Night Sky

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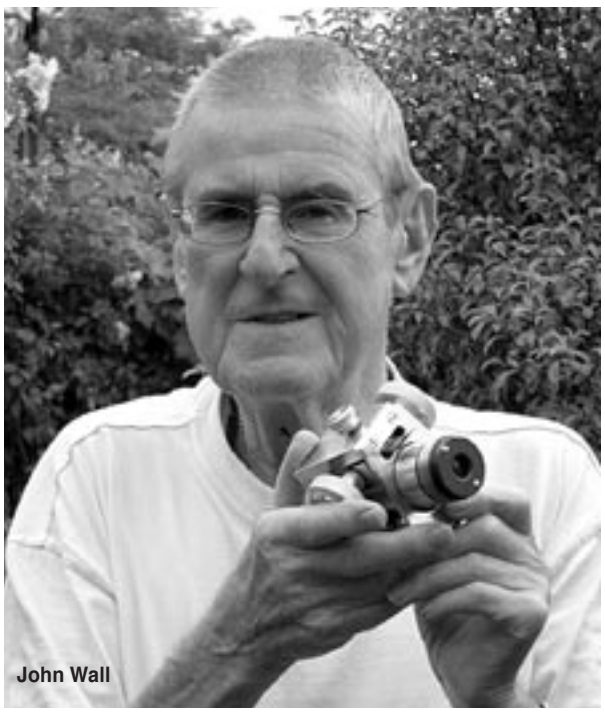
LUNAR ECLIPSE: see Page 2

AMATEUR ASTRONOMERS WHO MAKE A DIFFERENCE: JOHN WALL

ONE AMATEUR'S QUEST FOR A BETTER TELESCOPE FOCUSER BENEFITS US ALL



John Wall

Most amateur astronomers are familiar with the Crayford focuser that adorns many modern telescopes. Until fairly recently the type of focuser fitted to most telescopes- even those used by professional astronomers on large observatory telescopes- was the 'rack and pinion' design. It's limitations were understood by all and especially by those who tried to mount heavy eyepieces or cameras on the telescope. The rack-and-pinion system could be made to wobble ever so slightly- just what was not wanted for precision focusing and photography.

Various focusers were invented that could alleviate the problem to some extent, but most were either too complicated - or were far too expensive.

John Wall, a member of the Crayford Manor House Astronomical Society, in Crayford, near London took up the challenge of designing a new type of focuser. His design used the geometry of the components, rather than the hi-tech path of precision machining. Whilst the machining is precise, it's very simple and this produces the required absence of wobble or backlash.

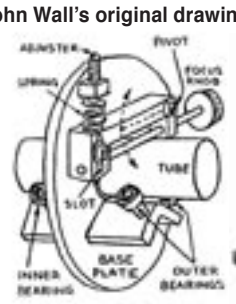
The Crayford is similar in appearance to a Rack and pinion focuser, but has no teeth on either the rack or the pinion. Instead, a round axle is held against against a flat under the focuser drawtube, relying only on friction and pressure to move the drawtube in and out as the axle is turned. This also presses the drawtube against a set of four ball bearings against which it moves smoothly with minimal friction. The pressure exerted on the axle can be adjusted to suit the individual's requirements. The drawtube may also be locked in position to support heavy eyepieces or cameras.

A popular Crayford focuser with two-speed focusing.

The focuser was initially demonstrated by John to the Crayford Manor House Astronomical Society and then descriptions were published in the journal of the British Astronomical Association in February nineteen seventy-one. John Wall decided not to patent his idea, effectively donating it to the amateur astronomical community.

Models of the focuser were soon being made by such companies as JMI in the USA which made them for amateur astronomers who wanted precision that wasn't easily available in the rack-and-pinion focuser. They have now become standard on most good quality refractors, Newtonian reflectors and even on Cassegrain telescopes, where they prevent the lateral shift when refocussing that bedevilled the conventional focus system. Telescope factories in China, Taiwan and Japan are producing them in large numbers. Amateur astronomers retro-fit Crayford focusers to older newtonians when refurbishing them. Amateur astronomers owe John Wall a debt of gratitude! The smoothness and precision of a Crayford focuser, when compared to what we had before is a real pleasure!

John Wall's original drawing.



A simple Crayford focuser

WHATEVER HAPPENED TO THE SYDNEY PLANETARIUM?

Each month Sydney Observatory recieves copies of the 'Night Sky'. In the May edition Mike Smith asked "Whatever happened to the old Zeiss projector at the Harris Street museum?"

Indeed! Like many people I remember visiting the hushed chamber as a child with my father. I only recall the dimming of the lights at the start of the show and a fancy and magical contraption filling the centre of the room. The rest is a blank! Still, it must have impressed me because now I'm the one teaching the next generation of kids about the sky at Sydney Observatory.

The old planetarium projector still exists. It arrrived from Spitz Laboratories (not Zeiss) of the US in 1950, and it is presently in the storage halls at the Powerhouse Museum – a place that always reminds me of the final scene from 'Raiders of the Lost Ark'.

Apart from the main projector there is a planet-Sun-Moon projector a couple of slide projectors and a couple of projectors to display meridian, equator & ecliptic lines on the sky. There is also something mysterious called an 'astronomical triangle'. This last one looks like three linked flying-saucers and I can only imagine it would be used to display lines on a dome to map out constellations. The whole lot is worn and dusty with lots of wires dangling out like entrails from road-kill – sad really.

There is also a frieze of the Sydney skyline that once graced the rim of the dome. Although this includes the Harbour Bridge the rest of the skyline looks like a medieval fareground. I suspect Spitz simply modified a standard frieze. Did you ever visit the old planetarium at Harris Street? What do you remember? ***Andrew Jacob***

A 1950's promotional brochure from Spitz. The planetarium demonstators were supposed to be dressed in dinner suits for the evening shows!

3 Column

I hear that the Hawkesbury Astronomical Society is being wound up. Looks as if members will be joining other astronomical groups around the area and continuing with their avocation elsewhere.

* * *

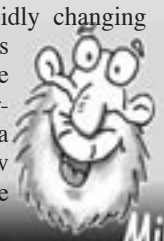
Andrew Jacob of the Sydney Observatory went searching for the old planetarium machine that used to grace the Applied Arts and Sciences Museum. He came up with the machine itself and some accessories in the depths of the bowels of the Powerhouse Museum. Andrew remarks, (in his story on the left) that he remembers visiting the old museum and watching the presentation in the darkened room. Personally, though I visited the museum also, I have more vivid memories of watching the "Transparent Woman" show just down the corridor. A life-size transparent statue of an adult woman had a complete set of internal organs that glowed when lit up by the operator at a switchboard. A recorded voice intoned the features of each individual organ and how it functioned. I recall being very disappointed when there was no illumination (or explanation offered) of the 'naughty bits". In the early nineteen-fifties that would have been a bit too risque, even for Sydney!

* * *

I'm always a sucker for anything to do with space. If it has come from space or been into space I get all touchy-feely. I have in my possession some pieces of space memorabilia, to wit: pieces of silver-coloured insulation material that was used in the Atlantis space shuttle's trip to the MIR space station in 1997. The material is neatly framed in such a way you can see the many layers that make up what appears to be very thin mylar. They come with a guarantee of authenticity. If you're interested in obtaining one of these framed mementoes of the Space Shuttle era let me know. Prices are quite reasonable. (***mike@bintel.com.au***)

* * *

This has been, in the words of the ancient teacher "an interesting year in a rapidly changing world". All of us at BINTEL hope you have a wonderful Christmas and a very pleasant New Year! Be happy, be good, and be safe!



IN THIS ISSUE

LOOKING SOUTH with Mel

LUNAR ECLIPSE

ON THE HORNS OF A DILEMMA ? NO, THE MOON IS ON THE HORNS OF TAURUS.

This month your eyes are all you the equipment you will require to see a special astronomical event. A lunar eclipse is an event that anyone can enjoy and this month we are especially lucky that we see a total lunar eclipse on Saturday 10th December / Sunday 11th December.

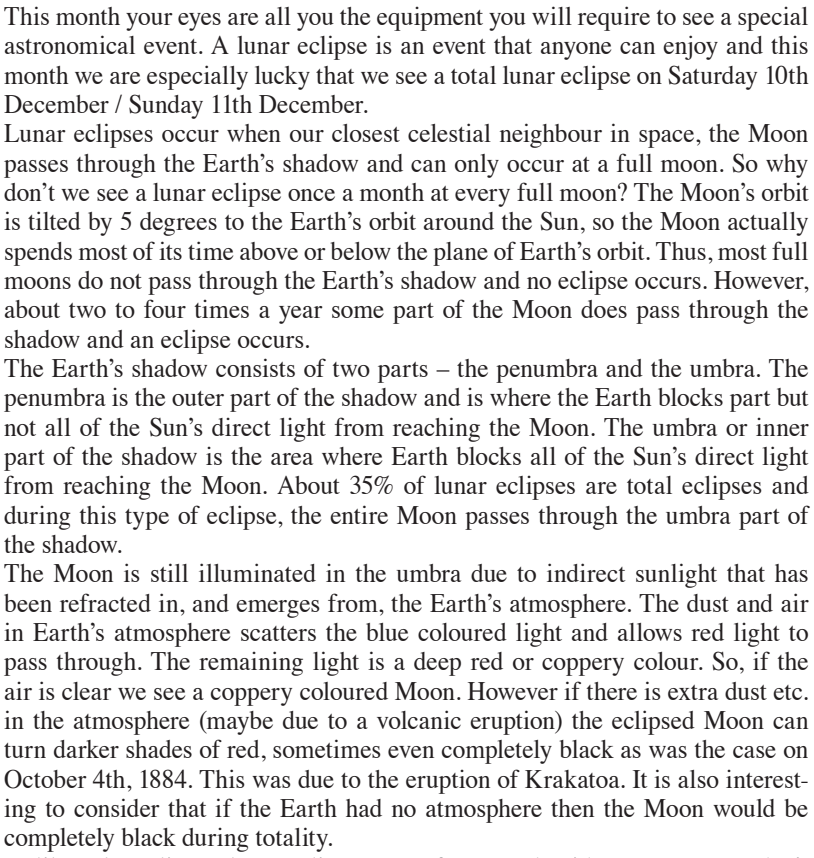
Lunar eclipses occur when our closest celestial neighbour in space, the Moon passes through the Earth's shadow and can only occur at a full moon. So why don't we see a lunar eclipse once a month at every full moon? The Moon's orbit is tilted by 5 degrees to the Earth's orbit around the Sun, so the Moon actually spends most of its time above or below the plane of Earth's orbit. Thus, most full moons do not pass through the Earth's shadow and no eclipse occurs. However, about two to four times a year some part of the Moon does pass through the shadow and an eclipse occurs.

The Earth's shadow consists of two parts – the penumbra and the umbra. The penumbra is the outer part of the shadow and is where the Earth blocks part but not all of the Sun's direct light from reaching the Moon. The umbra or inner part of the shadow is the area where Earth blocks all of the Sun's direct light from reaching the Moon. About 35% of lunar eclipses are total eclipses and during this type of eclipse, the entire Moon passes through the umbra part of the shadow.

The Moon is still illuminated in the umbra due to indirect sunlight that has been refracted in, and emerges from, the Earth's atmosphere. The dust and air in Earth's atmosphere scatters the blue coloured light and allows red light to pass through. The remaining light is a deep red or coppery colour. So, if the air is clear we see a coppery coloured Moon. However if there is extra dust etc. in the atmosphere (maybe due to a volcanic eruption) the eclipsed Moon can turn darker shades of red, sometimes even completely black as was the case on October 4th, 1884. This was due to the eruption of Krakatoa. It is also interesting to consider that if the Earth had no atmosphere then the Moon would be completely black during totality.

Unlike solar eclipses, lunar eclipses are safe to watch with your eyes, you don't need any special protective filters or even binoculars or a telescope, though these do help make the coppery colour stand out.

Amateur astronomers can make some very useful observations during total eclipses. A simple one is to use the Danjon Brightness Scale (http://sunearth.gsfc.nasa.gov/eclipse/OH/Danjon.html) to determine the Moon's colour and brightness during totality.



The Lunar eclipse will showcase an interesting part of the sky. Above and to the right of the Moon will be the constellation of Orion. Above to the left will be the horns of Taurus the bull. To the left will be seen the seven sisters, ususlly called "The Pleiades'.

Interestingly this time, the eclipsed Moon will be between the horns of Taurus the bull. Timings for the eclipse in Australia are listed in the table below.

Eclipse	*EDST*	*WST*	*UT (10 Dec)*
Penumbral Begins	10:34pm (10 Dec)	7:34pm	11:33
Partial Begins	11:46pm	8:46pm	12:45
Totality Begins	12:06am (11 Dec)	10:06pm	14:06
Mid-Eclipse	12:32am	10:32pm	14:31
Totality Ends	12:57am	10:57pm	14:57
Partial Ends	2:18am	12:18am (11 Dec)	16:17
Penumbral Ends	3:30am	1:30am	17:30

The next total lunar eclipse will be 8th October, 2014. Eastern states will see the entire eclipse, while central and western parts of the country will see an eclipsed Moon rise. Less than a year later, eastern states and the central parts of Australia will witness an entire lunar eclipse on 4th April, 2015.

It is difficult to predict the colour of totality in advance and this is perhaps one of the most magical aspects of total eclipses of the Moon. Whether this is your first eclipse or one of many, this unpredictability makes each and every eclipse exciting and definitely worth getting out of bed for. This time with the Moon placed between the bull's horns, it is a wonderful chance to view something a little different this month! ***Mel Hulbert***

SUNNY CORNER with Harry Roberts

TLC ? NO! THC? NO! TLP... MAYBE.

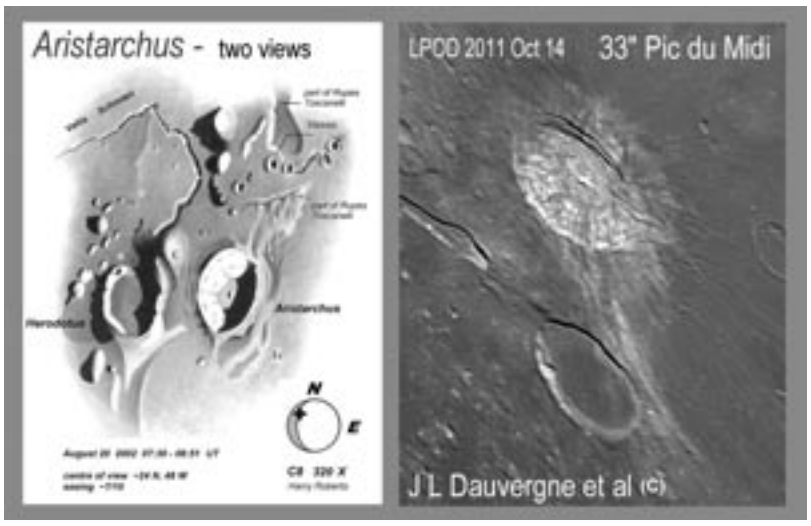
OH DEAR ! HARRY IS SEEING THINGS AGAIN.

Secretly perhaps, many of us who point a 'scope at the Moon hope to see some unexplained transient event – a TLP or transient lunar phenomenon (LTP for Americans, I believe). Sadly, such things have become rare in recent decades. They were however in plague proportions in the 1950's, with many eminent amateurs (and some professionals) logging a TLP. In our era of high-resolution lunar photography where have all the TLP's gone? A brief history of them might be of interest.

TLP's go back a long way. Consider the five monks who in 1178 saw the "upper horn of the new Moon split and ...fire, hot coals and sparks spewed out". This spectacular report has been attributed to the impact that formed crater Giordano Bruno just behind the Moon's NE limb. There is some evidence for this but, until precise dating of that crater is available, it remains an unlikely possibility.

Early in the telescope era amazing lunar changes were "recorded". Most famous perhaps is the "sudden disappearance" of the crater Linné in western M. Serenitatis, mapped (wrongly) as a ten km wide crater in 1837, but found by Schmidt in 1866 to have "vanished", leaving behind a brilliant white patch. It's worth taking a look at Linné in a modern scope with good seeing conditions – detecting the 2km wide crater at the centre of the bright patch is always hard, and reminds us of the challenges facing lunar mappers early in the 19th century.

The mid 20th C was the heyday for TLP's. Speculation about the Moon's composition was rife before the Apollo landings– with all kinds of theories in play. As well Earth based photography was then poor compared to current amateur imaging. Many amateur groups had TLP-search sections - and they were not idle: TLP's were logged by the hundreds!



what were they seeing on the Moon? Were the Russians lying?

Most commonly seen were "fogs", "hazes" and "bright glows", often coloured. So many were seen that maps of the most prolific sites were compiled, and section leaders published the future dates and times when near-exact repeats of lighting and libration would occur, to test if a past event was just a "trick" of lighting or such-like. Most "true-believers" felt they had seen some kind of volcanic eruption – and it was then widely thought that the Moon's craters (big and small) were due mostly to volcanism.

Caution and skepticism were early casualties: some believed the transient bright bands in Aristarchus (the most "active" of TLP sites, Fig) were due to vegetation that thrived on gasses venting from fissures in the crater wall. Others routinely "saw" a haze spread across Plato's floor obscuring the tiny craters on its surface (I find they're always hard to see).

Most of this was innocent enough, until in 1958 the Soviets published "convincing evidence" that the central peak of Alphonsus (a known "TLP hotspot") had vented hot carbon gas. The evidence convinced many major scientists – but with hindsight may have been Cold War disinformation. We can only speculate on the Soviets motive.

A US Ranger probe targeted on the "eruptive" peak found no trace of volcanism, and all recent work is also negative – Certainly the event has not recurred.

Editor willing we may revisit some of this TLP history in a future article (or two). To open the TLP discussion I attach a sketch of the Aristarchus region together with a superb recent image of the crater, the site of so many TLP's (Fig). Perhaps all the bright spots on the rim and wall of this crater have been reported as a TLP at one time or another.

Paradoxically, there are plenty of lunar volcanic sites within reach of amateur telescopes – but none, to my knowledge, have ever been the site of a reported transient lunar phenomenon! ***Harry Roberts***

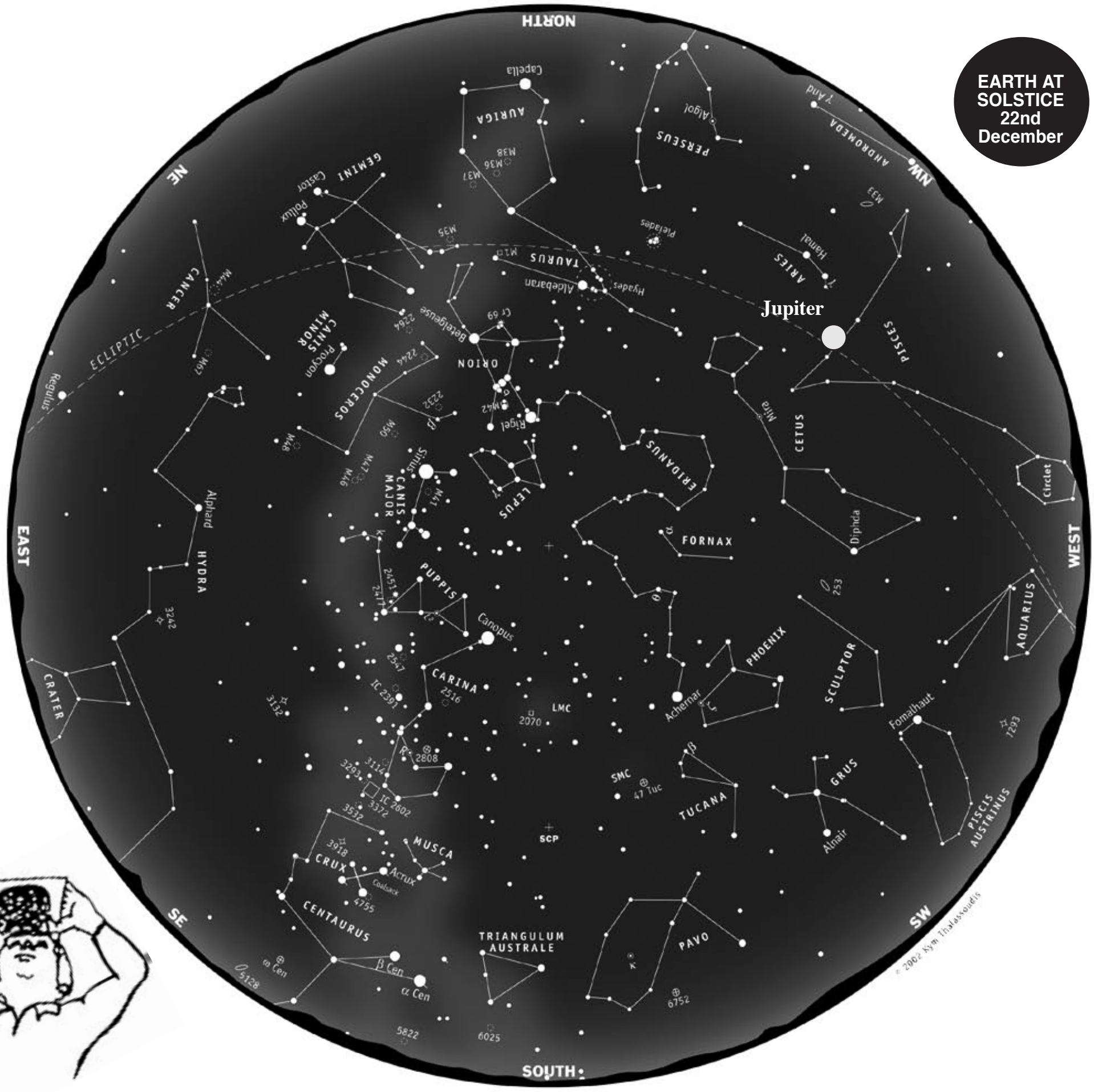
Oi, look ye yonder!

STRANGE THINGS SEEN ON THE MOON. REAL ? OR UNREAL ? ZOMBIES?

real or imagined... the moon hasn't given up all its secrets.

On June 18th in the yeare 1178, several monks from Canterbury did verily report an upheaval on the Moone shortly after sunset. "There was an bright new moon, and as usual in that phase its horns were tilted toward the east; and suddenly the upper horn split in two. From the midpoint of this division an flaming torch sprang up, spewing out, over a considerable distance, fire, hot coals, and sparkes. Meanwhile the body of the moon which was below, writhed as it were, in anxiety, and, to put it in the words of those who reported it to me and saw it with their own eyes, the moon throbbed like a wounded snake. Afterwards it resumed its proper state. This phenomenon was repeated a dozen times or more, the flame assuming various twisting shapes at random and then returning to normal. Then after these transformations the moon from horn to horn, that is along its whole length, took on a blackish appearance." In 1976 geologist Jack B. Hartung of the State University of New York proposed that this passage describes the creation of Giordano Bruno, a relatively young, 22-kilometre-wide crater near the Moon's northeast limb. Hartung reasoned that, seen from Earth, this brightly rayed crater appears near the midpoint of the young crescent Moon. Astronomers were quick to counter that on the date in question the Moon was only 1.3 days past new and thus too near the Sun to be easily visible at all. Also, Gervase's witnesses claimed to have seen the "flaming torch" many times, which sounds a lot more like the ordinary atmospheric distortions often seen near the horizon. On the night of November 1–2, 1963, at the Observatoire du Pic-du-Midi in the French Pyrenees, Zdenek Kopal and Thomas Rackham made the first photographs of a "wide area lunar luminescence." His article in Scientific American transformed it into one of the most widely publicized TLP events. Kopal, like others, had argued that Solar Energetic Particles could be the cause of such a phenomenon.

In 1992, Audouin Dollfus of the Observatoire de Paris reported anomalous features on the floor of Langrenus crater using a one-metre telescope. While observations on the night of December 29, 1992, were normal, unusually high albedo and polarization features were recorded the following night that did not change in appearance over the six minutes of data collection. Observations three days later showed a similar, but smaller, anomaly in the same vicinity. While the viewing conditions for this region were close to specular, it was argued that the amplitude of the observations were not consistent with a specular reflection of sunlight. The favored hypothesis was that this was the consequence of light scattering from clouds of airborne particles resulting from a release of gas. The fractured floor of this crater was cited as a possible source of the gas... but was it actually gas? Or something else far more sinister? Was somebody fracking coal-gas on the Moon?



Night sky December 2011

The Moon

The Moon pulls at the Earth's oceans, causing tides. When the gravity of the Moon and the Sun line up, we get the highest and lowest tides.
The Moon also pulls at the crust of the Earth causing it to bulge very slightly. You are a few metres higher every time the Moon is overhead, but because of the huge size of the Earth (compared to you) you don't notice it.

2nd	First Quarter.
6th	Moon at Apogee
11th	Full Moon ***Eclipse***
18th	Last Quarter
22nd	Moon at Perigee
25th	New Moon

The Solar System

Mercury: Is in the evening sky in Scorpius near much brighter Venus. They encounter M80 on the 7th, M19 on the 17th.

Venus: After canoodling with Mercury early in the month Venus swings by M8 and M28 in the star-studded fields of Sagittarius in the centre of the Milky Way galaxy.

Mars is now in the eastern sky before dawn. Can be found near Regulus in Leo. Both will be about the same brightness but Mars is orange.

Jupiter is high in the North-East when the sky gets dark. An easy sight in Aries. Great in binoculars... best in a telescope.

Saturn has re-appeared in the pre-dawn sky after passing behind the Sun. Can be seen below the star Spica. The sky gets brighter by the minute, so see it before 5.30am.

Uranus: Is in Pisces, high in the north, early in the evening. Not quite bright enough to see visually.

Neptune: Is in Aquarius in the north-western sky mid-evening. Very difficult to see with a small telescope,... so get a big one!

Pluto: Has been reading up on Shakespear to find the real meaning of, "Cry havoc and let slip the dogs of war." He suspects that there may be some connection to the current situation of a shamrock-eating bright red aerial herbivorous marsupial thingy.

Comets etc...

Not a lot happening with comets at the moment, though **Comet P/2006 T1 (Levy)** might be worth a squiz. It's in Pegasus, visible in a decent sized telescope as a 'faint fuzzy'. Wait till the sky is dark enough before looking for it. Remember, it won't be bright and it won't be moving noticeably. Want to find a new comet? Bill Bradfield, one of the greatest comet discoverers says, "Searches of the prime sky areas should be made twice a month, the first being early in the Moon-free period and the second towards the end of that period. The first search is often rewarding because it could reveal a comet which could have been brightening substantially in a sky covered by bright moonlight." Why not go out and discover your own comet and become an internationally famous celebrity?

Deep Sky

Fredrik Broms photographed the sun during its last minutes above the horizon from Tromsø in Northern Norway. It won't rise above the horizon again till mid-January! Says Fredrick, "To me, this is by far the most beautiful time of the year. "

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Astronomical Society of The South-West, W.A.
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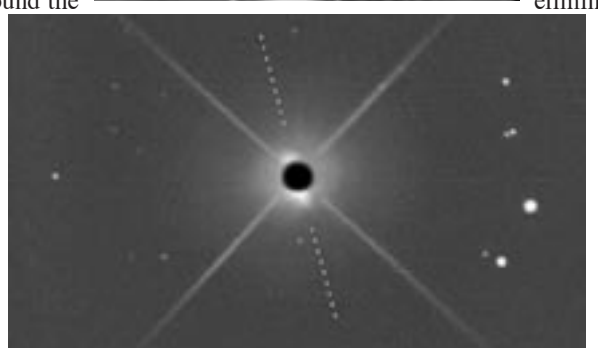
NEW SOLAR SYSTEM WITH AMATEUR TELESCOPE. BREAKTHROUGH WITH SIMPLE SCOPE IN NZ !

A Danish amateur astronomer, based in New Zealand, has captured the first amateur pictures of another solar system with a home-made ten-inch Suerrier-truss Newtonian telescope from a small observatory in his back yard in Titirangi in the foothills of the Waitakere Ranges west of Auckland, New Zealand, where there's not much light pollution and the sky is very dark (when not cloudy).

Rolf Olsen has published the first non-professional pictures of the disc of debris and dust that is forming a very young solar system around the star Beta Pictoris .



The 12 million-year-old system, young as solar systems go, is some 60 million light years away from us.

The proto-planetary disc around Beta Pictoris has been photographed with very big telescopes in large observatories often before, but it was not thought feasible for amateurs to take a picture of the system, because of the glare from the star itself.

Rolf Olsen managed his result by taking a picture of a nearby star of similar brightness and colour.- then subtracting its inage from his image of Beta Pictoris. This eliminated the bright glare, leaving the dusty disc of the new solar system. The open truss telescope is mounted on a Losmandy G11 computer-controlled equatorial head and pier.

TOP: Rolf Olsen
Middle: the image he took.
Bottom: The 250mm telescope he used.

Olsen says he got the idea by reading how it was done in a 1993 Harvard paper titled 'Observation of the central part of the beta Pictoris disk with an anti-blooming CCD'.

" I then realised that it might not be entirely impossible to also record this object with my own equipment. I followed the technique described in the paper above, which basically consists of imaging Beta and then taking another image of a similar reference star under the same conditions. The two images are subtracted from each other to eliminate the stellar glare, and the dust disc should then hopefully reveal itself. "

First he made fifty images of Beta Pictoris, then collected similar pictures of Alpha Pictoris as it is similar in colour and brightness. He then subtracted the image of the second star, removing the glare. He blended it with the original image of Beta Pictoris using photo editing software.

Olsen says "The result is, I believe, the first amateur image of another solar system: The proto-planetary disc around Beta Pictoris. I must say it feels really special to have actually captured this."

What makes this event particularly interesting is the use of amateur equipment together with an almost decade-old method of imaging.

TECTONIC PLATES

TECTONIC PLATES, EARTHQUAKES and TIDES

When: Wednesday, December 7th, 7.30 pm.
Where: Discovery Science & Technology Centre.
(next to Bendigo Marketplace).

Judith Bailey (B.A.S., A.S.V.) is fascinated by the potential relationship between the recent series of major earthquakes and the close approach of the moon. Public interest has also been so overwhelming that presentations on this topic have been oversubscribed leading to subsequent talks. A multitude of events lead to an examination of information about a series of major earthquakes and directed her interest in tectonic plates, oceanography and astronomy. For more information, contact Peter Mead on 0407 631 971.

Nervo Shatterini September Quiz

His Eminence Professor Dr Nervo Shatterini, Professor of Climate Change Denialogy at the A Jones College of TwoBG Radiology asks for your attendance. Please answer these questions.

1) Where is La Silla Observatory?
(2) Where was the Supernova discovered in 1885?
(3 Which colours appear in the Trifid Nebula?
(4) Near which large galaxy is the Ursa Minor Dwarf galaxy?
(5) Where was Helium first discovered?
(6) What is the second brightest star in Perseus known as?
(7) Where could you see a coronal streamer?
(8) What type of aberration is a 'correcting plate' used for?
(9) Which country is connected to the constellation Cepheus?
(10) In which constellation is the Solar Apex?
(11) Where does the Hirayama family live?
(12) Juliet is connected with which planet?
(13) Which is Neptune's second largest moon?
(14) Which four galaxies in Coma Berenice form a perfect square?
(15) Where is Burnham's Nebula?
(16) Which astronomer compiled the Historia Coelestis Britannica?
(17) Which Melbourne-based band plays the song "If your Dad has no beard you've got two Mums"?
(18) What is the twelfth letter of the Greek alphabet?
(19) What are the three brightest stars in the night sky?
(20) Which constellation has been called the "armchair"?

Now, if you're too lazy to look up the answers for yourself you could turn this page upside down and take a sticky-beak at His Honour's answers.

(1) Atacama Desert in Chile.
(2) In the Andomeda Galaxy.
(3) Blue and red
(4) It's near the Milky Way Galaxy.
(5) In the Sun's spectrum.
(6) Algol, the demon star.
(7) On the Sun.
(8) spherical aberration in a catadioptric telescope.
(9) Ethiopa. He was its king.
(10) It's in Hercules, if you must know.
(11) Sakura Lane, Kyoto, Japan*
(12) It's Uranus' sixth moon.
(13) Proton
(14) Hickson 61 aka The Box.
(15) It surrounds the star T Tauri.
(16) John Flamsteed, published 1725 The band is called "The Bears"
(18) It's mu (μ)
(19) Sirius, Canopus and Rigil Kentaurus
(20) Cetus, for some reason.
* Actually they're asteroids with similar orbital elements.

Mick 'n Don

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