



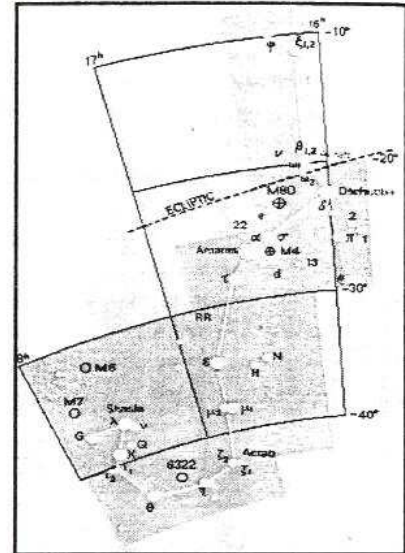
SCORPIUS

The Journal of the
Astronomical Society of Frankston Inc.

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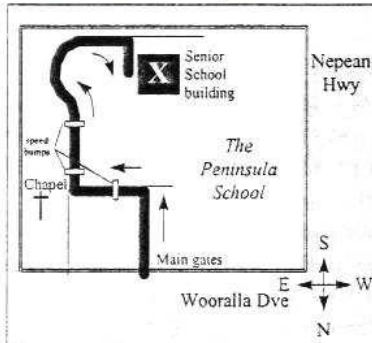
Volume X, No. 6 (Nov 2001)

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 theatre, 8pm on 3rd Wednesday of each month except December.
Phone: 0419 253 252 **Mail:** P.O. Box 596, Frankston 3199, Victoria, Australia
Internet: <http://www.asfnet.20m.com>
E-mail: aggro@peninsula.starway.net.au

Visitors are always welcome!



Annual Membership	
Full Member	\$35
Pensioner	\$30
Student	\$25
Family	\$45
Family Pensioners	\$40
Newsletter Only	\$16
Organisation	\$50

DUE 1ST OF JANUARY EACH YEAR

President	
Peter Skilton	0414 645 077
Vice President & Editor	
Richard Pollard	0419 100 802
Treasurer	
Neil Hewson	(03) 5975 7710
Secretary	
Sally Zetter	(03) 5976 2679
Committee of Management:	
John Cleverdon, Marty Rudd, Peter Lowe, Russell Thompson, Ian Sullivan	

All calls after hours and pre-8:30pm please.

FUTURE EVENTS

General Meetings:

Wed 21st Nov 2001 ANNUAL GENERAL MEETING. Nomination forms for Committee were in last edition or are available from the Secretary.
Session 1: Guest speaker: John Goodall on *Astronomical Photography*. John is a retired secondary school teacher from Dromana with over 30 years experience in scientific and astro-photography, and will show much of his colourful work as well as the tricks of the trade.
Session 2: Video on *The Christmas Star*.
Session 3: Informal interaction.

Remember: There is NO General Meeting in December.

Wed 16th Jan 2002
Session 1: Peter Skilton will speak on *The Natural Treasures of Cranbourne – Hunting Number 13*. In the 1850's Victoria was famous worldwide not so much for its gold rush, but rather for the enormous nickel-iron meteorites

that were discovered on the Mornington Peninsula and which were the largest in the world. Twelve are known to science, but perhaps there are more.
Session 2: Video on *Miracle in Orbit: The Hubble Space Telescope*.
Session 3: Loan telescope and informal chat outside if weather is clear.

Viewing Nights:

Members Only:
NOTE: Members nights are also now held on Fridays!

Nov 9th/10th and 16th/17th, all at *The Briars*, Nepean Hwy, Mt. Martha.

Dec 7th/8th and 14th/15th, all at *The Briars*, Nepean Hwy, Mt. Martha.

New attendees must always confirm with David Girling on (03) 5976 2806 before attending. Remember for security reasons you can only attend on planned Members' Nights, unless by prior arrangement with David who will liaise with *The Briars* accordingly. Last person out must switch on the shed security light.

Working Bees: Nov 4th and Dec 2nd at The Briars ~~beginning~~ starting at 11am, with ~~tea and coffee provided.~~ Strategy discussions will follow after these for those interested in participating.

Public, School & Community
Groups Viewing/slide nights:

If you can assist, please contact the Secretary. All events are at 8pm.

Fri 9th Nov, Thomas Mitchell Primary School, Thomas Mitchell Drive, Endeavour Hills, Melways 91/G5. 200+ (!) expected. **HELP NEEDED with telescopes!!! We need another 5.**

Wed 14th Nov, Resurrection Primary School. *The Briars* Education Centre, Melways 151/E1, 50 expected. We need 1 more telescope.

Thur 22nd Nov, Kingsley Park Primary, Franciscan Ave, Frankston Heights. Melways 103/A9. 100 expected. We need 5 more telescopes.

Mon 26th Nov, Kingsley Park Primary, Franciscan Ave, Frankston Heights. Melways 103/A9. 100 expected. We need 6 telescopes.

Fri 7th Dec, Monthly Public Viewing, *The Briars* Visitors Centre, Melways 145/F12. 60 expected. We need 4 more telescopes.

Mon 10th Dec, Derinya Primary School, *The Briars* Education Centre, Melways 151/E1. 80 expected. We need 4 more telescopes.

Wed 12th Dec, Derinya Primary School, *The Briars* Education Centre, Melways 151/E1. 80 expected. We need 4 more telescopes.

Fri 4th Jan, Monthly Public Viewing, *The Briars* Visitors Centre, Melways 145/F12. 60 expected. We need 4 telescopes.

Fri 11th Jan, Public Viewing, *The Briars* Visitors Centre, Melways 145/F12. 60 expected. We need 4 telescopes.

Sat 12th Jan, Coast Action, *The Briars* Visitors Centre, Melways 145/F12. 60 expected. We need 4 telescopes.

Fri 18th Jan, Public Viewing, *The Briars* Visitors Centre, Melways 145/F12. 60 expected. We need 4 telescopes.

Fri 25th Jan, Public Viewing, *The Briars* Visitors Centre, Melways 145/F12. 60 expected. We need 4 telescopes.

- Assistants are required for all of the above viewing nights. New members are welcome to watch, and participate if desired – after all, we all started somewhere!

Social Events

Leonids 2001

It's only a matter of days to go before astronomers all over the world will take up positions in dark spots to view, photograph and record *The Leonids* meteor shower.

Many in the ASF and ASV will take the opportunity of a lifetime and journey near and far to catch the show. Marty and Leanne Rudd, Phil Snelling and myself are heading off to Alice Springs, while Don Leggett and David Girling will head to the vicinity of Broken Hill, and Ken Bryant is off to Coober Pedy.

Recent displays of *The Leonids* have been disappointing in Australia, but have come very close to predictions, and with those predictions favouring Australia this year, hopes are high for some serious action. Combine this with the pristine skies of the outback and a near new moon and you can see why such an effort has been made.

The two peaks on the morning of Monday, November 19th are predicted for 1724 UT (4:24am) and 1813UT (5:13am) with maximum rates of 2,000 and 8,000 per hour. These are Melbourne daylight savings time.

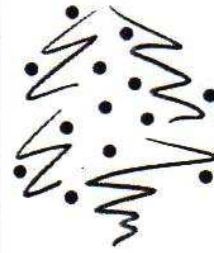
Of course, you don't need to travel far to view *The Leonids*; just a comfy chair and anywhere that has a clear north eastern horizon.



While in Alice, our group will also take the opportunity to visit the Henbury Meteorite Craters, Uluru and Gosse

Bluff, the remnant of a massive impact some 130 million years ago (above).

ASF Christmas BBQ



The annual ASF Christmas BBQ will start at 5pm on Saturday 8th December, and will be located at *The Briars* observatory site. All food/drink will be BYO.

There will be the BBQ and electric urn already there to use.

The Time Capsule will be placed in the ground during the function as well, so members are welcome to bring along any items they wish to place in the time capsule. The circular screw lid is 30 centimetres in diameter.

NACAA XX

Notification has been received from the Astronomical Society of South Australia, that the next biennial National Australian Convention of Amateur Astronomers (pronounced "Nayser"), which is the 20th, will be held from 2002 March 29 to April 1. Registration forms and a call for papers for presentation have been issued. The venue is the same as in 1992 when they hosted an earlier NACAA, at the Royal Coach Motor Inn in Adelaide. They have set up an information webpage at www.assa.org.au/nacaa2002. This convention is suitable for both beginners and advanced amateurs, and has professional astronomers also sometimes in attendance or presenting.

YOUR SOCIETY

NEW MEMBERS

Welcome to the following new Society member(s):

Darren Baker
Alex Dickson
Gillian Fox
Frank Lang
Sebastian Szalai

The current number of members is 167 and you wish to join the ASF, contact information through E-Scorpius or EAMN for meteors, please contact

Richard Pollard. If you wish to go on the southern Australia Aurora Alert telephone network, then contact Roger Giller.

LIBRARY MATTERS

The library has acquired the following new arrival:

Features of the Ballarat Municipal Observatory, by Bill Fiddian and Karenza Burk. This very colourful and well-written booklet issued by the Ballarat Astronomical Society details the history and significance of this famous Victorian landmark near Sovereign Hill and the people who championed it in the last two centuries. It gives a concise explanation of its historical stained glass windows, and of course the history of its telescopes, which are still in use today and open to the public.

Each year the society bulk buys for its members copies of an astronomical almanac produced by Quasar Publishing, and makes these available to members below retail price. The proceeds from these sales go directly to acquiring new books, videos, CD Roms



etc. for the Society library. If you have a request for the purchase of a particular book or other item, then please shop around and forward details of its

title, author, price, retailer etc. to either the Librarian or Assistant Librarian at meetings, or to Peter Skilton by phone, who may then be able to procure it, depending on demand and funds.

ASTRONOMY 2002 IS HERE

Orders for the next edition of the excellent and highly popular annual sky almanac *Astronomy 2002* will be taken at the November general meeting, or to Peter Skilton before or after by leaving a message on the Society's phone number of 0419 253 252. Price is still \$18 to members, or \$20 to non-members. Ordered books can be collected at any society get-together, viewing night or monthly meeting, or by special arrangement.

Why not order an extra one as a Christmas or birthday present for someone special to you?

As in all previous years, remember that proceeds made on the sale of these books supports your Library for purchase of all books, videos and other material, so please resist buying these elsewhere - support your Society instead.

FILLING IN THE HISTORY GAPS FOR POSTERITY

The Society is attempting once again to assemble some complete sets of our Newsletter/Journal spanning back to the earliest days of the ASF in 1969, when mankind ventured to the lunar surface (the trigger of our formation).

If you have copies of *Scorpius* pre-1990 tucked away in the back of a cupboard, or in your attic gathering dust, then please bring them to the attention of Peter Skilton who will either gladly take them off your hands (if you need the room) or, if you wish to keep them, arrange to have them photocopied for the Library. When complete sets (possibly three) have been collated, the aim is to have them properly bound and stored in separate locations, perhaps even in the State Library.

If you have these historical records, then please don't delay bringing them forth before they might be lost forever.

RECENT MEETINGS

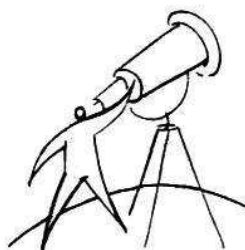
September's meeting, in the wake of the terrorist attacks in the USA, was chaired by the President and saw 46 in attendance on a clear evening. The entire proceedings were video taped for inclusion in the Time Capsule and for placing into the Library for borrowing. The monthly raffle prize was a nickel-iron meteorite and some astronomy books. Ian Porter started the segments with the rocket launches during the preceding six weeks, and noted that the amateurs who usually track military satellites and report their positions on the internet had agreed to withhold this data from now on because of the likely American military response. David Girling then spoke about the freely available Occult computer program for predicting lunar occultations. Roger Giller presented on the impressive auroral displays that had been photographed in mid-August and early

September in the northern hemisphere from Europe and the USA (unfortunately during our daytime). Bruce Tregaskis then showed current sunspot arrangements and spoke about the Alpha Centauri system. Ian Sullivan then shed light on the magnitude brightness scale and its history for beginners and those requiring a refresher on the topic. John Cleverdon then presented on available GIS (Geographical Information System) software of use for astronomical purposes such as for layered planetary maps (on the internet) and for star charts. The audience then assembled at the front of the theatre to be video taped for posterity before moving out for the tea break. Following the break, people then reassembled either to see the video on *An Astronaut's View of the Earth* in one room, informally discussing general matters in a second room, or to hear the excellent lecture by Peter Lowe on *Cosmology in the 20th Century*. This talk walked through the history of enlightenment in our knowledge of the wider Universe and its birth and the theories that have arisen along the way up to now. Meeting closed at 10:50pm.



October's meeting, chaired by the President, saw 62 members and visitors (including from overseas) turn up on a rainy evening. The entire meeting was video taped for inclusion in the Library. Apologies were reported from Bruce Tregaskis who was ill, and from Peter Hyson who had recently suffered a stroke and was slowly recovering. Unfortunately, the meeting was moved back into a classroom because the usual theatre was being used for a school function, and conditions were somewhat cramped. David Girling opened the information segments, presenting on eclipses of Jupiter's moons. Roger Giller followed with his Skylights, involving his laptop connected to a 17-inch colour monitor (as the usual data projector in the theatre was being used). This was particularly colourful as there had been scores of aurorae photographed during the month from the northern

hemisphere (we succumbed to weather or daylight). The President circulated sky charts for the month, kindly prepared by Bob Heale. Russell Thompson then presented a technical segment on telescope aperture, magnification and exit pupil, in response to a request from the idea/suggestion box. Ian Sullivan continued on from last month explaining about absolute magnitude and introducing the parsec measure of distance. Following the raffle draw, the group adjourned for a tea break, after the school people had vacated the kitchen area, then reconvened into a single session in the now vacant theatre. Marty Rudd, a seasoned meteor observing veteran and contributor to an IAUC telegram a few years ago, then gave a good primer on The Leonids meteor shower expected to peak on the early morning of 19th November. He explained why the latest calculations showed that we would expect two peaks of storm activity this year. These will be a once-in-a-lifetime phenomenon as the Earth sweeps through two debris fields left by the tail of comet Tempel-Tuttle on earlier orbits around the Sun. Marty fielded a large number of questions during the talk, and demonstrated the equipment he uses, culminating in a video of The Orionids meteor shower he obtained using a light intensifier last year. Because of the audience interest, the meeting continued until 11pm.



The public night on September 7 saw 65 in attendance on an evening with incoming threatening weather. As a

result, the assembly viewed outside through the telescopes first, getting good views of Mars, double stars and a number of constellations, followed by the talk by Richard Pollard and Peter Skilton. Thanks to Neil Hewson (sporting a cold) and Don Leggett for welcoming table duties, and in the field were Phil Snelling, Bruce Tregaskis, Ken Bryant, John and Roger Cleverdon, David Huby, Greg and Val Walton and the Florey family. Sally and Justin Zetter and Jane McConnell kindly then folded the next newsletter for posting.

The public night at The Briars on October 5 saw 30 in attendance to hear the talk by Richard Pollard. Once again the weather was far from favourable, however interest seemed to be high despite severely limited observing. Thanks again to Neil Hewson and Don Leggett for those table duties, Phil Snelling, David Huby, John Cleverdon and others.

The public night at The Briars on November 2 saw 30 in attendance to hear the talk by Peter Skilton, tailored as preparation for The Leonids meteor storm. The skies were clear and, as an added bonus, the talk was punctuated twice; once by an adjournment to watch the International Space Station pass over at magnitude -0.5 , and once again to see an Iridium Flare from Iridium satellite 55 over near Musca at magnitude -6 . There were additionally a surprisingly large number of members with their telescopes who turned up unexpectedly (they weren't on the roster). Thanks in the field to David Girling, David Huby, Don Leggett, Neil Hewson, Sally Zetter, Darren Baker, John Cleverdon, Jane McConnell, Ian Sullivan and Jakub B, Ken Bryant, Marty Rudd, Ronald Ritchie, Ian Porter and Greg Walton.

Schools and Community Groups:

Eighty-five pupils and teachers from Penbank Primary School were visited by the Society on September 4 at Camp Manyung. The talk and Q&A's were given by Peter Skilton, and had to contend with the noise of heavy rain on the roof of the hall. The night was still fully overcast following the talk, so the excited kids, and a couple of pumped-up teachers (one highly interested in space and satellites) went off to bed. As the optimistically set up scopes were just packed away and the crowd dispersed, the skies miraculously cleared, leaving a cool but steady starscape. Such are the vagaries of our weather. Thanks in the field to Ken Bryant, Neil Hewson and David Girling, and to Ian Sullivan and Roger Giller for being on-call.

The working bee/barbeque at The Briars site on Sunday, September 9, saw mowing and brushcutting as the primary activity. About a dozen cows were on the site and roaming around prior to work commencing, and had to

be herded off by disappointed members. The work was followed by a free social barbecue for participants then an informal discussion about possible plans for the site development. Thanks for their efforts to David and Hayden Girling, Mark Hillen, Jane McConnell, Greg Walton, Russell Thompson, Peter Skilton and John Cleverdon (all of whom remembered to put their name in the site log book).



TANKS A LOT

Marty Rudd and his father have kindly donated a 1500 litre water tank to be located next to the upper storage shed. The roof runoff will be collected and subsequently used for watering the plants, helping to make the site more environmentally sustainable in the longer term.

OBSERVATIONS:



The Reason I Like FORNAX is...

... That it is pure galaxy heaven. No where else in the southern sky can one aim a moderate sized telescope and spot bright galaxies no matter which direction one goes in. Every year I make it a point getting dizzy moving my scope at random around this small galaxy field, and seeing how many galaxies I can get into the eyepiece's field. The best I've done is six.

The sad thing about Fornax is that it is rarely mentioned by recreational astronomers, probably because it doesn't have bright stars, and is difficult to find without some sort of map. I always make my way to it by starting off from Achernar (the bright star pointed to by the Southern Cross), and following the river of Eridanus to a little triangle of stars (e, f & h Eridanus). The galaxy concentration is right next to them.

Sky Atlas 2000 1st Edition plots around 30 galaxies in Fornax, and many more are plotted in AstroAtlas. If

you have a 6" to 8" scope and you haven't explored this constellation, then you are in for a treat. If you have a 10" or bigger scope, and haven't explored this constellation, then perhaps you may find pottery, drama or the opera more suitable as a hobby.

Finally, the biggest observing challenge in Fornax is the Fornax system. This is a very big dwarf galaxy, very close to our own. I found it extremely difficult to see, despite its being plotted in most atlases. I never saw it in my C8. But various guides said it was supposed to be visible with telescopes as small as 3" or 4", providing one had a really dark sky. I used a trick out of Sky and Telescope to finally see it using my 14.5" dob. The trick was to use a No.12 Yellow Filter, which I held between my eye and the eyepiece. Spotting the three globular clusters around the Fornax system galaxy was tough going in my dob, but not as tough as seeing the galaxy itself. Good luck.

Renato Alessio

There were several geomagnetic storm and aurora alerts issued by email since last edition, however, poor weather over Victoria precluded any sightings of dancing lights in our sky.

NEWS



Mars Odyssey Reaches Orbit (SPACE.COM)

The Mars Odyssey spacecraft has succeeded in one of the most tricky and critical parts of its mission by slipping into orbit around the Red Planet. Odyssey emerged from behind Mars for the first time after 20 minutes of planned but tense silence enforced by Mars itself, which blocked radio signals from reaching Earth. "Finally after a long wait ... we are in Mars orbit," said Orlando Figueroa, head of NASA's Mars planning. Simultaneous cheers went up at NASA's Jet Propulsion Laboratory, which manages the mission, and at a subsidiary mission control centre at Lockheed Martin Astronautics in

Denver, Colorado. Lockheed Martin built the spacecraft.

But there were a few tense moments. After Odyssey's main engine was expected to kick in, which began the insertion, the craft's status was not known for about 5 minutes.

"That was a little longer than expected," said Robert Mase, navigation team leader. "That was a bit of a nail biter."

Then Odyssey zoomed around Mars and went out of radio contact. One of several Earth tracking stations made contact with the craft roughly 11 seconds after the planned time -- well within expected limits, officials said. The craft's emergence from behind Mars marks the first success in three tries by NASA to put a spacecraft on or near Mars.

More work is ahead to get Odyssey into its final, proper orbit. But officials at NASA and its Jet Propulsion Laboratory, which manages the mission, were excited and relieved after having spent months going over mission plans and the spacecraft's vital signs with unprecedented scrutiny to ensure every opportunity for success. Odyssey is a mission they cannot afford to botch, given the 1999 failures of Mars Climate Orbiter and Mars Polar Lander.

Outgoing NASA chief Dan Goldin hugged JPL director Charles Elachi after a cheer went up at mission control. Several other top managers hugged each other. An American flag hung on the wall above several rows of computers.

The mission...



Odyssey will not land on Mars. Instead, after it has settled into its final orbit by early February, it will begin a comprehensive mapping of the Martian surface, as well as its radiation environment. The visible-light and infrared images to be collected will complement and improve upon pictures and other data gathered by other robotic Mars explorers, including the currently orbiting Mars Global Surveyor.

Among the primary mission goals are to look for signs of water or ice, as well as hot lava, just under the surface of Mars, and to determine how deadly the radiation on Mars is. The objectives, if achieved, will help NASA plan possible future human missions to Mars.

"We made it," said Benton Clark, chief scientist at Lockheed Martin and a specialist in Mars exploration. Clark said Odyssey is an important astrobiology mission. By using the probe's science instruments, the search for hydrothermal vents on Mars can begin. These hot spots on the planet are ideal places for life, he said. "Hot water, rock and soil are nice niches for bacteria," Clark said. The first photographs from the mission are expected to be returned and released to the public in early February.

Leonids pose a threat: A severe meteor storm expected to peak in November will challenge the world's satellites with an unusually dense flurry of space dust, creating the greatest threat of a meteor impact since 1966, NASA scientists said recently. The Leonid meteor shower occurs annually but is forecast by some experts this year to be a storm unlike anything seen in recent decades. The last time The Leonids produced what astronomers call a *storm*, only a handful of satellites orbited Earth and confronted the threat. Now, hundreds of satellites will be at risk, providing services ranging from pagers and television to weather forecasts and monitoring for potential nuclear blasts by rogue nations. Forecasts for the number of meteors per hour during this year's peak on Nov. 19 range from 1,400 to 15,000, reflecting wide disagreement in methods used by various scientists to predict the potential of the November shower of "shooting stars".

Leonid meteors are bits of comet leftovers, most no larger than a grain of sand, that vaporise when they zoom through Earth's atmosphere at 260 times the speed of sound. If they hit a satellite, the small grains can destroy an imaging mirror, plough right through fragile parts or, worse, create electrical shorts that can disable the craft. Just the momentum imparted by an impact can throw a satellite off course.



NASA ADMINISTRATOR TO RESIGN

NASA Administrator Daniel Goldin will depart Nov. 17 satisfied and proud that the U.S. space agency launched so many spacecraft during his tenure. "NASA is alive!" Goldin, the agency's longest-serving administrator, said in a telephone interview. He noted that NASA had 160 spacecraft launched and planned during his tenure and said his proudest moment was the in-orbit repair of the Hubble Space Telescope. "We opened up the universe," he said.

Goldin also praised the agency's work to assemble the international space station. "It is a technical achievement that is nothing short of brilliant. It could not have been executed in a better fashion," he said.

While acknowledging the budget problems that have plagued the space station program, Goldin said: "I make no apologies. I am convinced that we delivered the station at the lowest cost we possibly could have given the conditions and challenges we had to deal with. I think we have identified the operational cost problem and we have fixed it ... We will be back on track. Could we have done better? Maybe, but we had to stress technical excellence. It is a very difficult balancing act." Goldin said his biggest disappointment is not going to Mars. "My life will be complete when an astronaut sets foot on Mars," Goldin said. "I want to be associated with it in some way."

For now though, Goldin, 61, said it is time for a break. "I need some decompression time. It's hard to explain the amount of intellectual investment you put into this job. I feel very satisfied. It was a long task. I feel good." (SPACE.COM)

ISS CREW VIEWS ATTACK AFTERMATH

The billowing plume from the collapse of the World Trade Centre could be seen aboard the International Space Station last month. Circling some 384 kilometres above Earth, U.S. astronaut Frank Culbertson

and two Russian cosmonauts spotted towering clouds from the collapse of the trade centre's twin towers as the outpost and its crew passed over the north eastern U.S.

"As we went over Maine, we could see New York City and the smoke from the fires," Culbertson told engineers in NASA's Mission Control Centre in Houston.

"Our prayers and thoughts go out to all the people there and everywhere else." Culbertson and his two colleagues – Vladimir Dezhurov and Mikhail Turin – also peered down the eastern seaboard of the U.S., but it was unclear whether the trio could see smoke from a plane crash into the Pentagon.

"I hope that the people responsible are caught and brought to justice as soon as possible," said Culbertson, a retired U.S. Navy captain and former military test pilot. "But first, our prayers and condolences to everybody involved." Launched Aug. 10 aboard shuttle Discovery, Culbertson and the so-called Expedition Three crew are in the midst of a four-month research tour aboard the international station. The trio is due back on Earth in early- to mid-December. (SPACE.COM)

Feature



AFRICAN ECLIPSE SAFARI by Ian Sullivan

Recently, and for the second time in two years, my wife Elvine and myself had the privilege of chasing a total solar eclipse. This one interestingly displayed its maximum duration of nearly five minutes near the Prime Meridian, in the South Atlantic, just after Greenwich noon, and only four hours after the June solstice.

Setting forth on our morning flight from Sydney to Johannesburg we had the experience of following the Sun (which was eclipsed a week later), for fourteen hours, and which only set as we arrived at our hotel.

Our tour group of thirteen originated in Canberra with five members of the CAS, joined by others including Jim Blanksby and Neil Speirs from ASV. Active Travel in Australia arranged

with Gecko Tours in South Africa to adapt a regular safari tour, to also include observing the eclipse of June 21 in Zambia, a day's drive from the famous Victoria Falls. Our driver was an Africaner (European of Dutch descent), and his assistant a black African. They worked together with great mutual respect, which surely is a positive outcome of black rule of the new Republic of South Africa.

A little further North we crossed the Tropic of Capricorn, then went West to ford the Limpopo River and enter Botswana (formerly Bechuanaland), into an area called the Tuli Block. It is tropical grassland with a sprinkling of large trees, especially along the river, and abundant wildlife including an abundance of impala and guinea fowl. In less than an hour we arrived at Tumelo Lodge run by Mark Thorp, a South African, who had a marvellous knowledge of his surrounding ecosystem. He and his wife were also keen to learn the constellations so brilliantly visible in clear skies each night. We stayed in bungalows and dined al fresco, in spite of the cool of the evening. Single figure temperatures were the norm at night.

After breakfast we set off on a 'game walk', but its value was mostly appreciating the vegetation, and how it survives the onslaught of a multitude of herbivores. We even saw some archaeological relics, like stone implements. We examined elephant droppings and through binoculars (essential equipment) we could, with assistance, identify many birds. As the Limpopo usually dries up for months at a time, a windmill was installed to provide bore water for the wildlife.

Later in the day we went on a game drive initially in daylight, and then in darkness using a spotlight. While waiting for darkness on a hill we appreciated the clear starry night and for the first time in my life I saw the 'Zodiacal Light,' in the wake of the setting Sun. Alas, my camera was back at the Lodge! Later in the spotlight I remember a mother hyena protecting young, a bat eared fox, and a genet with a long striped tailed, squirming around in a bush.

I left an eclipse map for Dec 2002 at Tumelo, as they were interested to find they are on the edge of the path of

totality. It is a great place to stay, but December is the rainy season. However there may be a break for this morning eclipse, as cloud is more prevalent in the afternoons. In Australia we will see the tail end at Ceduna SA.

Our next stop was the Makgadikgadi Pans (try pronouncing it), the vast expanse of salt beds that come alive with bird life after rain. We had to settle for a mostly dry and languid alternative. Staying nearby at Nata we learned how cold it gets overnight in the desert.

Further North, at Chobe National Park, we saw the big game in the form of numerous elephants, some giraffe, and in the Chobe River- hippos and crocs, and on the riverbank, a sleeping lioness.

Cruising on a motorised platform on pontoons is silent and less obtrusive than a motor vehicle, but still requires binoculars.

After several hours' wait, a car ferry on the Zambezi River (where we met Bratislav from ASV) allowed us to cross into Zambia, and drive to the town of Livingstone, within sight of spray clouds from the famous Victoria Falls. The camping ground where we stayed was filled with buses, trucks and four wheel drives laden with every European nationality. The eclipse had boosted tourist numbers way above the normal 'high season' level.

An early start and a long drive bypassing Lusaka brought us near the Lower Zambezi National Park, to a game lodge and camp ground (with outdoor toilets and showers) called Mvuu, on the banks of the Zambezi.

We were joined by many 'non-astronomical' eclipse watchers in the camp, but we selected our own viewing site away from the river, but near the road leading on to the National Park.

On the big day we drove a very short distance to the site, had lunch, and prepared for the event. We did not have precise contact times but knew we would follow Lusaka by no more than a minute or two. First Contact came as expected and I progressively photographed the Sun through my Questar 3½ and a scene (camera

with 50mm lens) on the ground at the same typical daylight exposure to record the darkening. It took nearly 1½ hours for the Moon to cover the Sun; longer than most due to the Solstice, when the Moon's shadow matches the direction of Earth's rotation.

It is very difficult to safely observe or photograph the 'diamond ring' at Second Contact and I managed neither. Since I did not have a mechanical drive, time was taken in guiding and I stayed with the photos until the last thirty seconds of the precious 3¼ minutes of totality.

Then I observed through a 40mm eyepiece to get thirty times magnification. There is never enough time even to see the prominences and corona, much less the darkened sky with planets suddenly revealed. I used Kodachrome 64 film but my longest exposure of 1/30 second was not enough to capture much corona, but its circular shape was a characteristic of the sunspot maximum period (11 year cycle) which has just passed.

Nevertheless, I did clearly expose six prominences with one noticeably larger than the others. There was also a suggestion of another five.

Only about half of our party attempted photography and there is a

good case for 'observing only'. No single photo can capture all the eyes can see at once - either by naked eye, or through a telescope. A glimpse of the real event is therefore special and what people pay thousands to see. We drank champagne after Third Contact, while I continued with photos of the final partial phases.

An evening of festivities at the camp followed and we drove back to Livingstone next day to our former campsite. The following day we walked around the town, and visited an interesting museum complete with animal dioramas. After lunch we drove down to see Victoria Falls from the Zambian side. Raincoats were on hire as the spray was all pervading, and had generated a local rainforest.

We then crossed the Zambezi arch truss bridge into Zimbabwe, said goodbye to camping, and moved into the A'Zambezi Motor Lodge. The town of 'Victoria Falls' is full of tourist



souvenirs (mostly animal carvings), money changers, beggars and dancing locals. We viewed the scene from a tethered helium balloon, had lunch at the hundred year old Vic. Falls Hotel, and met Phillip Hart from ASV! We then viewed the falls from the Zimbabwe side, which claims the statue of their 'discoverer', Dr David Livingstone. This side affords better views than that from Zambia, and at mid afternoon numerous rainbows add to the magnificence. We walked for over an hour in the forest and spray, along trails which span nearly the entire width of the river.

After a flight back to Johannesburg, we were heading home, but this time it was not in continual daylight. We were away from home hardly a fortnight, but it was a memorable and edifying experience.

HELP NEEDED

On the first weekend of December at Elmore (near Bendigo), there is a 2-day "Jamboree", called Vic Gathering, for Venturers (Scouts 15-18yrs old). I have been asked by the organisers to assist/run an activity on Astronomy at this event. I would like to know if anyone from the ASF is available to assist me in this endeavour. For more information, fell free to contact member Simon Birch, on....

email: simon@b2b-networks.com.au
ph: AH 8502 7466, BH 0417 325 726

WEATHER ON THE WEB

One of the most important things an astronomer needs to keep track of is the weather, and like so much else these days, there is plenty of information about the weather on the Internet.

One of the more useful sites is that for the Bureau of Meteorology, and the part of their web site covering Victoria is at

<http://www.bom.gov.au/weather/vic/>.

To begin with, there are regularly updated satellite images of Australia from the Japanese Geostationary Meteorological Satellite.

If you have something you'd like published in Scorpius, simply e-mail it in a document file to me at alphacent@iprimus.com.au, or, post it to me at 10 Stanhope Street, Dandenong 3175

Thanks, Richard Pollard (Editor)

Preparing for the Great Leonids Meteor Shower of 2001

by Peter Skilton

What is a meteor? Is it different from a meteorite?

Sometimes called a *shooting star*, a *meteor* is in fact not a star at all but rather the result of a small rocky particle from space colliding with Earth's atmosphere. On the way down, the particle rapidly heats up by friction as it flashes through the air at speeds of up to 250,000 kilometres per hour, and both the particle and the air glow brightly from the energy released, producing the familiar brilliant streak of a meteor in the sky. About 100 kilometres above the Earth, the particle eventually totally disintegrates into dust which, over time, settles to the ground, adding imperceptibly to the Earth's mass.

The particles that give rise to meteors streaking across the sky are typically a grain of sand in size, and no larger than a pea. The larger the particle, the brighter and longer lived the meteor. Rarer, unusually bright meteors are called *fireballs*. If a more substantial lump of rock from space encounters the Earth's atmosphere, it may actually survive until it reaches the ground, leaving behind *meteorites* on the surface, such as those that fell locally in Cranbourne in recent history.

Where do meteors come from?

The small particles that give rise to meteors are believed to be the fine debris from the tail of comets that have passed by at some stage in the past. The material was originally ejected from the comet as it approached, and was warmed by, the Sun.

Both comets and the Earth travel around the Sun in oval-shaped orbits, with the Earth orbiting the Sun once each year, and with comets usually taking much longer. If the Earth's orbit around the Sun happens to intersect the comet's path each year, then the Earth encounters the shed debris on a regular basis at about the

same time each year.

Larger incoming objects that produce meteorites are believed to originate by a different mechanism from collisions between asteroids and larger bodies in interplanetary space, and are not thought to originate from comets.

What is a meteor shower or storm?

When the Earth passes through the cloud of comet debris, an increase in the number of meteors is seen, depending on how dense the cloud is at that point in space, and we see a shower of meteors. Different passing comets over time have left behind their own debris in different regions of the solar system, and so we experience

several meteor showers throughout the year. If, on rare

occasions, the number of meteors observed is very high, then the meteor shower is called a meteor storm.

Over time, the gravitational tug of the planets causes the debris clouds to thin out and move around slightly, producing fewer meteors if Earth encounters them. Of course, Earth is also clearing away debris as it collides with it each year.

What are The Leonids?

The Leonids is a meteor shower that originates from particles left behind from the tail of comet Tempel-Tuttle. The comet was named after its two discoverers, and orbits the Sun once every 33.2 years. The Earth approaches this particular debris field around November 14 to 21 each year. Therefore each year around this time, several dozen meteors can be seen in the sky per hour. However, each time the comet passes



The meteors emerging from a radiant.

gravitational pull of the planets complicates matters, making predictions of storm activity more difficult.

What colour are they? The Leonids have been reported as various colours from pinks to greens. The colour is due to the chemical composition of each particular particle.

Why are they called The Leonids?

Because the particles are travelling through space in essentially the same direction, they hit the Earth's atmosphere on parallel paths. Like straight railway or tram lines emerging from a single point on your distant horizon, the paths of meteors appear to originate from a single point in the sky, known as the *radiant*. With the Leonids, the radiant lies

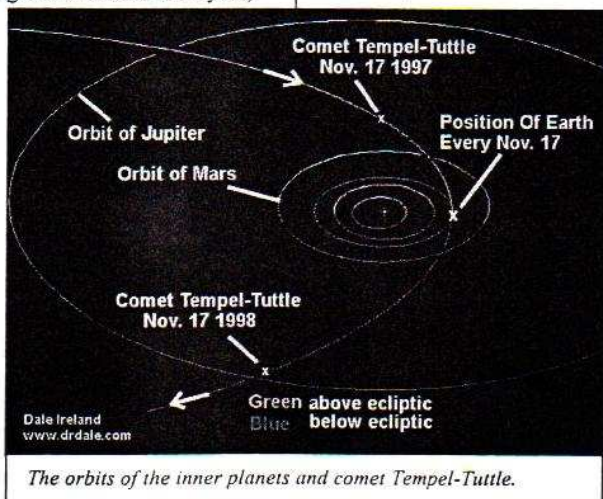
in a position that places it in the same part of the sky as the zodiac constellation of Leo, the Lion, giving the meteor shower its name. The meteors will appear to radiate from this point in the sky.

Will we see a meteor storm this year? Recent sophisticated modelling by David Asher of

Armagh Observatory in Ireland, and Rob McNaught of the Australian National University, predict that this year the Earth will encounter three past clouds of comet debris. These were deposited in the vicinity of Earth in the years 1767, 1699 and 1866 by comet Tempel-Tuttle. In Australia and East Asia we are predicted to see the latter two, whereas the Americas will see the former one. The more recent the debris, the more likely we are to see larger numbers of meteors. The model has been used to successfully predict the meteor activity seen in 1999 and 2000, providing confidence in its predictions for 2001.

Have the Leonids been seen throughout history?

Indeed they have, with observations recorded back to at least the year 902AD. Very famous intense encounters were reported by explorers from South America in November 1799, and from the USA in November 1833 (see engraving below). In the latter case, just before sunrise, 100,000 meteors per hour were witnessed in the sky (that's 30 per second)! In 1966, lucky USA observers saw an incredible 144,000 meteors per



The orbits of the inner planets and comet Tempel-Tuttle.

around the Sun, fresh material is deposited near Earth, and so about three times each century an unusually high number of Leonids meteors might be expected. In reality, the

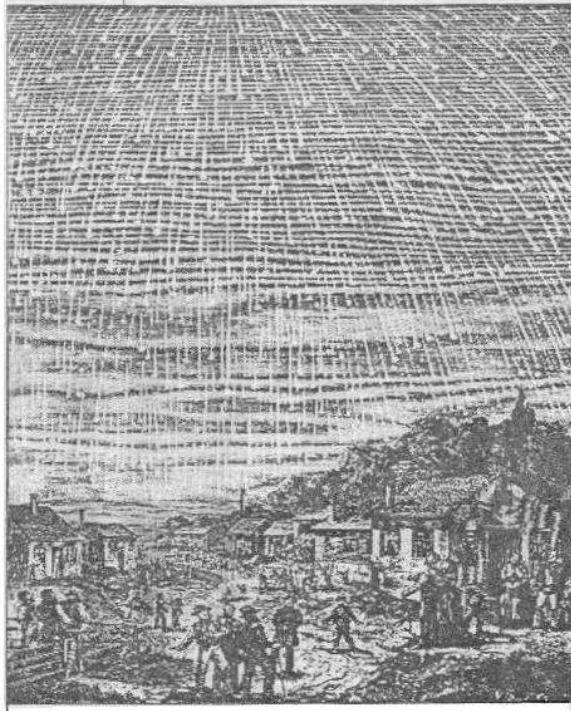
hour, literally filling the sky with light and movement. Such displays may last only for half an hour or less, and have been notoriously difficult to predict in the past.

Where and When do I look? In Australia, this year the peak of activity is predicted for the early morning of **Monday, November 19th**. If the weather is kind, we expect to see one peak of activity about **4:24am** and be up to a respectable 2,000 meteors per hour, and the second peak around **5:13am** and be up to a memorable 8,000 meteors per hour. Twilight will interfere especially with the latter as sunrise is around 6:00am. Of course, if the prediction is inaccurate, the times and even the date could vary unexpectedly.

The Leonids will appear to fan out from the radiant in the north east sky in Leo. This constellation looks to the eye like a large rotated question mark, or sickle shape, of stars about a handspan wide and will be about a handspan above your north east horizon at the time. The radiant lies within the head of the sickle.

With meteors, a darker sky will show fainter meteors, so you should aim to find a dark spot. If you can travel long distances, then the further north you go, the

Alice Springs this year. However, if you cannot travel, don't despair. Just find an area where the sky is relatively dark when looking in a north easterly direction.



The amazing 1833 Leonid storm depicted from the USA.

Will I be able to hear them? This is unlikely. Although the particles are travelling many times faster than sound, and so theoretically could cause sonic booms, they disintegrate typically 100 kilometres above the ground in very rarified air, so any sound effects are unlikely to reach the

sit down in a chair, or recline on a banana lounge or camping bed and look up to the north east from about 3am onwards.

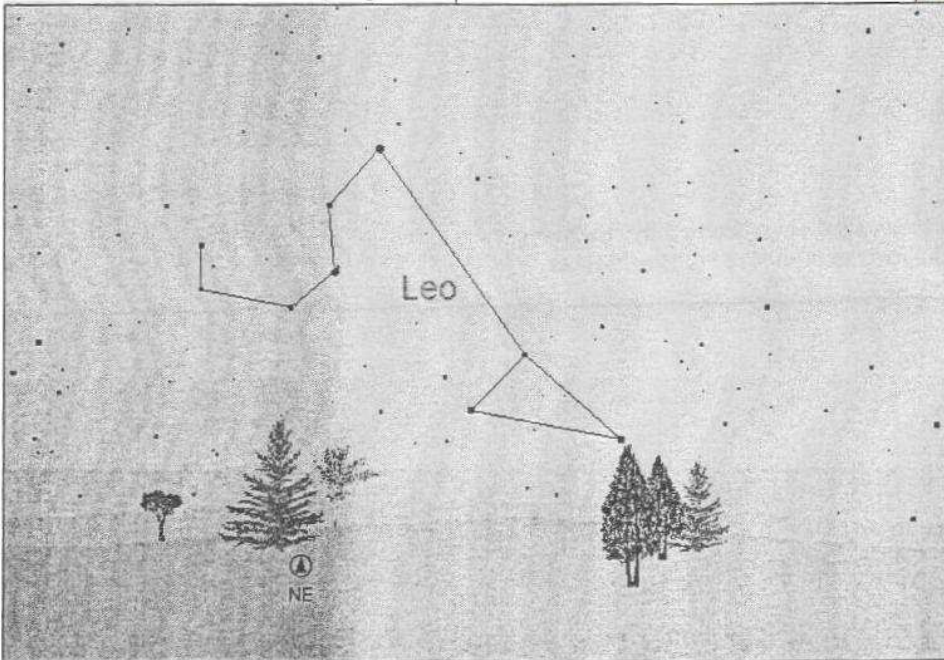
Can I photograph or video tape them? Yes. If you have an older manual camera with a "B" exposure setting this is ideal because you will need to keep the camera shutter open for up to 5 minutes. If you can mount your camera on a tripod this will help steady the camera. Use the fastest lens you have (say f/1.4 to f/3) as these let in more light, set the focus to infinity and open the shutter fully. You can take longer exposures, but the stars will trail across the film due to Earth's rotation. In modern automatic cameras, long exposures are possible but can rapidly drain the battery. Normal photographic film or slide film of 400ASA or faster is ideal for capturing meteors, especially the brighter ones. Slower film can be used, but will be less sensitive to fainter meteors. Video cameras, on the other hand, are typically not very sensitive in low light conditions, but should be able to capture the brighter meteors.

How many meteors will I actually see? If the predictions prove correct, then the number seen should be impressive and definitely noticeable, however, random variations are quite possible. Numbers seen will be reduced because Leo is quite low in the sky at the moment, and will also be reduced if your location suffers from light pollution.

How reliable are the predictions? Due to an unexpectedly low number of meteors seen in 1998, professional astronomers decided to apply rigorous orbital calculations to better understand the movement of the clouds of cometary debris. These new models then predicted recent Leonid showers reliably, and have been extrapolated into the future. In 2001, we can expect the best Leonids showers for at least the next 99 years. Of course, predictions are just that – predictions – and the underlying theories are refined over time based on actual observations. If the storm eventuates as predicted, then it will validate the current theories; if not, then the theories will need to be re-examined.

Acknowledgements The above material has been collated from numerous sources, courtesy of the Astronomical Society of Australia education sheet by Rob McNaught, NASA Space Environments and Effects Program, Quasar Publishing Astronomy 2001, Sky and Telescope

magazine, Redshift 3 software and Dale Ireland's web page. Also thanks to Richard Pollard and Roger Giller for the schematic diagrams.



The region around the constellation of Leo at 4:30am AEST Nov 19th, looking north east.

higher Leo will appear in the sky and so you will see more meteors. If you travel west, say to central Australia, then the Sun rises later and you should get a few minutes' longer view of the second peak of activity. The ideal place is probably near

ground and be heard.

What equipment do I need? Just your eyes. Rug up with warm clothing, put on suitable insect repellent if necessary, and



Left - Xmas at the ASF Briars site on 8th December 2001
Photo by John Cleverdon

Below - Digger the time capsule at the ASF Briars site on 8th December 2001
Photo by John Cleverdon



Left - Working Bee at the ASF Briars site on the 4th November 2001
Photo by John Cleverdon

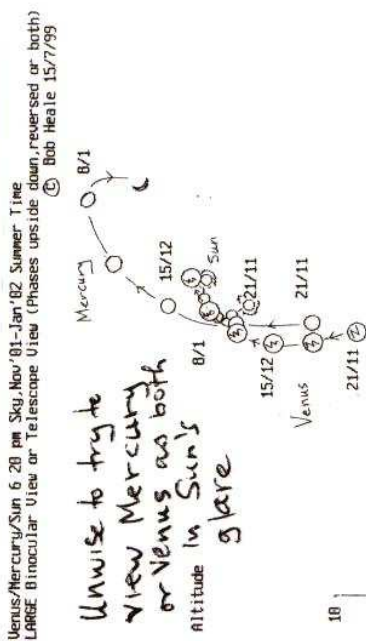
Kindly reproduced by Ken Bryant, and collated/posted by the Zetter family.

SKY FOR THE TWO MONTHS NOVEMBER 21 '01 - JANUARY 15 '02 planet views ↓

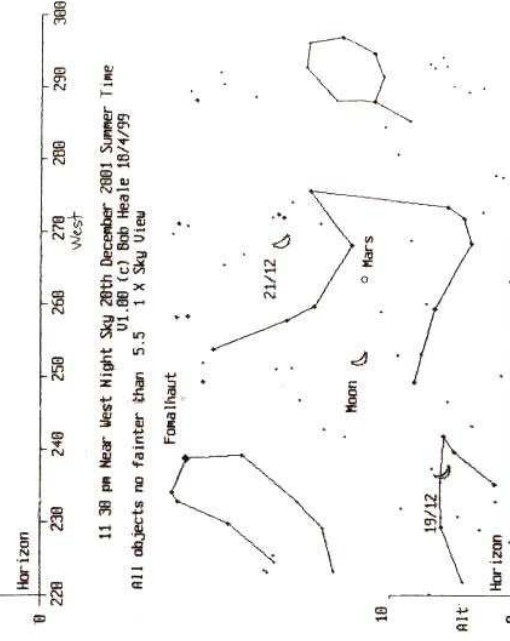


(a large oval plain (longwise runs East to West) Mare Crisium) Sea of Crises, a stand alone maria. Visited by 3 un-manned Soviet, Luna's 15, 23 and 24

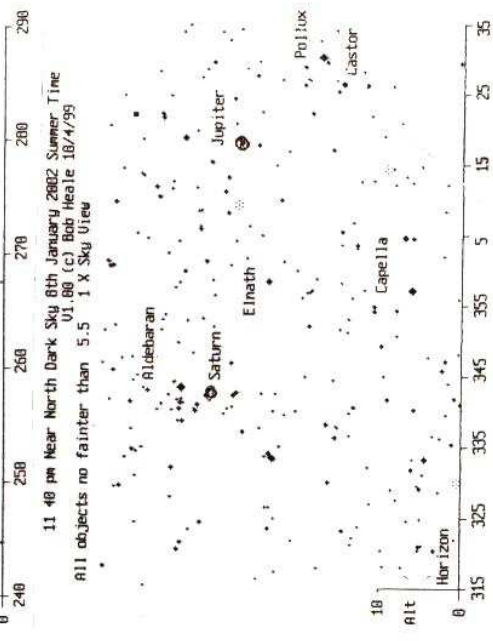
1 20am November 21 '01
 9 30pm January 17 '02
 Summer time



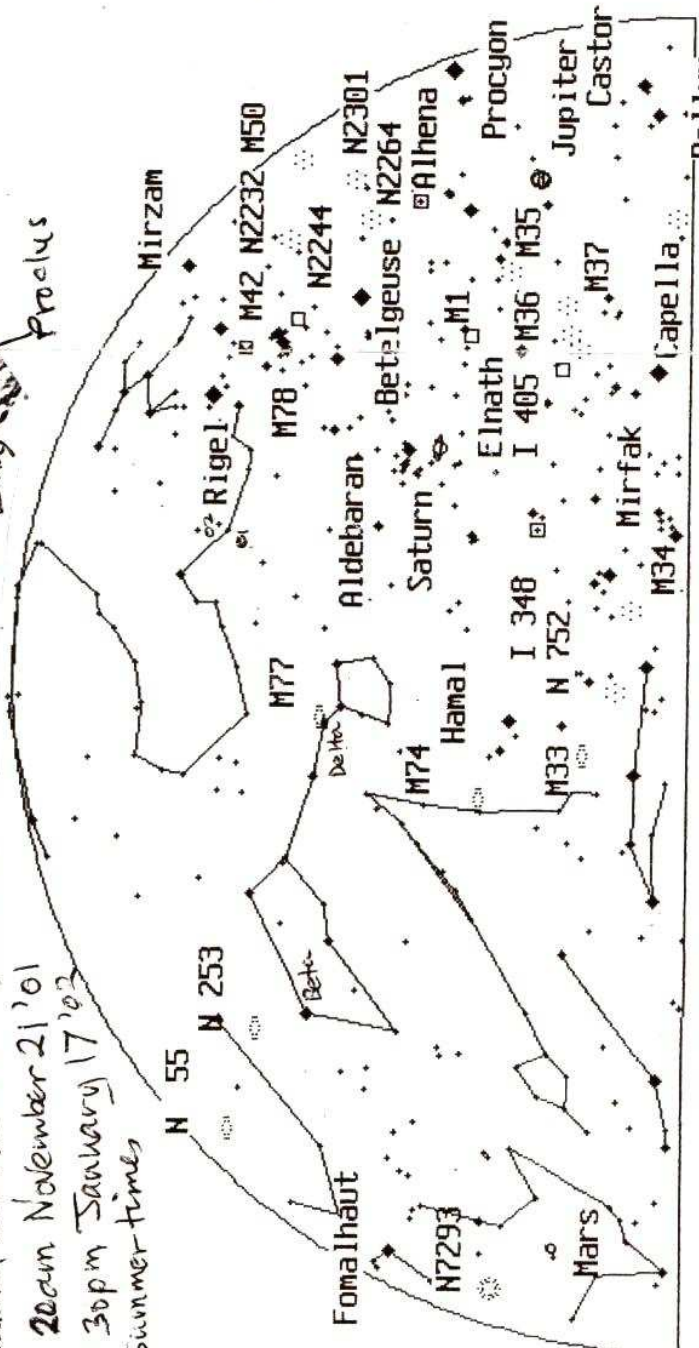
Venus/Mercury/Sun 6:20 pm Sky Nov '01-Jan '02 Summer Time
 LARGE Binocular View or Telescope View (Phases upside down, reversed or both)
 © Bob Heale 15/7/99



11:30 pm Near West Night Sky 28th December 2001 Summer Time
 01.00 (c) Bob Heale 10/4/99



11:40 pm Near North Dark Sky 8th January 2002 Summer Time
 01.00 (c) Bob Heale 10/4/99

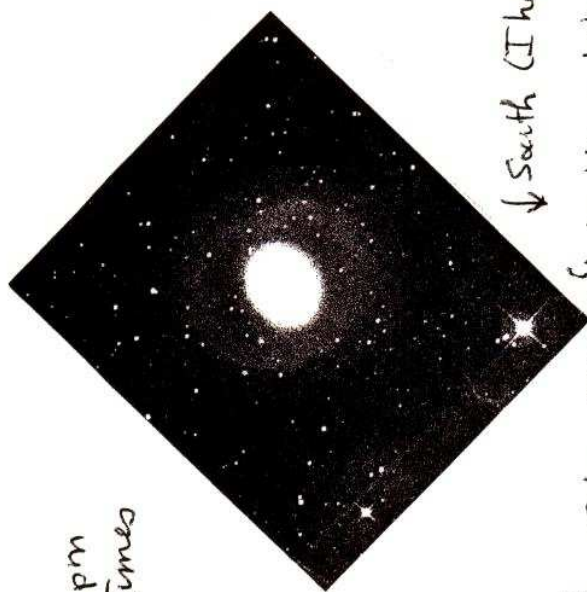
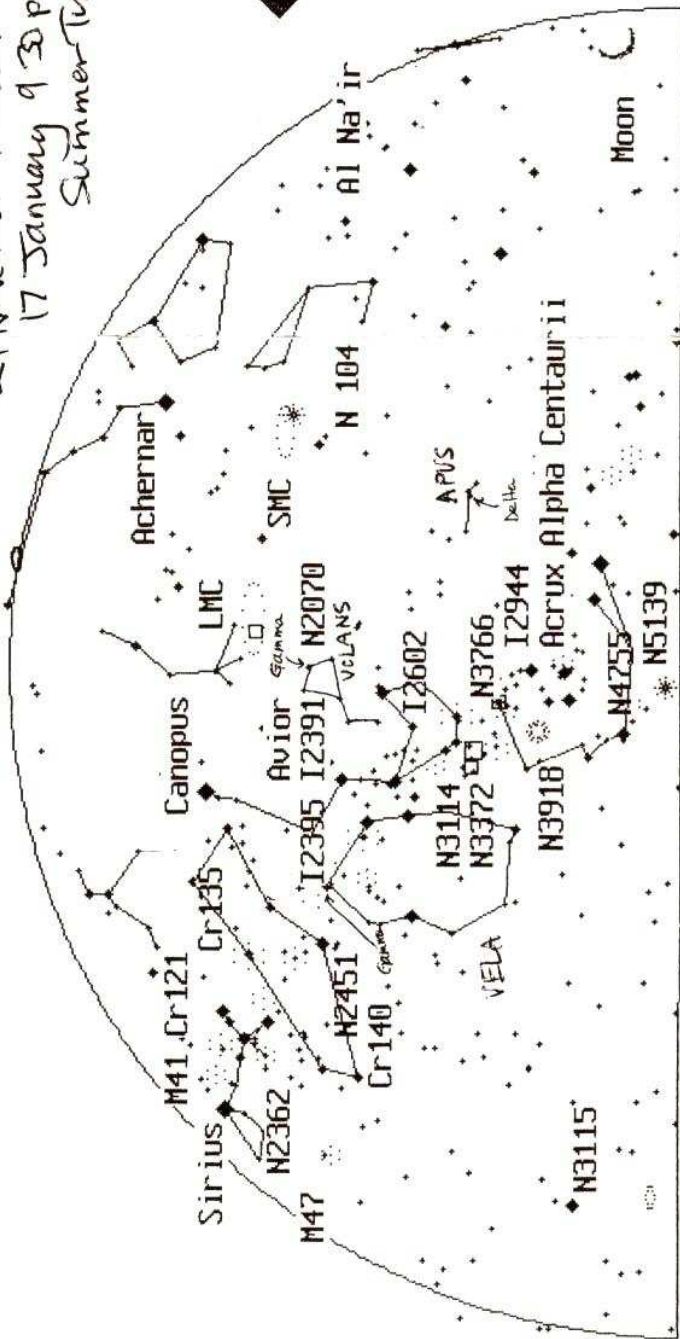


11:30 pm 17th December NNW Night Sky 2001 Summer Time

NOVEMBER 21 '01 - JANUARY '02 EASY SOUTHERN SKY OBJECTS

21 November 12am
17 January 9:30pm
Summer Times

M1291



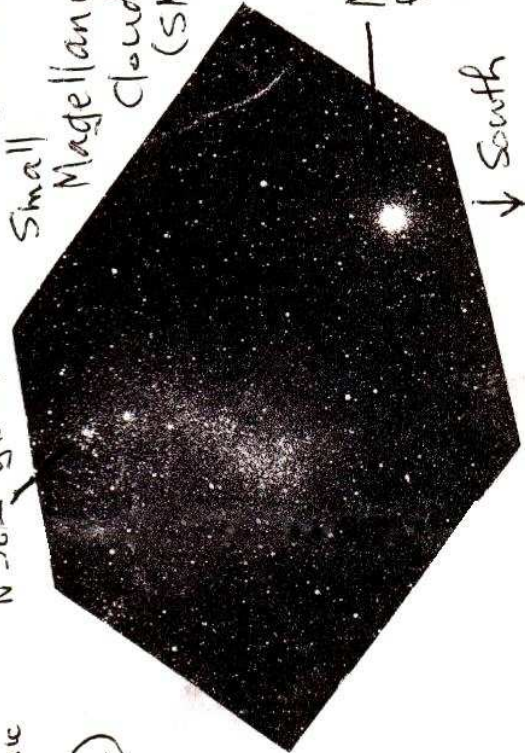
↓ South (I hope)

Galaxy N1291 'looks like a distant unresolved globular cluster and is easy for small apertures' Hartung
Another suggests it to easily identifiable in 80mm (large binoculars (on a good stand))

Small Magellanic Cloud (SMC) - outlying chain of star clusters and nebulae are faintly visible upper left of galaxy

N104 - Bob Heales ASF 20/11/01
Fantastic globular

11:30 pm 17th December SSE Night Sky 2001 Summer Time



↓ South

N362 globular

Large Magellanic Cloud (LMC)



↓ South

N2070

Tarantula Nebula N2070