Shoalhaven Astronomers Inc.
www.shoalhavenastronomers.asn.au
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Issue 1

Astro Flyer

JANUARY 2019

Club News

Hello all,

Welcome back from our yearly recess. I was in the USA to have Christmas with my brother. I had a fine time and indulged in a lot of Mexican food. Inoted that a lot of my work mates at the Griffith Observatory had taken many photos of comet 46P Wirtanen and published them on Facebook. Did anyone here get any pictures?

I made an executive decision for January and we will have a club viewing night Saturday, January 26th at dusk at our new viewing area just north of the university, (see below) weather permitting. The moon will be two thirds full but that is about the best we can do for the remainder of this month. See you at the monthly meeting.
Frank Gross, President

Next monthly meeting will be held at the Shoalhaven Campus of the Uni of W'Gong, George Evans Road off Yawal Road, West Nowra, January 18th, 7pm for 7.30 start.

Contents

MOON PHASES

New Moon	First Quarter	Full Moon	Last Quarter
Feb 5	Jan 14	Jan 21	Jan 28

Viewing Nights

Club viewing nights are selected to provide viewers with the best possible conditions for good viewing. They are held on specific Saturdays at different locations around Nowra.

The next club viewing night will be on Saturday 26 Jan (back-up night Sun 27 Jan) at the new viewing site. Go to the university on George Evans Road and go straight ahead through the second turning circle to the new viewing site.

More viewing nights Page 14

OUT THERE
Bob Turnbull OBSERVATION OFFICER

OUT THERE JANUARY to FEBRUARY 2019

With the fairly difficult viewing since my last report, I feel somewhat less confident about sighting objects and especially Comets, which in spite of numerous attempts I only had one doubtful siting with 10X50 Binoculars from Bomaderry and even when I was in Noosa in Queensland for Christmas and North Lakes for New Year, when I hoped to see something of 46P/Wirtanen, around Taurus, I was not successful (Note: I had no tools but my own eyes up there, so maybe I was expecting a bit much!)

PLANETS

VENUS Is a bright object in the Eastern sky, small telescopes can easily distinguish it's phases, still blazing at magnitude -4.5 across Libra, Scorpius and Ophiuchus. Then on the 21st to 25th it will join Jupiter at 2.3 degrees apart. In February it crosses the Archer (Sagittarius) in the early morning sky. Then from the 17th to the 21st it appears 2 degrees from Saturn.

MARS From the evening western sky above the Circlet of Pisces. It has little significant value for the telescope user in 2019 in comparison with is favourable position last JULY. In February it will be near the waxing crescent Moon on the 10th in Pisces then Mars will be approx. 1degree from Uranus.

JUPITER In midmonth this planet will be in the early Eastern morning sky in Ophiuchus until mid November.

SATURN s too close to the Sun for viewing until late January when it stays in Sagittarius throughout this year. It will be meeting with Venus between the 16th- 21st of February at less than 3 degrees and one degree on the 19th.

URANUS This planet begins its Eastern drift against the Stella background into Aries in February, where it will stay until 2024 !!

NEPTUNE Is in Aquarius until 2023 when it moves into Pisces.

COMETS
Although several are listed, it will take the dedicated viewer to track them with magnitudes round between 30th JAN. mag 10.2, 89 Julia (Cancer)-10.2, 14th JAN. 704 Interamnia (Gemini) mag 10.3, 21st JAN. mag 10.4, (Cancer)

On February 6th COMET 532 Herculina at mag 8.9 in Leo. See the list for February on page 24 of Astronomy 2019

There are three other Comets of slightly dimmer magnitude, see page 19 in Astronomy 2019.

GOOD LUCK WITH ALL OF THESE !
CLEAR SKIES AND GOOD VIEWING.

BOB TURNBULL

The Visual Astronomer

Part 2.

Eugene O'Connor

One of the most recognisable constellations dominates our northern sky in the months ahead. Orion the Hunter is a treasure chest for observers. I wrote the following in 2004 after completing a 16" Dobsonian, where members of the club helped in grinding the main mirror.

Deep Searches in The Hunter

Mention Orion and we think of Summer nights, swords, belts, saucepans and above all the Great Nebula of Orion, one of the masterpieces of the heavens. M42, the heart of this nebula is so well known and attracts so much attention that we can miss many of Orion's other fascinating objects. In this short article I plan to explore some of these, some easy some challenges for even the best telescopes. The following symbols may help: S- small telescopes; M- Moderate. D – Difficult – only large instruments.
Instrument: 16" Newt. F5.1, eyepieces: 10mm Plossl,18mm Ultima Celestron, 32 mm Teleview Plossl. H-Beta Filter. January 2004

Lambda Ori is a delightful mag. 3.5 and 5.6 Blue and Rose pair, located in a group of three stars at the Hunter's head. Two other fainter stars share the interesting field at moderate power. S

23 Orion. This impressive wide pair is found in a row of mag 6 and 7 stars between Delta and gamma Ori. Light Blue and dark Blue. S

NGC 2141: oc. This tantalising cluster is spotted NE of Mu Orion. A ladle of bright stars of mag 12 and 13 seem to circle a haze of stellar embers while a bow of stars attends it. M.
A snail shape is suggested, but this group defies labelling and the deft sprays of stars both teases and gladdens dark adjusted eyes. D

NGC 2169: oc. At our January meeting Brian Phelan suggested a search for this, which he said, resembles the number 37. It was easier to find than the last object since it forms the apex of a small triangle with Xi and Nu Ori. On first look at low power the contrasting groupings and colours reminds me of the Jewel Box. At moderate power a group of eight stars outline a rather formal number three while six stars nearby form the seven. My orientation was perfect for this group and the figures are not only striking but the outstanding colours makes this a memorable cluster. M

NGC 2194: oc. This is a faint and delicate cluster of mag. 12 stars bunched like a golf club with a trickle of stars SW forming the handle at low power. It forms a crescent with 74 and 73 Ori. D

NGC 2022: pn. I wrongly expected this bubble-like planetary to swim into view at medium power, while hopping East from the group of stars that form Orion's miniscule head. This object was fainter than I imagined and easily missed as I offset several times from Phi 1 and 2 Ori. When found it took enlarging well and resembled an ethereal greyish glass bubble in a dark field. M

Iota Ori. This is a stunning Orion's Belt triple star in a rich field with at least six stars visible in moderate instruments. S

NGC 2068: M78. Emission and reflection nebula. This strange glowing object resembles a bottom-feeding fish with the twin stars resembling eyes peering towards you from the nebulosity that suggests a symmetrical glowing head. The contrasting dark stream of matter in front of the head has a cool liquid look. An awesome object that no photograph or drawing can do justice to. M

Cont...2

NGC 2071: Reflection Nebula. Yet another strange object close to M78. Two stars sit in the field, resembling a wide double. The brighter of the stars, of magnitude ten exudes nebulosity, suggesting a solar corona. M

Barnard 33. The Horsehead Nebula. It was only after three nights of trying that this mega-elusive Dark Nebula emerged. No amount of reading, studying photographs or maps prepared me for the real test of locating this object in my less than perfect Summer skies. Everyone dreams of this one. It is a case of 'heard melodies are sweet but unheard are sweeter;' the expectation floods the imagination. We are all so familiar with the iconic David Malin photograph depicting the dark, rearing head emerging from a sea of star-studded seething dark cloud into the ethereal pinks of the emission nebula. Of course we have too long been educated in the school of reality eyepiece viewing to expect anything like this in the field, but we still long for a hint of something in this dramatic field which lies within a telescope's reach.

It took me well over half an hour on the first visit to orientate myself in this confusing field. Several things I discovered early:

1 A good sky atlas is essential.

2 Even at low power neither Delta nor Sigma Orion were a serious light-flooding problem. They were easily kept out of the field.

3 That bright star that the horse's nose points to in most pictures, SAO132451is merely a dim 7.5 mag star, and is a handy marker to the north. A quadrilateral of stars south help to accurately pinpoint the position.

4 Photographs of this area are very light soaked and fail to give a correct perspective to the field

5 My lowest power eyepiece was the only one that worked.

6 My first attempt was on a 7/10-transparency night. I merely caught glimpses of IC 434 as a faint haze with-averted vision. The second night was 6/10 and helped me confirm my bearings. The final night was 8/10 but still had northern sky glow and high humidity. The light nebulosity was just spotted and only with the filter in place and in fleeting moments did the dark nebula appear. Averted vision was best and it helped with the hands cupped around the eyepiece.

The Horsehead seemed to flit like a dark, stubby thumb on the extremely faint nebulosity. No definite shape was observed, and the image suggested a slow flickering presence, almost wraith-like and intangible. I tried other eyepieces and even tried an OIII filter with no results. I hope that someday, those of you with better skies, good instruments and excellent seeing conditions might view this elusive beast. Make sure Orion is near the Zenith.

Final points on the Horsehead: Only try for it when the Flame Nebula, faint nebulosity East of Zeta Orion is visible. This dark nebula has been spotted in 10" scopes in near perfect seeing conditions. On Meeting Night Harry will take you deep into this mysterious object.

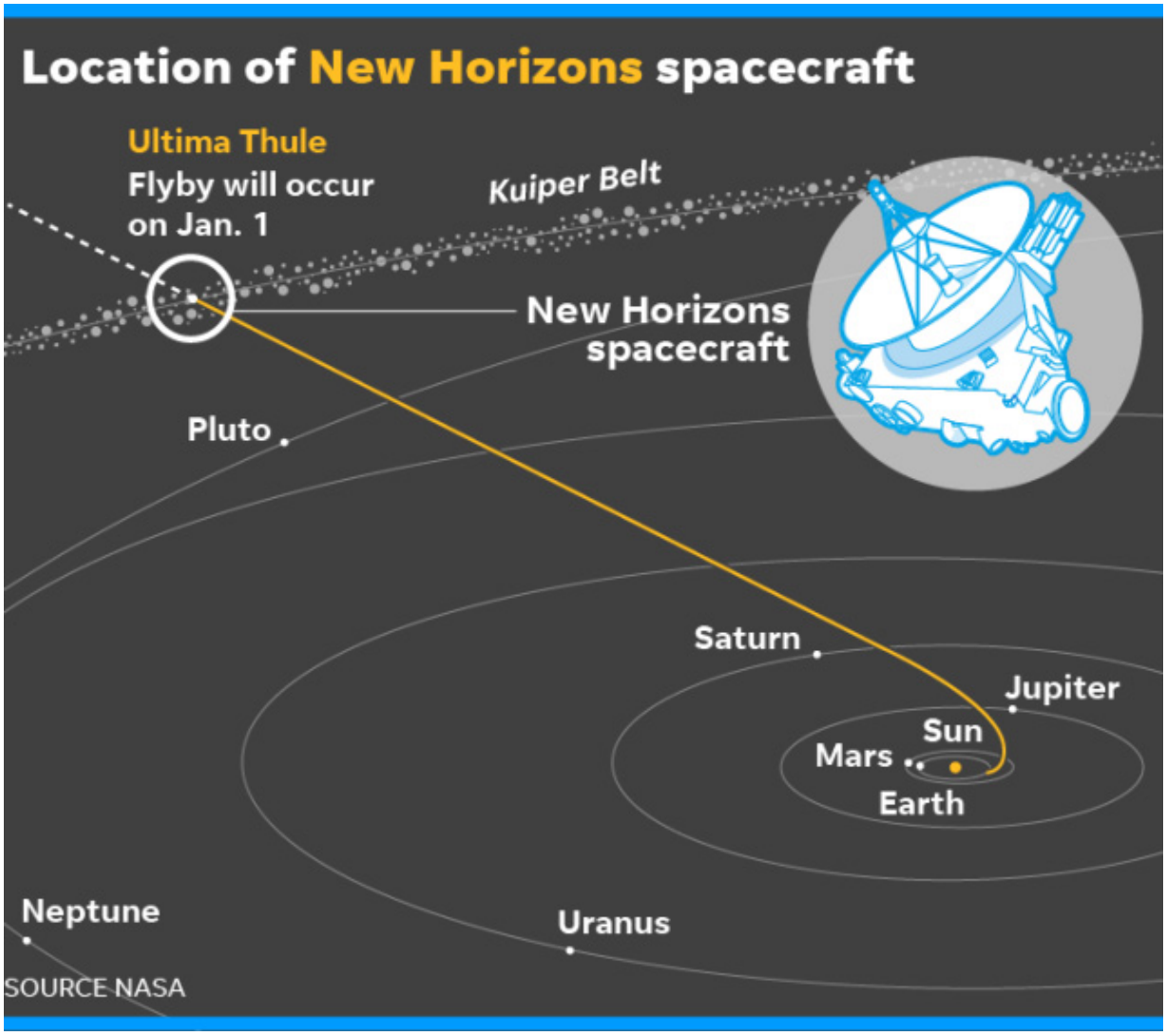
Cont...3

A long exposure of The Horsehead which bears little resemblance to the telescopic view.

Astro Events from Frank Gross

NASA gets ever-closer to its encounter with a distant world 1 billion miles past Pluto

Mark Kaufman,Mashable Wed, Dec 26 3:00 AM PST



It's getting bigger.
Last week, NASA released photos of the space exploration craft New Horizons gradually approaching an ancient, little-known object in deep space, called Ultima Thule.
Ultima orbits the sun one billion miles past Pluto, and NASA expects to swoop close to the far-off object soon after midnight, on January 1, 2019.
It will be humanity's farthest-ever encounter with another world.
"What will Ultima reveal? No one knows," Alan Stern, the NASA planetary scientist leading the deep space mission, wrote last week.

NASA suspects Ultima is a type of icy mass formed some 4.5 billion years ago, during the inception of our solar system. But since then, hovering in the profoundly cold outer reaches of the solar system, Ultima is presumed to have been preserved largely in its pristine, primeval state — allowing scientists to see the distant past.

Astro Events from Frank Gross

Cont...2

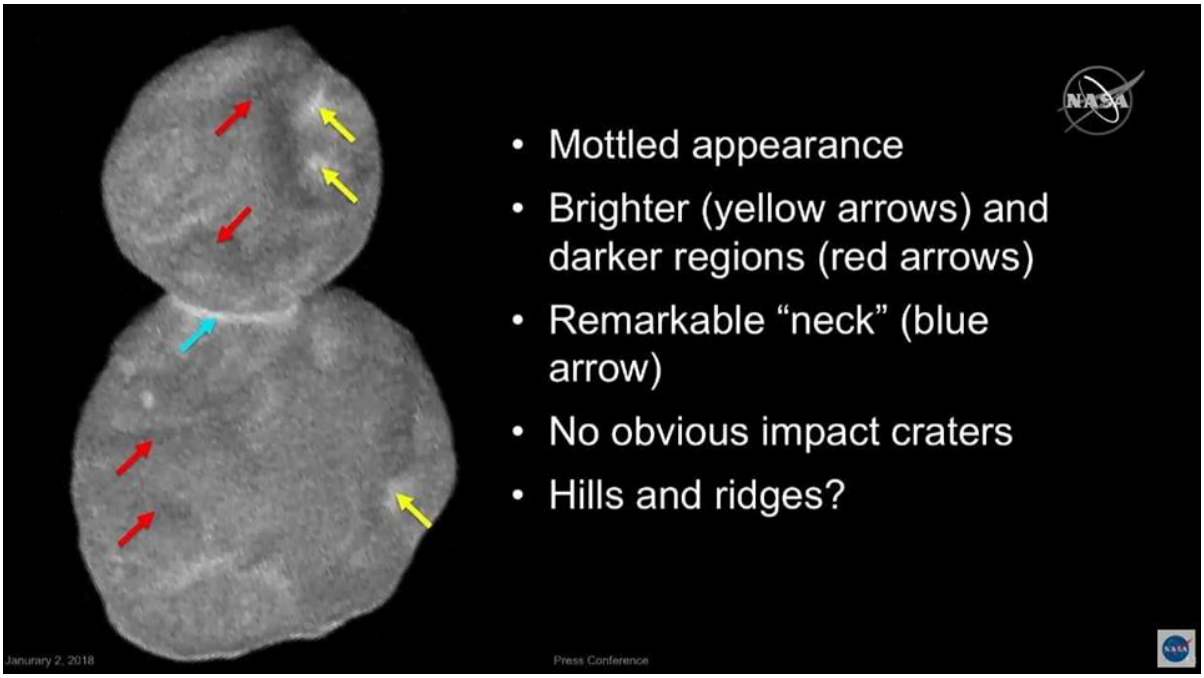
"In effect, Ultima should be a valuable window into the early stages of planet formation and what the solar system was like over 4.5 billion years ago," said Stern.

Ultima is formally classified as a "Kuiper Belt Object," which is a ring of icy worlds that encircles the solar system beyond the last major planet, Neptune. It is a "region of leftovers from the solar system's early history," says NASA

Ultima has already proven somewhat mysterious.
From previous images, scientists learned that Ultima probably has a weird, non-spherical shape. But as New Horizons travels closer, the pattern of light reflecting off off of Ultima, or its light curve, is inconsistent. With most other objects, these light patterns repeat as the objects spin.

"It's really a puzzle," said Stern in a statement.
Other New Horizons scientists mused that a dust cloud or moons "tumbling" around Ultima might be producing the strange light curve. But, there is one thing that's almost certain. On December 15, Stern's team concluded there were no obstructions between New Horizons — a triangular spacecraft 7 feet long and 9 feet tall — and Ultima Thule.

Cont...3



Images of Ultima Thule from Dec. 2, 2018

Stern told NASA that the deep space probe is now "Go" to closely approach Ultima.
In the summer of 2015, New Horizons flew by Pluto. It captured unprecedented detail of the dwarf planet, its mountains, cliffs, and icy plains. The exploration craft flew 7,000 miles from Pluto's surface.

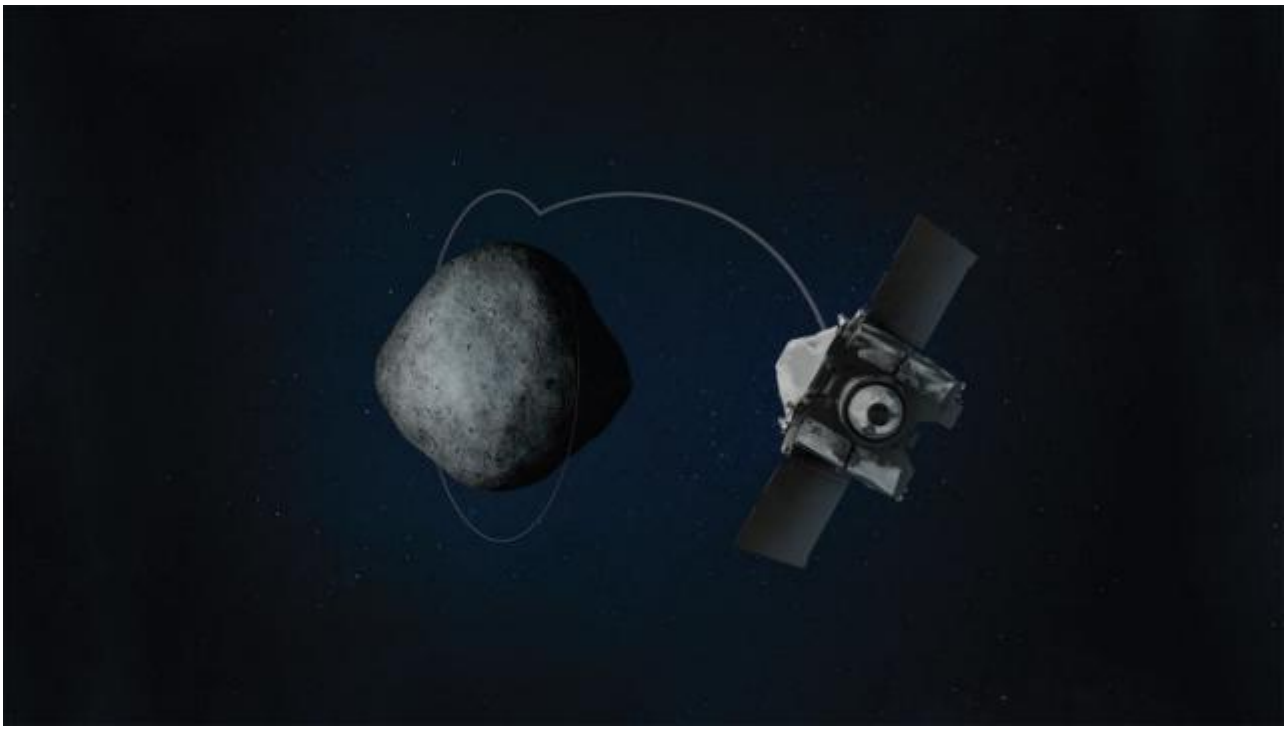
But it will get much closer to Ultima Thule, swooping 2,200 miles above the little-known object.
The first images are expected back early on New Years Day, about 30 minutes after the ball drops in Times Square.
"The Ultima Thule flyby is going to be fast, it’s going to be challenging, and it’s going to yield new knowledge," said Stern.

"Being the most distant exploration of anything in history, it’s also going to be historic."
We'll be watching.

Cont...4

Bennu Is Now the Smallest Object Ever Orbited by a Spacecraft

by Ryan F. Artist's concept of OSIRIS-REx arriving at Bennu



The new year has brought important milestones for two space missions—but only one of them deals in the very survival of the human species.

OSIRIS-REx, NASA's asteroid-visiting spacecraft, performed its eight-second thruster burn, putting the craft into orbit around the asteroid Bennu. Bennu is now the smallest object a spacecraft has ever orbited.

OSIRIS-REx has been en route to Bennu since May 2016 and arrived early last month. The spacecraft will now orbit a mile from the center of the asteroid, according to an OSIRIS-REx team press release. It's hard work, orbiting such a small thing. As we've written, asteroids have slight and uneven gravitational fields. And indeed, OSIRIS-REx's scientists didn't have a final orbit fully planned until they arrived at Bennu. Since then, the craft flew by the asteroid several times for surveying, before preparing for and carrying out the insertion maneuver. The OSIRIS-REx team will need to continue adjusting the spacecraft to keep it in orbit.

It's always exciting to arrive at a new solar system object. Two missions achieved important milestones this past New Year's Eve and Day: OSIRIS REx orbited Bennu, and New Horizons flew by the Kuiper Belt Object (486958) 2014 MU69, nicknamed Ultima Thule, the furthest object ever explored by a human-built mission.

But I'm more interested in OSIRIS-REx, simply because I live on Earth. Asteroids could hold secrets about the environment in which our own planet formed. They might contain precious water or metals that could be useful one day as exploitable resources for space travel. And Bennu is a potentially hazardous object, meaning that its size and future trajectories make it worthy of further study in case it ever threatens the Earth. OSIRIS REx will explore these three topics and more.

Science will continue around Bennu, now from up close. OSIRIS-REx will map the asteroid to create 3D models that will help the team prepare for 2020, when the orbiter will attempt to touch down on the asteroid's surface to collect samples. OSIRIS-REx is scheduled to return to Earth in 2023.

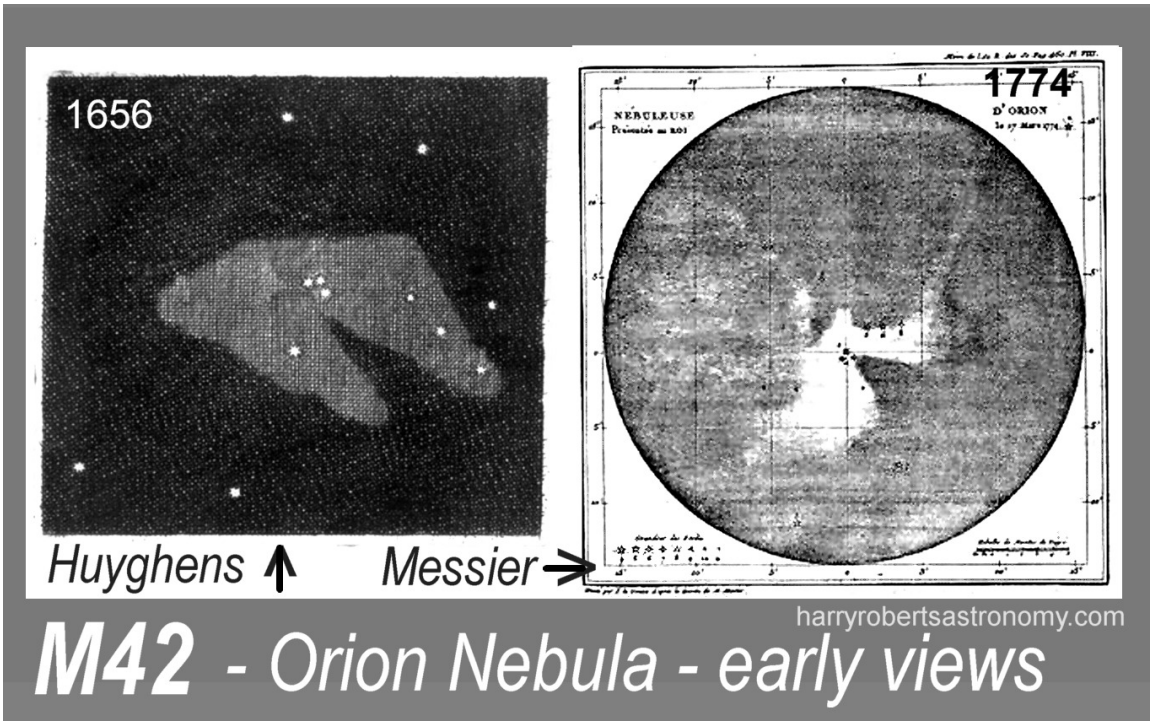
M42 The Beginning: Orion's "Sword" by Harry Roberts

Most stories have beginnings – but some have no known end. The astronomy of the Orion Complex is one such "end"-less story. Much has been learnt over four centuries – but much remains to be known.

To the western world Orion is "*the Great Hunter or Celestial Warrior, most brilliant of the constellations, and visible from every inhabited part of the Earth. The name origin is obscure… probably from the Greek word* ***'Ω αριων*** *which means simply 'warrior'*". With his sword, the line of three stars hanging from the prominent "Belt", it's an impressive constellation.

To the Booroung of western Victoria (who left a rich cosmology in 1857) Orion was- Kulkunbulla – a number of young men dancing– while the nearby Pleiades were Larnankurrk, a group of young women, playing for the men - the three "Belt" stars the well-coordinated dancers.

Discovery of M42: Central in Orion's Sword is the biggest and brightest emission nebula in the sky, but its detection required a telescope. Peresc first viewed the nebula in a 'scope in 1611, leaving a written account but no sketch. Huyghens' made a sketch of the brightest part in 1656, followed by Messier in 1774 (Fig1), both recorded the compact "Trapezium" cluster: telescopic astronomy had begun. Later the Earl of Rosse made many sketches (1860's) of M42 with his "Leviathan" 72inch reflector – recording much detail.

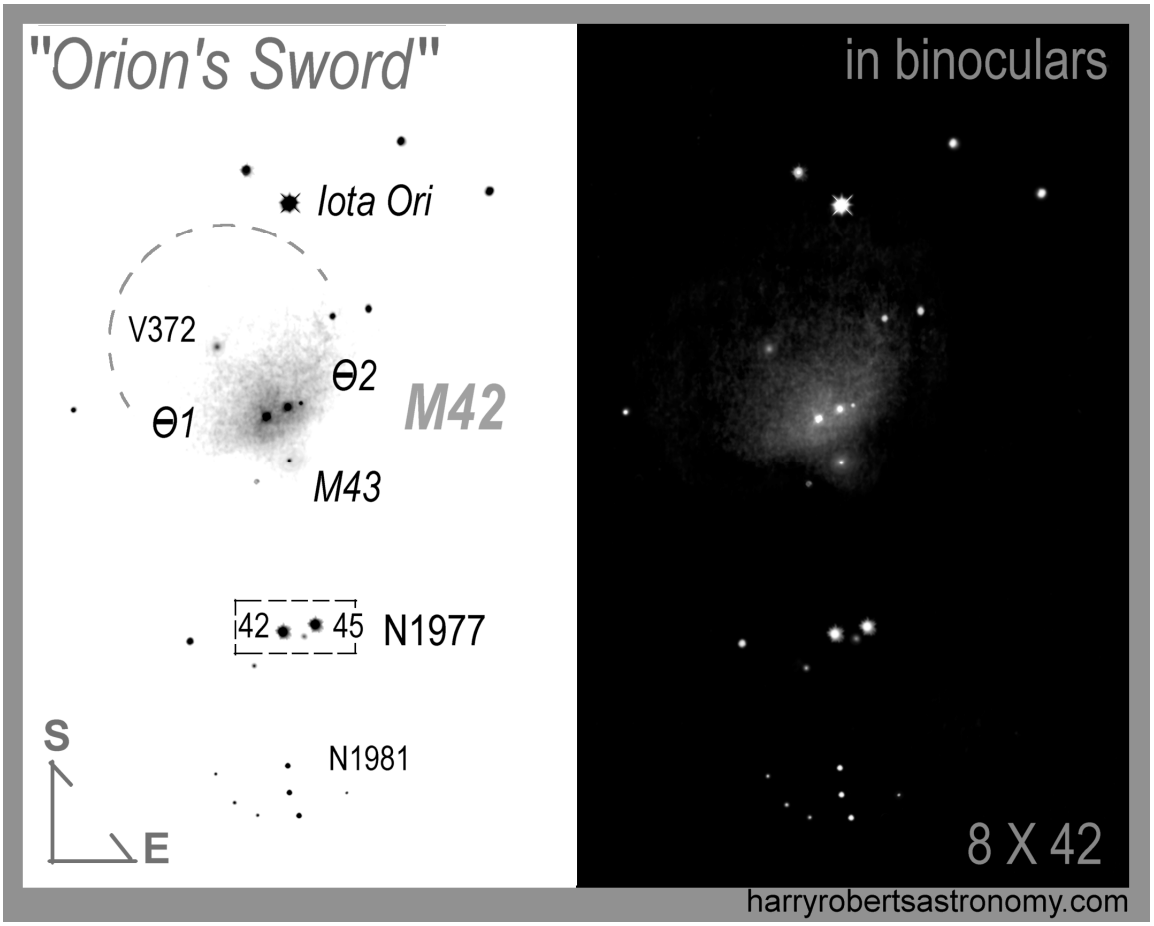


Hoping to match historic views of Orion's "Sword", 8x40 binoculars were put on a tripod to sketch the "Sword" region (Fig2) and the nebula. To the unaided eye the "Sword": consists of three faint stars forming a line north of the "Belt" stars. To the eye or binoculars the "Sword" has north downward and east to the right (Fig2 next page).

The Beginning: Orion's "Sword" by Harry Roberts

Cont...2

Binoculars showed the major features: the brighter parts of the Orion Nebula **M42** were seen – but only part of what we see in big 'scopes or photos. The smaller nebula **M43** and its central star were faintly seen. Principal stars Theta[1] Orionis and Theta[2] Ori. were both seen – with multiple star Theta[1], the "Trapezium", looking square but not separated. Theta[2] Ori. and its mag7 companion were distinct bright points –a nice binocular double.



The "nebulous" variable star V372 sited near the true centre of M42 was visible as a hazy spot and shows just how big the nebula is in large 'scopes; it reaches almost to the bright mag2.7 star Iota Ori. (dotted in sketch).

To the north (downward) from M42 lie the stars 42 and 45 Ori. within the reflection nebula N1977 that, while faint in an 8inch, was not visible in binoculars. Further north is the open star cluster N1961 with several bright stars. Overall Orion's "Sword" is about 1½º in N-S extent (three full Moons) and filled with brilliant white stars from 2.7 magnitude Iota down to some of 8th magnitude and less – a beautiful region in binoculars. Most of the stars forming the "Sword" are very young, of spectral classes O and B, and are bright and bluish.

Much of Orion consists of dark molecular clouds with a few very hot bright stars blowing 'bubbles' in the dark material –these we see as nebulae – M42 is the brightest, and except in very dark sites the only one visible in binoculars, though the "Flame Nebula" N2024 may be glimpsed near 'Belt' star Zeta.

In a future piece we will review more detailed structure of the Orion Nebula and the observing challenges they offer to users of bigger 'scopes. Enjoy the ***Orion Season 2019!***

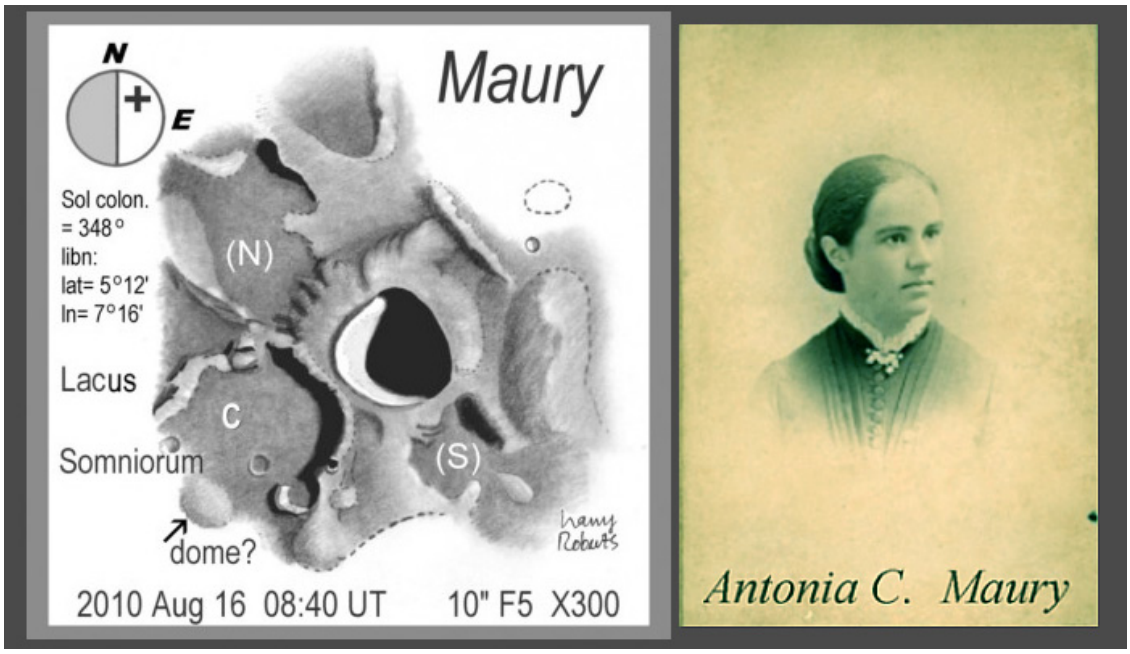
1 Burnham R Jr. "*Burnham's Celestial Handbook*". Dover NY. Vol 2 p1281
2 Stanbridge, E, "*The Astronomy and Mythology of the Aborigines of Victoria*". Read before the Philosophical Institute of Victoria 1857. P 139.

"Something Old, Something New" - Maury by Harry Roberts

In recent decades the IAU set out to correct an old injustice; it began to name lunar craters after *women* of science. As the process of crater naming has been going on for 350 years there were, sadly, few unnamed craters of a decent size available – and the twenty or so commemorating women are rather inconspicuous. Perhaps the IAU considered renaming craters with "legendary" male names to commemorate "real" women - Atlas and Hercules say: clearly neither were men of science! If they did, they rejected this option.

However, in the case of crater Maury they accepted a compromise: for the crater was firstly named for male oceanographer Matthew F Maury – and subsequently shared with Antonia Maury of stellar spectra fame. This crater then memorialises two people of science with the same surname, who were in fact cousins.

And crater Maury is one of the more conspicuous "female" craters, being well placed for viewing at first quarter moon, not far south of the two "Greeks" mentioned above. And appropriately Maury is a fresh bright crater imprinted on very ancient terrain: resulting in landforms with both "something old" and "something new" (Fig).



Maury is sited on the NE "shore" of Lacus Somniorum, the *Lake of Dreams*, (one of Riccioli's "moody" names) a basalt flooded patch joined to the larger Sea of Serenity to the SW. Somniorum may have resulted when lava, flooding the Serenity impact basin, spread to nearby low areas, forming the "dreamy lake" that is not, itself, an impact basin. These lavas are old, 3.5By at least, and shallow. Here and there rims of partly submerged craters are seen, smoothed and degraded by basin "ejecta-storms" and nearby cratering.

“Something Old, Something New” - Maury by Harry Roberts

Cont...2

Such lunar “weathering” had, it seems, left a plateau between the ancient hexagonal crater Maury C and two unnamed and older craters labelled (N) and (S) on the sketch – and for eons the plateau remained until, a mere billion years ago, the Maury impactor scored a bullseye on it. An oblique impact perhaps, as I recorded some out-of-roundness in Maury’s shape (slippage of the north rim maybe).

Maury is bright, fresh, and almost 18 km in diameter. Surprisingly, the Maury impact did not demolish the eastern rim of the older crater Maury C – its rim still stands as if nothing had happened! The south rim of crater (N) however seems to have collapsed into various slippage forms like “toes”. And crater (S) has been partly covered by Maury’s impact. This site’s history makes for an interesting mix of lunar landforms – well worth a telescopic ‘visit’.

Antonia Maury was one of Pickering’s "Harvard Computers", the group of women who compiled the Draper Catalogue of stellar spectra. It was crucial work -underpinning all modern astronomy. Antonia was educated at Vassar College, graduating in 1887, when she joined the Harvard team - classifying stellar spectra and developing a more comprehensive system. At the age of 77 she was awarded the Cannon Medal, named for her colleague Annie Cannon.

Antonia Maury’s dates are 1866 to 1952; a life spanning almost unimaginable changes – from horse and buggy to rocket propulsion!

As one biography says, she *“was a women ahead of her time – her system was the stepping stone to discoveries that constitute the very foundation of modern stellar astrophysics”.*

Search out crater Maury - you will find it’s worth the trip!

More Club News continued from page 1

Club/Social Viewing Nights are on Saturday evenings "just" Before Sunset. Viewing nights are for members and invited guests. The contingency plan for poor weather on the proposed viewing night is to meet the next night (a Sunday night) but consult Jack first on Landline: 44232255, Mobile:0407 018 982

Woncur Road, South Nowra (Head South down The Princes Highway, turn right at BTU Road, Woncur Road is the street first on the left).

University Viewing site. On the way to the university on George Evans Road go straight ahead through the second turning circle to the new viewing site.

Dates for Club/Social Viewing Nights for 2019 On Saturday Nights As Follows:
Will be available soon

More Monthly Meeting Information

The AGM was held at the July 2018 monthly meeting. Elected officials for 2018 - 2019

President: Frank Gross
Vice President: John Gould
Secretary/Treasurer: Tracey Newcombe
Public Officer; Frank Gross
Observation Officer: Robert Turnbull
Editor: Kaye Johnston
Librarian: Chris O'Hanlon

The Committee: Robert Turnbull, Rudolf Henssen, Robert Spruyt, Jack Apfelbaum, Chris O'Hanlon, John Gould

Check out the Astro Flyer on the web site: www.shoalhavenastronomers.asn.au

Shoalhaven Astronomers PO BOX 1053 Nowra NSW 2541	The deadline for Articles for the Astro Flyer is The First Friday of the Month. Editor Kaye Johnston

Club Video Projector Rental

The Video Projector is available for club members for a small rental fee. If a club member would like to project a football game, cricket game onto a wall for a party this is the way to go. You will get up to a 100 inch diagonal picture on a light coloured wall with the Epson video projector. The projector has an inbuilt speaker but you can add your own speaker units if necessary. The unit s very easy to use and instruction would be given before the borrowing (2 days) occurs. The rental price is set at present at $15 for two days.