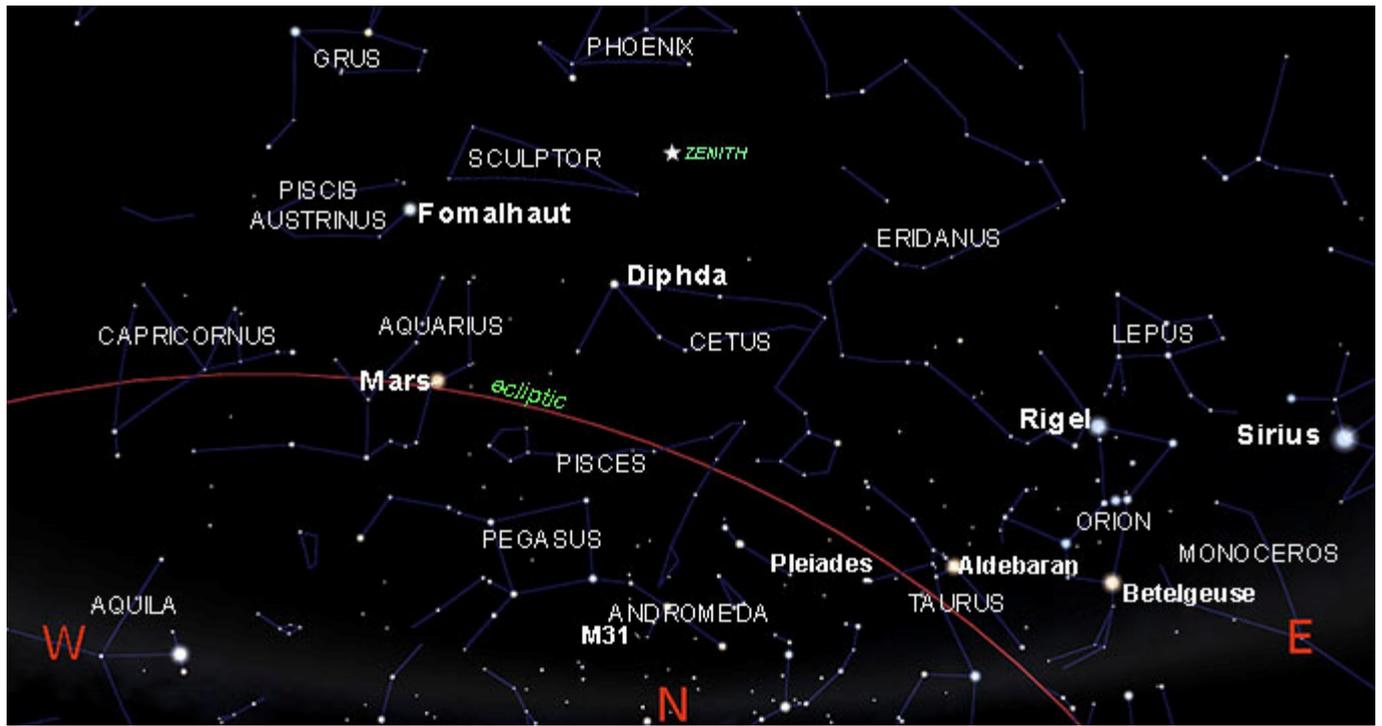
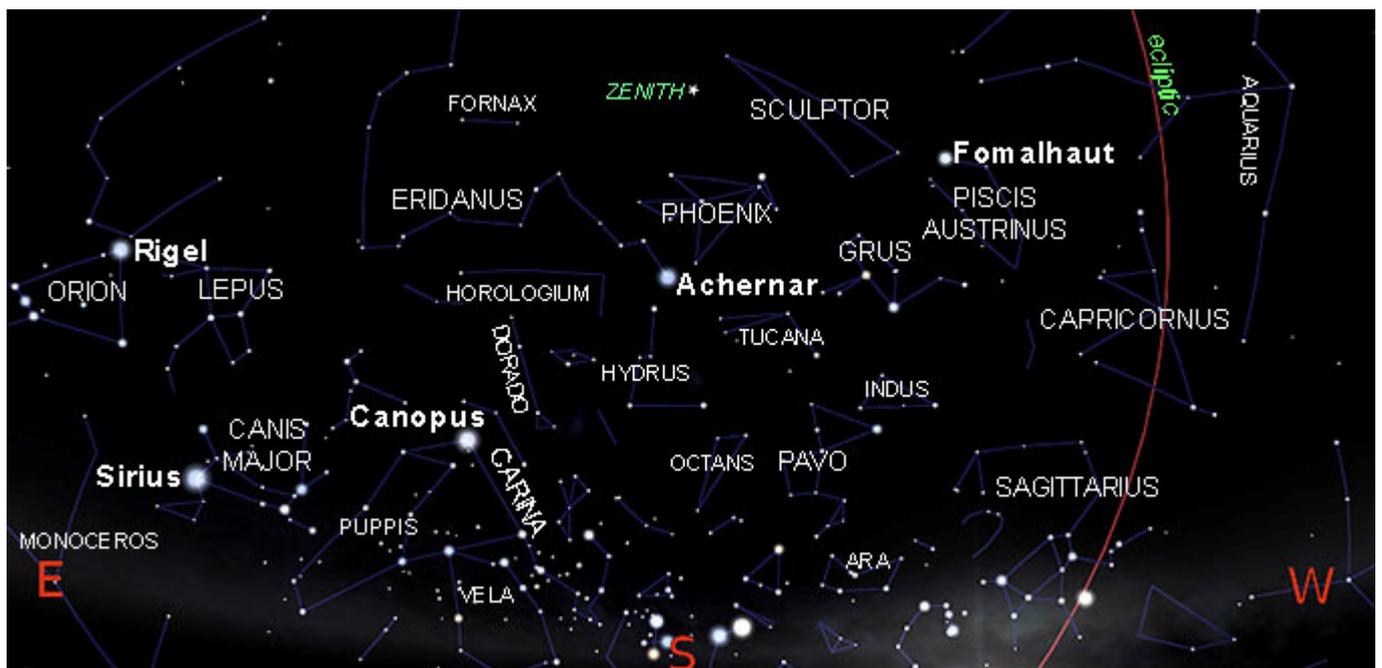


## 1. SKY CHARTS

### EVENING SKY 5<sup>TH</sup> DECEMBER at 21<sup>h</sup>00 (NORTH DOWN)



### EVENING SKY 5<sup>TH</sup> DECEMBER at 21<sup>h</sup>00 (SOUTH DOWN)



PLEASE NOTE: All events predicted are as observed from **Hermanus, Western Cape, South Africa**.

## 2. THE SOLAR SYSTEM

DECEMBER 2018			1 <sup>st</sup>	31 <sup>st</sup>	Visibility
<b>Sun</b> Length of day	Ophiuchus to Sagittarius 14h16 – 14h24	Rises:	05h25	05h34	<b>Never look directly at the sun without suitable eye protection!</b>
		Transit:	12h32	12h46	
		Sets:	19h40	19h58	
<b>Mercury</b> Magnitude Phase Diameter	Libra to Ophiuchus +2.4 to -0.4 7% to 89% 9" to 5"	Rises:	05h03	04h23	<b>Low in the east before sunrise</b>
		Transit:	11h56	11h34	
		Sets:	18h48	18h45	
<b>Venus</b> Magnitude Phase Diameter	Virgo to Libra -4.7 to -4.5 26% to 47% 40" – 26"	Rises:	03h24	02h45	<b>Morning</b>
		Transit:	09h54	09h30	
		Sets:	16h23	16h15	
<b>Mars</b> Magnitude Phase Diameter	Aquarius to Pisces -0.0 to +0.5 86% to 87% 9" - 7"	Rises:	12h22	11h59	<b>Evening</b>
		Transit:	18h49	18h03	
		Sets:	01h18	00h08	
<b>Jupiter</b> Magnitude Diameter	Scorpius to Ophiuchus -1.7 to -1.8 31" to 32"	Rises:	05h14	03h41	<b>Too close to sun then low in east before sunrise</b>
		Transit:	12h15	10h45	
		Sets:	19h17	17h50	
<b>Saturn</b> Magnitude Diameter	Sagittarius +0.6 to +0.5 15"	Rises:	07h28	05h46	<b>Early evening then too close to sun</b>
		Transit:	14h36	12h53	
		Sets:	21h44	20h00	
<b>Uranus</b> Magnitude Diameter	Aries to Pisces +5.7 to +5.8 4"	Rises:	16h17	14h17	<b>All night to evening</b>
		Transit:	21h50	19h50	
		Sets:	03h26	01h27	
<b>Neptune</b> Magnitude Diameter	Aquarius +7.9 2"	Rises:	12h41	10h45	<b>Evening</b>
		Transit:	19h03	17h06	
		Sets:	01h28	23h27	
<b>Pluto</b> Magnitude	Sagittarius +14.3	Rises:	08h21	06h27	<b>Evening to early evening</b>
		Transit:	15h27	13h33	
		Sets:	22h33	20h39	

### **Notes to the table above ....**

**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 magnitude -1.7. 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

*Lunar Highlight* (information from the 2018 *Sky Guide Africa South*):

### **GASSENDI**

**Type:** Crater with a double peaked central mountain and a system of hills rising from its central floor.

**Location:** Northern edge of Mare Humorum.

**Diameter:** 114 km

**Best seen:** three days after **first Quarter** and two days after **last Quarter**

**Notes:** Named for Pierre Gassendi, 17th century astronomer. The rilles in this crater can be seen in modest-sized telescopes.

**Age:** about 3.9 billion years



## ECLIPSES

No eclipses, solar or lunar, are predicted for the month.

## METEOR SHOWERS

Name	Date & Time of Max	Duration	Radiant	ZHR velocity		Observing Prospect
				ZHR	velocity	
<b>December Phoenicids</b>	6 December 20h30 to 02h00	3 to 9 December	7° NW of <b>Achernar</b> ( $\alpha$ Eri)	5	22	Favourable
<b>Geminids</b>	14 December 23h30 to 03h00	4 to 16 December	About 3° WNW of <b>Castor</b> ( $\alpha$ Gem)	50	36	Favourable to moonrise 002H21
<b>Puppis-Velids</b>	29 December 22h30 to 03h30	5 December to 7 January	About 23° east of <b>Acrux</b> ( $\alpha$ Cru)	5	40	Favourable to moonrise 00h36

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*

### 3. HIGHLIGHTS FROM THE SKY GUIDE

(observed from Hermanus)

<i>Date</i>	<i>Time</i>	<i>Item</i>
2		<b>Venus</b> greatest illuminated extent <sup>1</sup>
3		<b>Moon</b> near <b>Venus</b>
6		<b>Moon</b> near <b>Mercury</b> and <b>Jupiter</b>
		<b>Mercury</b> stationary
		<b>December Phoenicid</b> meteor shower maximum (see "METEOR SHOWERS")
7	09H20	<b>New Moon</b>
	16h11	<b>Mars</b> passes 2.2' north of <b>Neptune</b>
		<b>Mars</b> near <b>Neptune</b>
9		<b>Moon</b> furthest south (-21.5°)
		<b>Moon</b> near <b>Saturn</b>
		<b>Mercury</b> at greatest latitude north
10		<b>Moon</b> near <b>Pluto</b>
11		<b>Comet 60P/Tsuchinshan</b> at perihelion (period 6.6 years)
12	14h27	<b>Moon</b> at apogee (405 176 Km)
		<b>Comet 46P/Wirtanen</b> at perihelion (period 5.4 years)
13		<b>Comet 137P/Shoemaker-Levy</b> at perihelion (period 9.6 years)
		<b>Comet 198P/ODAS</b> at perihelion (period 6.8 years)
14	23h47	<b>Luna-X</b> visible
		<b>Moon</b> near <b>Neptune</b>
		<b>Geminid</b> meteor shower maximum (see "METEOR SHOWERS")
15	13h49	<b>First quarter Moon</b>
		<b>Moon</b> passes 2.8° south of <b>Mars</b>
		<b>Mercury</b> at greatest western elongation (21°)
18		<b>Moon</b> near <b>Uranus</b>
21		<b>Moon</b> passes 2° south of <b>Aldebaran</b>
	20h12	<b>Mercury</b> passes 50' north of <b>Jupiter</b>
22	00h23	<i>SUMMER SOLSTICE</i>
	19h49	<b>Full Moon</b>
23		<b>Moon</b> furthest north (+21.5°)
		<b>Jupiter</b> near <b>Antares</b>
24	11h53	<b>Moon</b> at perigee (361 059 Km)
26		<b>Moon</b> passes 3° north of <b>Regulus</b>
		<b>Venus</b> at perihelion
27		<b>Juno</b> stationary
29	11h34	<b>Last quarter Moon</b>

<sup>1</sup> The term "Illuminated Extent" was defined by Mark Gingrich in his paper on "**Illuminated Extent: A Telltale Measure of an Inferior Planet's Disk**".

"... Simply, it is the total solid angle subtended, from the observer's vantage point, by the celestial object's sunlit portion. (Think of it as the apparent disc's illuminated surface area; a square arcsecond is the convenient measurement unit.)"

## 4. STARGAZING

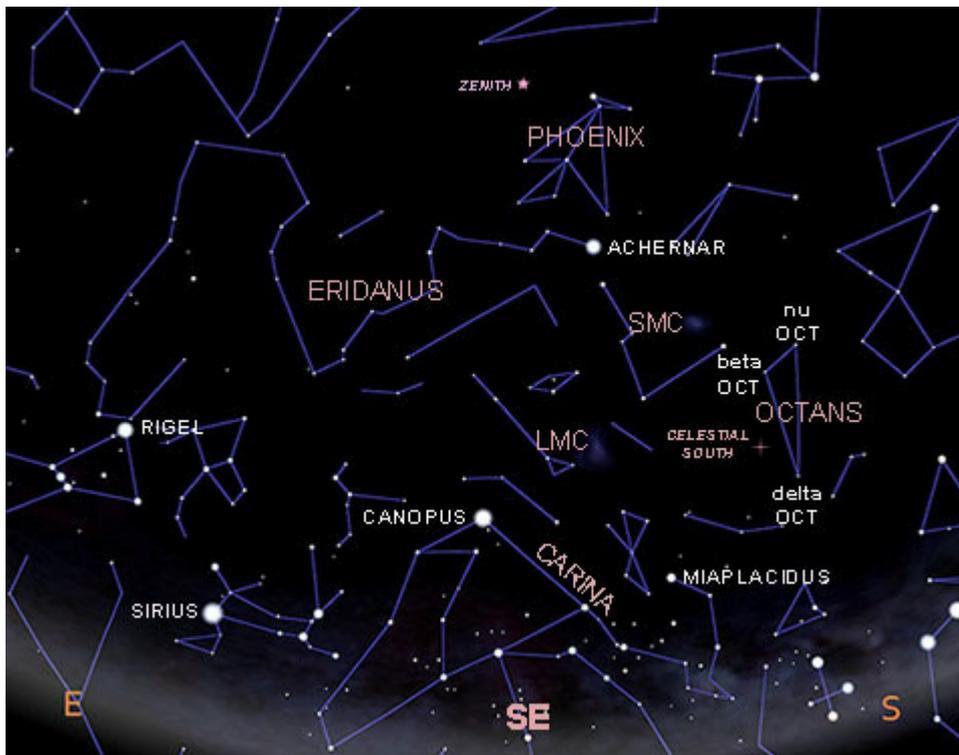
**SUGGESTED OBSERVATION DAYS FOR DECEMBER 2018:** Unless *specifically* targeting the moon, may I suggest the most convenient dates to plan evening stargazing in **December** are from **1<sup>st</sup>** (no evening moon) to **9<sup>th</sup>** (moonset 21h08). Then from **25<sup>th</sup>** (moonrise 22h01) to **month end**.



The next club stargazing evening is provisionally planned for **1<sup>st</sup> February 2019**. Members will receive updated information by e-mail (and, remember, it's always weather dependant!). Please check our website calendar (<http://www.hermanusastronomy.co.za>) closer to the date for confirmation or cancellation info.

### NO 'SCOPE REQUIRED

On a nice, dry, warm December evening (shouldn't be too difficult to find in Hermanus these days), make yourself comfortable on the lawn with toes to the south-east. Above the horizon are:



**CANOPUS** ( $\alpha$  Car, -0.65 mag) right ahead of you

**SIRIUS** ( $\alpha$  CMa, -1.45 mag) peeping over the horizon to the left

**RIGEL** ( $\beta$  Ori, -0.15 mag) further left to the east

**ACHERNAR** ( $\alpha$  Eri, +0.45 mag) at the end of the river Eridanus

**SMC** (Small Magellanic Cloud)

**LMC** (Large Magellanic Cloud)

**MIAPLACIDUS** ( $\beta$  Car, +1.65

mag), the opposite end of the Keel from Canopus.

Identifying **Octans** (the octant) will help with the reasonably accurate determination of the south celestial pole.

The three main stars are:

**$\beta$  Oct** (4.1 mag),  **$\nu$  Oct** (3.7 mag) and  **$\delta$  Oct** (4.3 mag). These three are visually fairly faint but quite observable on a good night.

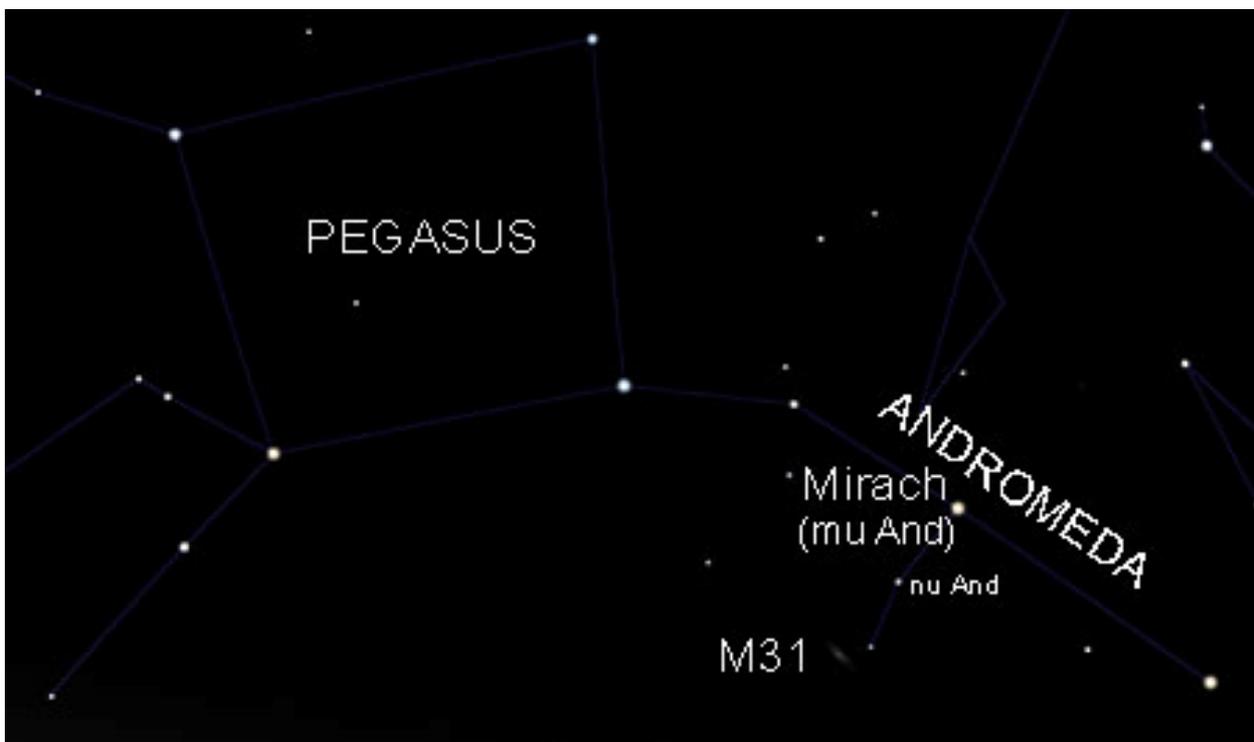
## 5. DEEP SKY HIGHLIGHT



### **Andromeda Galaxy (M31)**

<u>Description</u>	Almost edge-on Galaxy
<u>Distance</u>	2.5 million LY
<u>Location</u>	Constellation <b>Andromeda</b> . Approximately 14° above the northern horizon.
<u>J2000 coordinates</u>	RA 0h 42m 42s, DEC +41° 16' 0"
<u>Guide star</u>	3.8° NW of $\nu$ And. (see NORTH DOWN chart on page 1)
<u>Visibility</u>	magnitude 3.5
<u>Binoculars</u>	yes
<u>Small telescope</u>	yes
<u>Modest telescope</u>	Extends for about 2.9°
<u>Further comment</u>	

The Great Andromeda Galaxy, M31, is the nearest spiral galaxy to our own. It is one of the farthest objects visible to the naked eye. As a mirror image of the Milky Way, this huge aggregation of stars, gas and dust allows us to study all the features of our own galaxy that we cannot observe because we are inside it.



# Andromeda

Genitive: Andromedae

Abbreviation: And

Size ranking: 19th

Origin: One of the 48 Greek constellations listed by Ptolemy in the Almagest

Greek name: Ἀνδρομέδα

## Chinese associations

In the Chinese constellation system, the elliptical shape formed by nine stars including Beta, Mu, Nu, Pi, Delta, Epsilon, Zeta, and Eta Andromedae, along with seven others over the border in Pisces, was called Kui; the same name was also given to the 15th lunar mansion. The meaning of Kui is somewhat puzzling. According to one interpretation, it has to do with legs, feet or walking, possibly because its shape resembles that of a foot or sandal; perhaps it is the rear legs or feet of the **White Tiger**. As a result, the Chinese name is often seen translated as 'legs' or 'stride'. Alternatively, Kui was said to represent a wild boar.

Alpha Andromedae was joined with Gamma Pegasi to form Bi, the eastern wall of the Emperor's palace grounds, also said to represent the Emperor's private reference library. The 14th lunar mansion was named Bi, 'wall', after this pairing. (Confusingly, the 19th lunar mansion, in Taurus, is also called Bi but there it has a different meaning.)

Gamma Andromedae and ten nearby stars were known as Tianda jiangjun, representing the great general of the heavens and ten subordinate officers. Ten stars in the north and centre of Andromeda formed Tianjiu, a stable for despatch riders to change horses on a pony express route; the stars' identifications are uncertain but probably included Theta, Rho and Sigma Andromedae plus a loop of fainter stars to the west. Other stars in western Andromeda, including the modern-day 7, Lambda, Psi, Kappa and Iota, were part of Tingshe, a flying serpent, which was centred in neighbouring Lacerta.

Some sources identify Phi Andromedae as Junnanmen, the southern gate to the headquarters of Tianda jiangjun; however, this star is too far north to be described as a southern gate, and Alpha Trianguli seems a better fit to the position.

## Stars in Andromeda – and a spiral galaxy

Star maps picture Andromeda with her hands in chains. Her head is marked by the second-magnitude star Alpha Andromedae, originally shared with neighbouring Pegasus. In fact, in the Almagest Ptolemy listed this star not under Andromeda but Pegasus, where it marked the horse's navel, although he acknowledged that it was 'common to the head of Andromeda'. The star is now assigned exclusively to Andromeda but echoes of its dual identity live on in its popular name of Alpheratz, which comes from the Arabic al-faras, meaning 'the horse'. A now-obsolete alternative name for it was Sirrah, from the Arabic surrat, meaning 'navel', harking back to Ptolemy's description of it as the navel of the horse.

The girl's waist is marked by the star Beta Andromedae, called Mirach, a name corrupted from the Arabic al-mi'zar meaning 'the girdle' or 'loin cloth'. Ptolemy described it as 'the southernmost of the three stars over the girdle'. Her left foot is marked by Gamma Andromedae, whose official IAU-approved name is Almach but which in the past has also been variously spelled Almaak, Alamak, or Almak, from the Arabic al-'anaq, referring to the desert lynx or caracal which the old Arabs visualized here. Through small telescopes this is a beautiful twin star of contrasting yellow and blue colours. The star that Ptolemy

described as lying in Andromeda's right foot is now just within the modern borders of Perseus, where it is known as Phi Persei.

The most celebrated object in the constellation is the great spiral galaxy M31, positioned on Andromeda's right hip, where it is visible as an elongated blur to the naked eye on clear nights. M31 is a whirlpool of stars similar to our own Milky Way. At a distance of around 2.5 million light years, the Andromeda Galaxy is the farthest object visible to the naked eye. Discovery of this object is attributed to the Arabic astronomer al-Sufi, who first mentioned it in his *Book of the Fixed Stars* (c. AD 964).

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## **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.saa0.ac.za>  
[ASSA Deep-Sky Section](#)  
Whatsapp chat group: [ 074 100 7237 ]  
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