

As the summer months draw to an end, take advantage of the long warm nights with:

# The AUSTRALIAN Night Sky

By Wayne Roberts

The times, circumstances and star charts to follow are configured for the Melbourne Observatory in line with other publications of the Astronomical Society of Victoria (ASV), for which these viewing notes are principally compiled: Longitude  $144^{\circ} 58' 23.8''$  E, Latitude  $37^{\circ} 49' 54.1''$  S [ $''$  denotes arc second =  $1/60^{\text{th}}$  of an arc minute (symbol  $'$ ) or  $1/3600^{\text{th}}$  of a degree (symbol  $^{\circ}$ )].

The notes contain many references to rise and set times, all configured for the co-ordinates given above; the following procedure will facilitate determining the correct times for other locations.

The adjustment required for longitude is straight forward – for each degree east (of Melbourne Observatory) subtract four minutes; conversely, add four minutes for each degree west.

Adjustment for a difference in latitude is dependent on the declination of the object concerned – how far north or south of the celestial equator it lies. The table below, from the yearbook of the ASV, gives the required adjustment (in minutes) for any object at a declination of between  $+30^{\circ}$  and  $-30^{\circ}$  (by convention, north is positive and south negative) when viewing from any location between latitudes  $-28^{\circ}$  and  $-44^{\circ}$ ; interpolate for intermediate latitudes/declinations. Note: **add** these values to times of rising and **subtract** from setting times.

DECLINATION OF OBJECT

Lat. $^{\circ}$	$+30^{\circ}$ m	$+25^{\circ}$ m	$+20^{\circ}$ m	$+15^{\circ}$ m	$+10^{\circ}$ m	$+5^{\circ}$ m	$0^{\circ}$ m	$-5^{\circ}$ m	$-10^{\circ}$ m	$-15^{\circ}$ m	$-20^{\circ}$ m	$-25^{\circ}$ m	$-30^{\circ}$ m
$-28$	$-35$	$-27$	$-21$	$-15$	$-10$	$-5$	$0$	$+5$	$+10$	$+16$	$+21$	$+28$	$+35$
$-30$	$-28$	$-22$	$-17$	$-12$	$-8$	$-4$	$0$	$+4$	$+8$	$+13$	$+17$	$+23$	$+29$
$-32$	$-21$	$-17$	$-13$	$-9$	$-6$	$-3$	$0$	$+3$	$+6$	$+10$	$+13$	$+17$	$+22$
$-34$	$-14$	$-11$	$-9$	$-6$	$-4$	$-2$	$0$	$+2$	$+4$	$+6$	$+9$	$+12$	$+15$
$-36$	$-7$	$-5$	$-4$	$-3$	$-2$	$-1$	$0$	$+1$	$+2$	$+3$	$+4$	$+6$	$+7$
$-38$	$+1$	$+1$	$0$	$0$	$0$	$0$	$0$	$0$	$0$	$0$	$-1$	$-1$	$-1$
$-40$	$+9$	$+7$	$+5$	$+4$	$+2$	$+1$	$0$	$-1$	$-3$	$-4$	$-6$	$-8$	$-10$
$-42$	$+18$	$+14$	$+11$	$+8$	$+5$	$+2$	$0$	$-3$	$-5$	$-8$	$-11$	$-15$	$-19$
$-44$	$+28$	$+22$	$+16$	$+12$	$+8$	$+4$	$0$	$-4$	$-8$	$-12$	$-17$	$-23$	$-30$

Values are added to the time of rising and subtracted from the time of setting.

Whereas the declinations of stars and other deep sky objects are (very nearly) constant, those of the Sun, Moon and planets change considerably over time; a suitable resource for determining declinations is therefore required to obtain the adjustment for difference in latitude as described above.

While the reader may have ready access to such resources, I offer the following suggestions for those who do not: the ASV yearbook, free to members and available at reasonable cost to others (Sun and planets only), the yearly publication Astronomy Australia (Sun, planets and Moon), and various astronomical software packages (typically catering for all celestial objects). Other sources may be available on-line.

Note that some resources give co-ordinates for epoch 2000.0 – denoted as  $J_{2000}$  – whereas others may quote real time figures, denoted  $J_{\text{Now}}$ . The discrepancy between the two systems will not be significant for the purpose at hand.

Now a few notes defining terms which may be encountered in the text to follow:

For those not familiar with the terminology used to describe phases of the Moon, note that it is referred to as waning (hard ‘a’) when the phase is decreasing daily and waxing (soft ‘a’) when increasing, and as a crescent when less than half lit and gibbous when more than half. Thus you may find it referred to in the text as, for example, a waxing crescent Moon.

Appearances of the abbreviation “au” in the text denote “astronomical unit”, the average Earth-Sun distance, currently defined as 149,597,870.7 km.

The abbreviation ZHR, where it appears in relation to meteor showers, refers to the zenith hourly rate, the number of meteors per hour which can be expected to be seen under ideal conditions, with the radiant (the point from which the meteors appear to emanate) at the zenith and a clear dark sky.

The ecliptic, shown as a green line on many of the star charts to follow, is the path followed by the Sun and (very nearly) the planets as they arc across our sky daily.

As the outer planets, those that orbit farther from the Sun than does Earth, move along their orbital paths, they move from west to east in our sky relative to the stars; this is referred to as direct or prograde motion. Around the time of opposition however, when we overtake them on our inner, faster orbital path, they change direction, moving east to west relative to the stars. Referred to as retrograde motion, this phenomenon is caused by the same effect as that seen when a car which is overtaken seems momentarily to move backwards in relation to a line of trees in the background.

On any given night, a planet is said to be transiting (or culminating, there is a subtle difference between the two) when it reaches its highest point above the horizon in its passage across our sky that evening – do not confuse this use of the term ‘transit’ with the same word often used in these viewing notes to describe the passage of the moons of Jupiter across the face of their parent.

Regarding the inner planets, Mercury and Venus, which never stray very far from the Sun in our sky, greatest eastern elongation refers to their maximum angular distance east of the Sun when they are visible in our evening skies; similarly, greatest western elongation refers to their maximum angular separation west of the Sun when visible in our morning skies. They are said to be in inferior conjunction when passing between Earth and the Sun on their inner orbital tracks, and in superior conjunction when rounding the far side of the Sun from our perspective.

As a handy (excuse the pun) guide to estimating the angular separation of two objects, one finger held at arm’s length typically spans a little over  $1^\circ$ , a closed fist  $10^\circ$  and an open hand, thumb tip to tip of little finger,  $20^\circ$ .

Note finally that perihelion or aphelion of Mercury, Venus and other planets refer to the physical separation in space of the planet in question and the Sun, and are unrelated to their angular separation in our sky.



## ***What's in the sky this month; February 2018:***

- 31<sup>st</sup>/1<sup>st</sup> Total lunar eclipse.  
2<sup>nd</sup> Regulus (Alpha [α] Leonis) occulted by Moon (not from Australia).  
8<sup>th</sup> Last quarter Moon;  
Alpha Centaurids meteor shower peaks.  
11<sup>th</sup> (Midnight 11<sup>th</sup>/12<sup>th</sup>) Moon at apogee (farthest from Earth, 405,700 km).  
16<sup>th</sup> New Moon.  
17<sup>th</sup> Mercury in superior conjunction (rounds the far side of the Sun from our perspective).  
20<sup>th</sup> Mars 0.2° NW of globular cluster NGC 6235.  
23<sup>rd</sup> First quarter Moon.  
24<sup>th</sup> Aldebaran (Alpha Tauri) occulted by Moon (not from Australia).  
25<sup>th</sup> Mars 0.2° NE of globular cluster NGC 6287.  
28<sup>th</sup> Moon at perigee (closest to Earth, 363,933 km).

*N.B.: When reading the following, refer back to the explanatory notes at the beginning of this article for information on terminology, angular separation approximations and adjustment of latitude & longitude.*

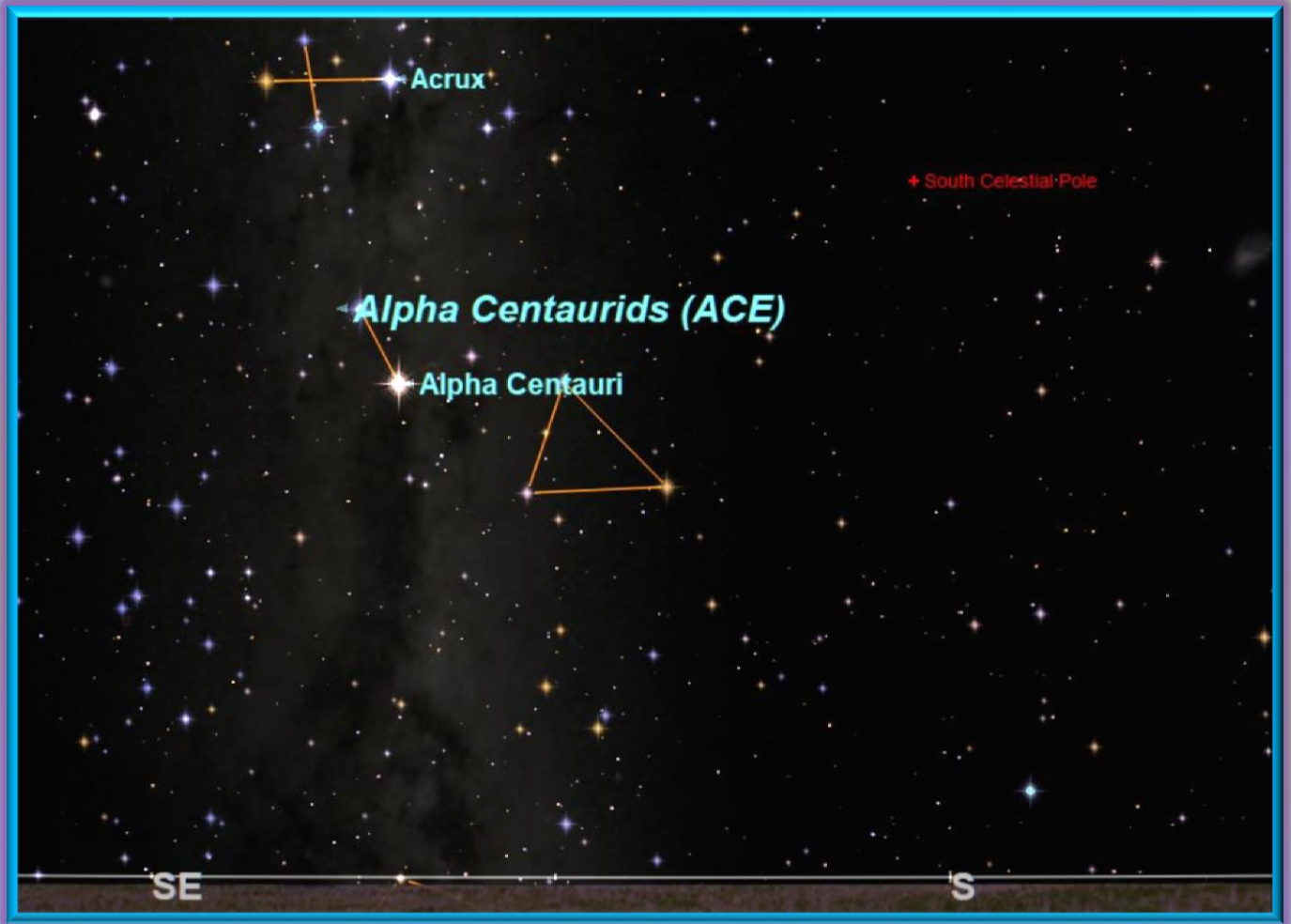
The month of February begins with a bang, with a total eclipse of the Moon underway and Australia beautifully positioned to view the event, especially the eastern half of the continent, for which location these notes are primarily targeted (from Perth, WA, the eclipse is already in progress when the Moon rises). For us, the opening penumbral phase (when observant viewers may be able to notice a slight darkening of the lunar surface, see last month's notes for an explanation) runs from 9:50 pm on January 31<sup>st</sup> until 10:48 pm. The eclipse is partial, with an ever-increasing portion of the lunar disk turning dark red, from 10:48 pm until 11:51 pm, when totality commences. Mid eclipse occurs ½ hour after January rolls over into February, the Moon remaining totally within the Earth's shadow until 1:08 am. After that time, the partial phase recommences, finishing at 2:12 am; the final penumbral phase, then plays out until 3:10 am.

The Moon occults Regulus on the 2<sup>nd</sup> and Aldebaran on the 24<sup>th</sup>; unfortunately neither event favours Australian viewers. From our perspective, Regulus is closest to the 98% illuminated waning gibbous Moon, just over 1° to the upper left of the lunar limb, at 7:55 am, a mere 12 minutes before the star sets; viewers in Japan, Siberia and northern Europe are favoured.

The Aldebaran event is even further removed from our experience – while the first quarter Moon's limb approaches a touch closer to the star – just *under* 1° – it does so 51° below our NW horizon, at 5:12 am. Europe, other than in the south, Iceland and parts of Asia provide views of the spectacle.

Only one meteor shower of note peaks this month, the Alpha Centaurids, on the 8<sup>th</sup>. This shower has a ZHR of 6, but outbursts of 20-30 were witnessed for a few hours in 1974 & 1980, with some heightened activity on the 14<sup>th</sup> also reported from an aircraft in 2015 (the shower is active from late January until February 21<sup>st</sup>).

In light of this history, and given the unpredictable nature of meteor showers in general, monitoring this one on the night of the 8<sup>th</sup>/9<sup>th</sup> may well pay dividends. On the downside, the International Meteor Organization predicts the shower to peak well before sundown, at 6pm, and the 41% lit waning crescent Moon rises at 1:14 am, whereby the viewing window in the post-midnight hours is compromised; nevertheless the shower is known for bright and colourful meteors with lasting trains, so some specimens can be expected to defy the moonglow. The following chart is configured for midnight; note that the radiant, which is circumpolar (never setting from our location), will be lower in the SSE earlier in the evening. It will carve a clockwise arc before transiting (reaching its greatest altitude, 69°) at 6:06 am, again in the SSE, with the sky rapidly brightening (having begun to do so just over an hour earlier, at 5:03 am).



# The PLANETS

## Mercury

As February begins, Mercury is rapidly retreating towards the eastern morning horizon in the latter stages of the morning apparition which it began last December. It rises at 5:33 am, one hour before the 6:33 am sunrise, at which time it sits  $10^\circ$  high in the ESE; its disk spans  $4.9''$  [" denotes arc second =  $1/60^{\text{th}}$  of an arc minute (symbol ') or  $1/3600^{\text{th}}$  of a degree (symbol  $^\circ$ )], is 95% illuminated and shines at magnitude -0.6. This is not a good time to attempt to view the innermost planet – despite its brightness at this time, the low altitude, proximity to the Sun, and the full Moon remaining above the horizon, all conspire to severely disadvantage prospects of spotting it.

With new Moon falling on Friday 16<sup>th</sup>, the following evening of the 17<sup>th</sup> will serve as our nominated viewing night; as Mercury reaches superior conjunction on this date, it is again disqualified. Come the end of the month, having swung around the far side of the Sun from Earth's perspective and re-emerging in the evening sky, the planet is in the early stages of its worst such apparition for the year, thus completing a trifecta of non-events this month. For the record, its circumstances on the 28<sup>th</sup> are: altitude  $5^\circ$  at sunset, 8:02 pm; sets 8:28 pm; phase 94%; disk span  $5.3''$ ; brightness mag -1.3.



Having just entered Capricornus on the final day of last month, the Messenger of the Gods races across that constellation in the first half of February, passing into Aquarius late on the evening of the 16<sup>th</sup>, and finishes the month just a few of days short of moving into Pisces.

## Venus

Venus begins the month of February very low in the western sky post sunset. While its inherent brilliance may enable naked eye identification for those with a keen desire and a flat & clear western horizon, patience is counselled, as it will remain in the evening sky until October, with the best views to be had in August and September.

On the 1<sup>st</sup>, having been at an altitude of 3½° at sunset, 8:33 pm, Venus sets at 8:54 pm; the Venusian disk spans 9.8", is 100% illuminated and shines (all month) at magnitude -3.91. The corresponding stat's for the 17<sup>th</sup> are 5° @ 8:16 pm, 8:46 pm, 9.9" and 99%, while for the 28<sup>th</sup> they are 6° @ 8:02 pm, 8:36 pm, 10.0" and 98%.

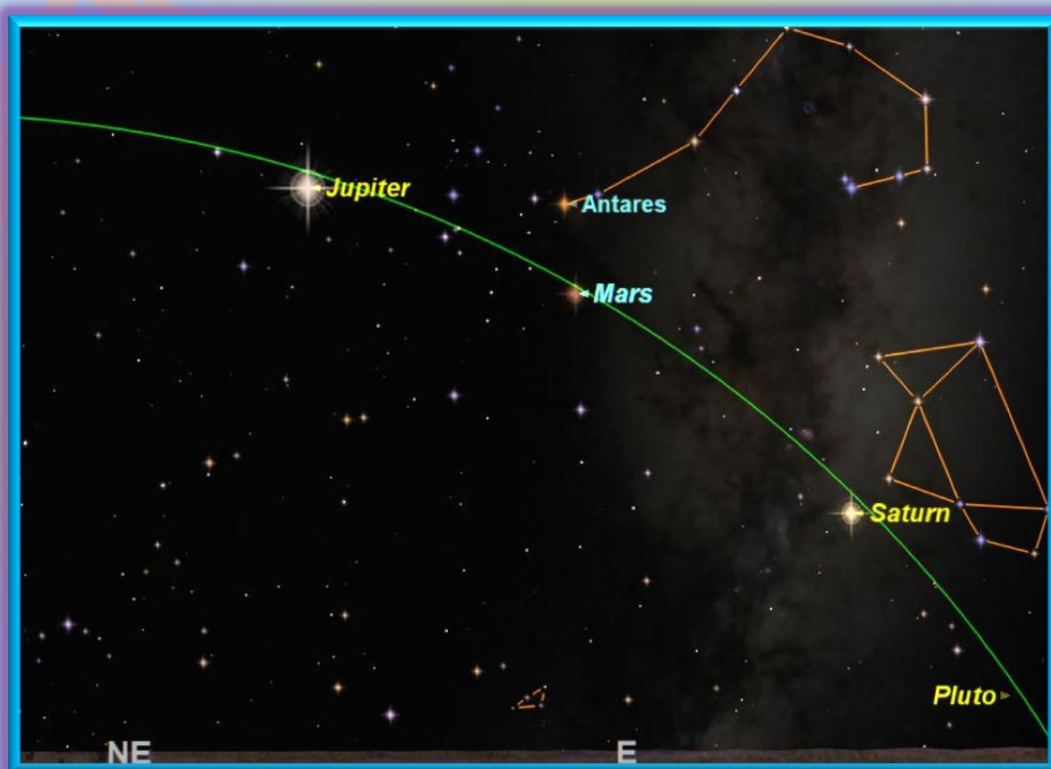
Venus' journey against the background stars this month is similar to Mercury's, albeit at a more sedate pace; it begins the month in Capricornus and transitions into Aquarius on the 9<sup>th</sup>, finishing the month close to the border with Pisces, less than 3° from Mercury. Its inner sibling is set to overtake and climb above it in the western sky in early March – for a couple of weeks only, before Mercury retreats towards the horizon while Venus continues to climb higher.

## Mars

Mars rises earlier and becomes bigger and brighter with every passing day, as its best apparition in fifteen years unfolds. While it still has a long way to go before shining at its biggest and brightest, it is progressively becoming more prominent in the post-midnight hours, and destined to rise before the witching hour as from April 1<sup>st</sup>.

At the start of February, the Red Planet rises at 1:33 am, displaying a 5.6" disk which is 91% lit and shines at magnitude 1.2. On our designated viewing night of the 17<sup>th</sup>, or more correctly the morning of the 18<sup>th</sup>, rise time has come forward to 1:02 am; the span of its disk is out to 6.2", 90 % illuminated and shining at mag 1.0. The following chart is configured for 4:00 am, with Mars at an altitude of 33°; it will be easy to identify by reference to brilliant Jupiter and to Antares (Alpha Scorpii, mag 1.0). The origin of the name of this star – “rival of Mars” – is on display here, as planet and star are situated just 6° apart (having reached a minimum of 5° on the 12<sup>th</sup>/13<sup>th</sup>), and well matched with regard to both visual magnitude and colouration. Saturn and Pluto are also labelled for later reference.

Mars passes very close to a couple



of small globular clusters this month; at the same time of night, 4:00 am, it is a little under  $0.2^\circ$  NW of NGC 6235 on the 20<sup>th</sup> and a little over  $0.2^\circ$  NE of NGC 6287 on the 25<sup>th</sup>. I haven't viewed these globulars, which are quite small and dim (respectively  $< 2'$  & mag 10.0,  $< 3'$  & mag 9.4 according to Starry Night software); have a look if you're viewing at these times. On both occasions the Moon will be out of the sky.

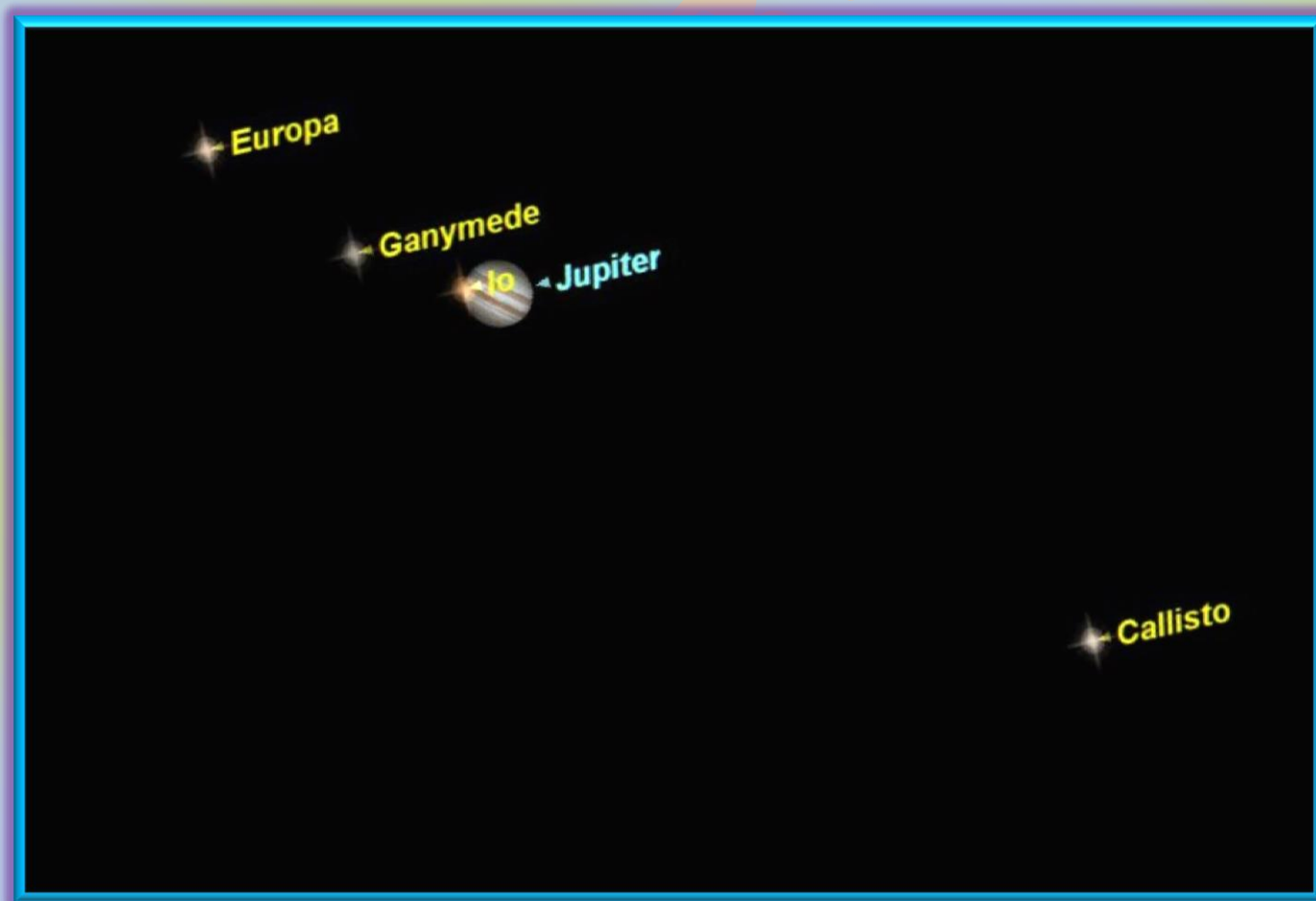
By Feb 28<sup>th</sup>, Mars' rise time has improved to 12:46 am; the planet is both larger and brighter in our skies – 6.6" and mag 0.8 – while its phase is down to 89%.

Mars crosses from Scorpius into Ophiuchus on the 8<sup>th</sup>, remaining in that constellation for the remainder of the month.

### **Jupiter**

Jupiter attains the status of evening object after mid-month, rising before midnight for the first time this apparition. On Feb 1<sup>st</sup>, it breaches the ESE horizon at 12:55 am, its 36" disk shining at magnitude -2.0.

Come the night of the 17<sup>th</sup>/18<sup>th</sup>, it rises at 11:53 pm and has attained an altitude of  $61^\circ$  NE by the time morning twilight first starts to paint the sky at 5:17 am (it's still more than  $1\frac{1}{2}$  hours short of transiting at this time); the span of the disk has swelled to 38", and it shines a little brighter, magnitude -2.1. Jupiter is readily identified in our night sky courtesy of its brightness; if you're unsure, the previous chart in the notes on Mars (configured for 4:00 am) may help. Here's a magnification, configured for the earlier time of 2:00 am, showing the position of the four Galilean moons.



All four moons are moving right to left on the chart; i.e. all except Callisto are moving away from Jupiter. The planet is only at an altitude of  $24^\circ$  in the east at this time, a little short of the  $30^\circ$  minimum usually recommended in these viewing notes; the earlier time has been chosen to catch the end of Io's transit

across the face of its parent, as it exits the disk between (a little before) 2:01 am and (a little after) 2:04 am.

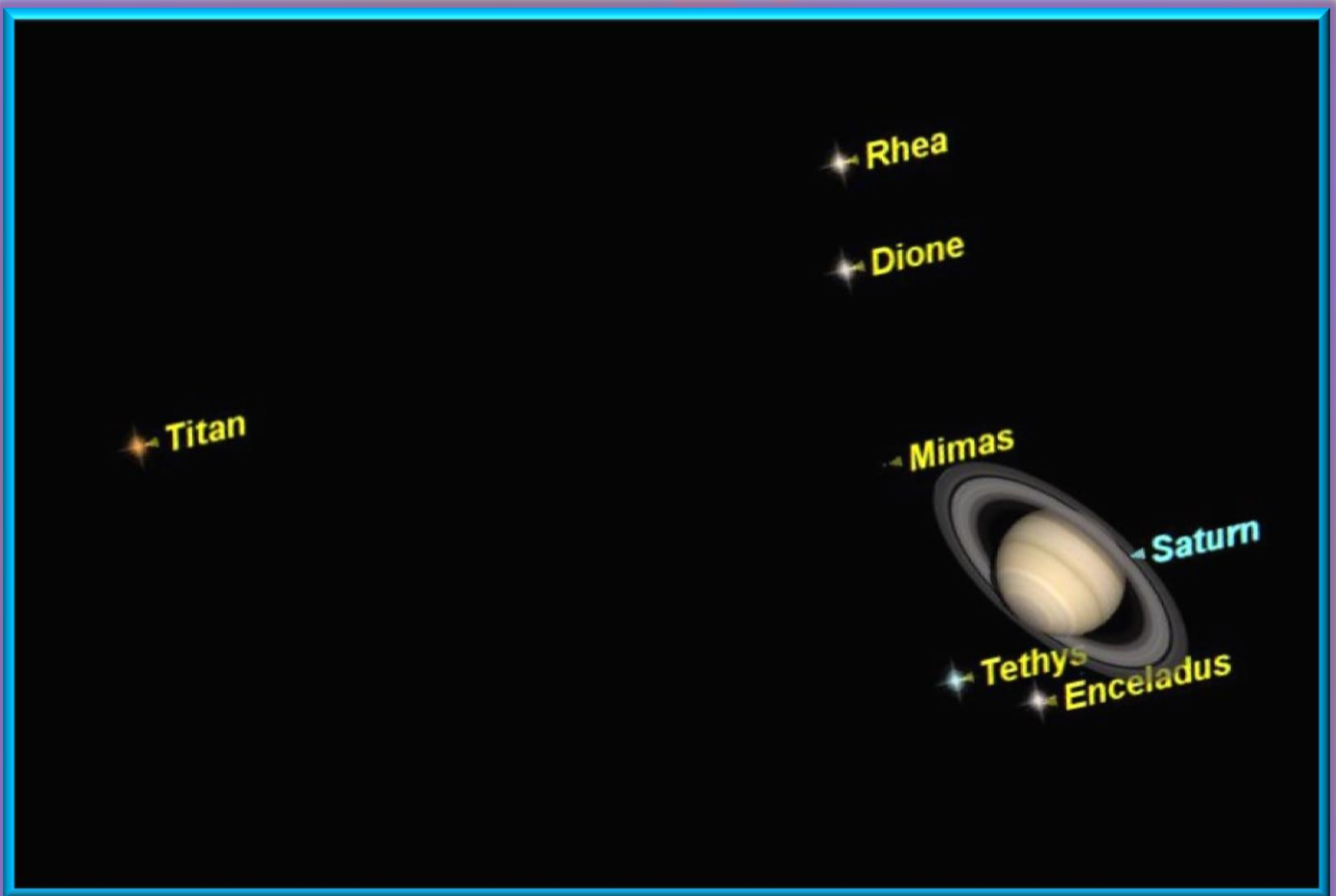
By month's end, the King of the Planets is rising at 11:12 pm, its magnitude -2.2 disk spanning 39"; when twilight commences at 5:32 am (on March 1<sup>st</sup>), Jupiter is still more than half an hour short of attaining its maximum altitude.

Jupiter is in Libra, where it will remain until late in the year.

### **Saturn**

Having emerged from conjunction with the Sun in the second half of December, Saturn is now attaining a decent altitude in our morning skies. On the first day of February, the Ringed Planet rises at 3:39 am, is 12° clear of the horizon when morning twilight begins at 4:51 am, and 32° high at sunrise, 6:33 am. Saturn's disk spans 15.3", its rings 34.8" (across the major axis) at an inclination of 26.2°, and the system as a whole shines at magnitude 0.6, invariant throughout the month.

By the time our viewing night comes around, matters have improved somewhat, albeit requiring telescopic views to be taken not long before twilight commences: rise time is 2:40 am, twilight altitude 29° @ 5:17 am, and altitude at sunrise, 6:52 am, 48°. The disk and rings span 15.6" and 35.5" respectively, the latter inclined at 25.9°. The Mars chart shows where Saturn sits in relation to Jupiter, Mars and the constellation figures of Scorpius and Sagittarius, and in any case it stands out as easily the brightest 'star' in its portion of the sky. The following magnified view, configured for 5:00 am, shows six of Saturn's seven brightest moons; far flung Iapetus will require a separate chart.





Left to right on the chart, the moons shine at the following visual magnitudes: Titan 8.9, Rhea 10.2, Dione 10.9, Mimas 13.4, Tethys 10.8 and Enceladus 12.3. As the brightest star in the field of view shines at magnitude 14.9, with most far fainter, they cannot be confused for the moons and so have been excluded; even faint Mimas is in the clear, with stars near it of 16<sup>th</sup> magnitude or fainter. Titan will show up in any telescope, Rhea, Tethys and Dione should yield to a six inch, an eight inch may be required for Enceladus, while faint Mimas will require at least a ten inch unless your skies are pitch black. The next chart zooms out to pick up Iapetus:



Iapetus shines at magnitude 11.7 – unlike the other moons, this is my own (confident) estimate, made necessary by the software on which I normally rely not taking into account the significant variation in brightness due to the starkly different albedo (reflectiveness) of Iapetus' opposing hemispheres. If any readers know of a resource which *does* take this variation into account, I would appreciate hearing of it ☺.

The star field has been retained in this chart, but only stars brighter than magnitude 14.0 are depicted. Iapetus should stand out as it is far brighter than all stars in its vicinity; the two stars shown closest to the moon shine relatively feebly at magnitudes 13.9 (USNO J1827068-222717, above left of Iapetus) and 13.75 (USNO J1827168-222651, below right). The two 10<sup>th</sup> magnitude stars, which shine noticeably brighter than Iapetus, are labelled for comparison purposes and to assist in orientation. A six inch 'scope may pick up your target under favourable conditions, an eight inch is more likely to be required.

At the end of February, Saturn rises at 2:04 am, and is a generous 39° clear of the horizon as the sky begins to brighten at 5:31 am; the span of its disk has increased to 15.8", that of the rings, which are inclined at 25.8°, to 36.0".

Slow moving Saturn will remain in Sagittarius throughout all of this year, next year, and parts of 2020.



## Uranus

Destined for conjunction with the Sun in April, Uranus now sits low in the western sky by the time evening twilight subsides, making it an unattractive target. Even as the month begins, Uranus is just 16° clear of the horizon when twilight wraps up at 10:15 pm, before setting at 11:41 pm; its 3.5" disk shines at magnitude 5.8.

Come our viewing night of the 17<sup>th</sup>, the situation has further deteriorated, with the planet just 9° clear of the WNW horizon as twilight is fully extinguished (9:51 pm), setting just a little over ¾ hour later, at 10:39 pm; its span remains as above, while brightness registers mag 5.9. If you wish to pursue the innermost ice giant at this late stage of its apparition, refer to the following chart, configured for 9:51 pm:



Stars relevant to your search have been labelled with their visual magnitudes, and will be referred to as such in the text to follow; for your information, the labelled stars, left to right on the chart, are as follows: Mu [ $\mu$ ] Piscium (4.81), Nu [ $\nu$ ] Psc (4.43), Omicron [ $\omicron$ ] Psc (4.25), Pi [ $\pi$ ] Psc (5.53), Eta [ $\eta$ ] Psc (3.59), Sheraton aka Beta [ $\beta$ ] Arietis (2.62) and Hamal aka Alpha Ari (2.00).

Start your search by identifying the two 2<sup>nd</sup> magnitude stars low in the WNW; use them to identify the fainter, but still comfortably naked eye 3.59, towards which they point. From 3.59 look up from the horizon and a little to the west (left) to pinpoint the three 4<sup>th</sup> magnitude stars, fainter again, but still visible without optical aid under a dark sky. Having identified all the aforementioned stars, you now know (by reference to the chart) where Uranus, which is brighter than all unlabelled stars near it, lies. Target this area through your finder 'scope and look for this brightest 'star', which may tend to advertise its identity via a subtle blue/green hue and a steady shine relative to the twinkling stars.

As a further aid, note that the planet forms the apex of a triangle with base 4.25 to 5.53 (depending on conditions and eyesight, this latter star will probably be near the limit of naked eye visibility). Note the two white crosses on the chart; that on the left signifies Uranus' position at the start of the month, the other (partially obscured by the 'U' of Uranus) at month's end.

Confirm capture of your target by employing the main eyepiece at medium-high power (I suggest 150x or more) to resolve the planet's tiny disk, the colouration of which will appear considerably richer than through the finder 'scope.

Uranus will inhabit Pisces until crossing into Aries in late April; it will backtrack into Pisces under the action of retrograde motion in early December, before again crossing into Aries in February next year.

### Neptune

Neptune, the outermost planet proper since Pluto's demotion, is in conjunction with the Sun early next month and so is not a viable target throughout February. For the sake of completeness, here are its vital statistics for this month:

1<sup>st</sup>: 16° high at sunset, 8:33 pm; planet sets 9:58 pm; disk span 2.2"; visual magnitude 7.95.

17<sup>th</sup>: 8° @ 8:16 pm; 8:57 pm; 2.2"; 7.96.

28<sup>th</sup>: 2° @ 8:02 pm; 8:15 pm; 2.2"; 7.96.

Neptune will make its way slowly through Aquarius until 2022/23.

### Pluto

Pluto's circumstances, in the morning sky, are not much better than Neptune's, having just passed conjunction on the 9<sup>th</sup> of last month (rather than nearing it). While higher in the sky than its neighbour, it's an extremely faint target requiring optimum observing conditions; as such it will receive a similarly abridged coverage (see the Mars chart for Pluto's location in relation to the 'Teapot' of Sagittarius):

1<sup>st</sup>: Rises 4:47 am; ½° high when morning twilight begins, 4:51 am; disk span 0.092"; magnitude 14.32.

18<sup>th</sup>: 3:43 am; 17° @ 5:17 am; 0.093"; 14.33.

28<sup>th</sup>: 3:05 am; 27° @ 5:31 am; 0.093"; 14.33.

Pluto will continue to inch through the dense star fields of Sagittarius until 2023/24.

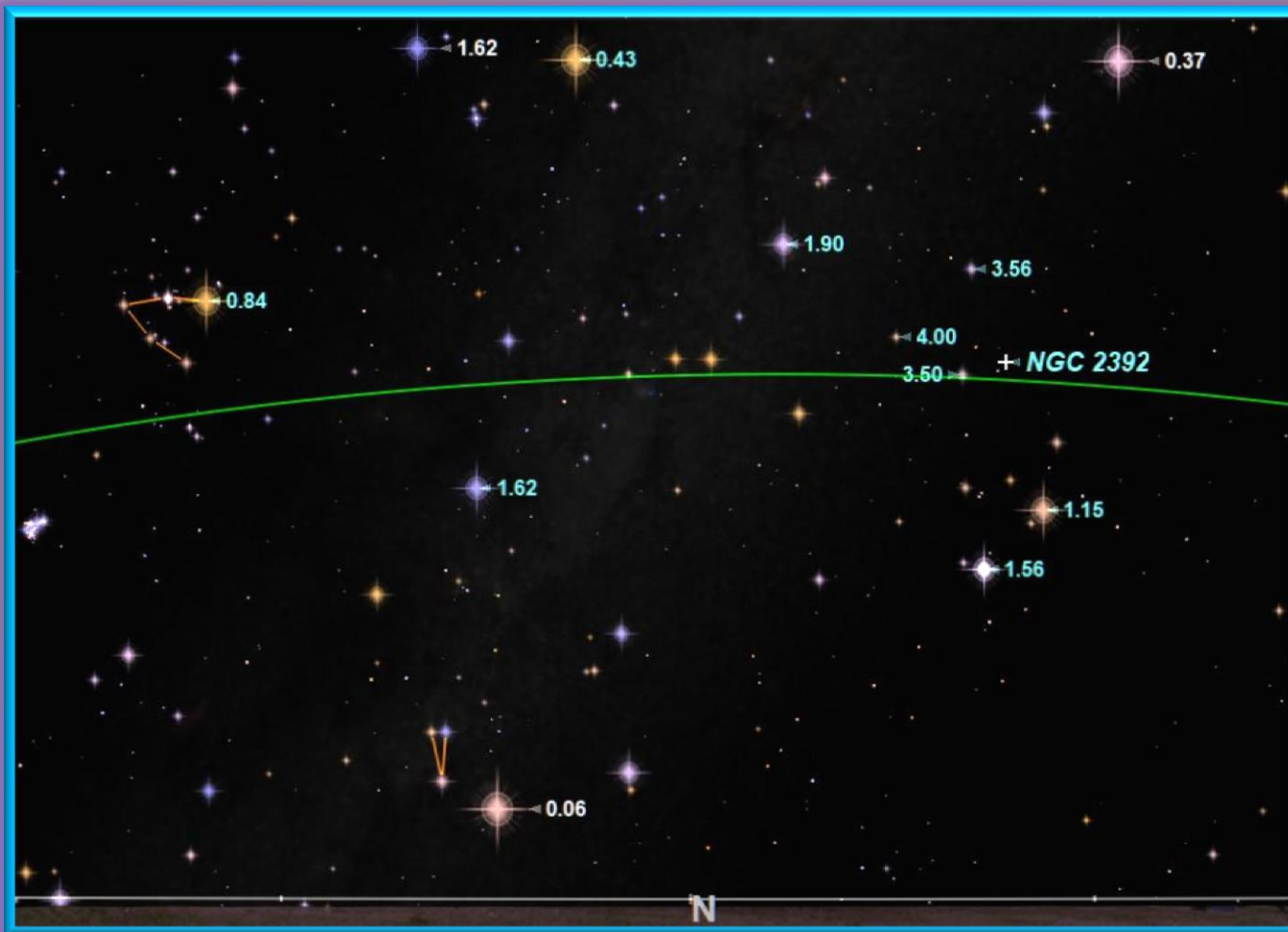
## *Our Monthly* **FEATURE**

This month's feature is the planetary nebula known as the Eskimo Nebula, aka NGC 2392, the Clownface Nebula & Caldwell 39. Like all planetaries, the Eskimo results from the expansion of the outer layers of a Sun-like star near the end of its life; the 'planetary' reference is a misnomer dating to earlier times when views through the 'scopes of the era resembled planets such as Jupiter and Uranus.

As with many deep space objects, estimates of the nebula's distance vary, around 3800 light years would be an approximate average value.

The Eskimo is quoted as glowing at magnitude 10.1; this gels with my inability to spot it through the finder 'scope. Nevertheless, I found it very easy to locate via relating the chart below, configured for 9:51 pm on the 17<sup>th</sup> (the end of evening twilight), to the night sky.





It is always a good idea to start a search for denizens of the night sky from a prominent 'landmark'; I chose two, Betelgeuse (Alpha Orionis) and Aldebaran (Alpha Tauri), labelled with their respective visual magnitudes of 0.43 and 0.84. Betelgeuse is one of the most recognisable stars in the sky, thanks not only to its brightness, but also its pairing with Orion's belt and, above that, brilliant Rigel (Beta Orionis, mag 0.15 – not shown on the chart). Aldebaran's own more than respectable glow is aided, in terms of identification, by its confluence with – and domination of – the Hyades star cluster with its distinctive arrowhead shape (note that this is a line of sight relationship only, the cluster is more than twice as far away as Aldebaran).

Betelgeuse being the primary initial reference point, the next step was to identify Alhena (Gamma [ $\gamma$ ] Geminorum), magnitude 1.90. This was a simple exercise, as no star near it shines anywhere near as brightly, and it was aided by noting the similarities, both in length and angular orientation, of lines from Betelgeuse-Alhena and Aldebaran-Elnath (Beta Tauri, mag 1.62).

Having identified Alhena, it's then easy to spot the triangular formation of Lambda [ $\lambda$ ] Gem, Mekbuda (Zeta [ $\zeta$ ] Gem) and Wasat (Delta [ $\delta$ ] Gem) to the lower right (directly right by midnight), marked with their mag's of 3.56, 4.00 and 3.50 respectively – while these stars are considerably fainter, all are comfortably visible to the naked eye under a dark sky.

As the chart shows, our target nebula lies close to Wasat; with a 17mm eyepiece – giving a magnification of 88x and a field of view of  $\frac{3}{4}^\circ$  – fitted, and using the Telrad (an invaluable addition to any telescope, especially one without goto capability) to point the 'scope to where the chart showed the nebula to lie, it was in the field on the first attempt! At this magnification, the target presented as just a small but bright

glow; experimenting with different magnifications of 125x and 250x, the nebula was still easy to locate – on one occasion, the first up success at 88x was emulated at 250x.

The intermediate magnification of 125x produced the most satisfying view – it more prominently showed the softer outer glow surrounding the nebula's core than at 88x, while the higher mag of 250x lost a little definition. Here's an approximation, sourced from [www.amateurastronomy.com.uk](http://www.amateurastronomy.com.uk), of the view through my 'scope ►



When swapping eyepieces to compare views, the nebula will often be temporarily lost; recapturing it using your finder 'scope may be convenient, and the following chart (showing stars down to magnitude 9.5, typical of a finder's limit) will be of assistance in doing so. As it shows, the nebula (denoted by a white cross) is virtually superimposed, at the magnification afforded by a finder, on the star of magnitude 8.21 (HIP36370). In my experience, the best way to identify this star through a finder is by reference to the arc of stars circled, the two closely spaced 7<sup>th</sup> magnitude stars shown within the smaller circle, and the other two labelled stars, 7.53 (HIP36468) and 8.06 (TYC1359-2518-1). Wasat is labelled at left (with its magnification of 3.50) to aid in orientation.



Before we conclude, here's a brief update on last month's galaxy hunt. Those of you who consulted January's ANS will recall that the feature article involved four galaxies, two of which went undetected in the limited time which was, for various reasons, available. I'm pleased to be able to report that after viewing the Eskimo, a second attempt found both galaxies with remarkable ease via the routes detailed



previously. I can only assume that the urgency, last month, to wrap up the night's activities, detracted from my usual methodology to the point where I was simply looking in the wrong places, although it's possible small concentrations of unseen cloud interfered. NGC 1532 presented, as expected, as a good sized edge on spiral, while NGC 1291, a ring galaxy, showed a small, bright, fuzzy core, with (unsurprisingly) no hint of the fainter outer ring structure.

That wraps up this edition of The Australian Night Sky, which will return in March for another tour through the antipodean heavens.

As always, questions, comments and suggestions are welcome, and may be directed to:  
[waynerobertsau@yahoo.com.au](mailto:waynerobertsau@yahoo.com.au)

***Until next month:***



**CLEAR SKIES**

**and**



**HAPPY HUNTING**

FEBRUARY