



# SCORPIUS

The Journal of the  
Astronomical Society of Frankston Inc.  
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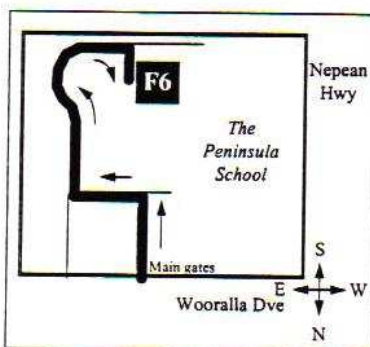
( Sep - Oct )

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 or observing nights for schools and community groups exclusively in the area bounded by Moorabbin, Dandenong and Tooradin.

**Meeting Venue:** Peninsula School, Wooralla Drive, Mt.Eliza (Melways map 105/F5) in room F6 at 8pm on the 3<sup>rd</sup> Wednesday of each month except December.

**Internet:** <http://www.peninsula.starway.net.au/~aggo>

Visitors are always welcome!



| Annual Membership |      |
|-------------------|------|
| Full Member       | \$30 |
| Pensioner         | \$25 |
| Student           | \$20 |
| Family            | \$40 |
| Family Pensioners | \$35 |
| Newsletter Only   | \$10 |

## DUE 1<sup>st</sup> OF JANUARY EACH YEAR

President & Editor  
Peter Skilton (03) 9776 5898

Vice President  
Peter Lowe (018) 318 920

Treasurer  
Bob Heale (03) 9787 1748

Secretary & Loan Telescope  
Richard Pollard (0419) 100 802

Committee  
Ken Bryant, Roger Giller, Don Leggett  
Ian Porter

All phone calls before 8:30pm please.

## FUTURE EVENTS

### General Meetings:

**Wed 16<sup>th</sup> Sep '98**

Session 1: Video on the secret *Russian Manned Moon Landing* that ever so nearly occurred.

Session 2: Chat session revolving around Astronomy Software. Members are asked to bring along portables or example outputs from their favourite programs.

Session 3: At least one instrument outside if the forecast is clear.

**Wed 21<sup>st</sup> Oct '98**

Session 1: Roger Vodicka of the ASV and David Girling will speak on *Meteors*, before the Leonids shower.

Session 2: Video on *Superstrings* and the Theory of Everything.

Session 3: At least one instrument outside if the forecast is clear.

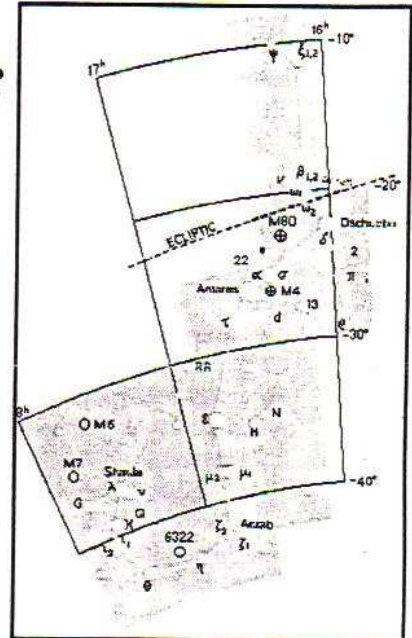
Note that the Orionids will peak on the night of this meeting, and this shower always produces good results. David Girling may coordinate some viewing afterwards if conditions are suitable.

**Wed 18<sup>th</sup> Nov '98**

Annual General Meeting.

Session 1: Bill Birch of the Museum of Victoria will speak on *Meteorites*.

Session 2: At least one instrument outside if the forecast is clear.



### Viewing Nights:

#### Members Only:

Sat Sep 19, 26 and Oct 17, 24 all at *The Briars*, Nepean Hwy, Mt.Martha (Melways 145/E12).

If weather forecast for the Saturday looks bad, the Friday before may be used instead. New attendees must always confirm with Ian Porter on (03) 5985 4203 or 0414 308 072 (if no answer) before attending. Follow the signs at *The Briars* from the Visitor Centre. 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 2<sup>nd</sup> Oct and Fri 6<sup>th</sup> Nov both at 8pm. Assistants to go on the roster are now required, even if you can only spare time once every few months. Please contact the co-ordinator, Don, on (0359) 854927.
- Mt.Martha Field Naturalists will have a talk on the Cranbourne Meteorites on Thur 3<sup>rd</sup> Sep at *The*

*Briars*. No help is needed.

- Resurrection Primary will have a viewing night at Camp Manyung, Sunnyside Rd, Morningside, on Mon 14<sup>th</sup> Sep, 8pm. Melways 105/A6.
- Seaford North Primary school will have a viewing night on Tue 13<sup>th</sup> Oct 8pm, Halifax St, Seaford, Melway 97/F11.
- St.Albans Primary school will have a viewing night on Wed 14<sup>th</sup> Oct at *The Briars* Education Centre, 8pm.
- Mt.Eliza Scout Group have requested a viewing night on 27<sup>th</sup> Oct, at a venue to be finalised.

### Phenomenal Events:

- A new visitor appeared in our skies on 10<sup>th</sup> Aug. Comet Williams (Comet 1998P1) was discovered by NSW amateur Peter Williams by accident while doing variable star measurements for the star *EK Trianguli Australis*. At the time of writing, the comet is high in the South West sky after twilight near Alpha Centauri, and will stay in the constellation of Centaurus until October. Reports on 14<sup>th</sup> Aug put the comet as easily within reach of 7x50 binoculars, but not sporting a tail. Later in August, telescopes were required to follow it.
- The variable star *BL Tel* detailed in the last edition has reached its minimum brightness, and is now climbing back to its steady value. Remember to pass along your observations to Peter Skilton who is collating them.



An earlier Society picnic gathering at Mt.Martha park. Photo courtesy of John Cleverdon.

### Social Events

- The film day on Sun 19th Jul was a great success with 24 attending the picnic, with several children, on a pleasantly warm afternoon at Mt.Martha Park. After this, most were conveyed to Frankston to enjoy the movie *Deep Impact*. This film tells the story of an amateur's discovery of a new comet

(unbelievably at a viewing night!) that subsequently turns out to be on a collision course with Earth, and predicted to cause what the film called an Extinction Level Event. Being a rock 10km across, this caused the nations of the world to unite to try and do something about it, and a mission with a futuristic space drive is mounted to the incoming rock so as to "nuke it". As expected, the nuclear weapons didn't do the job and merely succeeded in breaking the body into two. The astronauts on the intercepting space craft eventually fly a suicide mission into a deep fissure on the largest piece and blow it into trillions of pieces, saving us from extinction at the last moment (even though they wouldn't have succeeded if this were reality due to the proximity to the atmosphere when this occurred). However, the smaller 1km piece collides in the Atlantic creating an impressive 300 metre high tsunami wave that sweeps 1000km inland, destroying all in its path. The special effects quite accurately portray the incoming bolide and its likely devastating effects, however, it's a mystery why the craft decided to approach the comet from the anti-solar side and fly upstream through its tail, even though the instrument graphics showing the relative orbits of incoming comet and Earth suggested an approach from the sensible side was underway. The gravity on the comet was also a concern, as it should have been very, very small, however, the astronauts were moving and bouncing around on the comet's surface as if they were on the Moon. Nevertheless, the movie capped a great society day out.

- Informal equinox dinner at the Dava hotel, Esplanade, Morningside on Fri 25<sup>th</sup> Sep at 7-7:30pm. Melways 145/C6. Note the changed date. All members and friends are welcome, and remember you can choose a meal to suit your budget and tastes.

### Talk, Talk, Talk:

- Prof. Walter Neumann will give a free public lecture entitled *What Shape is the Universe* on Tue 15<sup>th</sup> Sep at 6:30pm at the Prince Philip Theatre, Architecture Building, Masson Rd (off Swanston St),

University of Melbourne, Melways 2B/E6. Parking is available in the Uni grounds for \$2, or for free in the surrounding streets.

- Australian astronaut, Andy Thomas, who recently returned from the Mir spacestation will give a free public talk on Fri 25<sup>th</sup> Sep at 8pm at Storey Hall at RMIT, Swanston St, Melbourne, Melways 2F/E1. Free tickets can be obtained by phoning Richard Tonkin on 9435 9044, as seating is limited. If you remember, he also gave an excellent talk a couple of years back at the same venue.



Some of the crowd at a recent Dava evening dinner in Morningside. Photo courtesy of John Cleverdon.

## YOUR SOCIETY

### NEW MEMBERS

Welcome to the following new Society members:

*Rex Farmer*  
*Alison Kuitert*  
*Burky Schulz*  
*Carol Willey*

The ASF is one of the largest groups in Australasia. Membership is currently at 112. 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 and are entitled to attend special viewing nights at *The Briars* where you can discover the secrets 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.



We are still on the lookout for a current or former plumber or

electrician to help connect our observatory site at *The Briars*. All offers from members will be gratefully accepted. Does any member have any contacts in the steel industry (e.g. Lysaghts) who we might approach for a donation of steel framing for the *Briars* Observatory? Also the bricks, sand and cement are at *The Briars*, now all we need is someone to build a brick barbecue. Can any retiree help out with their time? Do we also have any woodworking skills and/or spare timber to help make some picnic tables (like those in public parks) for the *Briars* site? Members are asked to bring along to meetings any posters, photos or other material of interest on their observing, or other astronomical interests.

### SECRETARY'S JOTTINGS

All neighbouring councils have been written to so as to remind them of our existence for matters astronomical. The Society has decided to try a trial subscription to the IAU Circulars for 6 months. These are the ones that notify the world of new discoveries as they are made. Ian Porter will receive the circulars on behalf of the Society, filter them, and electronically distribute to any members who wish to receive the information, and will provide updates at meetings for those who do not have electronic mail. We are also hoping to have a Society visit to the Latrobe Valley later this year, possibly coinciding with their break up function in December if this is possible. There was some preliminary discussion on themes for the next VASTROC, likely dates, and ideas on why other Victorian societies have not been forthcoming so far in offering to undertake it. Our building permit at *The Briars* has been extended. Hugh Carman has kindly offered to section and etch the most suitable of our Henbury meteorites (if indeed this is what they really are).

### LANGWARRIN GRAZE

Ken Bryant, Peter Lowe, Jim Blanksby and Peter Skilton met in the crisp (4 degrees Celsius) early morning before 4am on Sunday 19<sup>th</sup> July at Langwarrin Primary School along lonely Warrandyte Road in Langwarrin to observe a magnitude 8.1 star graze along the Moon's limb. Peter Lowe unfortunately was unable to see the star in his 4.5 inch refractor, even though conditions were clear and seeing was steady. The local population of Plovers screeched throughout (or was it really the blood curdling cries of the Langwarrin Banshee?), and we are unsure whether this was a contributing factor. However, the others stationed along the road reported multiple disappearances, reappearances and possible fadings of the star as it approached from the bright limb side of the cusp. After the event, the participants gathered for coffee, and looked over Peter Lowe's binoculars that have optics designed to actively take the shake out of observing. Other potential attendees did not come as the same night was a members' night at *The Briars* where the observers apparently enjoyed musical entertainment until late from a gathering of surfers at the Education Centre.

### RECENT MEETINGS

July's meeting was chaired by the President and saw 55 in attendance on a very cool evening where the new meeting order was tested. Bruce Tregaskis had observed a binary star going into eclipse the night before and brought along a produced light curve from his observations. Many members had seen the close approach of Jupiter and the Moon in the pre-dawn sky, and a couple had continued to follow Jupiter well after dawn. David Girling related a recent success he, Sue Stoner and others had had with meteor observing using nothing more than

their unaided eyes. The talk was presented next and Peter Skilton took the gathered group around the NASA Johnson Space Centre in Houston where he went in mid-May, and showed where the astronauts are based and undergo their training, and covered the history of NASA's achievements. He was also permitted to hold in the Lunar Samples Vault an actual Moon Rock specimen, which was 3.8 billion years old. The talk finished by exposing some positively shocking unreleased truths about the Shuttle programme and also about the Challenger disaster in January 1986, which were obtained by various reliable contacts. If you missed the talk, too bad! The *Show and Tell* session started after the tea break. Ken Bryant showed a cheaply obtained 13x finder of generous aperture that he had mounted in some PVC drain pipe with coach bolts. He found the pipe on the side of the road! Gerry Holt showed his 6 inch Dobsonian, including several improvements to its motion controls. This carefully crafted instrument was the product of about 4 years of effort. Peter Lowe next demonstrated the phases of the Moon, eclipses and libration with a Moon globe he sacrificed by coach bolting it to a 2 metre long stick, and using the slide projector as Sun. Members were invited to come up and have a go as the Earth. Peter Skilton showed a Ponsett mount, corner cube reflector, graze LED flasher, a 3-prong celestial object locator for demonstrating to novices, and various paraphernalia brought back from NASA. Ian Cuthbertson also brought along a very compact telescope he had recently acquired. Afterwards, Ian Porter presented the *What Goes Up* segment by showing what had been launched recently, and graphically representing the orbits each were now in. The launches included several Cosmos military satellites, a secret Chilean air force satellite, a Chinese launch, an Israeli satellite and a novel small German satellite launch from a Russian nuclear submarine using an ICBM missile (the first time this has ever been performed). Bob Heale presented *Sky for the Month* and touched on the wonderful array of planets in the morning sky, as well as issuing his traditional hand-out. Peter Lowe then handed out details of recent astronomical news from the Internet. The meeting closed at 10:20pm.

August's meeting saw 54 in attendance on a cool and clear night, with many new faces present.

The President opened with a humble public apology (not associated with Monica Lewinsky or any other US Whitehouse aide in any way!) as unfortunately the school had inappropriately changed all the internal locks without telling us. Consequently we didn't have access to the library, tea making facilities and the video equipment. Nevertheless the meeting went ahead. Several members had observed the faint comet Williams in binoculars or telescopes and a couple had tried unsuccessfully to find it so far. David Girling reported on meteor activity and quashed apparent rumours that his new observatory lets the rain in. Russell Thompson and others had been observing the eclipsing binary variable star *BL Tel* as it reached minimum light levels in early Aug, and was now starting to regain brightness. Ian Porter presented an excellent and passionate talk on *Near Earth Objects*, the danger they pose, and what humanity would do if confronted with a potential collision scenario with one. After many questions, the meeting adjourned for a short break, then reconvened to hear Bob Heale present *Sky for the Night*, including how to find the aforesaid comet. Some younger members, and those in need of beauty sleep, took advantage of the new evening format to leave early. Ian then reported on the launches this month, with far fewer occurring than normal, and handed out Mir spacestation predictions. The craft is due to be crashed into Earth's atmosphere middle of next year in the Pacific. The assembled members were also told of the forthcoming partial solar eclipse and penumbral lunar eclipse. The meeting closed at 10:00pm.

Thanks to the following members who participated in one or more of the viewing nights below: Ken Bryant, John & Roger Cleverdon, Sharron Fletcher, David Girling, Bob Heale, Neil Hewson, Don Leggett, Peter Lowe, Pam Marchington, Richard Pollard, Peter Skilton, Trent & Greg Veitch.

The Briars public night on Aug 7, saw only 4 attending to hear Richard Pollard and David Girling talk on the *Milky Way*. The reduced numbers were most likely due to the almost complete cloud cover, and unfortunately to the absence of newspaper coverage beforehand.

On Aug 21, sixty staff and Year 5 pupils of Black Rock Primary had

a viewing night at the new Education Centre. Although complete cloud cover prevented night sky viewing, the audience enjoyed a detailed tour of the Solar System, a look at some telescopes and handling of meteorites. All thoroughly enjoyed the experience and posed a very large number of particularly probing questions.

August 22<sup>nd</sup> was a great members' night at *The Briars*. With John Cleverdon's 6 inch scope, various celestial objects were viewed, and comet Williams was gloriously present at a magnitude of at least 7.5. It clouded in about 11pm, but cleared about half an hour after midnight, when Sharron Fletcher arrived as well as Adam Marsh of the ASV. They viewed until 3am before Sharron gave up, leaving myself and Adam to persevere until 4am. About 40 meteors were seen altogether in the few hours we had, the brightest being -2 magnitude with a 4 second train. It was very cold and windy and the limiting magnitude was about 6.2, with seeing being very clear in the South, West and East. A great night was had by all, but it was cold.

David Girling

## LIBRARY MATTERS

The library has acquired some new books which are available for borrowing.

*All About the Solar Eclipse of Australia 1976*, by Outback Press. This is for those who wish to learn more about the history of the total solar eclipse that our society viewed in 1976.

*Tunguska: Cauldron of Hell*, by Jack Stoneley. Details the events of the 1908 impact of a comet with Siberia which utterly destroyed thousands of square kilometres of Russian forest.

Kathy Stabb

## JUST FOR STARTERS

### GRAVITY WAVES

Colliding black holes and exploding stars should cause ripples in space and time called *Gravity Waves*. Here on Earth an earthquake will send seismic waves echoing around the planet. These disturbances

distort rocks in the Earth's crust through which they pass and can transfer some of the Earth's energy to the far side of the planet.

Seismic waves demonstrate three characteristics common to all types of wave :

- they are created by an event that releases energy.
- the disturbance is passed from one place to another at a finite speed through a connecting medium.
- they transfer energy from the original disturbance to other bodies.

Physicists believe that gravitational waves should occur as a consequence of events on an even greater scale than this.

According to Einstein's general theory of relativity, they are radiated by accelerating masses, such as coalescing black holes or exploding supernovae. They cause periodic variations in the geometry of space-time as they pass. They also travel at the speed of light and make distant masses vibrate, causing them to absorb some of the energy carried by the waves. Nobody has detected such gravitational waves, yet there is compelling indirect evidence that they do exist. Physicists in several countries are now setting up experiments to observe gravitational waves.

Any object that has mass will vibrate in response to the waves as they pass. All that is required is a test mass and a vibrator to pick up and measure its vibrations. The problem is that the vibrations are expected to be incredibly small. Gravitation is an extremely weak force. For example, the gravitational force between a proton and an

electron in a hydrogen atom is  $10^{40}$  times weaker than the electromagnetic force between these particles. Gravitation waves from violent events in our Galaxy such as a collapsing star would cause changes of less than 1 part in  $10^{18}$ . Hard to measure by any standards!

Gravity can only be observed through its tidal effects - that is, through distortions in a body that are caused by differences in gravity at different points across the body.

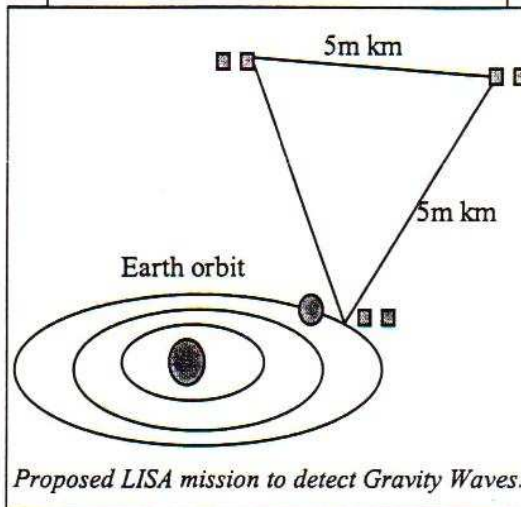
Several projects to detect gravitational waves are underway. The European Space Agency has proposed the most spectacular project so far. The *LISA* (Laser Interferometer Space Antenna) proposal consists of six spacecraft orbiting the Sun about  $20^\circ$  behind the Earth in its orbit, arranged in pairs at the corners of a giant equilateral triangle. The sides of the triangle are 5 million kilometres long and act as the arms of three giant interferometers. *LISA* must be sensitive enough to detect a change of less than one atomic diameter in a distance ten times that from the Earth to the Moon.

Large scale disturbances of space-time are the strongest sources of gravitational waves. They could provide information about black holes, collapsed stars and the Big Bang that no other kind of observation can reveal. A gravitational wave detector ought to be a particularly rich source of information about the physics of regions of intense gravity. For more details you might like to read the article *Gravity Waves* in the 14<sup>th</sup> Mar 1998 *New Scientist*.

Pam Marchington

## THE BEST RADIO SHOW ON ASTRONOMY

Are you tired of coming to club meetings and having everyone know more about the latest news than you do (just because they have the Internet)? Well, you can remedy the situation by listening to "*STAR STUFF*" on the Parliamentary and News Network (PNN) at 1026 on your AM radio dial. It is on at very convenient times,



which rarely clash with anything that you may be doing. It's first on at midnight Sunday night (i.e. 12.00am Monday morning). If you miss it, never fear, they replay it at just the time you are getting up to view the early morning planets, at 5.00am. If they are not broadcasting Parliament, it is repeated again at 1.00pm Monday afternoon.

The programme is half an hour long, and gives details of all the week's discoveries and interesting astronomical news, together with a few feature items. It's presented in a very lively manner, by a most enthusiastic presenter. Funnily enough, they manage to make topics on Australian astronomy sound interesting. I had previously found them to be a bit dry.

Renato Alessio

## IN THE NEWS

### ASTRONAUT GOLFER PASSES AT 74

Alan Shepard, the first American to fly in space under the Mercury project, and one of only 12 humans who walked on the Moon, died recently from a prolonged illness. He flew in space just three weeks after the Soviet cosmonaut Yuri Gargarin went first into orbit on 12<sup>th</sup> Apr, 1961.

He was the fifth man to walk on the Moon, and the oldest, at the age of 47. Shepard, however, was almost bypassed for a trip to the Moon as he had to overcome an inner ear problem called Meunier's syndrome that grounded him for several years following his initial pioneering flight.

An operation eventually cured the problem and Shepard was named to command the Apollo 14 mission. On 31<sup>st</sup> Jan 1971, Shepard embarked for the Moon atop a Saturn 5 rocket, and landed the lunar module *Antares* on Feb 5 in the *Fra Mauro* highlands.

Shepard planted his feet on the lunar surface a few hours later, declaring, "*Al is on the surface, and it's been a long way, but we're here*". During two excursions on the surface totalling 9 hours, the astronauts set up a science station, collected 45 kg of rocks and gathered soil samples from the mountainous region.

Near the end of the second Moon walk, and just before entering the lunar module for the last time, Shepard (an avid golfer) hit two golf balls with a

telescopic golf club he had smuggled onboard. The first landed in a nearby crater. The second was hit squarely, and in the one-sixth gravity of the moon, Shepard said it travelled "miles and miles and miles".

In a glowing tribute, NASA head Dan Goldin said "Alan Shepard lived to explore the heavens. On this final journey, we wish him Godspeed".

## SO LONG SOHO?

Contact with the Solar and Heliospheric Observatory (*SOHO*) was lost on 24<sup>th</sup> Jun. *SOHO* had recently discovered a new comet, comet *SOHO*. Using the giant radio dish at Arecibo in Puerto Rico, the 305 metre radio telescope bounced high power signals off the craft and determined it was spinning out of control at about one revolution per minute. Analysis of the radar data indicates that *SOHO* is still in its orbit near the so-called "L-1" Lagrangian point in space, a gravitationally stable vantage point 1.5 million kilometres ahead of the Earth.

The cause is believed to be two command sequences that were sent incorrectly to the craft from ground controllers. These resulted in the craft triggering an Emergency Sun Reacquisition mode, and when coupled with incorrect gyro commands caused the craft to spin uncontrollably such that the solar panels faced edge-on to the Sun. Without proper pointing to the Sun, the batteries eventually drained, leaving the craft paralysed.

On 4<sup>th</sup> Aug, the NASA Deep Space Tracking Station in Canberra succeeded in beaming high power simple signals to *SOHO*, which it managed to

answer weakly, but nevertheless demonstrating that the spacecraft is still capable of receiving and responding to ground commands. NASA and the European Space Agency hope that over the next 3 months, the spacecraft's solar panels will increasingly face the Sun and generate power recharging the flattened onboard batteries, and hence enabling commands to be fully actioned from Earth.

## SO LONG ORRORAL VALLEY

The government has decided to close Australia's Geodetic Observatory located in the Orroral Valley in the ACT, which uses NASA equipment on long term loan. Those who attended the Canberra NACAA several years ago were fortunate enough to visit this intriguing Laser Ranging site, which bounces pulsed laser beams off orbiting satellites, day or night, to precisely determine their orbits. The site is 60 kilometres south of Canberra, and sports a 60 inch telescope. It is expected that the Observatory will cease operations by the end of 1998.

## FEATURE

### PROJECT STARSHINE

This year I have had the opportunity to be personally involved on a space science project called "Project Starshine". Project Starshine is an international space research project for students sponsored by NASA. Students around the world will polish highly reflective mirrors to be mounted on a satellite that will be launched aboard the Space Shuttle *Atlantis* in May of 1999. Students will then track the satellite visually, measuring its

rate of decay, until it re-enters the atmosphere. If the experiment is successful, NASA has agreed to launch one spacecraft a year, in an ongoing project to measure the size and density of the Earth's upper atmosphere. This project is an unprecedented chance for students to participate in serious space science.

The school I teach at, Mornington Secondary College, has been accepted into the project and was sent two mirrors for students to polish. When polished, one of the mirrors will be mounted on the *Starshine* spacecraft and sent into orbit.

Myself and a team of 15 students went to work with emery paper and diamond paste, converting a small dull aluminium disk into a space mirror. It took about a day and a half to get one of the mirrors to the required flatness



A mock up of Starshine held by the project leader Professor Gil Moore.

and smoothness. The other mirror developed some deep scratches and was a failure. We then posted the mirror back to the States to be mounted on the spacecraft in October. A small microdot with our names will be placed on the back of the mirror.

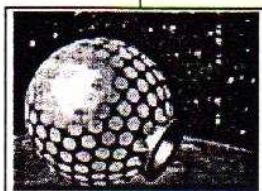
The *Starshine* spacecraft consists of a hollow aluminium sphere, 48 centimetres in diameter, covered with 875 polished

covered with 875 polished aluminium mirrors, each of which is 2.5 centimetres in diameter. The spacecraft will be mounted in, and spring-deployed from, a "Get Away" canister with a Hitchhiker ejection system. The weight of the sphere will be approximately 50 kilograms. Its initial deployment altitude will be approximately 345 kilometres, and the plane of its circular orbit will be inclined to Earth's equator by 51.6 degrees.



Picture of one of the students polishing one of the Starshine mirrors.

The spacecraft's longitudinal axis will be maintained parallel to Earth's local magnetic field by an on-board permanent magnet, and the spacecraft will be spun about that axis by solar photon pressure acting on externally mounted vanes that are coated to produce alternating patterns of high and low optical absorptivity and emissivity. Induced eddy currents in its aluminium shell will limit its spin rate to a value of approximately one revolution per minute.



View of the Starshine spacecraft in orbit.

The spacecraft will fly on the second US mission to the *International Space Station*, which will have an orbit similar to *Mir's*. The craft will last for about 4-6 months until it decays from orbit. The mirrors should reflect the Sun and give flashes of about mag 1-2 when it is overhead. It will flash about every ten seconds as it moves quickly across the sky.

After deployment from the Shuttle, this twinkling satellite will be observed against the star background during morning and evening astronomical twilight periods by student observers spaced around the world between latitudes 55 degrees North and 55 degrees South. They will record its right

ascension and declination at precise intervals, together with their own latitude, longitude and altitude, then exchange their sightings with each other via the Internet and

amateur satellite radio, and calculate the spacecraft's orbital elements by the "angles only" method of Laplace.

From day to day, the orbit of the satellite will change, due primarily to Earth's geodetic irregularities and atmospheric drag. The students will compute and remove the orbital changes due to geodetic terms and

calculate the density of the atmosphere at the satellite's orbital altitude. After approximately six months, the satellite will re-enter the atmosphere and vaporise.

If this experiment is successful, additional spacecraft will be built by other student groups and flown on Shuttle missions annually throughout an eleven-year Sunspot cycle in order to measure the response of Earth's atmosphere to changes in solar activity.

Ian Porter

## COMET CASH

Those discovering new comets from their backyards will in future receive a cash bounty for their efforts. The *Edgar Wilson Award*, named after a late US



businessman with a passion for astronomy, is for \$US20,000 a year, to be

divided equally among all amateur sky watchers anywhere in the world who discover a comet, or jointly discover one, either visually, photographically or electronically, and have their name assigned to it by the *International Astronomical Union*. The past average is about 5 comets discovered per annum, so get looking!

## REVIEW OF MILLENNIUM STAR ATLAS

Did you know that any atlas coming into Australia has a 12% sales tax attached to it? Did you know that the Customs people don't routinely collect it (as there is no sales tax on books) but that the international carrier can collect it, and charge you a fee for doing so? This was all part of the saga of getting this Atlas.



What I like most about this atlas is the logarithmic depiction of stars. Unlike other atlases, the star depiction looks much closer to the real thing. That's always been my main gripe with *Astro Atlas*, where the large size depiction of moderately big stars was way out of kilter with what was actually observable in the sky.

Now that I have it, I can say that it is superior to most of *Astro*

*Atlas*, except for the Magellanic clouds. Nonetheless, I find it way too heavy to lug around most of the time. I tend to use it for reference, or for when *Astro Atlas* lets me down badly. For example, the *Astro Atlas D Chart* on the Centaurus Galaxy cluster is hopeless in the crowded region. I seemed to have three or more galaxies everywhere I aimed my eyepiece, and the chart was a jumble. With *Millennium* the next night, I was able to leisurely identify and observe each galaxy.

With the new Overlays, one can estimate the magnitudes of stars, separation of double stars and other features with pretty good accuracy. This eliminates much of the need for a catalogue.

While it's an extremely impressive work, I don't think I could recommend it to your average advanced observer, unless he or she has a big scope set up in some type of observatory. Also advanced observers are currently pretty well served by either *Uranometria* or *Astro Atlas*.

Renato Alessio

## WHEN JUPITER'S MOONS WENT OUT!

Now that I have built my observatory I wanted to do more than just look around. After talking to Peter Skilton and Patricia Larkin of ASV they encouraged me to have a go at Jupiter moons' eclipse timings. So I have been having a go and found it great fun apart from the hours. Knowing what I am doing is of scientific value, is great encouragement.

Wednesday 17<sup>th</sup> Jun was an ASF meeting night, my wife's birthday and an early morning

18<sup>th</sup> eclipse timing; not much going on! I decided to stay home to celebrate my wife's birthday and get up early for the eclipse. This was to be no ordinary eclipse, because there were 3 events happening that morning; first Ganymede was to go into eclipse around 3:24 AEST, then Io would go into eclipse around 3:35 AEST. This seemed to be extraordinary that two disappearances were within 15 minutes of each other. Looking at my predictions, this was not to happen again this apparition by two different moons. So after dinner that night I watched some TV, wondered how the ASF meeting was going and set my alarm for 3:00am, guessing it was going to be cloudy. Normally it is when you want it to be clear.

I set off to bed around 9:30pm that night. At 3:00am the alarm went off and I stumbled out of bed thinking it would be cloudy. Guess what - clear skies. Quickly I woke up and got rugged up since it was about 4 degrees outside. Zipped off to the observatory, and within 3 minutes had Jupiter in my eyepiece. Now I know why I built my observatory! Jupiter was in full view, Io and Ganymede on one side and Europa & Callisto on the other. VNG was up and beeping loudly and clearly and my tape was running in readiness. The motor drive was on but something had to go wrong. Lucky enough it didn't. First Ganymede disappeared then a little time later Io disappeared. Then there were only 2 moons left! Quite funny first to see Jupiter with 4 moons as per normal then to see it with just 2. Amazing. All things went well - the tape worked and times recorded, and by 4:00am I was back in bed. I

did say 3 events. Yes, well at around 6:45am Ganymede was to come out of eclipse. I normally go to work by then, this time work could wait. Yes at around 6:40am a very small flicker of light turned out to be Ganymede coming out of eclipse. Times recorded, and all went well. It was great to see all 3 events; well worth the effort; building that observatory that is. It makes morning observing that much easier.

David Girling

## ASF & ASV METEOR GROUP

A couple of years ago, I became interested in meteor observing, so I set out to find people who could help me. As a member of the ASV as well as the ASF, I found there is a small Meteor Group in the ASV. I heard about the section about 10 years ago when Daryl Martin, then its coordinator, came to the ASF for a talk. I still found it up and running, this time run by Roger Vodika & Adam Marsh. In the last couple of years they have given a talk on meteor observing to our Society, and some of our members are becoming keen observers. We now have a combined ASF & ASV Meteor Group. Meteor observing is one part of amateur astronomy that you can contribute to science, and don't need a telescope. I think of meteor observing like fishing; you never know what you could catch, or should that be see! In the past couple of years we have been successful, observing many meteor showers. These include the *Orionids*, *Eta Aquarids*, *Pi Puppids*, *Leonids*, and recently the *June Boötids*, many of these showers producing fireballs. All meteors brighter than -3 mag are normally considered fireballs.



Sue Stoner of the ASF was one of the most successful in viewing this year's *June Boötids*; she is to be congratulated for her efforts - keep up the great work Sue. Meteor group members from the ASF include myself, Sue Stoner, Ed Barber, Martin Rudd, Sharron Fletcher & Trent Veitch. Some other members have shown interest, and the group looks forward to their observations. I have found meteor observing very relaxing and a good way to enhance my viewing time. I would like to thank Roger and Adam for their help with getting me and other members going in meteor observing. If you would like to learn more, simply talk to me at our monthly ASF meetings - I would be glad to help.

David Girling

### CRANBOURNE METEORITES TO MOVE?

Due to our long association over the years, many members will be aware of the Cranbourne meteorite display at Camms Road in Cranbourne. It now appears they may be on the move to adorn the Cranbourne Complex instead (where the library is situated). A consultant's report on the feasibility of moving them and possibly redesigning the display is due to be tabled to local council at the end of August, when a public competition for the new display may be launched.

### ASTRONOMY CLASSIFIEDS

The Western Sydney Amateur Astronomy Group has an astronomy classifieds webpage dedicated to those who wish to sell/buy items related to astronomy. Anyone can have their ad posted on the page free of charge. The aim is

to get a handy page going where amateurs across the country can check what's on the 2nd hand market for telescopes and astronomy gear in a manner similar to the classifieds on the back of *Sky & Space* but with the convenience of the Internet. The internet address is <http://wsaag.base.org/>.

### TRINKET BOX?

Does anyone know of a group of stars called the *Trinket Box* in the Southern sky? It is apparently shaped like a house, and supposed to be smaller than the *Southern Cross* and probably about 1 degree across.

Bruce Tregaskis

### NO INTERNET? NO WORRIES

Don't know anything about the Internet or the World Wide Web (WWW), or don't have access? Have you considered trying *Frankston Public Library* where you can pre-book an hour at a time for free and be given driving instructions. Other regional libraries might also offer this service. You might also want to consider the internet café just opened in Central Park, Frankston where over a cappuccino you can also surf the net (I believe it is a couple of dollars an hour) and be given instructions on what to do.

### 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.



*Latrobe Valley Astron. Soc.*  
(Vic) - Several members attended

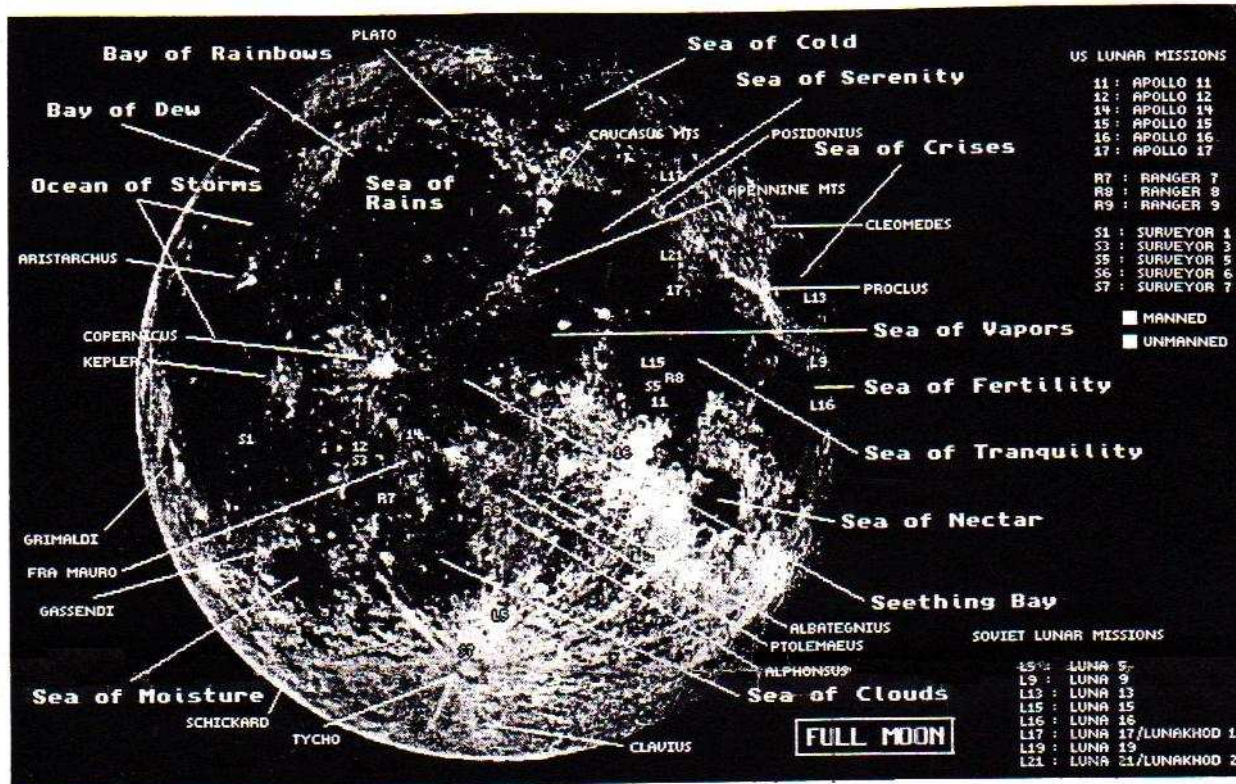
Ballaarat Astron. Society's 40<sup>th</sup> anniversary celebrations. They are currently brainstorming ways to improve their Society and meetings for members. An 8 inch Schmidt Cassegrain telescope is for sale. One member's variable star estimates have appeared in an IAU Circular.

*Astron. Assoc. Queensland (Qld)* - Have received three 8 inch f/10 Meade Schmidt Cassegrains for use at viewing nights, paid by their Gaming Machine Community Benefits fund. A flare was reported in comet SOHO. Conducted an inaugural TAFE course in practical astronomy that was successful. The story of asteroid 1997XF11 is given, originally predicted for a near miss of Earth in 2028. Article on atmospheric turbulence and seeing conditions. Review given of *Expert Astronomer Windows* CD ROM software.

### FINAL PRONOUNCEMENT - ANALEMMA

If you were to carefully draw on a single piece of paper the position of the Sun in the daytime sky at the same time every day for a year, the resulting shape you would see would be a figure eight. This '8' shape, with one of its lobes smaller than the other, is known as the analemma, pronounced "anna-lemma". The position of the Sun in the sky from day to day at the same time of day varies because the Earth's rotation axis is not at right angles to its orbit around the Sun. Instead it is oriented at just over 23 degrees to the plane of the Solar System (hence why a purchased globe of the Earth is tilted at this angle). In addition, the Earth's orbit around the Sun is an ellipse (or oval) shape rather than being a perfect circle. The combined result of these two effects is the shape of the analemma.

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.



Left - AFS Society dinner at the Dave Hotel on the 25th September 1998  
 Photo - by John Cleverdon



If this box is ticked then membership needs renewing and this may be your last edition of the newsletter, so please contact the Treasurer in this case. Newer members who join late in a calendar year will have this time taken fairly into account when renewing in January, and should remind the Treasurer of this.

When something is said to be hot, it means that the components of it (atoms or molecules in our normal experience) are moving very quickly and hence have a lot of energy. The maximum temperature possible is infinitely high, where all parts are theoretically so energetic they are moving at the speed of light, akin to the temperature at the instant of the Big Bang (which was 10,000 trillion trillion degrees after it had been cooling for a trillion-trillion-trillionth of a second). On the other hand, as motion slows down, the temperature measured is said to drop until theoretically all atomic motion ceases. This occurs at the temperature of zero degrees Kelvin (or -273.15 degrees Celsius), which is known as *absolute zero*. Laboratory measurements have come to within a few millionths of a degree above this temperature, but have never achieved zero. A temperature of -274 degrees Celsius is impossible since atoms cannot become slower than being stopped! The temperature of interstellar space is a chilling 2.73 degrees Celsius above absolute zero, this being the slowly fading remnant temperature of the Big Bang itself after it has been cooling now for about 15 billion years. Eventually this will drop to zero, signalling the end of all motion in our Universe, and hence of the Universe itself.