

# OUT THERE Bob Turnbull OBSERVATION OFFICER

# **OUT THERE JAN.FEB 2018**

By the time you use this document it will be another new year, so time to try the astronomical gifts you dropped heavy hints about with family and friends before the festive season! What? You didn't get any astronomical gifts, OH Well there's always your up and coming birthday.

## THE MOON

Closest to Earth at 356,565km on 2<sup>nd</sup> of January, and if you take some lunar photos then and later on the 15<sup>th</sup> January this Moon will be at its furthest at 406,464 kms away from Earth.( 49899 kms further away !) So, show us the results at the first meeting after this in the Astro flyer.

BLUE MOONS, The second full Moon in a month is called a BLUE Moon and no, it's not blue and happens at regular intervals (not "Once in a blue moon" to describe something rare, at all) Total Lunar eclipse can be seen on the 31<sup>st</sup> of January at 11pm (refer to page 91 for the three partial Solar eclipses and two total Lunar eclipses, of Astronomy 2018)

## FOUR PLANETS IN THE MORNING SKY

## MERCURY

Will be seen on the 2<sup>nd</sup> of January in the eastern morning sky but will be placed better on the 13<sup>th</sup>- 14<sup>th</sup> with Saturn at less than 1 degree apart. (No viewing of Mercury in February, too close to SUN.)

## VENUS

Too close to the SUN until end of FEBRUARY when barely above the horizon. It then becomes a brilliant object until October.

## MARS

Will be the show piece of this year! In July it will attain a maximum diameter of 24.31 less than one arc second or 97% of the best ever opposition. Have a look on page 45 on 27<sup>th</sup> of July WOW!

## JUPITER

Begins the New Year in the predawn eastern sky in Libra and has a close encounter with Mars at its closest of 0.25 degrees. On the 7<sup>th</sup>.Watch the maps on page18 for planet positions.

## SATURN

Close to Mercury in the morning Eastern sky.

## URANUS

North western evening sky in Pisces in January and February.

**COMET C/206 R2 (PANSTARRS)** 10<sup>th</sup> magnitude opens in Taurus in the first week of January near Aldebaran, and skirts the western edge of Hyades and sets at midnight at months end. In February this comet continues to reside in Taurus.

Bob Turnbull

# Sky Objects By Eugene O'Connor



A Search for Southern Doubles

## **Episode 11: Canis Major The Greater Dog**

Canis Major is the only constellation which we know with certainty was depicted and studied by our ancestors going back nearly six centuries. It played a key role in the lives of the early Egyptians and Romans as it carried the brightest star in the firmament, Sirius, the Dog Star. This marvellous star these centuries ago seemed to detach itself from the sun in the predawn skies around the northern solstice, and its heliacal rising marked the rising floodwaters of the Nile, a signal to farmers to plant their crops prior to the inundation. Through procession this date is now in August. The picture below shows Canis Major as seen in maps based on the northern hemisphere views, while the map below shows our view of the constellation in the eastern sky after dark. Sirius marks the Dog's chest and it rises around the same time as Orion to its north. Double stars listed are all easily visible, with the exception of Sirius, which requires special conditions or the surname Roberts! More on this later.

## The map at the end of this article shows the position of all objects listed.

1)Adhara, Epsilon CaMaj.RA 6.58.6; Dec -28.58.mag 1.5/7.5 sep. 7.9.

This mag 1.5 star which marks the Dog's back foot is a very easy object in small telescopes. I first spotted this double in early January 2001 and found it to be "A dazzling blueish white primary with a wide faint blue com-

panion." I caught up with this one in early December 2017 and found it low in the sky as," Gold and light blue, wide and easy to spot."

2) v1 CaMaj. RA 06.36.4;Dec 18° 40'. Mag 5.8/7.4 sep 17.8". This is a dainty pair in the small viewfinder cluster of Nu 1,2,3 and found between Sirius and Mirzam or Alpha and Beta CaMaj. In a moderate eyepiece Nu1 the middle star in the group separates to a deep yellow and light-yellow pair.

Figure 1: The Great Dog



# **Sky Objects By Eugene O'Connor**

#### Cont...2

#### 3) Mu (µ) CaMaj. RA 6°56.1'; Dec .14°03'. mag 5.3/7.1; sep 3.2

This star represents the star just below the Dog's eye in the picture above and is striking in the finderscope as it sits inside a neat triangle of equal mag fainter stars. The primary is deep yellow, and the faint ashen blue companion requires at least a magnification of X140 for a comfortable separation.

#### 4) h3945 CaMaj. RA 7°16'; Dec -23.19', mag 5/5.8; sep 26.8". Showcase Pair

This is one of my favourite easy doubles located just above the Dog's rump and showing slight separation in the picture above. The easiest pathway is by using O2 and Delta CaMaj as the base of a triangle(see map below) and h3945 as the apex on the eastern side. Colours are deep gold and blue. Split in 25X binos. A brilliant object of the same class of Beta Cygnus (Albireo).



5) Sirius -Alpha CaMaj. RA 6°.45; Dec -16°.43'. mag -1.5/8.5, sep 4"; PA 195° This is a challenging object, whatever the scope and eyepiece and requires:

- 1.Excellent collimation allowing a
- 2. Very high power eyepiece (X300 +).
- 3.Excellent seeing.
- 4.A moderate to high power telescope.
- 5.Near perfect vision.

Having spent many fruitless hours trying to split Sirius I am still trying, and looking for that perfect night. Having tested a variety of filters, both on the tube and on the eyepiece, I regard it as a work in progress. Hawke-eyes Harry will advise you on the finer points of this search as he has spotted the Pup on numerous occasions. May the force be with you....!

# Sky Objects By Eugene O'Connor





Map showing 50-year apparent orbit of Sirius B (the Pup) around Sirius A

Why don't we use the moon as a space station? Seems like it would make a good staging spot for Mars missions.

The Moon is a great spot to build a station so we can go from there to venture out to the whole solar system, in the long term.



See, humans in general are extremely bad in looking and preparing for the long term of things. We don't want to go to Mars in 80 years from now, we want to go to Mars now.

Building a space station on the Moon is a giant effort. Labour and money wise.

Have you ever heard of the ISS? That space station is the most expensive "building" ever to be created so far. Costing roughly 115 billion dollars! And that thing is only 100 meters long and only 400 km above us!

Cont...2



Now imagine a space station the same size on the Moon. It will most likely require at least more than 30 Apollo-like missions to build that thing. Long story short, it takes a lot of time and a lot of money.





Is it efficient if we are truly aiming for colonizing Mars? Absolutely. But trust me, (sadly enough) we are far from making a successful colony on Mars. For now we better send brave people straight to Mars to examine the planet.

#### Cont...3

# Question and Answers Questions put forward to astronauts by members of the public Oldest and Youngest



Just for interest, what age limits are there with operative astronauts, what's the youngest and oldest age that an astronaut can fly?

There really aren't limits per se, I guess the youngest that has ever flown was Sally Ride, she was 31 years old when she flew and the oldest to date has been Story Musgrave and he was 61. There's about a 30-year difference between the oldest and the youngest.

But what about John Glenn?

John Glenn, in my mind, is one of the premiere astronauts. He was 77 when he last flew but was not what we call an active duty astronaut "technically," but in my mind he is still an astronaut so the oldest that ever flew was John Glenn who was 77.



#### Cont...4

#### **Sunrise from Orbit**

From the astronaut's perspective, what exactly is it like to see the Sun rise over the horizon of the Earth in outer space? Is it truly the most amazing sight ever?



Well, it is not the most amazing but it is spectacular. You have to remember you are going around the Earth every hour and a half at 18,000 miles an hour.



Whereas it takes about 20 minutes or so for the Sun to rise and go down on Earth, where on orbit it only takes the Sun about five to ten seconds to blossom as you come around the edge of the Earth at 25 times the speed of sound. You go from darkness to light, just like that! And light to darkness, just like that! You get to see 16 of them everyday, every hour and half you get to see a sunrise and sunset.

# Cont...5 Skylab vs ISS

Do you think the SKYLAB assembly was more difficult than ISS, because you used 70's technology?

I think it is like comparing apples and oranges. Back in the 70's the SKYLAB was the most... fanciest thing we had going then, so as society progresses and technology advances, of course you'll get a more complicated machine, that's just normal. Back in the 70's the SKYLAB was a wonderful machine and today the ISS is a wonderful machine.



# Earth from the Darkside

When you are on the dark side of the Earth, what does space look like? What do the stars look like, and how many more do you see from the dark side?



One of the two things that impressed me most from the darkside was looking back at Earth and the most impressive is that you can see the whole outline of the United States by the lighting patterns. You can follow the west coast, the Gulf of Mexico and the isthmus of Florida and back up the east coast. Just by the lighted patterns you can pick out countries and virtually all the inhabited parts of the world are essentially lit up. That is good and bad I guess. Looking the opposite directions out into the depths of space it is so crystal clear when you are viewing the stars and the planets and the universe, it is so bright as a matter of fact that we can't have our navigation stars within the Milky Way. It's one broad band of light when you are above the atmosphere and have the clarity of the depths of space.

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## Reentry

What does it feel like when you re-enter the Earth's atmosphere?

It's a...well if you can imagine, it takes us only eight and half minutes to get into space from the time we liftoff here from the Kennedy Space Center.

Coming back in it takes an hour from the time we turn around backwards, fire our engines, slow down and start our reentry process it is about an hour from the burn until we touch down here at the Kennedy Space Center. You have to readapt from being in zero-gravity or weightlessness for however long you have



been up there and start getting use to the first twinges of gravity.



## Cont...7

# **Food in Space**

What do you eat when you are in the space shuttle? Did you eat an apple? Yes, I did eat an apple.



We do take some fresh fruits and vegetables up with us and that lasts for a day or two. We don't have a refrigerator so they have to go first. After that what do we eat, we have a menu at Houston where we order from, maybe 500 different items from mashed potatoes, scrambled eggs, macaroni and cheese, Italian vegetables, steak. I like filet mignon and I like to cap it off with a strawberry shortcake. The menu is varied and it is tasty. It has gotten a lot better in the last 40 years.

We don't squeeze things out of tubes anymore. It's freeze-dried, a lot of it, but you reconstitute it with water, heat it in the oven and it tastes very good. They do a fabulous job in Houston preparing the food.



## Cont...8

#### More eating in orbit

What effects does weightlessness have on your digestive system? Is it difficult to eat when you return to Earth after a mission?

It is more difficult to eat when you go into space than when you come back from space. Coming back you regain your appetite pretty quickly. Going up it takes the body one or two days to figure what to do with this food, how to process it in zero gravity. I advise all the youngsters that are flying for the first time, don't eat a big breakfast.

## What powered the buggies in the Apollo mission?





Two 36-volt silver-zinc potassium hydroxide batteries with a combined capacity of 242 amp hours—roughly the same as a golf cart battery.



You may not know this, but batteries produce heat when in use. On earth, that heat is almost always wicked away by the air, but in space, there is no air and these batteries, under heavy load, produced a lot of heat. The solution was to pack them in parrafin. When driving around, the heat would cause the paraffin to liquify, soaking up heat from the batteries. When they stopped, they'd brush the dust of the housing and open the cover, allowing the heat to slowly escape into space.

#### Cont...9

## **Two New Satellites for Jupiter**

Just a mile across, a pair of moonlets found orbiting Jupiter bring the planet's total satellite count to 69.

The advent of monster telescopes equipped with super-sensitive, wide-field detectors has been a boon for astronomical discoveries, among them a bevy of tiny moonlets around the outer planets. For example, observations made from 2000 to 2003 yielded 46 moons around Jupiter more than two-thirds of the planet's total!

Now astronomer Scott Sheppard (Carnegie Institution for Science) has added two more to the planet's extended family, bringing the total of known moons to 69. The announcements for S/2016 J 1 and S/2017 J 1 ("S" for satellite, "J" for Jupiter) came via Minor Planet Electronic



Circulars issued on June 2nd and June 5th, respectively.



As Sheppard explains, "We were continuing our survey looking for very distant objects in the outer solar system, which includes looking for Planet X, and Jupiter just happened to be in the area we were looking in 2016 and 2017." So they took a minor detour to image some fields that were very close to Jupiter.

With magnitudes hovering near 24, these barely-there moonlets must be only 1 or 2 km across. So for now all that's really known is the character of their orbits:

Two of the discovery images for Jupiter's tiny moonlet S/2016 J1, acquired on March 3, 2016, with the 6.5-m Magellan-Baade telescope in Chile.

#### Scott Sheppard

S/2016 J 1: Sheppard discovered this moonlet during an observing run on March 8, 2016, with the 6.5-m Magellan-Baade reflector at Las Campanas Observatory in Chile. Averaging 20,600,000 from Jupiter, it's in an elongated orbit inclined 140° with an eccentricity of 0.14. It takes 1.65 years to orbit the planet.

Although Sheppard first sighted this moon last year, its orbit remained uncertain until he teamed up with David Tholen (University of Hawai'i) and Chadwick Trujillo (Gemini Observatory), who swept it up six weeks ago with the 8.2-m Subaru reflector on Mauna Kea.

#### Discovery images for S/2017 J 1

This animation combines two discovery images for the new Jovian satellite S/2017 J 1, taken March 23, 2017, with the 4 -m reflector on Cerro Tololo in Chile.

# M42: Summer amid the Stars by Harry Roberts

## M42: Summer amid the Stars

The Great Nebula of Orion appears bigger than the full Moon – in fact it's about 1600 light years away, and 301.y. wide. It is nature's greatest gift to amateur astronomers – for many the highlight of the year.

For a sky-sketcher it's also a big challenge –large and detailed, it's a daunting task. Only in recent years have I attempted to log some of its complexity – sketching both the entire nebula as well as detailed views of the central (or Huyghenian) region. The "Early Views" Fig shows Huygens original sketch of it with Messier's made a century later; a more accurate image.

M42 can't be 'captured' in one session – and in late December I logged some details of the dark area called the "fish's mouth" and the fainter stars nearby- adding them to an earlier sketch of the region.

In its central parts M42's brightness and contrast let us use high magnifications with the 'scope tracking –and we see more if the image is static rather than moving – particularly for subtle details.

I concentrated on the area of multiple star Theta 1 Orionis (the "Trapezium") and the nearby end of the "Fish's mouth" (Fig, upper left) – noting some details of the dark cloud and the faint stars just north of it.

Close to the Trapezium we find the dark cloud gets thinner, causing complex lighter areas, with a bright oval patch and dark mottling. From the dark cloud, plumes of dust sweep north towards a pair of faint stars and growing thinner with pale mottling. Several faint stars are found in this part of M42 and they form an interesting group.

After adding these new details to January's sketch (Fig LHS) I checked how many of M42's field stars are variables. Surprisingly, most of the fainter stars in the region *are* variables, many of irregular type. They fade and brighten across the limit of detection for an 8 to 10 inch 'scope – changing the appearance of the region in sub-tle ways.

One example is the pair sited below the "fish hook" feature (Fig, lower right). They are stars LR and LU – both vary between a faint mag 12 to an invisible mag 13; and last January only LU was visible.

Most of the Trapezium stars are extremely young B-types, massive blue stars while star C, the brightest, is a rare O-type: it illuminates the *entire* Orion Nebula! Just as well it's so far away. Both stars E and F are about magnitude 10 and may be hard to see against the nebula, but high powers will usually show them. Members G, H and I are not stars, but proplyds, or protoplanetary discs; don't feel bad if you can't see them! They might be seen in 20in. Scopes?

While I targeted the central part of M42 on the night, the vast outer "plumes" of nebulosity are well seen in urban 'scopes of all sizes – and special filters (UHC, OIII etc) will enhance the view. And so, in summer, point the new "Santa 'scope" at the central star in the "Belt of Orion" –*and prepare to be amazed*!

Clear skies!

# 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).

# Dates for Club/Social Viewing Nights for 2018 On Saturday Nights As Follows:

Jan-20, Feb-17, Mar-17, Apr-14, May-12, Jun-16, Jul-14, Aug-11, Sep-8, Oct-6, Nov-10, Dec-8

# **More Monthly Meeting Information**

# The AGM was held at the July monthly meeting. Elected officials for 2017 - 2018

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

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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.