SCORPIUS

The Journal of the Astronomical Society of Frankston Inc.

P.O. Box 596, Frankston, Victoria 3199

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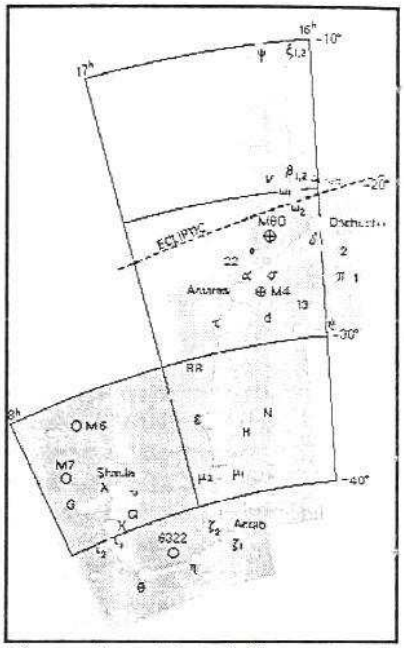
(Nov - Dec)

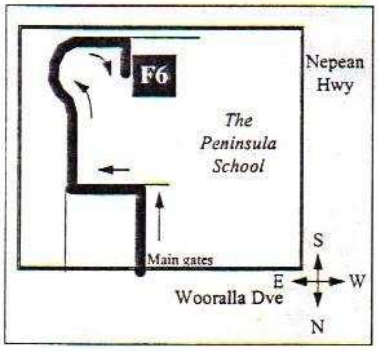


The Astronomical Society of Frankston was founded in 1969 with the aim of fostering the study of Astronomy by amateurs and promoting the hobby of amateur Astronomy to the general public. The Society holds a General Meeting each month for the exchange of ideas and information. Regular observing nights, 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 3rd Wednesday of each month except December.

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

Visitors are always welcome!



Annual Membership

Full Member	$30
Pensioner	$25
Student	$20
Family	$40
Family Pensioners	$35
Newsletter Only	$10

DUE 1st 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 18th Nov '98

Annual General Meeting. *Nominations for committee positions can be made on the back page form or a copy.*
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.
As we have a guest speaker this month, the 3rd session will not be given.

Please remember there is NO monthly meeting held in December.

Wed 20th Jan '99

Session 1: Ken Bryant will speak about his *18 inch Langwarrin Leviathon Telescope*.
Session 2: Video on *Black Holes*.
Session 3: At least one instrument outside if the forecast is clear.

Viewing Nights:

Members Only:

Sat Nov 14 and Dec 12, 19 all at *The Briars*, Nepean Hwy, Mt.Martha (Melways 145/E12). Note the Nov 21 night has been cancelled as this clashes with the Society's visit to the LVAS.

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 6th Nov, Fri 4th Dec and Fri 1st Jan 1999 all at 8pm. Assistants are required. Please contact the co-ordinator, Don, on (0359) 854927.
- The 1st Ranleigh Scouts will have a viewing night on Tue 27th Oct, at Butler Reserve, Mornington at 8pm. About 40 people expected and help required. Melways 104G11.
- Keilor Heights Primary will have a viewing night on Mon 9th Nov at Camp Manyung, Sunnyside Rd, Mt.Eliza. Melways 105A6. Help is needed with telescopes as 60 Year 9/10 students expected.
- The annual 4 Friday public nights at *The Briars* will occur at 8pm on the

first 4 Fridays of January 1999, i.e. 1st, 8th, 15th, 22nd. Help needed.

Phenomenal Events:

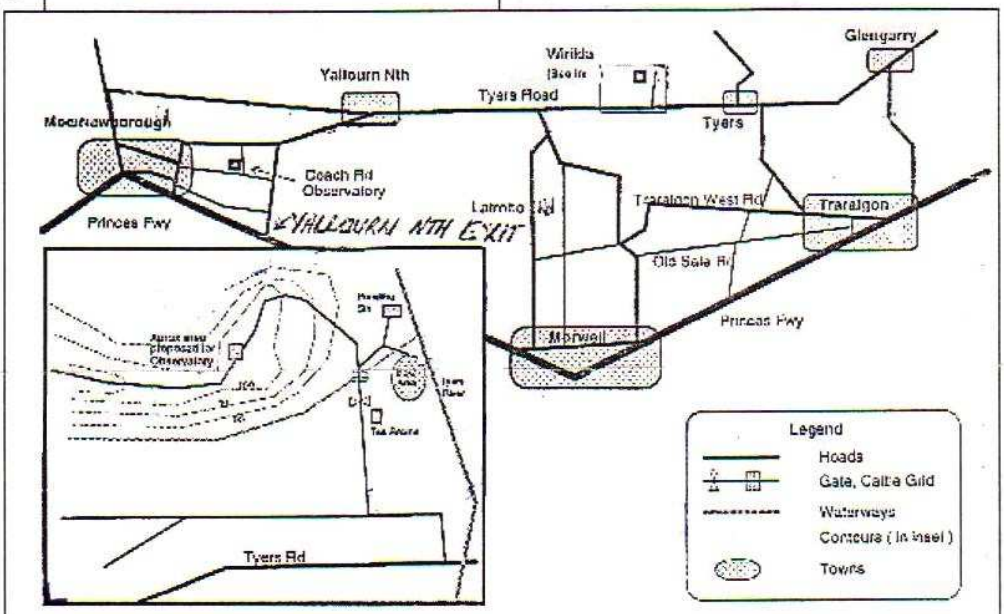
- Members who followed the variable eclipsing binary star *BL Tel* recently are reminded to forward their results ASAP to Peter Nelson, RMB 2493, Hazeldean Rd, Ellinbank, Vic 3820.
- Several members have reported seeing the daytime low altitude occultation of Jupiter by the Moon on 4th Oct near sunset, and its very close naked eye approach in the early morning skies.
- The very bright star Regulus (alpha Leo) will undergo a Southern limit grazing occultation by a 40% sunlit Moon on Wed 12th Nov at 10:32am. Although this is daytime, the magnitude 1.3 star will be visible in small instruments. A graze expedition will be mounted with other Societies as the track is across the Mornington Peninsula and Western Port Bay region, and ideally positioned for us. Members who have a telescope, time signal radio and cassette recorder are asked to attend if possible, e.g. work at home, take the day off, etc. Those members who are unable to travel, should time the disappearance and reappearance of the star behind the Moon from their home location as these times will also be useful. The Telstra time signal can be used for this by phoning 1194 and recording it on the tape. Those wishing to take part in the graze expedition should inform Peter Skilton beforehand and meet at Baxter Park, Frankston-Flinders Rd (Melways 106J3) at 9am on the morning where sites will be determined.

Social Events

- The equinox dinner at the Dava hotel on Fri 25th Sep was attended by 20, who stayed until closing time. This was the day of the Gas explosion at Longford in SE Victoria and the gas stoves were still going at that stage, prior to imposition of gas rationing.
- A Working Bee will be held at *The Briars* to bring the grass under control on Sunday 31st Oct at 3pm. It was about 2 feet high when we had St.Albans Primary up there, wading through it. The BBQ will be onsite and please bring mowers and whipper snippers and take the opportunity to say hello to other members on a relaxing afternoon. We might also consider applying the new grass growth inhibitor being advertised on TV at the moment once it is cleared.
- All members and their friends are invited to visit the *Latrobe Valley Astronomical Society* on Saturday afternoon 21st Nov, down at their Wirilda site (map is shown elsewhere in this edition). Sheltered BBQs and public toilets are onsite, so just BYO your food and drink for a great afternoon. Meet at say 4pm, though for those who are working, turn up anytime afterwards. If you wish to stay into the evening, some telescopes might also be present. If weather prospects are looking very poor, please phone Peter Skilton at the number on the front page on the Saturday afternoon to confirm the gathering is not cancelled.
- The Annual Breakup BBQ will be held at Mt.Martha Park, Forest Dve, on Sat 5th Dec at 4pm. Free electric BBQ's are onsite, as are toilets and a shelter with fireplace if it rains. Melways 150H7. BYO everything and no booking necessary.

Talk, Talk, Talk

- Dr. Matthew Golombek, chief scientist of NASA's Mars Pathfinder mission at the Jet Propulsion Laboratory, was in town on Thu 22nd Oct at the Melbourne Town Hall to take the audience on a guided tour of the Martian terrain in 3 dimensions. Unfortunately due to late notification to the Society of this talk, sufficient warning could only be given to members at the October monthly meeting.



Map showing at upper right and the inset box the Wirilda location at Tyers Road near Traralgon for the LVAS gathering. Courtesy of David Shead and Bob Parsons.

YOUR SOCIETY

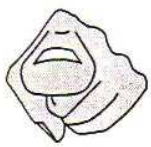
NEW MEMBERS

Welcome to the following new Society members:

(no notified new arrivals)

The ASF is one of the largest groups in Australasia. Membership is currently at 114. 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* to existing facilities A replacement wooden shed is being kindly assembled by Don Leggett in his spare time, and will be ready before Christmas. Does any member have any contacts in the steel industry (e.g. Lysaghts) whom we might approach for a donation of steel framing for *The Briars* Observatory? We need someone with bricklaying skills to build a brick barbecue at *The Briars*, all materials will be provided. Can any retiree help with their time? Do we also have any wood working skills and/or timber to help make some picnic tables (like those in public parks) for *The Briars* site?

SECRETARY'S JOTTINGS

Members are hereby advised of an intention to amend the constitution of the society at the Annual General Meeting to give the committee the power to co-opt financial members of the society onto the committee for specific purposes and terms at the sole discretion of the committee. Such co-opted members will have full voting rights. Members are also advised of an intention to change the subscription rate for a *Newsletter Only* membership to be $15 per annum to help better defray the overheads of producing *Scorpius*. The rate for all other member categories remains unchanged. There are also a number of changes to the constitution that we are required to make due to new changes to the Incorporations Act.

No further offers of assistance with running VASTROC have been received from other Victorian societies to date, who seem to be preoccupied with their internal matters. As a result, it appears we might have the responsibility of running it a second time in a row. Preliminary discussion on VASTROC has suggested this be held on the 1st weekend of October next year, to coincide with the NSW Labour Day holiday, enabling interstate visitors travel time. It is unlikely to be held on a Victorian long weekend as attendance is typically affected by local aficionados being away on holidays.

RECENT MEETINGS

September's meeting saw about 50 in attendance, and was chaired by the Vice President while the President was in Perth. An astronomy software night was presented, featuring Richard Pollard, who showed some of the finer features of *The Sky* software that was very impressive. In addition to general star charts and sky simulations, Richard was able to demonstrate some of the online tutorials. Peter Lowe showed how ray tracing software could be used to design simple optical systems and later showed some of the features of image processing software used with CCD images. A video projector was used as a great aid because of the large display possible. As the hour was getting late, many members took the opportunity to leave early. The advertised video session was unfortunately overlooked on the evening, and will be shown at a later date. For those who stayed after the tea-break, Bob Heale presented *Sky for the Month*, and Ian Porter his *What Goes Up* feature. The meeting closed at 10:30pm.

Thanks to the following members who participated in one or more of the viewing nights below: Ken Bryant, Peter Elias, Bob Heale, Don Leggett, Peter Lowe, Pam Marchington, Richard Pollard, Ian Porter, Ros & Peter Skilton. If you are interested in helping advance the night sky education of the Peninsula's youth, please offer some of your time and turn up to one, even as an observer. We would also like more ladies at these nights, whose presence would help to greatly inspire the girls.

On the 3rd Sep, the Mt.Martha Field Naturalists were visited at *The Briars* and Peter Skilton gave a talk on the Cranbourne meteorites and their colourful history in Victoria.

The *Briars* public night on 4th Sep saw 20 turn up, despite rainy conditions. Peter Skilton and Richard Pollard delivered the talks before the rain cleared briefly, enabling a quick view of majestic Jupiter and the Moon.

September 14 saw 60 occupants of Resurrection Primary school visited at Camp Manyung for a traditional piece of *Astronomy on the Move*, however, cloud cover conspired to prevent successful viewing.

About 30 binocular wielding Grade 6 students and parents were visited at Seaford North Primary school on 13th Oct. Although the skies were completely overcast, the troupe was treated to slides, question and answer time, meteorites and other paraphernalia, and enjoyed the evening. Unfortunately, no telescope bearers turned up so the pupils were unable to look over a sizeable telescope, or the different types, at close hand.

On 14th Oct, sixty students and staff from St.Albans Primary school visited us at *The Briars* Education Centre and viewed various night sky objects on our concrete pads through intermittent cloud, ahead of a cool change. The grass was definitely in need of a mow, and to add spice to the evening, the electric fence was operating. Afterwards, as the cloud encroached, they came inside for the traditional slide show. All enjoyed the night.

On 16th Oct, as a labour of love during the day, Frankston Heights Primary school prep grades were visited and treated to a multi-media talk on space, including hands-on experience of meteorites and fossils, and experiencing an actual lift-off from the vantage point of the cockpit of the space shuttle, and following it all the way into orbit on video. A telescope was also present for the extremely keen and inquisitive minds there on the day.

LIBRARY MATTERS

The library has acquired some more material which is available for borrowing.

NASA: Apollo/Shuttle, a video containing 4 films entitled *Eagle Has Landed: The Flight of Apollo 11*, *The Moon and Man*, *We Deliver*, and *Building Towards New Heights*.

Astronomy, a video containing 4 films entitled *Stars, Nebulae and Galaxies*, *Universe*, *And Then There Was Voyager*, and *Australian Astronomy*.

Kathy Stabb

JUST FOR STARTERS

WHY ARE THE LAWS AND CONSTANTS THAT GOVERN THE UNIVERSE SO FINELY TUNED FOR LIFE TO FLOURISH?

The ultimate goal of physics is to find a *Theory of Everything* that captures all the fundamental features of reality in a simple set of equations. However, there would still be the

question posed by John Wheeler, one of the fathers of 20th century physics: *'why does nature obey this set of equations and not another?'*

Max Tegmark, physicist at the Institute for Advanced Study at Princeton, New Jersey says there may be a way to answer Wheeler's question and explain why the Universe behaves the way it does. If Max Tegmark is right, all logically possible universes exist. What he has in mind are universes 'which dance to the tune' of entirely different sets of equations of physics.

Replacing our Universe with a profusion of universes may have a big pay-off. The only universes that will be 'perceived' will be the ones containing life. If he can work out the conditions necessary for life to evolve then these conditions will specify the equations governing our Universe and tell us why they, and no others, apply.

The idea of a vast "ensemble" of universes is not new. In the *many worlds interpretation* of the quantum theory, the Universe splits into parallel realities at every quantum instant. According to the popular theory of the early universe known as *'inflation'*, our Universe is no bigger that a tiny bubble in a tremendously bigger Universe.

The main reason for believing in an ensemble of universes is that it could explain why the laws governing our Universe appear to be so finely tuned for our existence. In the 1950s, Fred Hoyle discovered that the step-by-step build-up of heavy elements inside stars depends on a series of spectacular coincidences. Only if the nuclei of beryllium-8, carbon-12 and oxygen-16 exist in particular energy states can hydrogen be built up into the elements of life such as calcium, magnesium and iron.

This fine tuning has a possible explanation - there is a multitude of universes. Only in those universes in which the properties of beryllium-8, carbon-12 and oxygen-16 are right for life would any life arise to notice any fine-tuning. This is called the *anthropic principle*.

Everywhere you look

Many other examples of fine-tuning have been found. For instance, if the strong nuclear force, which glues nuclei together, were only 1% stronger, two protons would stick to make a di-proton. In our Universe, protons are welded in the Sun via the weak nuclear force, which first converts one of the protons to a neutron, and is extremely slow. On average, it takes 10 billion years for two protons to combine, ensuring that the Sun burns its fuel slowly over the billions of years needed for life to evolve. If the di-protons were stable, the strong force would snap protons together so fast that the Sun would burn its fuel in less than a second and explode. If the strong force had always been stronger, all hydrogen nuclei would have been processed into di-protons in the *Big Bang* and there would be no hydrogen for stars to burn.

The weak nuclear force also appears to be finely balanced to permit our existence. During the catastrophic collapse of a star, the matter in its dense core is transformed into neutrons and a vast number of neutrinos. The neutrinos fly outwards and, in the process, blow away the star's 'envelope', triggering a supernova. Yet neutrinos interact with matter in the envelope only via the weak force. If the weak interaction were slightly stronger, the neutrinos would be trapped in the heart of the star and the explosion would stall. If it were slightly weaker, they would escape from the star without interacting with matter. Either way, the heavy elements forged in the massive stars, which are essential for life, would not be catapulted into space to be incorporated into new stars and planets.

Everywhere you look there are more examples.

Tegmark has found that only with three dimensions of space and one of time is physics both predictable enough and complex enough for the evolution of life while yielding stable structures such as atoms and planets.

Physics and maths

The fact that the laws of physics appear to be mathematical leads Tegmark to infer that one of the 'boxes' on the 'tree of mathematics' must correspond to our universe. In other words, it must contain the equations of the *theory of everything*. Every mathematical box should correspond to its own physical Universe. Universes for all conceivable mathematical structures: one consists of nothing but Euclidean geometry, another merely of complex numbers, etc.

'The key thing is that although every mathematical structure exists and has physical existence, only some are perceived to have physical existence,' says Tegmark. 'For instance, a universe consisting of Euclidean geometry exists but its equations are nowhere rich enough to evolve observers.' 'Observers' means any kind of life that could also be non-organic. The laws of physics would be slightly different for every universe containing life. Our Universe is simply one of a subset of universes, all compatible with life.

For further reading on this subject refer to *Anything Goes*, in New Scientist 6 June 1998

Pam Marchington

IN THE NEWS

HUGE GAMMA-RAY FLARE SLAMS EARTH

An intense wave of high energy gamma rays and X-rays, emanating from a catastrophic magnetic flare on a neutron star 20,000 light years away in the constellation of Aquila, pounded the Earth's atmosphere on Aug 27 this year.

The wave hit the night side of the Earth and ionized (or knocked electrons out of) the atoms in the upper atmosphere to a level usually seen only during daytime. It is extremely rare for an event occurring outside the solar system to have any measurable effect on the Earth. The blast was so powerful that it overloaded detectors on at least 7 scientific spacecraft in Earth orbit and around the solar system, including the NEAR asteroid probe near Mars and the Ulysses solar probe near Jupiter's orbit.

The blast of radiation originated from a newly discovered type of star called a *magnetar*. *Magnetars* are dense balls of super-heavy matter, no larger

than a city but having a mass greater than the Sun. They have the greatest magnetic field known in the Universe, being 800 trillion times stronger than the Earth's magnetic field. The field is so intense that it powers a steady glow of X-rays from the star's surface, often punctuated by brief, intense gamma-ray flashes, and occasionally by cataclysmic flares like the one observed. Astronomers think that all these effects are caused by an out-of-control magnetic field - a field capable of heating, mixing, and sometimes cracking the star's rigid surface to bits.

The star is a Soft Gamma Repeater (SGR), known as "SGR1900+14", and NASA's Rossi X-ray Timing Explorer satellite detected X-ray pulses every 5.16 seconds.

A *magnetar* forms from the explosion, or supernova, of a very large, ordinary star. The star's heavy centre collapses under its own gravity into a dense ball of super-compressed matter 20 kilometres wide. This "neutron star" consists mostly of neutrons in a dense fluid, but the outer layers solidify into a rigid crust of atoms about 1.6 kilometres deep, with a surface of iron.

Even with this solid crust, a magnetar is incredibly unstable. Almost unimaginable magnetic fields cause the crust to crack and ripple in powerful starquakes. The energy released in these explosive starquakes streams out into space as intense flashes of gamma-rays. In the Aug 27 flare, pure magnetic energy was also released, as the star's entire crust was broken to bits.

A magnet this strong could erase the magnetic strip on the credit cards in your wallet or pull the keys out of your pocket from a distance halfway to the Moon.

JUPITER'S WHITE OVALS

Giant swirling storms, called *white ovals*, in one of Jupiter's mid-section bands have collided to form a storm as large as Earth itself. The newly merged white oval is the strongest storm in our Solar System, with the exception of Jupiter's 300-year-old *Great Red Spot*. The storm, detected by the Galileo spacecraft in orbit around the Jovian system for the last 2½ years, is very cold (about -157 Celsius), but about one degree warmer than the surrounding areas.

ANTARCTIC OZONE DROPS TO NEW LOW

NASA and NOAA satellites have shown that the Antarctic ozone hole is 5% larger this year than in any previously recorded years. Data from the satellite instruments show that this year's ozone depletion reached a record size of 27.3 million square kilometres on Sep 19 over Antarctica, due to unusually cold stratospheric temperatures, though it is unknown why it is colder this year.

The decrease in ozone could result in more acute solar or ultraviolet radiation exposure in southern continents if the ozone hole were to pass over that region. One of the primary concerns with an ozone hole of this size is that, as the hole breaks up, the ozone-depleted air will diffuse and reduce the overall ozone levels in the mid-latitudes of the southern hemisphere, including Southern Australia.

These ozone losses are caused by chlorine and bromine compounds released by chlorofluorocarbons (CFCs) and halons. As a result of international agreements known as the *Montreal Protocol* on ozone-depleting substances, chlorine levels from CFCs already have peaked in the lower atmosphere and should peak in the Antarctic stratosphere within a few years. As we move into the next century, chlorine-catalysed ozone losses resulting from CFCs and other chlorine-containing species should be reduced.

The increased amounts of ultraviolet radiation that reach the Earth's surface because of ozone loss have the potential to increase the incidence of skin cancer and cataracts in humans, harm some crops, and interfere with marine life.

Ozone is measured in Dobson units, which measures the physical thickness of the ozone layer at the pressure of the Earth's surface. The global average ozone layer thickness is 300 Dobson units, which equals 3 millimetres. In contrast, during these annual occurrences, the ozone layer thickness in the ozone hole drops below 100 Dobson units (1 millimetre thick).

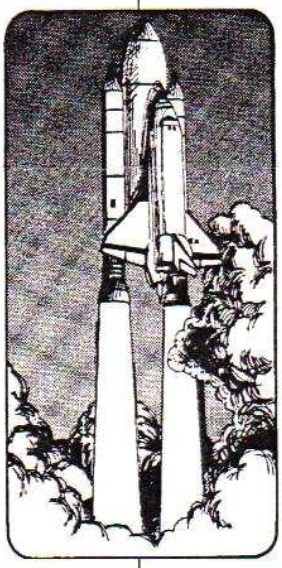
Ozone shields life on Earth from the harmful effects of the Sun's ultraviolet radiation. The ozone molecule is made up of three atoms of oxygen; ozone comprises a thin layer of the atmosphere that absorbs harmful ultraviolet radiation from the Sun. Most atmospheric ozone is found in a thin layer between 10 and 29 kilometres above the Earth's surface.

FEATURE

Photographs accompanying this article were unavailable at the time of going to press, but will appear in a later edition.

ANDY THOMAS IN TOWN

On Sunday evening 27th Sep, several society members were lucky enough to have reserved seats in the front row at RMIT Storey Hall in Swanston Street, Melbourne, to hear Andy Thomas talk about his experiences as an astronaut. Dr. Andrew Thomas is Australia's only astronaut in the current astronaut corps, and about 500 people of all ages and backgrounds crowded in to hear him tell of his experiences preparing for life aboard the Mir space station, in Star City in Russia, and his adventures onboard.



Amongst several gruelling tests to prepare for the flight, Andy was dropped North of Siberia then abandoned for 2 days to survive. This necessitated learning how to build snow caves and igloos, and being dropped into the ocean in a mock-up space capsule, then having to get out of their space suits and into survival suits in a space the size of a car's front seat section (and there were three onboard to do this)!

He showed a video of the space shuttle launch, life on Mir and, of course, re-entry. Contrary to press reports, his return was not afflicted as being the worst physical shape of any returning cosmonaut, although he related the shock of trying to stand and move after 4 months in weightlessness this year (apparently like having your legs replaced with large lumps of lead). On re-entry, the transition from weightlessness to full gravity was slow, and the straps holding him to his seat went from floating to slowly descending.

The video showed his passage over Adelaide and Melbourne, with Port Phillip bay appearing remarkably small from the height of the space station. He said the only manmade feature visible to him was the trans-continental railway, which appeared as a very fine line drawn across the Australian outback, though patterns from farm areas were also just seeable. The cities only became evident at night due to their lights and from Mir you could simultaneously see the lights of Adelaide, Melbourne and Sydney, with Brisbane shining just over the horizon. He joked you could not see Canberra due to the perpetual black cloud that hangs over it!

While on Mir, Andy performed numerous scientific experiments and much was learned. Every task in zero gravity is more arduous than on the Earth, necessitating the cosmonauts be fit, but not to athletic extent, especially when performing EVAs (space walks) to repair or replace parts of the station outside.

Speaking Russian was a necessity as all instruments on Mir are in Russian, and so he had to learn it for a year before the flight as preparation. His formal qualifications are in engineering from the University of Adelaide, though specific astronaut/cosmonaut training was necessary once he was chosen for entry into the astronaut corps at the Johnson Space Centre in Houston.

Question time was unsurprisingly lengthy, with many taking the opportunity to quiz an astronaut up close and personal. After jumping up and down in her front row seat with hand held high in the air, the wandering microphone came over and my 5-year old daughter Cassandra confidently asked *"Was it dark and scary?"* to which she was reassured it was a little bit dark, but not at all scary up there. The audience chuckled at the question, which was one of many she wished to ask. Dayle Moriarty asked about what happens to all the toilet waste, and found this was all loaded onto a Progress capsule along with other material to be discarded, and jettisoned for re-entry and burning up over the ocean. Both these questioners met Andy before the lecture, shook hands, said hello and received his autograph. Now that's guaranteed to impress anyone. Other questions asked about the effect of sneezing in space (you do actually move a little in the opposite direction), and the hopes for a piloted mission to Mars (believed to occur within 20 years' time).

There were many interesting exchanges with Andrew Thomas. He was heartened that Australia had started to use the Woomera Rocket Range again, and called for Australia to seize the opportunity to use the Northern tip of Cape York peninsula as a launch facility for

rockets, this being near the equator and able to use Earth's natural slingshot effect. This would create a large number of jobs and continue indefinitely as satellite launches were big business and Australia has a definite geographical advantage.

It was fascinating to discover that Russian space suits are one-piece affairs, and you open the door (like a fridge door) on the back, step in, then close the door behind you. This differs from the American ones that are put on like donning a suit, i.e. one piece at a time.

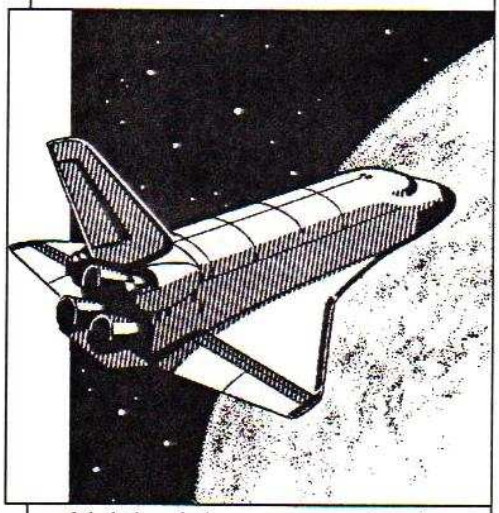
Interestingly, Andy has yet to see the Great Wall of China from space, and would love to go to the Moon if the chance ever arose.

In orbit, all the food is dehydrated and packaged, to which the cosmonauts add water, then knead it, before eating it with a straw. Despite everything being like baby food to eat, he related that it tasted surprisingly good. Fresh supplies are periodically brought up to Mir from the ground, and the robot spacecraft that does this is packed with waste, and allowed to burn up on re-entry into the Earth's atmosphere. Prized in the resupplies is chocolate - no surprises here I guess. Each Mir tenant has videos they can watch in their "spare time". These are smaller cartridge size than normal video cassettes, and Andy took along 70 with him.

Even moderate exercise in space, which is necessary to prevent accumulated muscle wastage and bone mass loss, causes the occupants to perspire profusely, because in space sweat stays on you and does not evaporate away, hence you are almost perpetually in an unpleasantly wet state.

The Mir craft is reasonably cramped, with equipment lining the inside of each tubular module like plaque around the inside of an artery in the body. It is apparently quite a psychological challenge living with 2 or 3 others in relatively cramped conditions, round the clock, with no respite.

After dozens of questions, the evening concluded with a presentation of a bottle of Australian red wine, however, about 100 then lined up to ask him more and take photos,



which he duly accommodated despite being undoubtedly well and truly jet lagged. The experience was truly inspirational, and Australia's ambassador from space went back to his hotel, and probably to a cold shower due to the gas disaster, maybe in the knowledge that some in the audience could very well follow in his footsteps.

Special thanks go to new member, Betty Brady, and her friends for bringing this talk to our attention.

Peter Skilton

THE JOY OF THERMAL UNDERWEAR

The main joy is that you don't freeze to such an extent that it takes you three days to recover from that chilled to the bone feeling (of course, some would argue that saner people would just stay snug at home watching television). Thermal underwear can be considered as a reasonable alternative to freezer suits for some people. Before discovering thermal underwear, I used to wear so much clothing on a cold night, that I could have fallen over without any discomfort.

The cheapest underwear costs around $14 for long sleeved tops and $18 for pants (falling to $11 as winter progresses). It is made of cotton and can be bought at K-Mart or Target stores. I find this best for use in early autumn or late spring. Other warmer and dearer cotton and/or polyester and/or wool blends are available at the above stores and at Myers.

However, for those really cold nights the straight polypropylene fabric underwear is the way to go. Long sleeved tops and bottoms usually sell for around $29 to $34 each at the beginning of winter, and prices start dropping thereafter. They are currently at $23. Most of the big camping and ski places sell them, and whatever the brand name, e.g. Winter Designs, Ocean Designs, etc., they all look suspiciously alike, and they are all made in New Zealand.

Coupled with other essentials, such as a thin scarf, Thinsulate Beanie, Thinsulate Gloves (without the fingertips), and Explorer socks, I can now spend a pleasant 5 or 6 hours under a frosty winter's sky.

Renato Alessio

CELESTIAL HEAVYWEIGHTS

The largest known star is *Mu Cephei* with a radius of 11 times the Earth-Sun distance. The most massive star is *Eta Carinae* (100 solar masses). The largest known meteorite in the ground (an estimated 60 tons) lies in a farm in Namibia. The largest dug-up meteorite, the *Ahnighito* (34 tons), is on view in New York's American Museum of Natural History. The furthest galaxy (a distinction which changes frequently) is an unnamed object in Virgo with a redshift of 4.38. The most distant known object is the quasar PC 1247+3406, with a redshift of 4.897. The brightest recorded supernova occurred in the year 1006. As bright as a quarter Moon, the object was visible in daylight and cast shadows at night.

Simon Hamm

ICEBERGS AND OCEANS ON EUROPA

Pictures from the *Galileo* spacecraft have suggested that Jupiter's moon Europa was covered with an Arctic-like fractured ice sheet. The images reveal what look like detached icebergs that can be traced back to earlier lodgements. Scientists believe that the turned-around ice blocks are probably floating on an ocean kept at least partially liquid by tidal forces from Jupiter or possibly from heat generated by internal radioactivity. The relative lack of impact craters and the extensive scarring imply, furthermore, that the icy surface is young (millions of years) and in places thin (several km). The last time a new ocean was reported was five hundred years ago when Balboa supposedly discovered the Pacific.

Simon Hamm

ASTRONOMY 1999

Orders for the next edition of the excellent and highly popular annual sky almanac *Astronomy 1999* will be taken at the November general meeting, or over the phone to the editor afterwards. Copies may be available for this meeting, depending on the final publishing date. If pre-paid at the November meeting, an extra discount will be applicable. Prices in all cases will be better than retail and will be well under $20. As in previous years, ordered books can be collected at a subsequent society get-together or monthly meeting, or by special arrangement. Why not order an extra one as a Christmas present for someone else?

ASF NOW ON IAUC LIST

A new 6 month trial service is now available for full members who have access to email (electronic mail) and wish to receive the IAUC circulars. These brief circulars are issued by the *International Astronomical Union, Central Bureau for Astronomical Telegrams* the moment new discoveries are made in astronomy, for example such as new novae or comets. They are forwarded to professional observatories around the world and also to some amateur societies, alerting them of new phenomena well before any details reach the press or in astronomy magazines.

Within our Society, if you are interested in receiving these circulars (approximately one per day) then please forward your email address to Ian Porter on *sharian@alphalink.com.au*, who is coordinating the distribution. If you wish no longer to receive them, then please send him an appropriate message. One condition stipulated by the IAUC is that you agree not to forward any part of the circulars on to others who are not full financial members of the society. At the end of 6 months, we will review the service.

For those who do not have email access, the circulars will be available for browsing at the next society monthly meeting.

TWO NEW INTERNET WEBSITES AVAILABLE

The Occultation Section of the *Royal Astronomical Society of New Zealand* has announced that its new website is now open for business. The site has two functions:

1) To promote all types of occultation observing by providing basic information of interest to any amateur astronomers wishing to contribute useful scientific results;

2) To provide timely information about occultation events in the vicinity of New Zealand, Australia and the southwest Pacific.

Graphics have been kept to a minimum to keep the site fast-loading. Pages up so far include:

- Total Lunar Occultations (with predictions for bright 1999 New Zealand events);
- Grazing Occultations (including downloadable predictions for upcoming New Zealand [and shortly Australian] 1998 grazes; how to plan, observe and report a graze; and recent graze results);
- Planetary Occultations (including how to observe planetary occultations, selected downloadable

predictions and charts for 1998, and advance notice of events for 1999);
- Eclipses of Jupiter's Satellites;
- Downloadable report forms for most types of occultation observing; and
- A comprehensive set of links to other occultation and general astronomy sites.

You can find the site at http://occsec.wellington.net.nz.

The other new site has been put together by the *Ballaarat Astronomical Society*, and focuses on the historical observatory over which they have stewardship. Their site can be found at http://www.giant.com.au/astronomy.

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.

Astron. Soc. Tasmania (Tas) - Article on the Australian Antarctic Lidar facility for probing climate change in Antarctica, which has been tested in Kingston. The Lidar's laser sends pulses of light high into the atmosphere and measures the back scatter as a function of altitude. Articles on recent Hubble telescope discoveries, and a reminder to watch out for aurorae, which appear to be more frequent around the equinoxes, for unknown reasons.

Latrobe Valley Astron. Soc. (Vic) - A bat (nocturnal variety) was seen in their Evans telescope house. A 12 inch Dobsonian is up for sale. They are prototyping an internet page, and surveying the needs of their members. Detailed ideas have been floated on their society's direction and focus, and much discussion has ensued.

Astron. Assoc. Queensland (Qld) - They are writing to their Science Minister for funding for Earth crossing asteroid work. A new Qld society has formed, known as the *Bundy Skywatchers*. Report on the 1998 Queensland Astrofest. Software review given of *SkyMap for Windows*. A brief history is given of the AAQ. An 11 inch Celestron Ultima Schmidt Cassegrain telescope is for sale.

Astron. Soc. South Australia (SA) - Articles on Comets and Life, on Astronomy, Creation, Evolution and Religion, and on the bright star Arcturus. Book review of *Cosmic Bullets* by Clay & Dawson. How to identify satellites in the night sky. Some feedback from Canada on what to look for in cold-weather observing gear - they should definitely know what they are talking about! Feature on the star epsilon Eridani, and the chances of life having evolved around it. Recent geochemical evidence of comets that pummelled Earth only 36 million years ago in Italy, Siberia and USA. Background on how asteroids are named.

Astron. Soc. New South Wales (NSW) - They are amending their constitution, and trying to crack the 300 member barrier. Article on the Sun. A full debriefing report is given on the 1998 South Pacific Star Party, which included small rocket launches this year, several professional astronomers in attendance, and saw over 280 in attendance, and was extremely successful, raising over $5,000 profit. A member has donated $23,000 for an amenities block for their viewing site in Ilford! Consideration is being given as to whether or not to get their radio telescope dish operational at their Wiruna 100 acre property. Articles are given on the search for Pluto, the Great Melbourne Telescope, the runaway protoplanet in Taurus, and a sky tour of objects along the local meridian. An excellent series of detailed articles and design diagrams are given on making your own Dobsonian telescope from scratch. Telescope design for the disabled observer is given.

Astron. Soc. Victoria (Vic) - The government's Melbourne Observatory is undergoing development with the main building being restored to reflect its appearance a century ago, with half set aside for corporate functions. It is hoped to have historical and astronomical displays on show. The society hopes to continue public demonstrations near the end of 1998 on the site. It is planned that the domes will be silver and heritage mustard in colour. A new nova was discovered in Sagittarius. Looking at using cheap video cameras at public nights.

Astron. Group Mount Isa (Qld) - Finder chart provided for comet Williams. Doing viewing nights with the CSIRO Double Helix Club, and public solar observing as well. Bright fireball reported in August. Background material on lunar and solar eclipses.

Ballaarat Astron. Soc. (Vic) - Restorations of their observatory are continuing with a cedar bench in their Baker building being refurbished. A full account of their 40th anniversary celebrations is given, where up to 90 attended this successful gathering, and media coverage was provided.

Sutherland Astron. Soc. (NSW) - Succeeded in making a profit from NACAA where 114 attended. Work is underway on the mechanism of their new observatory roof. They have video taped several educational talks, which are available in their library. The society is listed in phone books and added to local Council "Welcome to the Shire" signs. They have an internet home page, and also subscribe to the IAU Circulars.

FINAL PRONOUNCEMENT - HELIACAL RISING

The rising of a bright star just preceding the Sun at Sunrise is known as its heliacal rising, pronounced *"helly-ack-all rie-sing"*. This would in practice be the date when the star was first observable in the Eastern dawn sky after having been previously swamped by the light from the Sun on earlier dates. In ancient Egypt, the heliacal rising of the brightest star in the sky, *Sirius* (alpha Canis Majoris), was used to warn of the imminent flooding of the River Nile.

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.

ASF Inc. Annual General Meeting *(AGM)* Elections

Nominee: _____

Proposer: _____ } must be current financial members

Seconder: _____

Position (tick 1 or more***):

Office Bearers: ❑ President ❑ Vice President ❑ Treasurer ❑ Secretary

Ordinaries: ❑ Public Officer ❑ Ordinary Committee Member (5 of these)
❑ Editor ❑ Librarian ❑ Public Relations
❑ Briars Coordinator ❑ Phenomena & Observations

Acceptance Signature of Nominee: _____ **Return to Secretary prior to 7 days before AGM.**

****Note that one person cannot nominate for multiple Office Bearer positions.*

Left - Xmas BBQ Mt Martha Park on the 5th December 1998

Photo - By John Cleverdon

❑ If this box is ticked then membership needs immediate renewing and this may be your last edition, so please contact the Treasurer. 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.

COMPETITION

Find both the longest and the shortest astronomical term you can. The longest will have the most letters possible, and the shortest will have the least. Hyphenated words are allowed. You will be scored by dividing the number of letters (A to Z) in the longest word, by the number of letters in the shortest word, with hyphens, numbers or other non-alphabetic characters not being included in the count. For example, the longest term might be "Sagittarius" and the shortest "Moon". Your score in this case would be 11 divided by 4 = 2.75. Or the longest term might be "Jewel Box" and the shortest "ion", which would give a score of 8 / 3 = 2.67. The committee's decision is final.

The winner will be the 1999 financial member of highest score who writes the longest & shortest words (correctly spelled) clearly on the back of an envelope and posts it to the Society's address at P.O. Box 596, Frankston 3199. Entries close on 1999 Jan 16. The prize is a block of 4 hard-to-get USA *First Man on the Moon* stamps from 1969 featuring Neil Armstrong stepping down the ladder of the lunar module onto the Moon's surface (these are in mint condition), and a mini-sheet stamp (also perfect condition) issued by the USA Postal Service of the *Mars Sojourner Rover* robot vehicle that was driven around on Mars in 1997. The stamp shows one of the actual photographs taken on the surface of Mars, and on the gummed side of the stamp are printed details of the mission.