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SCORPIUS

THE JOURNAL OF THE
MORNINGTON PENINSULA ASTRONOMICAL SOCIETY INC.

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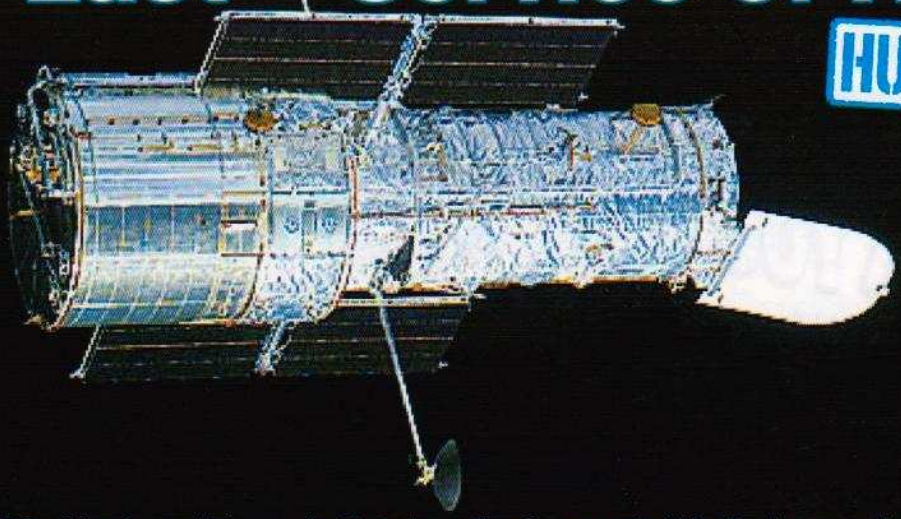
The Mornington Peninsula Astronomical Society (formerly the Astronomical Society of Frankston) was founded in 1969 with the aim of fostering the study and understanding of Astronomy by amateurs and promoting the hobby of amateur Astronomy to the general community at all levels.

The Society holds a focused general meeting each month for the exchange of ideas and information. Regular public and private observing nights are arranged to observe currently available celestial objects and phenomena. In addition, the society encourages the services of its members for educational presentations and observing nights for schools and community groups.

ABN:34569548751

The Last Service of Hubble



Scheduled for launch in early October, the Space shuttle Endeavour is due to meet in orbit the Hubble Space Telescope, for what will be the telescope's final service. And in a mission first, the E.V.A.s to service Hubble will include performing in-orbit surgery to repair two declining science instruments that are within inside the actual telescope – the Space Telescope Imaging Spectrograph (STIS) and the Advanced Camera for Surveys (ACS).

Hubble was designed with servicing in mind, so its instrument bay doors are lined with handrails and, with custom tools, are relatively easy to open for the astronauts. The same cannot be said for the instruments themselves.

"The repair of STIS and of ACS in particular, involves techniques that the astronauts have never performed on Hubble, possibly never before anywhere," explained HST senior scientist Dave Leckrone at Goddard. "That is, to open up an instrument that was not designed to be opened up and actually pull out electronic printed circuit boards and replace them with new boards."

The Space Telescope Imaging Spectrograph:

Astronauts installed STIS in Hubble in 1997 during Servicing Mission 2. Its main function is spectroscopy - the separation of light into its component colours, or wavelengths, to reveal

(Continued on Page 9)

Reg No: A268

Also in SCORPIUS for September & October...

• Cranbourne 13 found • Science Week Wrap-Up • Society News & Pics •

Mornington Peninsula Astronomical Society

Society News

Upcoming Society Events for September & October

September

Fri 5th - Public Viewing Night at The Briars (8pm)*

Wed 17th - General Meeting at The Peninsula School (8pm)
Session 1 - ***Speaker*** - **Dr. Ramesh Bhat from Swinburne University talking about '*Testing Einstein's Theory of Gravity*'**
Session 2 - ***Open Forum & 'Sky for the Month'***

Wed 24th - Committee Meeting

Sat 27th - Members Viewing Night at The Briars

October

Fri 3rd - Public Viewing Night at The Briars (8pm)*

Wed 15th - General Meeting at The Peninsula School (8pm)
Session 1 - ***Open Meeting format for attendees***
Session 2 - ***Open Forum & 'Sky for the Month'***

Sat 18th - President Birthday Bash at The Briars
(see page 4 for details)

Wed 22nd - Committee Meeting

Sat 30th - Members Viewing Night at The Briars

* *Denotes assistance in the form of telescopes and general evening operating assistance (i.e. - parking, answering queries, organising supper, etc.) for the public/school nights would be appreciated.*

A big THANK YOU for a big August

August was indeed a very busy month for the society with multiple public viewing nights, and the odd school visit, putting extra pressure on our small band of volunteers. So it is with relief that we have been able to meet this challenge again and produce another successful National Science Week. Your efforts, especially over the last month of National Science Week, have showcased our society to the general public. The time and enthusiasm these volunteers bring earning positive reviews from the public who attended. So for those that helped out over this period, congratulations on a job very well done.

Remember, If you can spare the time just every once in a while, we could always use an extra set of hands to help out with the running of any of the public nights or general meeting. Be it actively or just behind the scenes, all help will be appreciated. If interested, just catch up with one of the committee members to discuss any help you can give.

Dr. Ramesh Bhat
Image Credit: Swinburne University

September General Meeting Speaker - *8pm, Wed 17/09/2008*

We are fortunate to have Dr. Ramesh Bhat from Swinburne University's Centre for Astrophysics & Supercomputing, as our guest speaker for the upcoming September's general meeting. Dr. Ramesh Bhat's interests lie in observational pulsar astronomy, and is currently engaged in technical and science demonstration experiments relevant to Square Kilometre Array project using the Giant Metrewave Radio Telescope. Dr Bhat will speak on '*Testing Einstein's Theory of Gravity*' The general meeting starts at 8pm *(details are on the back page)* and is open to both M.P.A.S. members and General Public.

Annual General Meeting - *8pm, Wed 19/11/2008*

This is an early reminder about the Annual General Meeting that is to take place in November. As you are aware, the society relies on the voluntary efforts of individuals to keep the society going. These efforts are co-ordinated by the society's committee. If you feel you have the time and/or ability to contribute something back, then come along to the Annual General Meeting on Wednesday, 19th of November, 2008, at The Peninsula School, Wooralla Drive, Mt. Eliza.

Society News

national science week Wrap-up

The 2008 National Science Week was again a busy time for the society, with events registered in both August and early September. In past years we've had good mentions in The Age, on page 2 and in its science week lift out, though this year amongst all the journalistic redundancies at The Age, we put an entry into a special lift out in the Herald-Sun on August 13th, which no-one remembered to pick up from the newsagent! This would have put our name at least in front of 100,000 people for a day, and under a lot more fish and chips the next day.

This is about the 9th year we've done something during the month, though in earlier years our contributions were lower key and not widely advertised. In fact, M.P.A.S. (or ASF at the time) was the first astronomical society in Australia to participate in the festival, something which persisted for a few years. We even achieved "recommended status" for our events this year, meaning that we had achieved certain quality criteria for the event, satisfying the central organisers in Canberra that it was going to be done professionally. Others with a similar status for their events included CSIRO, University of Melbourne, RMIT and Melbourne Museum, so in good company.

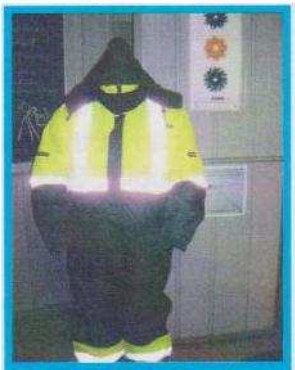
While the general public numbers were a bit down this year, those who did venture out into the freezing cold evenings did appear to enjoy their time with us. We even picked up a few new members along the way.

Our monthly general meeting for August coincided during the actual Science week itself, with Bob's sky for the month, followed by Peter Skilton giving the annual National Science Week lecture with an updated talk about the Cranbourne meteorite, which included the newly discovered Cranbourne #13 piece. During the evening break, Greg had the microscopes out for people to view, and a few super keen members got together for the first time to discuss some aspects of radio astronomy for The Briars. Peter Lowe completed the evening with an informative look at 'Life In Space'.

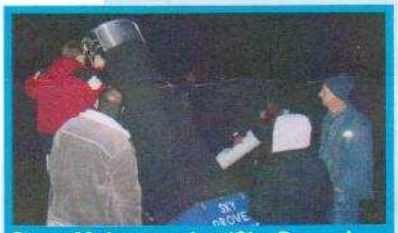
Friday and Saturday again saw additional public viewing nights, with the Saturday night's presentation looking at astrophotography, and drawing in R.M.I.T. students studying photography and some keen photographers from the other side of Melbourne attending. This included a talk by Brett Bajada on using Photoshop software for general and astronomical images.

The viewing nights all also screened this year's astronomy selection of short films from SCINEMA, the CSIRO's Science Cinema, with an interesting one demonstrating the scale of the solar system and other stars, and another on the reminiscences of the Apollo astronauts. The final night under the banner of National Science Week this year was held on September 5th at The Briars.

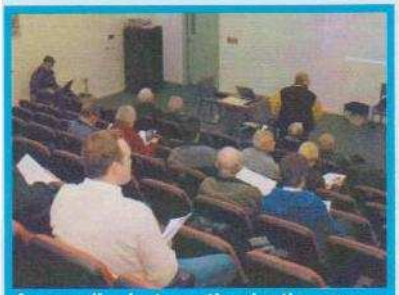
Article by Peter Skilton



The cold nights during National Science Week meant rugging up was in order. With that in mind, somewhere in that freezer suit was Kevin.

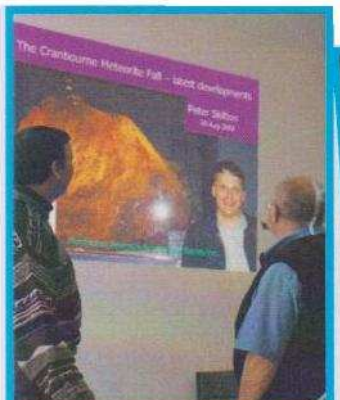


Steve Mohr manning 'Sky Drover'.



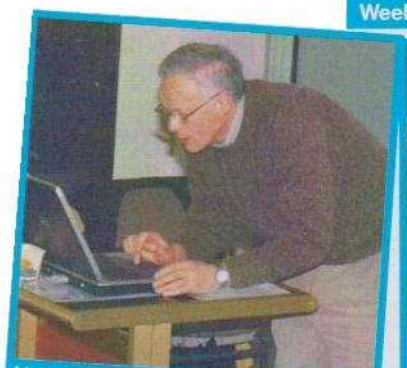
A small, but enthusiastic group gather for the Science Week General Meeting back in August.

One of the talks during the Astrophotography Night in Science Week.



Peter Skilton and Peter Lowe discussing the Cranbourne Meteorite Update.

The different science of looking down, rather than our usual looking up science.



Unfortunately for Bob, his 'Sky for the Month' presentation was a constant battle with technology.

Greg Walton showing members some recent images he has taken.

Society News

General Meeting News

The National Science Week report on the previous page covered the activities from the August general meeting. However, for those that may have missed the July General Meeting at the Peninsula School, here is a quick recap of the evenings discussions. As always, these meetings are open to both M.P.A.S. members and general public. So come along, and bring a friend if you want. All are welcome.

18th July General Meeting

Peter Lowe opened the meeting with our guest speaker for July, A.S.V.'s Rod Brown presented his talk on "Tides". He described the gravitational cause of the Earth tides (and their universal application), the dominant effect of the Moon, sometimes with, sometimes against the Sun as the lunar cycle dictates. Local coastal geography, the latitude, and the relative distances of Sun and Moon all play a role, and he showed us some of the mathematics involved. All up it was an enlightening presentation. Rod had the honour of drawing the nightly raffle, and after this we adjourned for our usual coffee break. After the break, Bob closed out the evening with his "Sky for the month" presentation.

President's Birthday Bash at the Briars - *5pm onwards, Sat 18/10/2008*

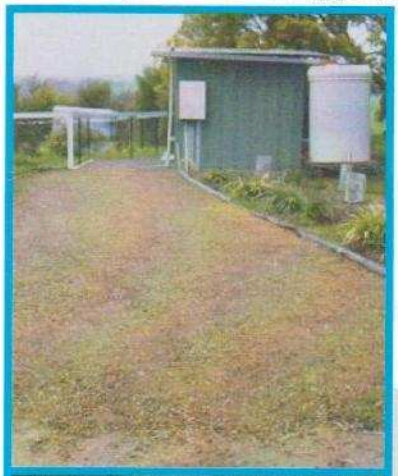
With our winter finally behind us for another year, our first social event for this Spring is the President's Birthday viewing night at The Briars. This is a great night to dust off those winter cobwebs on our telescopes, and enjoy a B.B.Q. and drinks with other members of the society, in a relaxed social atmosphere.

While it's called the President's Birthday Bash, this is open to all members and their families who have a birthday this year! So if you meet this requirement then come on down anytime after 5pm on Saturday afternoon, the 18th of October. A sausage sizzle will be put on for members with soft drink available for a $1 a can, however you can B.Y.O. other meats and drinks, if you like. We hope to see you there.

Sustainable Exhibition Centre Update

Another update for those members who have visited our Briars site recently and have noticed that construction of the Sustainable Exhibition Centre. The last issue of Scorpius showed that while close to our facilities, this still didn't greatly impact on the Western viewing sky, (as the bottom left picture shows).

However another temporary problem has arisen, and that is the surrounding ground. Due to the heavy construction traffic and recent rains we have had, the surrounding grass area has become quite muddy, and slippery under foot. To bypass this, a new pedestrian entry access is now available at the south end of the Astronomy centre. There is a new gravel path from the gravel road near the camp to our concrete walking path. We suggest pedestrian access take this path for the time being. For cars, access is still available via the usual entrance, but care is suggested to be taken when approaching due to the slippery conditions.



The new pedestrian access path.

Once again the committee would like to make members aware that, for the next few months while the construction process continues, access to our site may be limited and parking will need to move south of our pedestrian gate. We ask visitors to take care when driving or walking around the site. Again, any major changes affecting our use of the Briars site will be communicated in either Scorpius, E-Scorpius, What's On, or at the monthly General Meeting.

Muddy conditions to be mindful of when accessing the Briars.

The Sustainable Exhibition Centre, as seen from the North-West corner of the upper observing pad. As you can see, the roof is near level to the western tree line. Hence the western horizon is not greatly affected by the new development

Society News

Cranbourne 13 uncovered

Seems another moderate size piece (number 13) of the Cranbourne meteorite has just come to light at Clyde Primary School. The last discovery was in 1928. An 85kg fragment was found by a nearby market gardener who had loaded this unusually heavy nuisance to him into his ute for taking down the tip. Fortunately, the school was doing a space exhibition on Mars and wished a simulated meteorite. One of the parents knew of this find and brought it in. It turned out to be more than simulated! The kids did the right thing and tried a magnet on it, and it stuck. We've always advised schools to do that at viewing nights, as it's a very simple first test that can be done on any potential find.

The owner cut a small piece off with an angle grinder and the school submitted it to Museum Victoria, who 2 months later confirmed it as a meteorite, based on its location and also on detecting Nickel and certain meteoritic mineral crystals under a scanning electron microscope. The school have lovingly called the meteorite "Clyde". The owner wishes to stay anonymous, fearing a gold rush in the region. Indeed, within a week a local meteorite dealer had suggested the find was worth $150,000 (a fraction of its real value in fact).

Our resident society expert on the Cranbourne meteorite, Peter Skilton, has been following this up of late. "I'm pleased to hear that the owner has apparently offered the find to the Museum on condition that it remains within the Casey shire. It seems destined to go on display at the new sporting library facility just outside the main Cranbourne CBD."

Cranbourne 1 meteorite, 1862 Photographer: Richard Daintree.
Image source: State Library of Victoria, La Trobe Picture Collection

"The photos I've seen so far of the fragment do bear a very close likeness to the existing rusty fragments, especially to Number 1 housed now in the Science Museum in South Kensington in London. This particular new one landed in the region around fragment 2, the 2nd largest discovered, and was dug up by the market gardener."

Peter goes on to note that scatter ellipse predictions presented at VASTROC a long while ago was that there was a medium chance of finding small fragments to the North East of where No.2 actually fell. We are yet to find out the precise location of the actual find, but the school is extremely close to the predicted fall line.

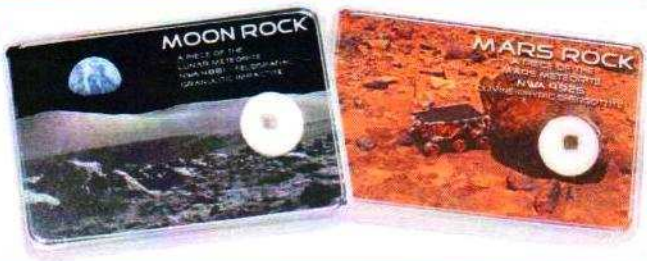
At 85kg, this is a small fragment, though you wouldn't want that landing on your car.

Article by Peter Skilton.

Articles from this latest discovery can be found on display at the Briars facility

...and some more rocks from space

Society member Trevor Hand has kindly donated two meteorite samples from the Moon and Mars, for use at our public viewing nights. Fragments like these, and the rest of our meteorite collection are always well received by the public. On behalf of the society, we thank Trevor for his donation.



The Committee and Society welcome the following new members.

Wishing you all clear skies.

Louie Giosis

David Sherwin

Fiona & Pearl Murray

Cathy Campbell

Skywatcher Events for SEPTEMBER and OCTOBER 2008

Constellation Aquarius

Events for SEPTEMBER

2th - Mercury, Venus & Mars are within 5° North of Crescent Moon (7pm).
8th - First Quarter Moon.
12th - Venus 0.3° North of Mars (7pm)
13th - Uranus 4° South of Moon (6pm).
15th - Full Moon.
18th - Venus 3° North of Spica (7pm).
22nd - Last Quarter Moon.
23rd - Spring Equinox (2am)
25th - M44 (Beehive) close to waning Moon (5am).
28th - Saturn 5° North of Moon (6am).
29th - New Moon.

Events for OCTOBER

2nd Oct. - Orionids meteor shower is active with to 7th Nov. maximum activity 3-4 days around the 21st of Oct. (Z.H.R. of up to 23). Radiant in North Eastern sky. (See pg. 8)

4th - Antares within 0.4° of Moon (10pm).
7th - First Quarter Moon.
7th - Jupiter 2° North of Moon (5pm).
10th - Neptune 0.9° South of Moon (8pm).
13th - Uranus 4° South of Moon (2am).
15th - Full Moon.
21st - Last Quarter Moon.
24th - Venus 0.4° NE of M80 in Scorpius (8pm).
26th - Venus 3° North of Antares (11pm).
29th - New Moon.
31st - Mercury 4° North of Spica (6am).

This issue we take a look at the constellation Aquarius. Aquarius the Water Bearer is a zodiacal constellation associated with water in Greek, Indian and Chinese mythology. Over these next couple of months we find Aquarius rising in the East to North-Eastern evening sky.

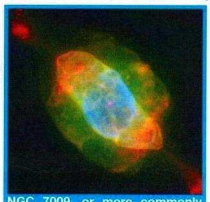
Notable stars in Aquarius are **Alpha Aquarii** (*Sadalmelik*), a giant star with a diameter perhaps 100 times that of the Sun. It is located 760 light years from Earth and shines at magnitude 2.95. **Beta Aquarii** (*Sadalsund*) is the brightest star of the constellation, shining at magnitude 2.9. Its computed distance is about 600 light years from Earth. **Gamma Aquarii** (*Sadachbia*) is a spectroscopic binary with a period of 58.1 days. It is located 158 light years from Earth and shines at magnitude 3.8. These figures lead to an actual luminosity of about 25 suns.

Maybe you noticed that the three stars described above share similar names. Their Arabic names translate into "The luck of the king", "The luck of lucks", and "The lucky star of hidden things". The origin of the names is quite lost to history, but the next time you wish on a star choose one of these three. You might have a better chance for your wish to come true...

The constellation Aquarius

Zeta Aquarii is the central star of the Y-shaped asterism that makes up the water jar of Aquarius. It is a close pair of 4th-magnitude stars 1.7 arc seconds apart. **R Aquarii** is an interesting variable star that reaches the 6th magnitude at maximum and has a period of little over a year. R Aquarii is a symbiotic star system, an interacting pair consisting of a variable red giant and a white dwarf companion.

The notable deep sky objects in Aquarius are **M2**, a bright globular cluster visible with the naked eye on a dark sky. Through binoculars or a small telescope it appears as a small hazy patch with a diameter of 7 arc minutes. **M72** is a faint globular cluster located in the western part of the constellation. It is unimpressive in small telescopes, appearing as a pale nebulous patch of light. **M73** is a small asterism composed of four stars with magnitudes between 10.5 and 12. Seen with a small telescope M73 looks like a tiny nebulosity, and this is probably why Messier included this object in his catalog.


NGC 7009, or more commonly known as The Saturn Nebula
Image Credit: NASA

NGC 7009 (***The Saturn Nebula***) is one of the brightest planetary nebulae in the sky, first observed by Sir William Herschel in 1782. It was named the Saturn Nebula because when observed with larger telescopes its shape resembles that of the planet Saturn. To find NGC 7009, center the 5th-magnitude star Nu Aquarii in your finder scope and then move one degree to the west. At low powers the nebula is almost starlike, but going to higher powers reveals a bright greenish disk with no other evident details. **NGC 7293** (***The Helix Nebula***) is the closest of all planetary nebulae, lying at a distance of 400 light years from Earth. Small scopes show NGC 7293 as a circular patch of faint light, but a 6-inch scope reveals that the center is dark and contains a 13th-magnitude star. The nebula's diameter is 16 arc minutes, so when observing use a wide field eyepiece and low magnification.

The constellation is also associated as the radiant area of a few meteor showers as well. These include the Eta Aquarids shower which is active between April 21 and May 12. The Delta Aquarids Shower is divided into two sub-showers separated by 15 degrees of declination. The Southern Delta Aquarids are active between July 14 and August 18, and the Northern Delta Aquarids are active between July 16 to September 10. Also split in two are the Iota Aquarids. The Southern Iota Aquarids occur during July 1 to September 18, and the Northern Iota Aquarids are active between August 11 to September 10.

RISE and SHINE TIMES

	Sun				Moon			Mercury		Venus		Mars		Jupiter		Saturn		Uranus		Neptune		
	Twilight Begins	Rise	Set	Twilight Ends	Rise	Set	Phase	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set	
Sep 6	05:07	06:34	18:03	19:30	09:27	D.N.S.	*Waxing to 1st Q. Moon*	07:32	20:14	07:39	19:59	07:45	20:16	12:52	03:35	06:39	17:50	18:28	07:03	16:07	05:47	6 Sep
13	04:57	06:24	18:09	19:36	15:56	05:04	*Waxing to Full Moon*	07:18	20:22	07:31	20:14	07:29	20:11	12:24	03:07	06:14	17:27	18:00	06:35	15:39	05:19	13
20	04:45	06:13	18:15	19:42	D.N.R.	08:34	*Waning to Last Q. Moon*	06:59	20:18	07:24	20:29	07:12	20:06	11:58	02:40	05:49	17:04	17:31	06:07	15:11	04:51	20
27	04:34	06:02	18:21	19:49	04:43	16:14	*Waning to New Moon*	06:32	19:52	07:18	20:45	06:57	20:02	11:32	02:14	05:23	16:40	17:02	05:38	14:42	04:23	27
Oct 4	04:22	05:51	18:27	19:57	08:03	23:32	*Waxing to 1st Q. Moon*	05:56	18:56	07:12	21:00	06:41	19:57	11:06	01:49	04:58	16:17	16:33	05:10	14:14	03:55	4 Oct
Daylight Savings Time ▼ 11	05:10	06:41	19:33	21:05	15:43	04:30	*Waxing to Full Moon*	06:19	18:49	08:09	22:16	07:26	20:54	11:42	02:23	05:33	16:53	17:04	05:42	14:46	04:27	11 Daylight Savings Time ▼
18	04:58	06:31	19:40	21:13	D.N.R.	08:19	*Waning to Last Q. Moon*	05:55	18:12	08:07	22:32	07:11	20:50	11:18	01:59	05:07	16:30	16:36	05:14	14:18	04:00	18
25	04:47	06:22	19:47	21:23	04:12	16:10	*Waning to New Moon*	05:46	18:15	08:07	22:48	06:57	20:47	10:54	01:35	04:41	16:06	16:07	04:46	12:51	03:32	25

Right & Below - Presidents birthday bash at the MPAS Briars site on 18 October 2008

Photos - *By John Cleverdon*

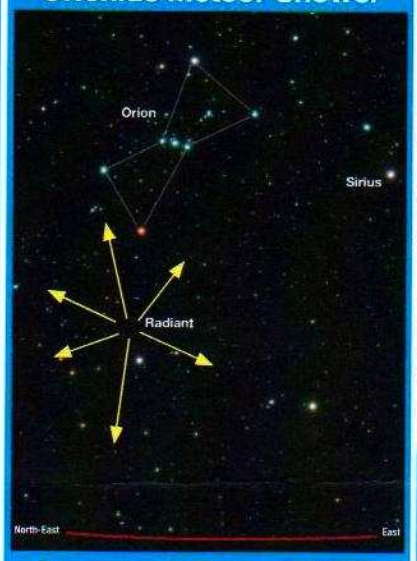
Bottom Right - Working Bee at the MPAS Briars site on 21 June 2008 closing in carport area with colour bond sheets.

Photo - *By John Cleverdon*

Skywatcher Events for SEPTEMBER and OCTOBER 2008

Skywatching Meteor Showers in September & October

Orionids Meteor Shower



A representation of the view from about 2:00 a.m. local time around October 21st. The point from where the Orionid meteors appear to radiate is located near the constellation Orion.

The Orionids meteor shower is the second of two showers that occur each year as a result of Earth passing through dust released by Haley's Comet, with the first being the Eta Aquarids *(19th April to 28th May)*. The Orionids for 2008 begin on October 2nd and end on November 2nd, with maximum generally occurring during the morning hours of October 20-22 Observers in the Southern Hemisphere will see around 20-25 meteors per hour. Maximum can last two or three nights, and there is evidence of some fluctuation in Zenith Hourly Rate from year to year.

There are other, weaker meteor showers going on around the same time as the Orionids *(see table below)*. The Orionids generally appear to move fast. When you see a meteor, mentally trace it backwards. If you end up at Orion then you have probably seen an Orionid meteor! If you are not sure where Orion is in the sky, the diagram to the left should help you find it.

Meteor Shower	Activity Duration	Max. Activity	Z.H.R. (at peak period)
alpha-Aurigids (AUR)	25th Aug to 8th Sep	1st Sep	7
September Perseids (SPE)	5th Sep to 17th Sep	9th Sep	5
delta-Aurigids (DAU)	18th Sep to 10th Oct	4th Oct	2
Draconids (GIA)	6th Oct to 10th Oct	9th Oct	Var
Epsilon Geminids (EGE)	14th Oct to 27th Oct	18th Oct	2
Orionds (ORI)	2nd Oct to 7th Nov	21st Oct	23
Leo Minorids (LMI)	19th Oct to 27th Oct	24th Oct	2

Skywatching Comets in September & October

Comet	Magnitude	Comet Location to closest Constellation (1st September → 31st October)	Perihelion Date	Time to Observe
C/2008 A1 McNaught	7	Centaurus → Libra → Ophiuchus	29th Sept '08	Evening to Midnight
6P/d'Arrest	9	Microscopium → Grus → Sculptor	14th Aug '08	All Night
C/2007 N3 Lulin	11	Ophiuchus → Scorpius	10th Jan '09	Evening
C/2007 W1 Boattini	10	Aries → Pisces → Pegasus	13th July '08	Midnight to Morning
85P/Boethin	10	Sagittarius → Capricornus	16th Dec '08	Evening to Midnight

'Perihelion Date' - *Date of closest approach to the Sun*
→ - *represents the comet travelling from one Constellation through to next Constellation*

An Astronomical Problem

Ian Sullivan runs his monthly astronomical classes at the Mornington Library on Saturday afternoons. Check "What's On" for dates. This recent question was brought up, see if you can figure it out:

"At local noon on 21st of March, you are temporarily blinded by the reflection of the Sun, off the wind-screen from an on-coming car, approaching you from the North on a level highway. The windscreen is flat and inclined at 20ø from vertical. What is your latitude at that time?"

Source - Van Allen J. 564 Elementary Problems in Solar System Astronomy No. 565

Answer in the next edition of Scorpius

Missing Scorpius?

If you know of any society members who are missing their bimonthly fix of Scorpius in the mail, please email us at **welcome@mpas.asn.au** to let us know, and correctly put you on the address list. Thanks.

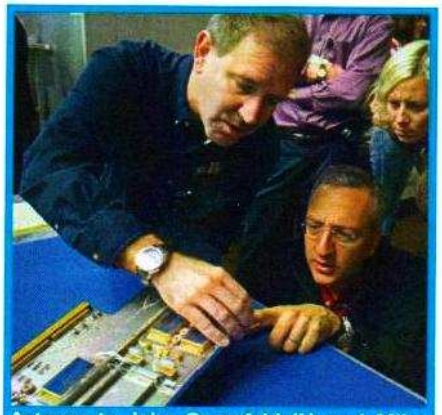
ASTRO NEWS HUBBLE MISSION SPECIAL

The Last Service of Hubble (Cont. from page 1)

information about the chemical content, temperature, and motion of stars and gas. Among its many accomplishments, STIS confirmed the existence of super-massive black holes and was the first instrument ever to detect and analyze the atmosphere of a planet orbiting another star.

Although spectrographs like STIS generally do not produce the beautiful images that Hubble is famous for, the data they provide are absolutely essential to understanding the physical properties of the universe. It could be said that they put the "physics" in astrophysics.

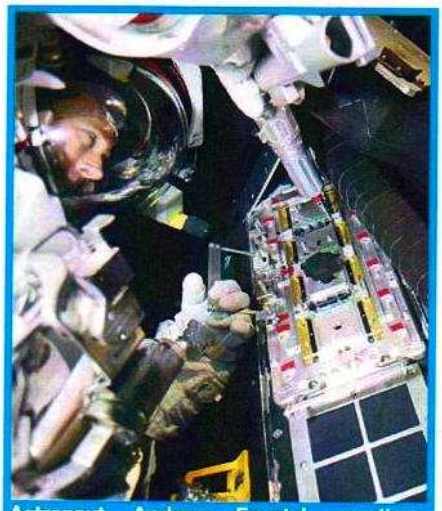
After a long life of scientific discovery, STIS experienced a power supply failure in August 2004, causing it to suspend operations. NASA engineers were able to pinpoint exactly where and how the failure occurred by examining data from STIS and determined that the inoperable power supply resides on a printed circuit board housed within the instrument.



Astronauts John Grunsfeld (*L*) and Mike Massimino and a team of Hubble engineers inspect position indicator decals on the STIS replacement printed circuit board. The board will be installed during Servicing Mission 4 in an attempt to restore power to the instrument.
Credit: NASA.

The Advanced Camera for Surveys

Installed during Servicing Mission 3B in 2002, ACS quickly became Hubble's workhorse imaging camera. Designed to survey large areas of the sky at visible and red wavelengths, it had twice the field-of-view and a finer resolution than its predecessor, the Wide Field Planetary Camera 2. It quickly became Hubble's most heavily used instrument and was responsible for many of the telescope's most popular and dramatic images.



Astronaut Andrew Feustel practices installing the Fastener Capture Plate on an underwater mock up of the Advanced Camera for Surveys at the Neutral Buoyancy Laboratory in Houston. Astronauts will attempt to repair the instrument during Servicing Mission 4 to Hubble.
Credit: NASA.

It took three failures to put ACS out of commission - the first two were recovered by operating the instrument in different ways. To protect against failures, all Hubble instruments have some degree of "redundancy," meaning that there are duplicate parts that can perform the same function. If one part fails, another can be activated to restore the function.

When the first two failures occurred in 2006, the ground operations team was able to keep the entire instrument fully operational by using a redundant power supply. The final failure came in January 2007 when the backup power supply failed.

With less than two years until the final servicing mission, there would have been little time to develop procedures and tools needed to repair ACS had the team not already been preparing for a very similar task involving the repair of STIS. Designing a repair process for ACS became very workable by adapting the processes already under development for STIS repair.

Tool and Procedure Development

The repair of STIS and ACS presented a multitude of challenges during the development process. Engineers needed to work around three major issues: (1) safely getting access to the failed boards; (2) figuring a way to pull them out wearing the pressurized gloves; and (3) closing out the work site when repairs are complete.

Knowing exactly what needs to be fixed is not enough to make repairs a piece of cake. To access the failed circuit boards on these two instruments, astronauts will have to remove 111 screws from the cover of STIS, and 32 screws from ACS, a time-consuming process in an environment where time is a scarce commodity.

To confront this challenge, Goddard engineers developed a high-speed power screwdriver with low torque, or twisting force. This combination of operational abilities means that the drill will speed up the removal process without breaking the screws and fasteners.

The sheer number of screws to be removed is not the only issue with gaining access to the circuit boards. Despite its mammoth size and giant status in space discovery, Hubble's instruments are extremely delicate. Floating debris pose the threat of contaminating exposed electronics, so as astronauts open Hubble's outer shell to make their repairs they must exercise extreme caution.

To avoid the debris issue, NASA engineers designed a fastener capture plate. Using the custom drill, astronauts will first remove four screws to install the transparent "capture plate" over the electronic access panel. Tiny, labeled holes in the plate will allow them to then insert the drill bit and remove screws as the capture plate contains them. When all of the screws have been removed, the entire capture plate can be released as one unit, safely taking the access panel and all debris with it.

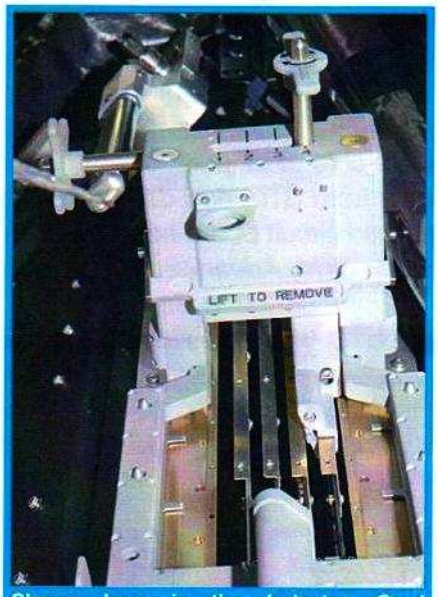
(Continue Over Page)

ASTRO NEWS HUBBLE MISSION SPECIAL

The Last Service of Hubble (Conclusion from page 9)

The astronauts' second challenge is grasping the failed circuit boards once the access panel has been removed. The boards are thin and the astronaut's suits, including their gloves, are bulky and pressurized to protect them from the space environment. If you were to put on a pair of thick, wool mittens and try to grab a single piece of paper from the middle of a stack, you might have some idea of how difficult and time-consuming the task is for astronauts. NASA engineers got around this issue by developing a special card extraction tool which will allow the astronauts to easily grab and remove the circuit boards using large handles made specifically for their gloves.

The last major challenge of the repair process involves closing the instruments back up after repairs are complete. To conserve time, engineers designed a simplified version of the access panels. Two lever-like latches will be all it takes for the astronauts to securely lock the new STIS cover into place. A new panel is not required for ACS because the new electronic cards have all been built into one box that easily slides into place and covers the open side of the instrument.



Shown here is the Indexing Card Extraction Tool (ICET) that the astronauts will be use to extract the printed circuit cards from the Advanced Camera for Surveys.
Credit: NASA.

Appreciating a Complement

Because NASA will be installing similar instruments into Hubble during this service mission, you may wonder what purpose it serves to fix STIS and ACS. The answer lies in their differing, but complementary, capabilities.

While the new Wide Field Camera 3 (WFC3) will expand Hubble's high resolution and provide a wide field-of-view into the near ultra-violet and near infrared regions of the spectrum, the ACS has a slightly higher discovery potential in the visible wavelengths of light. STIS is a two-dimensional spectrograph while the Cosmic Origins Spectrograph (COS) is a point-source ultra-violet spectrograph. These two spectrographs working in tandem would give astronomers a full, spectroscopic suite of instruments.

The improvements will add years of science to Hubble's mission and provide a full 'toolkit' to astronomers around the world. "Personally, I think that's where the more exciting results will come from after this servicing mission," explained Leckrone, "the new ideas that astronomers have about how to use these wonderful instruments now that they're all together in a set that is internally complementary."

Making History Again

Hubble has been arguably the most well-known and successful telescope in NASA history, but it is not solely a pathfinder for the science it has yielded over the years. The processes and procedures carried out during servicing missions have also always been innovative.

Before Hubble, nothing launched into space had even been built to be serviced and upgraded on orbit. The telescope is close to making history again with the first on-orbit repairs of existing instruments. Should these repair tasks be successful, Hubble is expected to be 90 times more powerful than ever before.

"At the end of this service mission, when the astronauts leave Hubble for the last time, we have a very good prospect that Hubble will be at the apex of its capabilities. It will be better than it's ever been before, which is quite awesome when you realize that it will be over eighteen years old as an observatory," Leckrone said.

Article extract by Kelsey Paquin and Ann Jenkins. NASA's Goddard Space Flight Center


The 12th of July, 2001 launch of Space Shuttle Atlantis, with sister Shuttle Discovery on the pad, preparing for it's launch on 10th of August, 2001.
Credit: NASA.

Seeing Double for the Last Time

Also shaping up for the last time this Hubble mission, is the opportunity to have two flight ready space shuttles on both pads at the same time. NASA will have fully assembled shuttles on both of its Kennedy Space Center launch pads for the first time since 2001 and for only the 17th time in more than a quarter-century of shuttle fleet operations.

The relatively rare sight will come after the planned Aug. 29 rollout of shuttle Atlantis to launch pad 39A in preparation for NASA's fifth and final Hubble Space Telescope servicing mission. The agency aims to move shuttle Endeavour on Sept. 23 to pad 39B, where it will be poised to launch on a rescue mission in the unlikely event that Atlantis sustains damage that would endanger the crew during

ASTRO NEWS HUBBLE MISSION SPECIAL

Seeing Double for the Last Time *(from previous page)*

atmospheric re-entry.

These rollout dates are planning dates and could change. But there should be about a 16-day window for people to see shuttles on both pads - likely for the last time before the fleet is retired in September 2010.

In the wake of the February 2003 Columbia accident, NASA decided a second shuttle always should be ready to roll out for a rescue mission should one of its winged orbiters sustain critical damage during a nine-minute climb into space or orbital operations. Shuttle crews typically would seek safe haven on the International Space Station and remain there up to three months until a second shuttle could be rolled out to pad 39B and launched with a rescue crew.

But the Hubble telescope is in an entirely different orbit, so its crew would not have enough fuel to reach the station in the event of an emergency. A rescue mission would have to be launched within weeks rather than months. So the second shuttle in this case must already be on pad 39B in order to carry out a rescue mission in a timely enough manner to save the Atlantis crew.

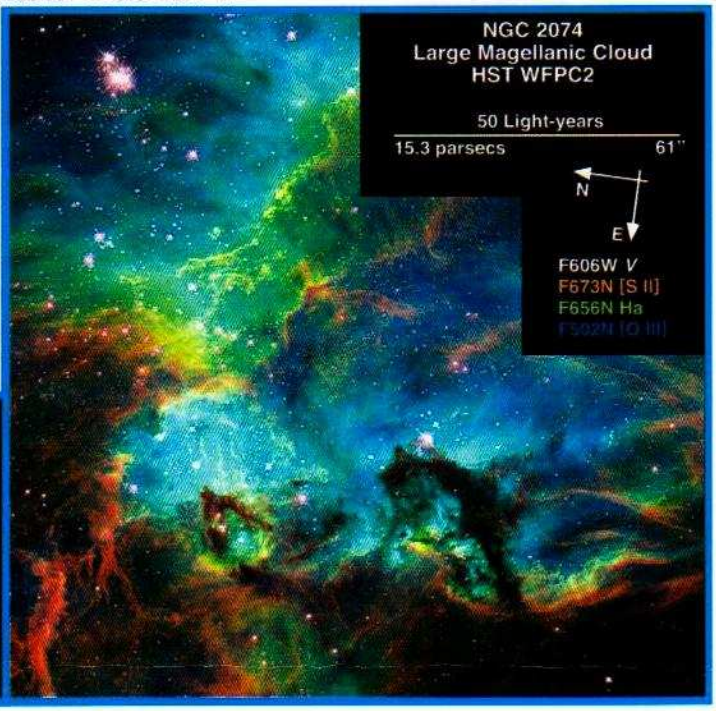
Article Extract from Todd Halvorson, Florida Today

100,000 Orbits on the Clock *(no wonder it needs another service!)*

NASA's Hubble Space Telescope completed its 100,000th orbit of Earth on the morning of August 11. In commemoration of this event in its 18th year of exploration and discovery, scientists at the Space Telescope Science Institute in Baltimore, Md., aimed Hubble at a dazzling region of celestial birth and renewal. Hubble peered into a small portion of this nebula near the star cluster NGC 2074.

The region is a firestorm of raw stellar creation, perhaps triggered by a nearby supernova explosion. It lies about 170,000 light-years away near the Tarantula nebula, one of the most active star-forming regions in our Local Group of galaxies. This representative color image was taken on August 10, 2008, with Hubble's Wide Field Planetary Camera 2. Red shows emission from sulfur atoms, green from glowing hydrogen, and blue from glowing oxygen.

Article Credit: NASA, ESA, and the Hubble Heritage Team (STScI/AURA)



Main Image: This nebula, imaged by the Hubble Space Telescope on August 10, is about 170,000 light-years away.
Credit: NASA, ESA, and the Hubble Heritage Team (STScI/AURA)

Insert: At that time the telescope was flying above the midway point of the Pacific Ocean and directly over the equator, heading northward.
Credit: NASA, ESA, and G. Bacon (STScI)

Society Pics

BORDER STARGAZE

28-31 August 2008

Several M.P.A.S. members made the trek up to Albury to attend the recent Border Stargaze Party. Here are a couple of pictures of our members enjoying the event up there. From their feedback, they all seem to enjoy their time up there. A full report, and more pictures from the weekend, will be in the next edition of Scorpius.

Some of the M.P.A.S. members getting together with Robert McNaught.

During the day the M.P.A.S. members were able to catch up with Dr. Fred Watson

The M.P.A.S. members pausing for picture during the afternoon setting up.

Office bearers of the Mornington Peninsula Astronomical Society

President: Peter Lowe - 0419 355 819
Vice President: Bob Heale
Scorpius Editor: Brett Bajada
Committee: Ian Sullivan, Kevin Rossiter, Terry Ryan, Brett Bajada
Phone Contact: Peter Skilton

Secretary: Peter Skilton - 0419 253 252
Treasurer: Marty Rudd - 5977 8863
Public Officer: Rhonda Sawosz
Web Master: Steven Mohr

General Meetings

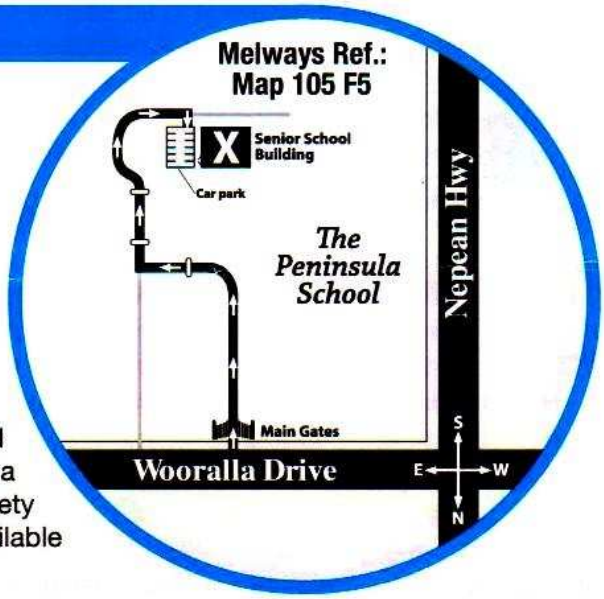
Meeting Venue: Peninsula School, Wooralla Drive, Mt. Eliza, (Melways map 105/F5) in the Senior School at 8pm, on the 3rd Wednesday of each month, except December.

Phone: 0419 253 252

Mail: P.O. Box 596, Frankston 3199, Victoria, Australia.

Internet: http://www.mpas.asn.au

email: welcome@mpas.asn.au



Loan Equipment

The Society has an 8-inch reflector, 80mm refractor and binoculars available for loan. Contact Kevin Rossiter or a committee member to arrange the loan of equipment. The Society also has books and videos for loan from it's library, made available during General Meetings.

Contributions To Scorpius

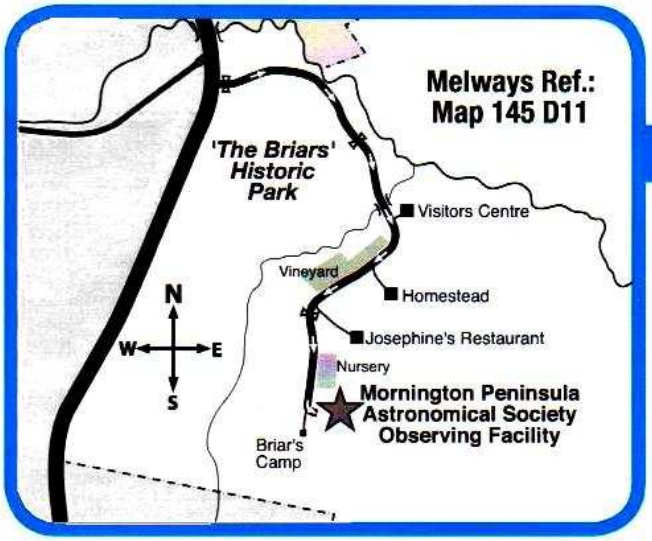
If you would like to submit an article or written contribution to Scorpius, then please send your submission to M.P.A.S., P.O. Box 596, Frankston 3199, or email you can now email to welcome@mpas.asn.au .

Any astronomical events that you have witnessed or tales you would like to tell, things you have for sale (eg: telescopes, eyepieces, etc.) then please send them in. And the new ***Society Pics*** page requires images that you have taken for all members of the society to see - don't keep them to yourself! All contributions are welcome.

E-Scorpius Newsgroup

The M.P.A.S. has an online newsgroup called E-Scorpius. Here you will be kept up to date with the latest M.P.A.S. news and event information as well as being able to join in discussions and ask questions with other members. To join, go to http://groups.yahoo.com and sign up to Yahoo groups. You require to sign up to Yahoo groups to join E-Scorpius.

Once you have signed up at Yahoo groups, email skywatch@iprimus.com.au saying that you want to join E-Scorpius and you will be added to the E-Scorpius list. Come on, join up. The more people in the group the better.



Viewing Nights - Members Only

Any night, at The Briars, Nepean Hwy, Mt. Martha, starting at dusk. If you would like to know if others are observing at the site, then call the society's site mobile on 0408 127 443.

Members visiting The Briars for the first time must contact Greg Walton on either 9773 0098 or 0415 172 503 if they need help in getting to the site. Upon arrival at the site, remember to sign the attendance book in the observatory building to verify that the mobile is turned on.

Right & Below - President Birthday Bash at the MPAS Briars site on 18th October 2008

Photos - *By John Cleverdon*

Left - Working Bee at the MPAS Briars site on 21st June 2008

Closing in the end walls on carport

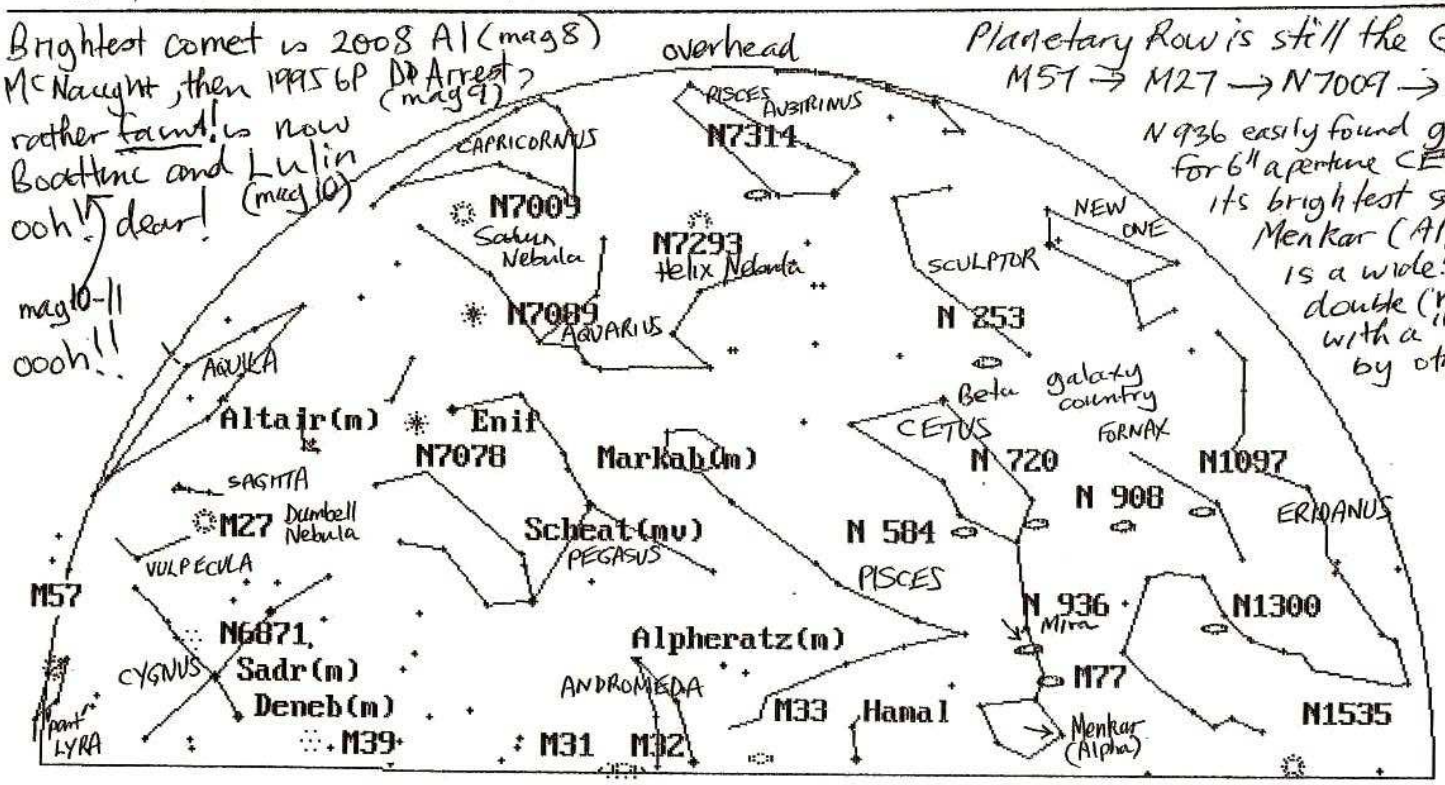
Photos - *By John Cleverdon*

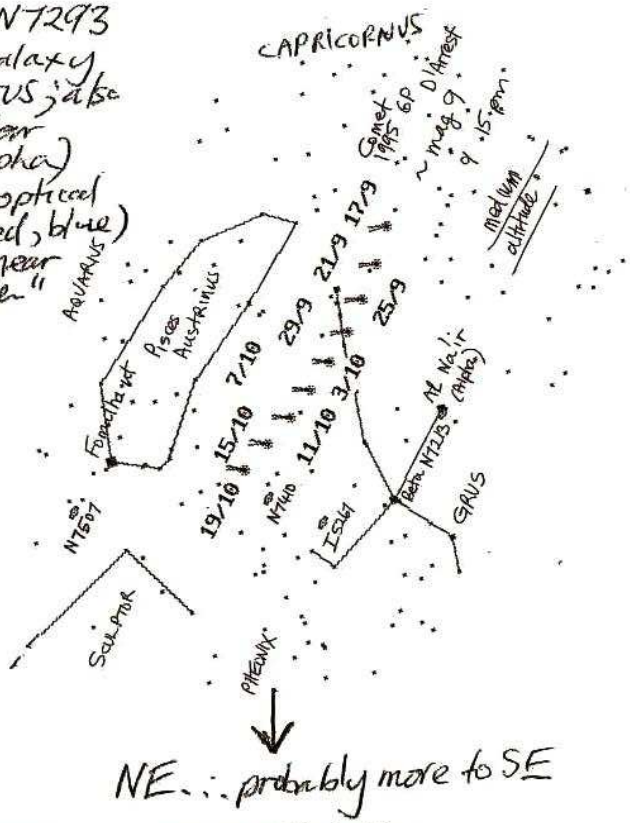
SKY FOR THE MONTH 17TH SEPTEMBER TO 14TH OCTOBER 2008 MORNINGTON PENINSULA

Brightest comet is 2008 A1 (mag8) McNaught, then 1995 Q1 Bradfield (mag9) rather faint! is now Boötes and Lulin (mag10) ooh!! dear! mag10-11 oooh!!

Planetary Row is still the Go!
M57 → M27 → N7009 → N7293

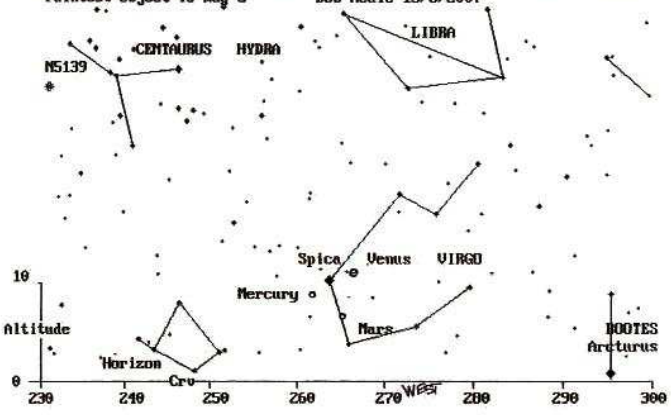
N936 easily found galaxy for 6" aperture CETUS; also its brightest star Menkar (Alpha) is a wide! optical double (red, blue) with a "near by other"

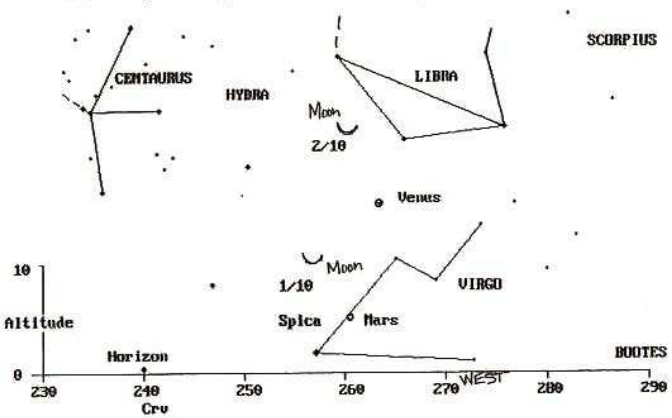


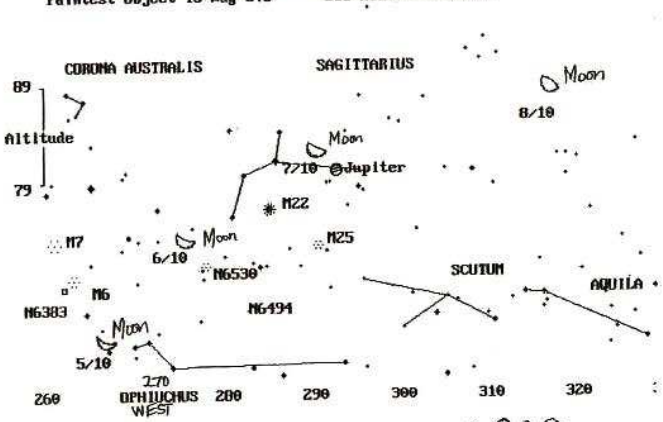


September 16th 9 15pm 1st October NE Dark Sky 2008 Standard Times also 10 15pm 2008 and 8 15pm 15th October 2008

NE.:. probably more to SE

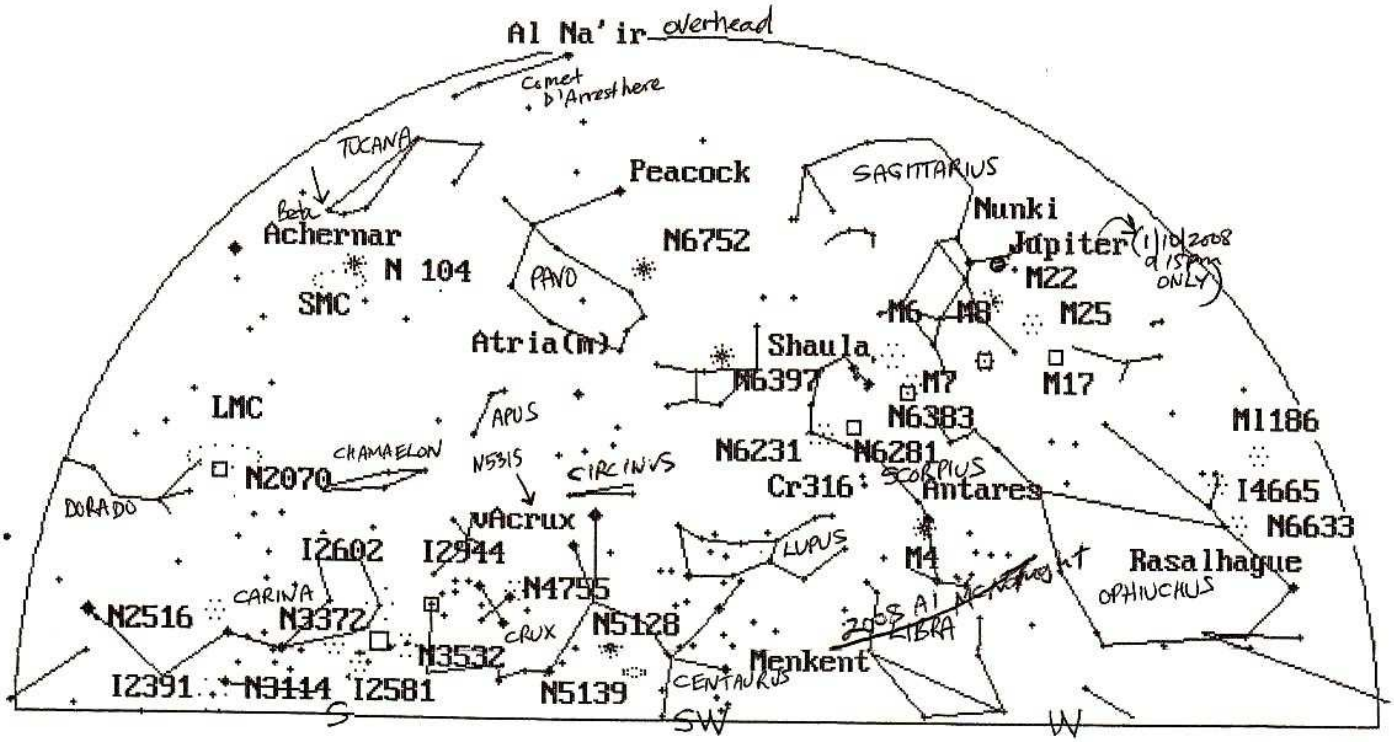






Bob Heale MPAS
15/9/2008

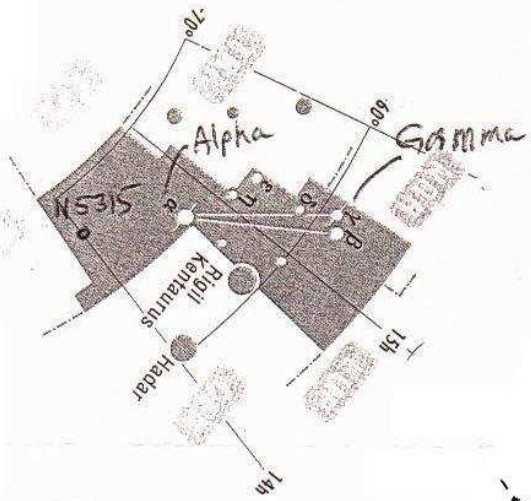
Mornington Peninsula Astronomical Society

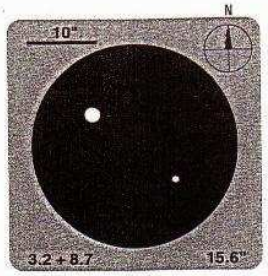


15th October 2008 9 15pm 1st October SW Dark Sky 2008 Standard Times also 8 15pm and 10 15pm 16th September 2008. Milky Way near bottom

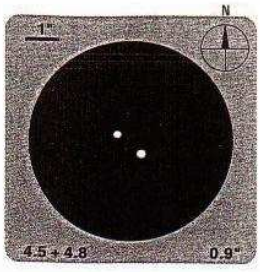
Beta Tucanae is a mag 4.5/4.5 yellow/yellow telescope double, probably not a binary .... in TUCANA (above SMC)

N5315 is a bright blue planetary nebula easy 6" telescope

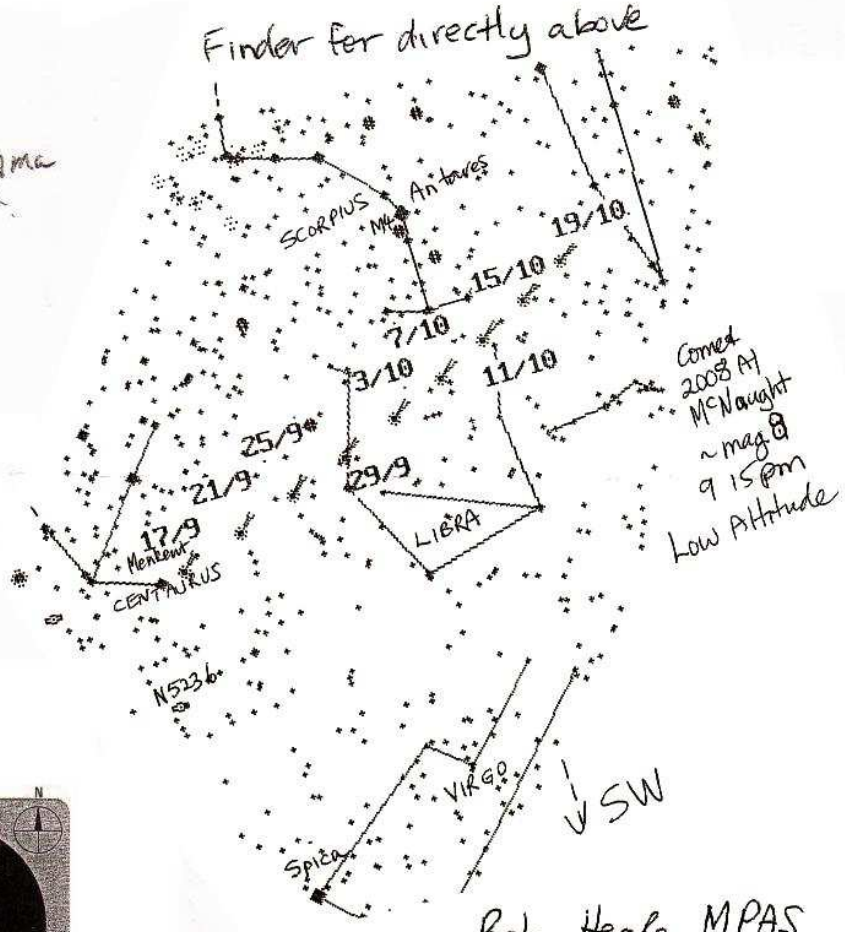




Left: Double star **Alpha** α **Circini**, the components of which can be separated with a small telescope.



Right: **Gamma Circini** is a close visual double star, which can serve as a test object for the telescope with a 150 mm objective.



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