

SCORPIO

Journal of the Astronomical Society of Frankston Inc

Vol 2, No.3

P.O.Box 596, Frankston Victoria 3199

MAY/JUNE 1993

FUTURE EVENT

GENERAL MEETING

19 May 1993

Special Topic: Lunar Eclipses

16 June 1993

Special Topic: Astro-Photography

VIEWING NIGHTS

Public and Members Viewing Nights are planned for the 14/15/16 June at The Briars.

The Briars is located off Nepean Highway at Melways Map 145, E11

SOLSTICE PARTY 26 JUNE 1993

see details on page 2

COMMITTEE MEETING

27 May 1993

24 June 1993

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

Primary School Viewing Goes Well

The past few weeks have been a busy time for schools and public viewing nights. We have given viewing nights to several primary schools. The Mt Eliza primary night was highly successful with several hundred parents and children viewing The Moon, Jupiter, Mars, and the usual nebula and clusters. The newly purchased slide sets are proving a great aid and helps stimulate questions. Cloud hampered the night at Frankston primary out most of the night and we relied on the slide show while a small number of students viewed a few objects through the holes in the clouds. Despite the observing difficulties, it was still a very successful night and a highly successful slide show. An almost identical night occurred at the St Augustine primary school campout. We got more time at the telescopes but eventually cloud stopped viewing. The Langwarrin Park night was totally clouded out and we relied on the slide. The range and depth of the questions from the students were remarkable and stumped us on a few occasions. These viewing nights are an important part of our plans to increase the general membership and in all cases the interest in the Society has been pleasing. In addition we received \$150 additional funds. While it is getting a bit late in the year for schools viewing nights, we are planning to hold viewing nights at some of the local elderly persons' villages. I would like to thank all those members who gave their time and expertise to create some great nights.

P.J.Lowe.

FOR SALE

TASCO 59T telescope

60mm refractor with 700mm FL including additional eyepieces

Sell all inclusive \$300 or exchnage for spotting scope

Phone 03-7899634

Meeting Venue:

The Peninsula School

Wooralla Drive, Mt Eliza

(Melways Map 105, F5)

Room F6 at 8.00pm on the third Wednesday of each Month except December/January

Visitors are always welcome

Annual Membership Fees

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

Membership Fees due 1st July each year

President

Peter Lowe (03)775 9347

Vice President

Peter Skilton (03) 776 5898

Treasurer

Peter Brown (03)789 5679

Secretary

Don Leggett (059)854 927

Committee

Ros Skilton (03) 776 5898

Steve Malone (03)789 6239

Tony Hales (03)781 3251

Bob Heale (03)787 1748

Laurie McIntyre (03)786 6120

Don't forget if you have any comments about the magazine, its layout or its contents - please send comments to the President

SOCIETY NEWS

SOCIAL PROGRAM

The social get togethers continue to be a great success. The BBQ at The Briars on 7th March was an excellent night. About thirty members turned out for a great BBQ (except yours truly who forgot the meat: how embarrassing). It was a dark, transparent night and members had a perfect opportunity to assess observing conditions from The Briars. Some of the members got into a globular hunt and I must say we found some globular clusters I'd never seen before. It was gone midnight before we packed it in and went home.

The Big Bang BBQ at Ballam Park also attracted about twenty members after which there was a public viewing night. As with most of our public viewing nights, the weather was not kind. Although it didn't rain, 100% cloud cover put pay to any public viewing, at least until all the public had left after which the clouds parted revealing a beautifully clear sky. What did we do to deserve this?? Special honours must go to my wife who as chief ticket seller actually sold a ticket to the Mr. Whippy ice cream man to look at the clouds through a telescope. The President and Vice President took appropriate graft and corruption in the form of a free ice cream. We like to think of it as quality testing the product for future viewing events!!!

It is important to keep our social program going, so if you have any ideas please mention them to a committee member.

CATALOGS

The Society has received a number of catalogs and price lists from ELKEN RIDGE Pty.Ltd. which is a company setup by Clive Garner, an early member of the ASF. The catalogs cover a vast array of telescopes, accessories and computer equipment and have been bound and added to the library.

If you would like to speak to Clive direct his number is 03-751 2176.

TELESCOPE MAKING

Don't forget for those interested in making their own telescopes, Steve Malone has kindly offered to support the telescope making group at his place. Materials and mirror blanks can be purchased at very competitive prices and advice is free.

It is our aim this year to get a few small reflectors built for the Society as well as getting members to build their own instruments.

If you want more information just contact Steve.

BRIARS VIEWING.

We had another successful viewing night at The Briars on the 24 April. A small group of members braved a cold night to view a beautifully clear and dark sky. This was the best viewing conditions I've seen in years. The Centaurus-A galaxy was so clear I could study details in 16x50 binoculars. Needless to say the view through the telescopes was great. This was the first time I'd had my C11 out at a dark site and Peter Hyson was trying out a new refractor he'd bought that day. It brought out a beautiful view of Jupiter and the planetary banding plus the Red Spot could be seen in fine detail even at low power. The high contrast images from refractors is always an asset for observing planets. When we got the scopes set up, we realised I had missed a shadow transit to 2 minutes.

It was arranged with the Briar's staff for us to have a fire and as the night got colder and damper with a light dew the crowd around the fire got bigger.

One thing of note was the large number of slow long duration meteors seen.

CRANBOURNE VIEWING

The Society held its first public viewing night at Cranbourne on the 2nd April. We hoped at this viewing night to test the local interest in astronomy as well as raise some funding. The weather was not bad and a small group of people attended to view though short bursts of clear skies. Considering the weather the night showed considerable promise concerning local interest and we should try it again. Our thanks to the Cranbourne Secondary School for the use of their grounds.

ODD SPOT

Columbia Pictures have paid \$A710,000 to advertise the latest Arnold Schwarzenegger film "Last Action Hero" on the side of a US rocket. The rocket will lift a science satellite and blazed across its side will be the films title in red, orange and yellow.

WINTER SOLSTICE PARTY

A Winter Solstice party will be held at the President's home on 26 June. It is intended to have a variety of activities ranging from observing with the telescopes, astronomical videos or armchair astronomy at the open fireplace. Some refreshments will be provided but please help by bringing a plate.

All members are welcome

More details will be given at the May and June General Meetings

WHAT'S NEWS IN ASTRONOMY

UNDISCOVERED MOONS

The discovery of rings around all the major gas planets has raised a number of problems. Paramount is how the rings maintain their structure. The discovery of shepherd moons that hold objects in rings or ring arcs suggests there must be source of material to replenish the dust particles constantly being lost to space. Astronomers from Colorado propose this source of material may be the debris from collisions between numerous undiscovered moons orbiting the planets. They suggest upto 1000 moons between 1 - 10 kilometres may be present. Collisions between moons and comets moving at speeds upto 100,000 km/hr would shatter into millions of fragments. Based on probable collision frequencies, a typical moon between 10 - 100 kilometres in diameter would only last a few hundred million years. Compared with the 4.5 billion years since the Solar System formation this is more than enough to produce the material need for the rings.

MAGNETIC ASTEROID.

Late last year the spacecraft Galileo was close enough to Earth that data collected from its 1991 flyby of the asteroid Gaspra could be transmitted. Surprisingly the interplanetary magnetic field near the asteroid is strongly distorted suggesting the body consists largely of iron and is magnetised. A sort of space compass??

NEW STAR CHART?

Have you noticed Australia Post's new airmail stamp, proudly displaying the Southern Cross (Crux) and the Australia Post logo for all the world to see?

Unfortunately, there is a fundamental mistake in the design. Can you spot it?



Maybe the designer of the Air Mail stamp owns a refractor!!

TWIN TELESCOPES.

Construction of the two 150'' Gemini telescopes is about to start in Britain. The two identical telescopes will be sited at Mauna Kea in Hawaii and Cerro Pachon in Chile. Siting identical telescope either side of the equator allows them to survey the whole sky.

RUSSIA GOES COMMERCIAL

The Russian space agency has won its first commercial contract to launch Western satellites. One of four mobile telecommunication satellites will be launched in 1995 by a Russian Proton rocket. This rocket was chosen because of its excellent reliability record. The other three satellites will be launched by American and European rockets.

KEEPING IN TOUCH

We are all familiar with the deep space probes that have been launched over the years. Craft such as Voyager, Pioneer, Magellan and Mariner to name just a few come readily to mind. They all have a point in common in that all such spacecraft have contacted the Earth via radio waves. Commands to the spacecraft from Earth tracking stations and downloaded information from say the spacecraft cameras have all been transferred by radio. However, now there is an exception. Recently, NASA scientists have successfully transmitted laser signals to the Galileo spacecraft bound for Jupiter. If you recall, this craft came past Earth last December and used our planet's gravitational assistance to aid it on its way. Now, at over 2.2 million kilometres from Earth, the Jet Propulsion Laboratory in Pasadena, California has succeeded in establishing contact via light, and not only by radio waves. Laser beams were simultaneously beamed upwards from a 24 inch and a 60 inch telescope in the USA. Two widely separated sites were used so as to minimise the effect of any weather. Laser light from both sites were detected by Galileo's on-board camera, showing the feasibility of the

method - at least on a clear day. Radio waves have no trouble passing through clouds, but visible laser light would be absorbed or reflected by intervening matter. Unconfirmed reports suggest that a plan for a laser tracking station near Frankston are unlikely to proceed, following intensive lobbying by the local seagull population.

MILKY WAY CENTRE IN I.R.

The search for the centre of the Milky Way galaxy is still on in earnest. As better and better instruments are developed so they seem to reveal the centre of our galaxy as a very chaotic but highly interesting place. Astronomers in Germany have recently taken the highest resolution infrared photographs of the galactic centre to date. The galactic centre is some 27,000 lightyears away in the direction of Sagittarius but the extensive clouds of dust and gas prevent us from seeing it in visible light. Longer wavelength light in infra-red, microwaves and radio do penetrate however and astronomers can observe at these wavelengths. Using the 3.5m New Technology Telescope in Chile, German astronomers have been able to photograph objects to a resolution of 0.02 lightyears at the centre. The photographs reveal a dense star cluster at the galactic centre containing at least 340 stars. There are probably many more stars since they are only seeing the brightest at infrared wavelengths. Interestingly the stars are packed so closely together that it is highly likely that stellar collisions occur. Based on the scale of the photographs the typical distance between stars is only 0.01 lightyears while stars in the local cluster containing our Sun are typically several lightyears apart. While the central black hole thought to be at the centre of the galaxy was not detected, the centroid of the star cluster coincided with the radio & gamma ray source Sagittarius A* though to harbour the black hole.

BOLIDE OVER N.S.W.

As relayed in the media in recent weeks, a bright fireball was seen over central West NSW down to around the Victorian border. Apparently it was so bright that it woke up one of Rosalind's relatives in Griffith by the light it shone into her bedroom, and was easily seen by another in Dubbo. Police stations were inundated by reports from hundreds of members of the public about a bright flashing object last Friday night that literally lit up the night sky making it like day. Now that is bright. The fireball would probably have been bright enough to see in daylight. The big question is did it end up striking the Earth (and hence becoming a meteorite) or did it simply disintegrate in the atmosphere? To date no one has found any debris along the path followed by the object. A published estimate gauged the object as around 30 kilograms, which is quite small compared to what is possible, however, most meteors you see in the sky are only around the size of a pea or smaller. One this size occurs somewhere on Earth on average about once every year. This year we received it. In fact we received it twice, as this fireball occurred about a week after a similar one was reported near Goulburn along the same track. Clearly the Earth is passing through a region of our Solar System where a train of debris exists, and we've swept up at least two pieces. These pieces may possibly be remnants from a comet that has broken up in the past. Hopefully there is nothing bigger yet to be vacuumed up. It is sobering to think of the object that struck Siberia in 1908 that flattened thousands of square kilometers of forest as it disintegrated in mid-air. It was estimated to be a few tens of metres across, and flattened fully grown pines as if they were made of matchsticks. Now that would have made a lasting impression on NSW. Were there any observations made by amateur astronomers? I was outside at the time and saw nothing unusual, so it didn't get down to Frankston. Hopefully other Societies around Australia will report any observations that were made locally.

LOCAL METEOR ACTIVITY

There has been some local meteor activity that I suppose is connected with the spectacular sights reported from NSW. The local Frankston newspaper has reported locals seeing bright meteors and a friend of mine reported seeing a meteor so bright that it lit up the lake he was fishing and then broke up into hundreds of bright sparks. On our last viewing night at The Briars there were a few quite bright meteors. One was so long lasted it travels right across the sky almost horizon to horizon. The thing that impressed me was not that it was particularly bright but that it moved so slowly with such a short tail.

NEW SUPERNOVA

Except for the one discovered in 1987 in the Large Magellanic Cloud, most supernova are in very remote galaxies and so are usually discovered by professional astronomers using large telescopes. As you know, a supernova occurs when a star nears the end of its life, resulting in a titanic detonation as a significant fraction of the star is blown away into space. Supernova 1987A was in fact the first nearby supernova that could be seen since 1604, and was visible to the naked eye - indeed this was how it was

discovered. Just before the beginning of April this year, a Spanish amateur astronomer Francisco Garcia discovered supernova SN1993J in the spiral galaxy M81. Unfortunately for us, this object is well into the Northern sky in the constellation of the Great Bear (Ursa Major), and so we cannot see it from Australia. Much like the Large Magellanic Cloud, the M81 galaxy is very well observed, and the star that exploded was easily found from old astronomy photographic plates. Although the area was very crowded, the original star was found to be a red supergiant about 10 times as massive as our Sun, thereby fitting in with current theories on supernova formation. In contrast, the one discovered in 1987 was quite a bit more troublesome, being formed unusually from a hot blue supergiant star. A red supergiant occurs when a star has burned all its hydrogen in the core, and is now using up heavier elements, causing the star to swell. Photographs taken by a French amateur astronomer of the region of M81 a few hours prior to discovery on March 28 showed no sign of the bright new guest star. However, nine hours later, a New Mexico amateur astronomer caught it on a CCD image. So this discovery chalks up another achievement for amateurs. Needless to say, a battery of professional, and indeed amateur, telescopes across the Northern hemisphere are now trained on the new arrival in the skies.

COMET BREAKUP

Astronomers have observed the breakup of a comet near Jupiter. It is not known if the cometary fragments will fall into the planet's atmosphere or continue on the journey around the Sun. The comet Shoemaker-Levy 1993e was discovered on 24 March and has since broken up into about 20 pieces. These pieces have been held in a tight line as shown in the photograph below. It is yet to be seen if this debris will stay in orbit as a sort of new ring or will eventually breakup into a broad meteor cluster orbiting the Sun.



SUPERNOVA 1993J DISCOVERED IN URSA MAJOR

During March this year, a Spanish amateur excited the professional astronomers when he discovered a supernova 1993J in the spiral galaxy M81. The supernova has been confirmed as a Type II explosion similar to the 1987A explosion seen in the Large Magellanic Cloud. Type II supernova are used a "standard candles" for determining the large scale distances in the universe. The discovery of 1993J is exciting because M81 is close enough to be resolved into stars and a progenitor star has already been identified. A problem with "standard candles" is they're supposed to be a standard brightness. In the case of Type II supernova this is know not to be precisely the case because the explosion details vary according to the type of star and how the explosion occurred. It appears 1993J appears to have be born from a red super-giant star while the 1987A supernova occurred when a blue supergiant blew up. 1987A surprised astronomers when it failed to reach the predicted brightness expected for a supernova at that distance from us. Astronomers need to understand the inter-relationships between the supernova characteristics and the underlying mechanisms inside the

progenitor star. We know that Type II explosions occur deep inside the star when a run away nuclear reaction starts a explosive nuclear shock front leading to a compression of the stellar core producing a neutron star and blowing off the rest of the stellar material as a vast explosion seen as a supernova to the rest of the universe. The exact details of where, how and when this internal explosion occurs appears to depend strongly on the stars mass, age and stage of evolution. With better models of the supernova explosion, astronomers should be able to more accurately predict the explosions light curve. Armed with this information they should be able to more accurately measure the distance to more distant galaxies when the supernova cannot be resolved

M81 lies at the heart of a nearby galactic cluster in the direction of Ursa Major. At a distance of about 11 million lightyears, this is close enough to allow detailed study of the explosion across the light spectrum. In addition to visible light, astronomers have already detected the explosion at several radio wavelengths and X-rays. These observations so far suggest the

supernova results from the explosion of a red supergiant of about 10 times the mass of the Sun. The early detection of X-rays (X-rays were not detected from 1987A until four months after the supernova) suggest the progenitor star have been ejecting a strong stellar wind which was still close enough to be quickly caught by the expanding explosion. This stellar wind is estimated to have been 2×10^{-6} solar masses per year. This offers an exciting prospect. The explosion is close enough that the expansion of the supernova shockwave and its interaction with the material in the stellar wind can be observed at radio wavelengths. Knowing the absolute rate of expansion which can be gleaned from the nova spectrum, it will be possible to measure the absolute brightness of the explosion itself as well as getting a accurate measure of the distance to M81. This will be one of the few supernova were this is possible (1987A is another) and will help astronomers calibrated their standard candles. This supernova could become a Rosetta Stone for observing and understanding the more distance parts of our universe.



NGC 3031 (M81), spiral galaxy in Ursa Major, photographed with the 5-m telescope.

M81 (NGC3031) is a type Sab spiral galaxy. It lies at the core of a nearby galactic clusters about 2.5 megaparsecs away in the constellation of Ursa Major. At about magnitude 9, the galaxy is easily seen in medium size telescopes.

COMETS - A SKYWATCHER GUIDE

One of the most rewarding, and inspiring sights to appear in the night sky is that of the sweeping tail of a comet, extending across many degrees of sky - 70, 80, 90 degrees and more, a sight some people may never see in a lifetime whilst others may be lucky enough to see at a number of different times.

Much the most spectacular comet of recent times was Skey-Ikeya of 1965, named after its two Japanese discoverers and visible for some weeks in the spring of 1965, when early in the morning hours, its brilliant curving tail extended almost halfway from horizon to horizon was visible to those enthusiastic skywatchers prepared to gaze in wonder in the hours before dawn.

Other notable naked eye comets have been Comet Bennett in 1970, another early morning object and of course Comet Halley in 1986, much less of a visual spectacle but of great historical interest because of its numerous well recorded returns through human history.

What then are these remarkable visitors to our skies which provoke awe, wonder and fear into mankind.

The answer to this question has evolved over the years from medieval times when they were seen as omen of natural and human disasters, to a better understanding which initially saw them as very insubstantial bodies, mere vaporous ghosts in the sky, posing no threat to ourselves. This has again evolved to a present day view helped by direct investigation by space probes during Comet Halley's 1986 return, which sees them as dangerously massive bodies composed of ice and rock with the potential for vast destruction to our Earth. Increasingly evidence has confirmed that cometary impacts have caused enormous damage in the past with a probable impact 65 million years ago leading to the extinction of the dinosaurs, who had dominated the Earth for 100 million years.

These hazards arise from the fact that comets, unlike the planets move around the Sun in highly elongated orbits and in some cases hurtle

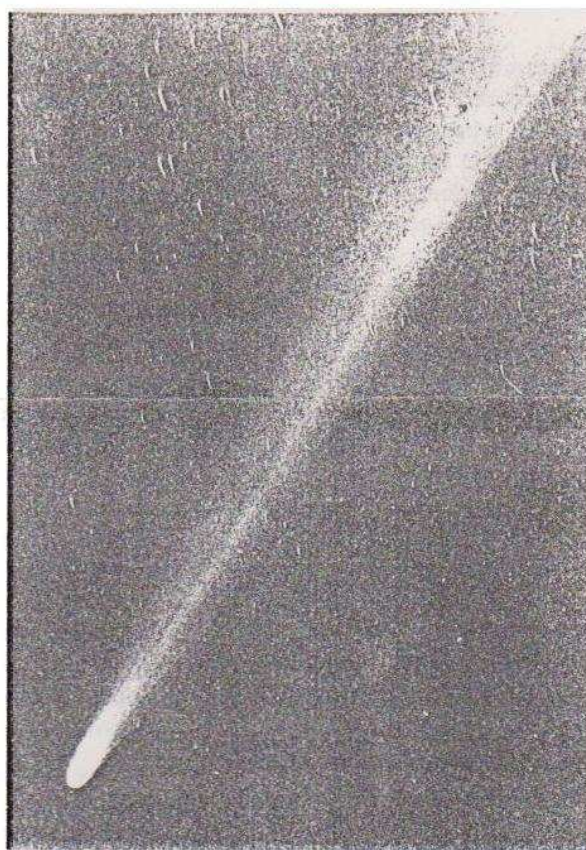


Figure 20.2 Halley's comet. (Yerkes Observatory)

inwards to the Sun and out again never to return, in both cases crossing Earth's orbit on their way to pass the Sun.

Many periodic comets, such as Comet Halley have known regular appearances, in Halley's case every 76 years, recur again and again. Most of the periodic comets are faint telescopic objects although some such as Comet D'Arrest are quite easy for amateur observers to see on more than one return.

Periodic Comet Swift-Tuttle seen from the Northern hemisphere at the end of 1992, is expected to return in 2126 to a much closer encounter with Earth and even a possible collision - collision or not it should be a most dramatic sight in the skies of that year.

The enormous tail seen extending from major comets consists of evaporated ice and dust from the comet nucleus, heated up by its approach to the Sun and then driven away from the Sun by the solar wind. With its tail the comet becomes much the largest body in the Solar System

The nucleus or core of the comet consisting of a frozen mass of ice

and rock is known in the case of Comet Halley to be some 20 km or so in size. Interestingly there now seems to be no clear distinction between comets and asteroids, both have some characteristics of each other to greater or lesser degrees: although comets are seen as originating from the Oort cloud of residual material from the solar systems formation, beyond the orbit of Neptune.

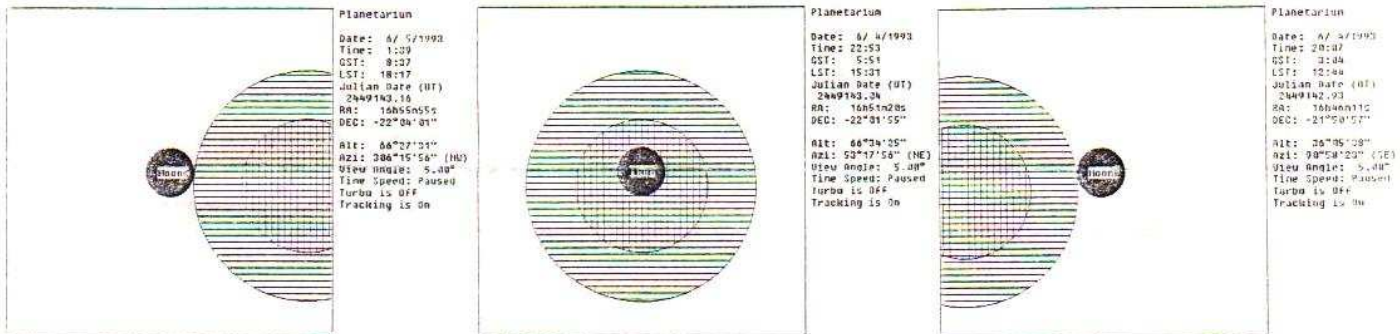
From the observers viewpoint comets are mostly seen in the period after evening or before morning twilight, although some of the really spectacular one's become so bright that they can be seen in full daylight from a shaded position. Binoculars provide views to good advantage for bright comets, whilst the numerous faint comets seen as mere smudges of light definitely require a telescope.

It is now many years since a really bright comet was seen in our skies but such an event could indeed occur tomorrow

Good Sky Watching

Ken Bryant

TOTAL LUNAR ECLIPSE 4-5 JUNE 1993



On the night of Friday 4th May we will witness a total lunar eclipse. These eclipses occur fairly frequently and the June eclipse is well placed to view from Frankston. This is a great opportunity for all sorts of fun. During the eclipse crater timings allow you to measure the shape of the Earth's shadow, during totality it is possible to measure stellar occultations and the ASV is planning to observe a grazing occultation which passes near Frankston.

The moon will be quite high in the sky and easily observable. The eclipse details for Frankston are:-

Moon enters Penumbral shadow	8:05pm
Moon enters Umbra shadow	9:05pm
Moon enters Totality	10:06pm
Middle of Eclipse	10:54pm
Moon leaves Totality	11:42pm
Moon leaves Umbra	0:44am
Moon leaves Penumbra	1:44am

This particular eclipse is expected to be quite dark because the angular size of the moon is small compared to the Earth's shadow. The Moon reaches apogee in its orbit on the 13th of June when it is at its furthest distance from the Earth. For this apogee the Moon will be some 404,000 km from Earth and its apparent diameter will be 0.493 degrees. As a result the total phase of the eclipse will last some 96 minutes. This is the longest eclipse now before the next century. The next longest eclipse will not occur until 16th July 2000 when an eclipse duration of 106 minutes will occur. Interestingly I have been exploring future eclipses on my computer and have found a few "useless" facts. Did you know the 106 minutes eclipse on 16/7/2000 is the longest lunar eclipse of the 21st century? The shortest total lunar eclipse is on 26/5/21 and lasts a mere 16 minutes. New Years Eve 2029 will be an extra swinging time. The people will be celebrating a new year and a total lunar eclipse when mid-eclipse occurs at 0:46am. I think I can just make it!!

The details of the June eclipse are shown in the diagram above. Using Astronomy Lab Shareware, the computer was programmed to keep the Moon centred and show the Earth's shadow apparently moving across the lunar face. The three diagrams are read from right to left. The right hand diagram shows the Moon just touching the penumbral shadow at 8:05pm. The centre diagram shows the mid-eclipse at 10:45pm. Note how deep inside the Earth's shadow the Moon gets. This explains why we expect such a dark eclipse. The left diagram shows the end of the eclipse as the Moon leaves the penumbra shadow.

PROJECTS FOR THE LUNAR ECLIPSE

There are a number of simple and fun projects that can be done during a total lunar eclipse.

- 1) Crater Timing
- 2) Measure the total brightness of the moon
- 3) Stellar occultations
- 4) General photography
- 5) Looking for Lunar Anomalies such as bright spots

Crater Timing has been a favourite past time of mine for quite a few years ever since Byron Soulsby introduced the idea to me at one of the early NACAA's. The method is easy. Firstly get yourself a map of the lunar surface with the direction of the Earth's shadow marked out. Identify before the eclipse the major, well defined craters. This could be done on the few night before the eclipse. Make up a list of these craters on a records board as shown below. Make sure your watch has been accurately set. As the Earth's shadow moves across the lunar face note for each crater on your list the time the shadow first touches the edge of the crater, when it crosses the middle of the crater and when it touches the other side of the crater. This of course can also be done as the moon leaves the Earth's shadow. Don't try to do too many craters. I've found things can happen very quickly and you soon lose track of where you are. The edge of the shadow can be pretty fuzzy so you need to be consistent about what you call the shadow edge. Some members will be trying to video the eclipse.

An interesting project would be to plot out a curve showing the brightness of the moon at various stages of the eclipse. A simple photometer could be made using a magnifying glass and a photographic light meter. Mount the magnifying glass onto one end of a cardboard tube and mount the light meter at the other end. The tube should have been cut to a length such that the image of the moon is the same size as the light meter sensor. Measurements could be taken about every 15 mins from 8pm until 2am and the results plotted directly onto a graph.

Of course for the slightly more advanced, there are great possibilities for general photography of the whole event. Photographs directly at the telescope or through tele-photo lens are easily taken. It is difficult to select a precise exposure for taking photos. Normally exposure range from a 1/10th to 1/100th of a second on 400ASA colour film. I suggest you plan your photographs and bracket your shots. That is take several photos of the same object at three different exposures. During totality you of course want to take some longer exposures to show the moon illuminated in Earth-shine.

While there is a great deal of scepticism, there have been reports of bright spots, reddish in colour during eclipses. Some have suggested the existence of active volcanic activity associated with these spots. The evidence is slim but you never know. There's always room for the unexpected during any observation so have a good look around. This is the only time you get to view the moon in complete darkness and something may turn up.

On the subject of stellar occultations. When the moon is fully eclipsed it is possible of course to time stars being occultated by the moon. I believe Peter Skilton is getting information about any predicted stellar observations including a grazing occultations north of Frankston. If you would like to get involved in these please contact Peter.

There will no doubt be a discussion about planned observations at the May General Meeting.

CRATER	IMMERSION(I) EMERSION(E)	FIRST CONTACT	MIDDLE CONTACT	FINAL CONTACT	COMMENTS