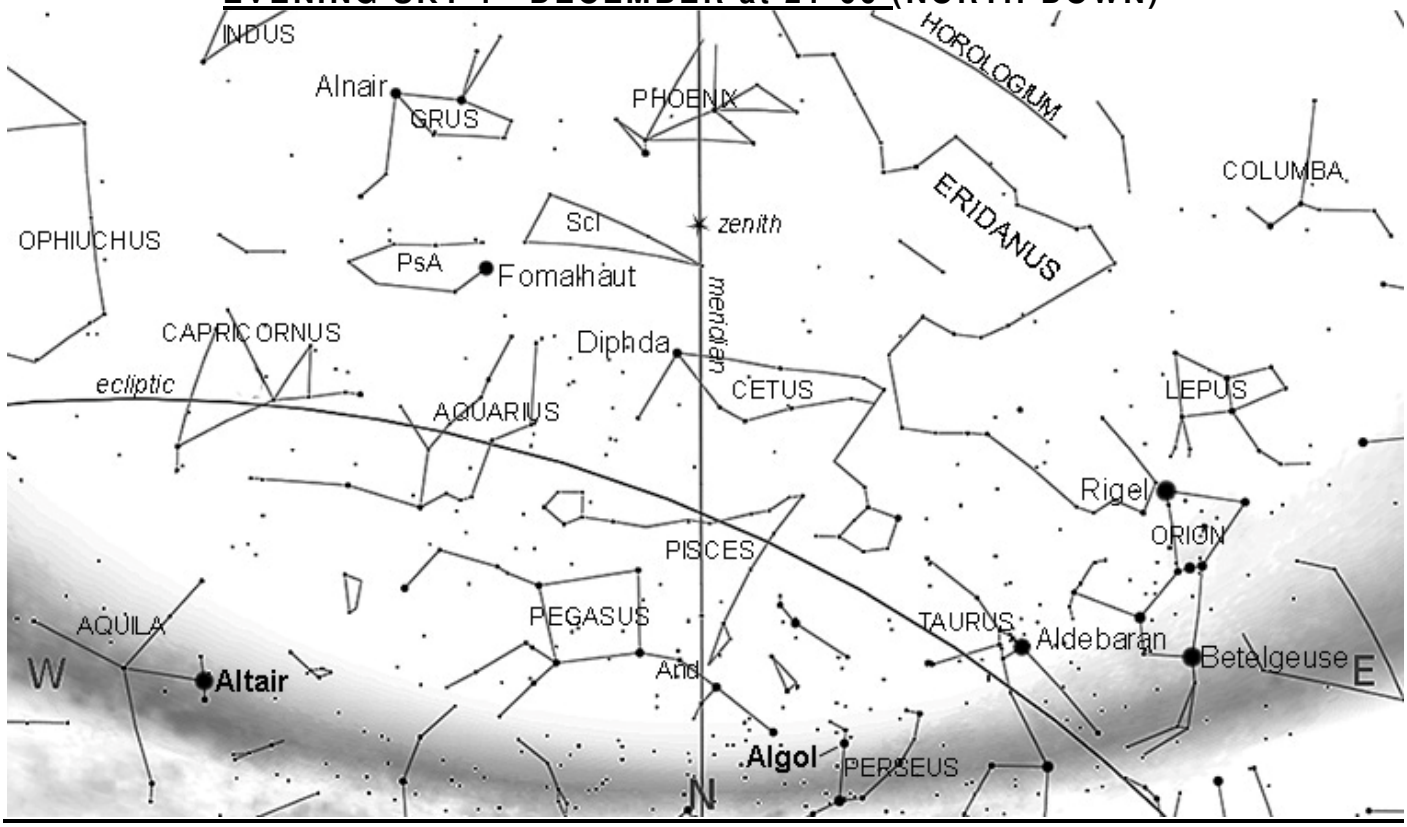
SKYNOTES from Hermanus

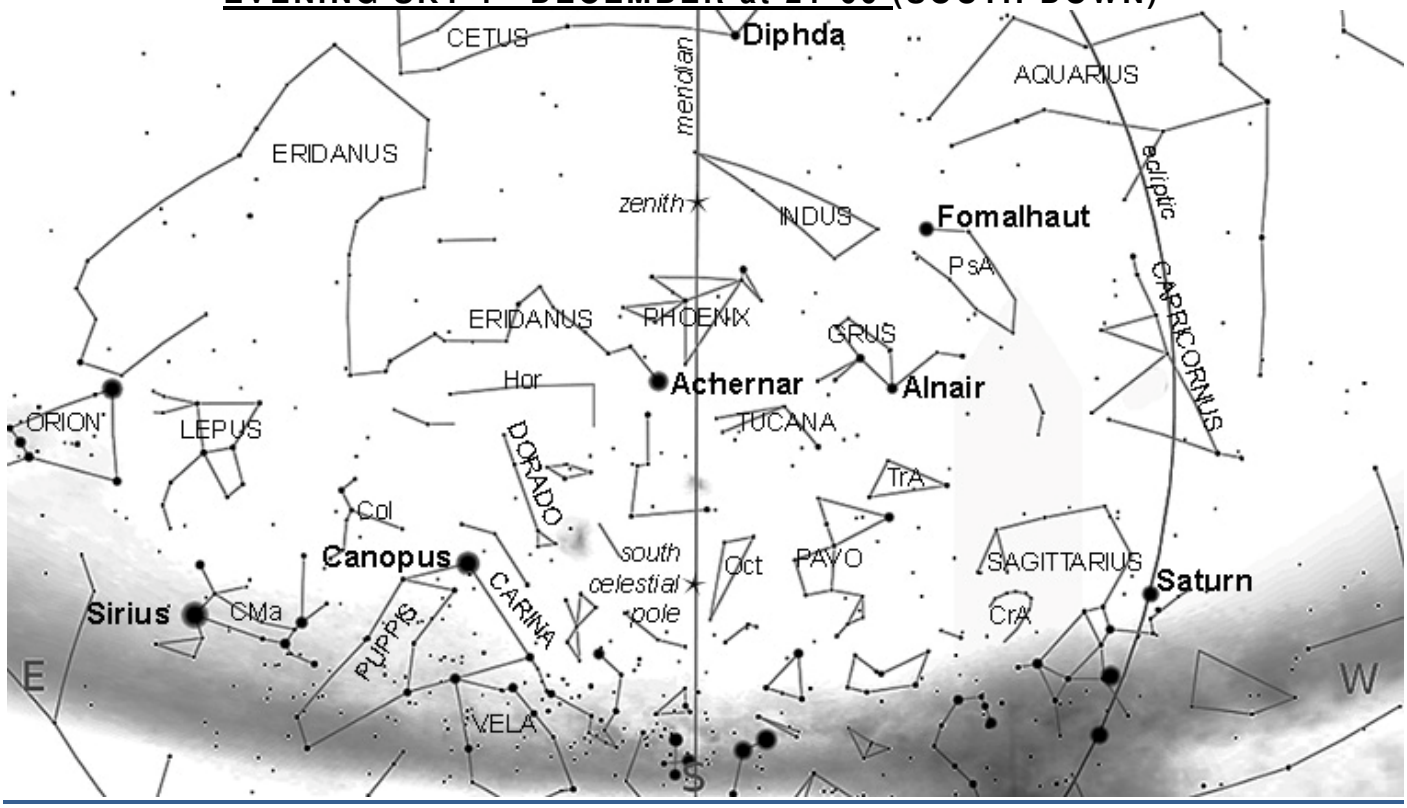
DECEMBER 2019

1. SKY CHARTS

EVENING SKY 1st DECEMBER at 21h00 (NORTH DOWN)



EVENING SKY 1st DECEMBER at 21h00 (SOUTH DOWN)



2. HIGHLIGHTS FROM THE SKY GUIDE

PLEASE NOTE: All events predicted are as observed from **Hermanus, Western Cape, South Africa. Times are South African Standard Time (UTC +2)**

Date	Time	Item
3		**Pallas** at conjunction
4		**Moon** near **Neptune**
	08h44	**Luna-X** feature forms
	08h58	**First quarter Moon**
6		**December Phoenicid** meteor shower at maximum
7		**Jupiter** at southernmost declination for the year (-23.3º)
8		**Moon** near **Uranus**
11		**Moon** near **Aldebaran**
		Venus near **Saturn**
12	07h12	**Full Moon**
13		**Moon** furthest north (+23.2º)
		Venus near **Pluto**
14		**Moon** near **Pollux**
		Geminid meteor shower at maximum
16		**Mercury** near **Antares**
17		**Moon** near **Regulus**
18	22h31	**Moon** at perigee
19	06h57	**Last quarter Moon**
20		**Venus** at greatest latitude south
22		SOLSTICE
23	04h17	**Moon** passes 4.1º east of **Mars**
25		*HAPPY CHRISTMAS*
		Moon near **Mercury**
26	05h19	**New Moon**
		Solar Eclipse (*not visible in southern Africa*) [1]
		Moon near **Jupiter**
27		**Moon** near **Saturn**
	14h11	**Moon** near **Saturn**
	18h05	**Moon** occults **Pluto**
		Jupiter at conjunction
29	03h30	**Moon** skims **Venus**
30		**Mercury** at aphelion

[1] Annular eclipse visible from Middle East, north and east Africa, Asia (except north and east Russia), north and west Australia, Micronesia and Solomon Islands. For further information please see https://en.wikipedia.org/wiki/Solar_eclipse_of_December_26,_2019

3. THE SOLAR SYSTEM

DECEMBER 2019			*1st December*	*1st January*	*Visibility*
Sun Length of day	Ophiuchus to Sagittarius 13h29 to 14h16	Rises: Transit: Sets:	05h24 12h32 19h40	05h34 12h46 19h59	***Never look at the sun without SUITABLE EYE PROTECTION!***
Mercury Magnitude Phase Diameter	Libra to Sagittarius -0.6 to -0.9 69% to 99% 6" to 5"	Rises: Transit: Sets:	04h26 11h13 18h00	05h06 12h23 19h41	**Low in the west after sunset becoming too close to the Sun**
Venus Magnitude Phase Diameter	Sagittarius to Capricornus -3.9 to -4.0 89% to 82% 12" to 13"	Rises: Transit: Sets:	07h16 14h33 21h50	08h18 15h13 22h07	**Evening**
Mars Magnitude Phase Diameter	Virgo to Libra +1.7 to +1.6 98% to 96% 4"	Rises: Transit: Sets:	03h46 10h27 17h07	02h48 09h47 16h46	**Morning**
Jupiter Magnitude Diameter	Sagittarius -1.8 32"	Rises: Transit: Sets:	06h51 14h02 21h12	05h20 12h30 19h41	**Evening becoming too close to the Sun**
Saturn Magnitude Diameter	Sagittarius +0.6 to +0.5 15"	Rises: Transit: Sets:	08h14 15h21 22h27	06h28 13h33 20h39	**Low in the west after sunset**
Uranus Magnitude Diameter	Aries +5.7 4"	Rises: Transit: Sets:	16h39 22h07 03h39	14h34 20h02 01h35	**Evening**
Neptune Magnitude Diameter	Aquarius +7.9 2"	Rises: Transit: Sets:	12h52 19h12 0135	10h52 17h11 23h30	**Evening**
Pluto Magnitude	Sagittarius +14.4	Rises: Transit: Sets:	08h28 15h36 22h43	06h31 13h38 20h45	**Low in the west after sunset**

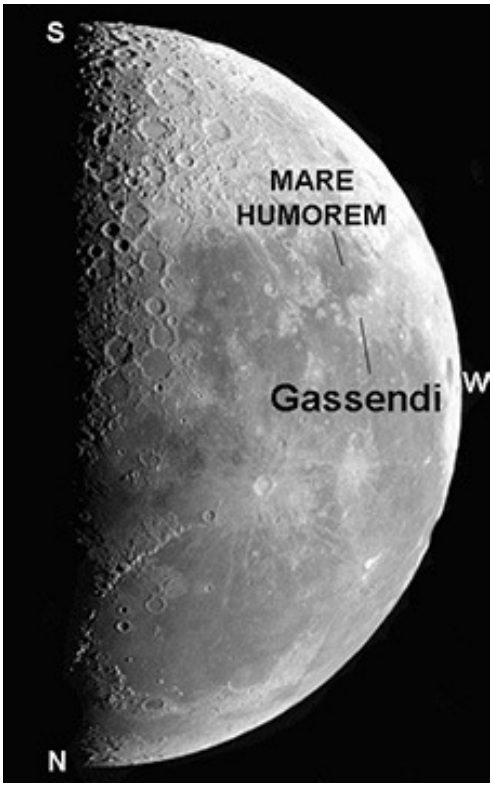
Phase: In a telescope, the inner planets (Mercury, Venus and Mars) appear to us in phases, depending on the angle of the Sun's illumination, as does the Moon. The **angular diameter** is given in arc seconds (“). This is the apparent size of the object as we see it from Earth.

Magnitude: we are accustomed to hearing stars described in terms of 'magnitude', for example Antares (in Scorpius) at +1.05 and the planet Jupiter, at (for example) magnitude -1.8. The latter is considerably brighter than Antares as the scale is 'inverse'; the brighter the object, the lower the number. A 'good' human eye on a clear night can see down to a magnitude of about +6.

Transit: When an object crosses the local **meridian** it is said to **'transit'**. The local meridian is an imaginary line from the horizon directly north passing overhead (through *zenith,* see charts on page 1) to the horizon directly south.

THE MOON

GASSENDI



Type: a large lunar impact crater with three central mountains rising 1.2 km above the crater floor.

Diameter: 114 Km.

Notes: The crater has been inundated by lava during the formation of the mare, so only the rim and the multiple central peaks remain above the surface. The outer rim is worn and eroded, although it retains a generally circular form. A smaller crater – Gassendi A – intrudes into the northern rim, and joins a rough uplift at the northwest part of the floor. The crater pair bears a curious resemblance to a diamond ring. In the southern part of the crater floor is a semi-circular ridge-like formation that is concentric with the outer rim. It is in this southern part where the rim dips down to its lowest portion, and a gap appears at the most southern point. The rim varies in height from as little as 200 meters to as high as 2.5 Km above the surface. The floor has numerous hummocks and rough spots. There is also a system of rilles that criss-crosses the floor, named the Rimae Gassend.

Best seen: three days after first quarter and two days after last quarter.
Age: about 3.9 billion years
Location: northern edge of mare Humorem

Naming: named after 17th century French astronomer Pierre Gassendi

Crater Gassendi and Gassendi A (north down)

No eclipses visible in southern Africa, solar or lunar, are predicted for December 2019 *(see footnote on page 2)*

METEOR SHOWERS

Name	*Date & Time of Max*	*Duration*	*Radiant*	*ZHR*	*velocity*	*Observing Prospect*
December Phoenicids	6 December 20h30 to 02h00	3 to 9 December	7º NW of **Achernar** (**α Eri**)	5	22	Poor
Geminids	14 December 23h30 to 03h00	4 to 16 December	About 3º WNW of **Castor** (**α Gem**)	50	36	Unfavourable
Puppid-Velids	29 December 22h30 to 03h30	5 December to 7 January	About 23º east of **Acrux** (**α Cru**)	5	40	Favourable

Guide to the table above:
ZHR – zenithal hourly rate
vel. - velocity in km per second

For more details regarding meteor watching, please see the Sky Guide Africa South (SGAS), pages 86- 87.

4. STARGAZING

SUGGESTED OBSERVATION DAYS

Unless *specifically* targeting the moon, may I suggest the most convenient dates to plan evening stargazing are from **17th** (moonrise at 23h19) to **29th November** (moonset at 22h33, 10%). Then from **17th** (moonrise 23h42) to **29th December** (moonset 22h38).

*The next club stargazing evening is provisionally scheduled for **29th** or **30th** **November**. Members will receive updated information by e-mail. Also, please check our website calendar.* http://www.hermanusastronomy.co.za*)*
Remember, it's always weather dependant!

BINOCULAR HIGHLIGHTS

This month, we shall devote the monthly "Deep Sky highlights" section to binocular users. It is really not essential to use expensive and unwieldy equipment to enjoy stargazing. The commonly used 7x50 or 10x50 is quite capable of observing down to a magnitude of +10 (a good human eye on a clear night does well to see a magnitude of +6!) so modest binoculars can hugely increase the scope of our observing.

Perseus was the mythical Greek hero who used the severed Gorgon Medusa's head to turn the sea monster Cetus into stone. To the Greeks, Algol represented the "evil eye" of Medusa probably because of its regularly changing brightness and colour.

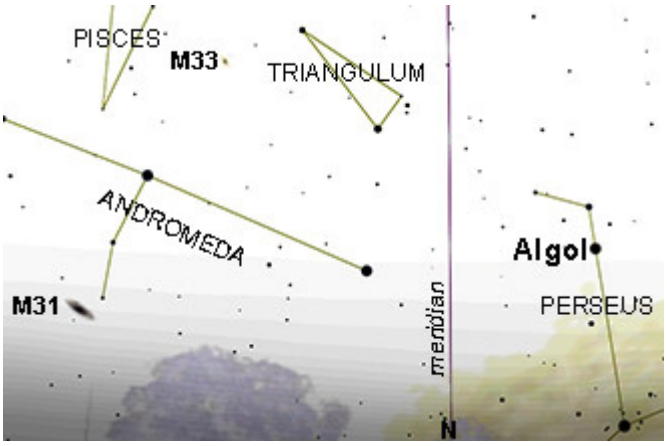
Known in English as "the Demon Star", the name Algol derives from the Arabic "ra's al-ghul", meaning "head of the ghoul", also probably given due to the star's peculiar behaviour. In Hebrew folklore, Algol was known as "Rosh ha Satan" or "Satan's Head".

It's also known as "Head of Medusa" and "Gorgonia Prima."

ALGOL (β Persei, 26 Persei, HIP14576)		**NOTES**
Description	Eclipsing binary, variable Period 2.8673 days	Low in the north in the constellation Perseus and at a maximum of 14.5º above our theoretical horizon, Algol is available to us for evening viewing for a short time in December and January.
Properties	Algol A – blue-white main sequence Algol B – orange subgiant Algol C – white main sequence	The variability of Algol was first recorded in 1667 by Geminiano Montanari but was noticed long before this time. The first person to propose a mechanism for Algol's variability was the British amateur astronomer John Goodricke. In May 1783 he presented his findings to the Royal Society, suggesting that the periodic variability was caused by a dark body passing in front of the star or that the star had a darker region that periodically turned toward earth.
Distance	89.9 ly, 27.6 pc	
Magnitude	+2.1 and +12.7 Range +2.11 to +3.39	
Age	Less than 300 million years old	
Location	Constellation Perseus, Max elev. 14.5º	

J2000 coordinates	3h05m10.1s / +40º57'20.3"

Visibility	**24 December** Algol rises 18h03, transits 21h40 and sets 01h22
Naked eye	Yes but components not resolvable
Binoculars	Yes
Telescopes	Yes



The above Stellarium chart is timed at 21h00 on 24th December. 40 minutes later, Algol will cross the meridian and be at its highest point above the horizon.

In 1881, the Harvard astronomer Edward Pickering presented evidence that Algol was actually an eclipsing binary. This was confirmed in 1889 when the Potsdam astronomer Herman Carl Vogel found periodic Doppler shifts in Algol's spectrum inferring variations in the system's radial velocity. Thus Algol became one of the first known spectroscopic binaries.

Algol is actually a three-star system (designated β Per A, B and C). The large, bright primary (β Per A) is regularly eclipsed by the dimmer β Per B every 2 days 20 hours 49 minutes. Thus Algol's magnitude is usually near constant at 2.1 but regularly dips to 3.4 during the roughly 10 hour-long partial eclipses. β Per A is separated from β Per B by 0.062 AU and from β Per C by 2.69 AU.

There is also a secondary eclipse when the brighter star occults the fainter secondary. But this secondary eclipse can only be detected photoelectrically.

And while we're about it, let's have a look at the nearby **Triangulum** (M33, NGC 598, magnitude 5.7) and **Andromeda** (M31) galaxies, both quite accessible to binoculars. M31, however, is very low and better suited to earlier in the month.

WISHING YOU CLEAR SKIES AND A WONDERFUL FESTIVE SEASON

Please keep in touch...

Don’t forget to have a look at our excellent website, edited by Derek Duckitt.
http://www.hermanusastronomy.co.za/

Also...

ASSA website http://assa.saao.ac.za
ASSA Deep-Sky Section
Whatsappchat group: [074 100 7237]
MNASSAhttp://assa.saao.ac.za/about/publications/mnassa/
Nightfall https://assa.saao.ac.za/?s=Nightfall
Official Big 5 of the African Sky web page
Official Big 5 Facebook group
ASSA Deep-Sky Section mailing list

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You can find us on Facebook, Twitter, the ASSAInfo mailing list and the ASSADiscussion mailing list.

Grateful thanks to the following:

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Stellarium

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