives a mini review for each telescope! Furthermore, he provides some interesting insights into the suitability of telescope types for planetary and deep sky viewing. As one reads his reviews, it becomes clear that he has owned more than one telescope within each type, e.g. 3 Prontos and 2 Travellers.

I also found it refreshing to find an apochromatic refractor owner who was unafraid to admit that apochromatics aren't the be all and end all of planetary viewing.

As far as I am concerned, anybody who has knowledgeably used more than twice as many telescopes as I have used different eyepieces, is both pretty authoritative and pretty amazing. If any of you should find similar or equivalent sites, please let me know.

Renato Alessio

## VIEWING THE MOON

The moon is a dazzling object, which can make one very uncomfortable. Polarising filters reduce the intensity. Combining two polarising filter gives one a variable density filter, so that one can make the image as dark as one wants. However, the sharpness seems to decrease as the filters are stacked.

My preference is for Neutral Density (ND) filters. I have 0.3 and 0.9 ND filters, and I use the least dense (0.3) one at higher powers, and the densest (0.9) at low powers. I can't say that I have found it all that profitable using colour filters on the moon - a number 25 red filter gives an aesthetically pleasing view of the full moon - and that's about it.

Renato Alessio

## THE BRIARS

Your society, aside from attending schools and camps, bases its viewing activities principally at *The Briars* Historic Park in Mt.Martha, but how much do you know of *The Briars*?

The property contains a homestead and out-buildings from the 1840's, including wetlands, bird observation hides, a woodland and wetland walk, a vineyard, a restaurant, an education camp, and live-in ranger, and of course us. *The Briars* is one of the peninsula's oldest properties, first settled in 1840 by Capt. James Reid, a retired British army officer. He took up a 2,000 hectare pastoral lease named Tichin-gorourk after the local Aboriginal name for Balcombe Creek, meaning "*voice of the frogs*". In 1846, Alexander Balcombe settled from NSW on the property with his wife Emma and baby daughter. Over many years, he was able to buy over 500 hectares of the property and between 1848 and 1851 built the current homestead using mud bricks made on the property.

The buildings contain many highly valuable artefacts from the French Emperor Napoleon. In 1815 Balcombe's father lived on St.Helena and befriended the exiled Emperor by

allowing him to live temporarily in a pavilion near his house until permanent quarters were constructed. In appreciation for this act of kindness, Napoleon gave the Balcombe family pieces of priceless furniture and other valuable items now on display.

When Balcombe died in 1877, ownership of *The Briars* passed to Emma. Following her death 30 years later, the main part of the property stayed in her family until 1977 when her great-great grandson finally sold the remaining broadacres to the Mornington Peninsula Shire, presenting the homestead, farm buildings and surrounding areas to the National Trust of Victoria.

In 1988 the Visitors Centre was built, using a design based on the original design of a wooden hut built by Capt. Reid. The reserve is surrounded by an electrified game-proof fence to keep out foxes and rabbits while protecting the resident wildlife of koalas, kangaroos and wallabies. It is worthwhile keeping this in mind if moving around the broadacres. Not long after the Visitors Centre was constructed, our society approached *The Briars* for a home, having had no success within the city of Frankston. Our activities were seen as complementary and valuable in opening up natural heritage to the people of the region and so we now lease a property there that we are actively developing as an observatory site and public viewing area.

Our neighbour on the property is the environmental education centre, a venture of two Mt.Martha based companies, involving school teachers. Their development saw the removal of the three large army huts that once adorned our hill, and their cannibalism for timbers to build the new structures. About half a million dollars later, the education and tourist centre sits within the fuelwood lot and is a treat for its users. The local shire council provided the water, sewerage and stormwater run-off controls, and installed a roadway for admitting buses.

## TELESCOPE FOR SALE

8 inch f/6 Astro-Optical Dobsonian with 2 inch focuser, 7x50 finderscope and 3 Vixen LV eyepieces (25mm, 15mm, 9mm). The scope also has a Telrad base, but the actual Telrad is not for sale. $800, phone Russell Thompson on (03) 9787 0079. Also a separate Meade 8x50 finderscope (no bracket) is for sale, never used, $90.

## YOU CAN GO TO MARS!

The Mars 2001 Lander internet site allows you to enter your name and it will be put on the CD ROM disk that will go to Mars. You can also print off an official certificate confirming your entry was received successfully. To place your name on the Red Planet, go to http://spacekids.hq.nasa.gov/2001/.

## FROM AROUND THE PLANET

Leading Astronomical Societies exchange each other's newsletters to assist in sharing items of interest. This column grabs some of the highlights of recent receipts. You can find out more in the library collection.

*Ballarat Astron. Soc. (Vic)* - A member was honoured with a medal of the Order of Australia on the Queen's birthday. Summary given on the life of the Russian Mir spacestation to date. One member has built an 8 inch mirror from scratch. The origin is given of the "aa" spelling in Ballaarat - it was spelled "Ballarat" originally but pronounced in aboriginal tongue as "Balla-ar-at".

*Latrobe Valley Astron. Soc. (Vic)* - They are consolidating their assets back to the ATCO hut at Wirilda and are selling the shed purchased from Loy Yang power station. A mobile phone tower has been built next to their land in Coach Road. Plenty of variable star charts are reproduced. Membership is 38. David Girling spoke to a recent meeting on meteor observing.

*Wollongong Amateur Astronomy Club (NSW)* - This is the first receipt of a newsletter from this newly formed society. They have an internet page at http://www.users.bigpond.com/paul.b/index.htm. They call themselves the "WAACers" and aim to have at least two viewing nights a month for members. Instructions are given for making a low battery voltage indicator if you run your telescope motors off 12 volts DC.

*Sutherland Astron. Soc. (NSW)* - They have acquired a Celestron C14 telescope for their roll-off roof observatory, and are scouting out a CCD camera for it, using a significant grant from their local council. Membership is currently 150. NACAA in 1998, which they hosted, ended up turning out a 25% profit. Introductory article on cosmology. They are planning a social trip to the Lucas Heights nuclear reactor.

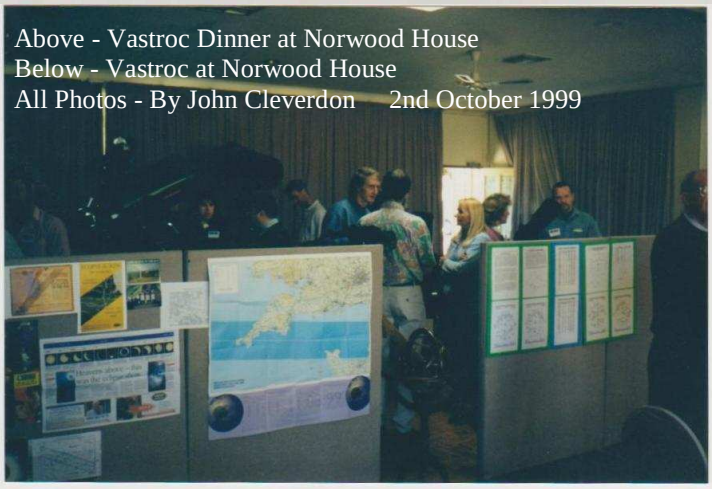
*Astron. Soc. South West (WA)* - The mobile telephone tower next to their observatory is about to have multiple other antennae attached by other carriers. The February solar eclipse is outlined, as seen from Western Australia. They have recently held an introduction to astronomy course for the public, and obtained 62 paying attendees. Working bees continue in and around their observatory, planting trees, building access ramps and pruning limbs.

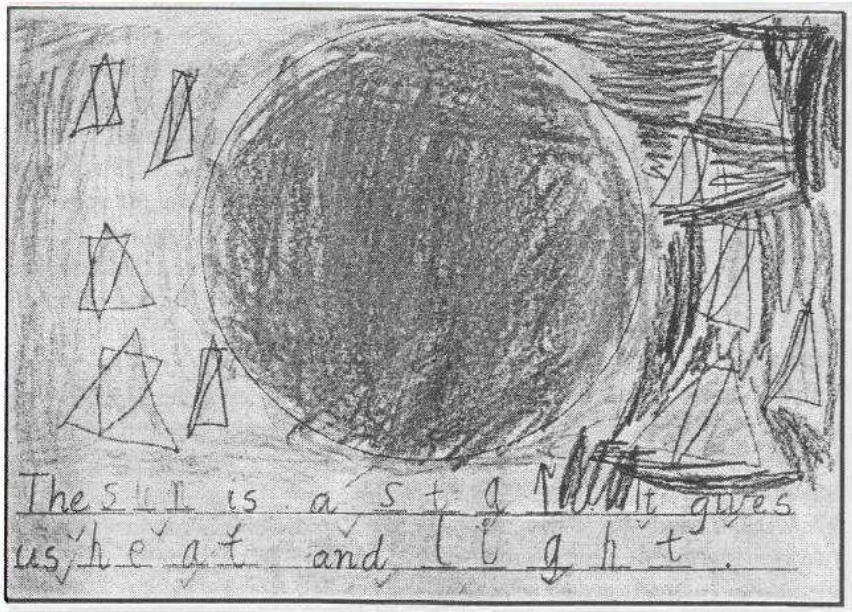
## FINAL PRONOUNCEMENT - ROCHE LIMIT

The closest point which a moon held together only by gravity can approach its parent planet without disintegrating due to tidal forces is known as the Roche limit, pronounced *"Roe-sh"*. Its value is about 2.5 to 3 times the radius of the primary body depending on the densities of the two objects. In reality, smaller real satellites can approach slightly closer to their parent body than this limiting radius because of the tensile strength of the material from which they are formed. In the case of looking for new planets closer to the Sun than Mercury, even without drag effects due to say the Sun's own atmosphere, the closest a planet could be to the Sun would be its Roche Limit. Several impacts of comets colliding with the Sun have been photographed, but in reality the rocky or icy material from which they were formed would have disintegrated very high above the Sun's surface.

If you have any Astronomical query that has been niggling you, drop it in the question box at a General Meeting and let us look into it for you.


Above - Vastroc Dinner at Norwood House
Below - Vastroc at Norwood House
All Photos - By John Cleverdon 2nd October 1999






*"The sun is a star.*
*It gives us heat and light".*

*By Cassandra Skilton, age 5.*

*The journal was kindly reproduced by the efforts of Ken Bryant, and collated/posted by Shari & Ian Porter.*