The COLOUR of CREATION
observing and astrophotography targets "*at a glance*" guide.

(Naked eye, binoculars, small and "monster" scopes)

Dear fellow amateur astronomer.
Please note - this is a work in progress – compiled from several sources - and undoubtedly WILL contain inaccuracies. It would therefor be HIGHLY appreciated if readers would be so kind as to forward ANY corrections and/ or additions (as the document is still obviously incomplete) to: georg.moolman@lancet.co.za.
The document will be updated/ revised/ expanded* on a regular basis, replacing the existing document on the ASSA Pretoria website, as well as on the website: coloursofcreation.co.za .
This is by no means intended to be a complete nor an exhaustive listing, but rather an "at a glance guide" (2nd column), that will hopefully assist in choosing or eliminating certain objects in a specific constellation for further research, to determine suitability for observation or astrophotography.
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Warm regards. JohanM.
***Edition 1: June 2016 ("Pre-Karoo Star Party version").**

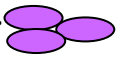
"To me, one of the wonders and lures of astronomy is observing a galaxy… realizing you are detecting ancient photons, emitted by billions of stars, reduced to a magnitude below naked eye detection…lying at a distance beyond comprehension..."

ASSA 100. (Auke Slotegraaf).	
Messier objects. **Apparent size: degrees, arc minutes, arc seconds.**	
Interesting info. AKA's.	
Emphasis, correction.	
Coordinates, location.	
Stars, star groups, etc.	
Variable stars.	
Double stars. (Only a small number included. "Colourful descriptions" taken from the book by **Sissy Haas).**	**Ds.**
Carbon star.	
Asterisma. (Including many **"Streicher"** objects, taken from ASTRONOMY DELIGHTS).	**Asterism.**
Open (galactic) clusters.	**Oc.**
Globular clusters.	**Gb.**
Nebulae, including reflection, emission, absorption/ dark.	**N.**
Planetary nebulae.	**Pn.**
Galaxies and galaxy clusters.	**Gx.**
Order listed:	

Constellation: Object/ Info.	@MERIDIAN/ Target Type.	App. Mag.	SIZE
JAN			
Cae CAELUM SEE-lum The Chisel	**01-Jan**		
α Caeli, Alpha Caeli, F-type main-sequence star: suspected **Delta Scuti type variable:** exhibiting variations in luminosity as a result of both radial and non-radial pulsations on its surface + a **red dwarf** spectral class M, also a variable, **UV Ceti type** (**flare star**): occasionally undergoes sudden extreme increases in luminosity for a few minutes.	**Ds.** 	**4.45+9.8**	
β Caeli, Beta Caeli, 3rd brightest star in Caelum, yellow-white F-type main sequence dwarf.		**5.04**	
γ Caeli, Gamma Caeli. Gamma-1, binary: orange K-type red giant, + fainter white companion @ 3.1". PLUS @ 0.22° **Gamma-2,** also a double star, a yellow-white F-type giant, **Delta Scuti** type variable and a companion spectral type F.	**Ds.** 	**4.5+8th & 6.34+9.6**	
STREICHER 17, ASTERISM, An arrow is formed with a few stars of varying brilliance. The brightest star, magnitude 6.6 (HD 31142/ **HIP 22611**) is at the eastern end of the arrow shape. The centre comprised of fainter stars, with slightly brighter stars to the tail end, **RA 04h51m.3 DEC -34°14'.0**	**Asterism.** 	**?**	**17'**
NGC 1679, spiral galaxy located two degrees south of **Zeta Caeli**.	**Gx.** 	**11.4**	**2.7x2'**
NGC 1571. Elliptical.	**Gx.** 	**12.3**	**1.5x1.2'**
NGC 1668, Galaxy, with a mag 14 star @ northern edge.	**Gx.** 	**12.7**	**1.5'×1.0'**
NGC 1701, Galaxy, extremely small galaxy, mag 9 star close to E end.	**Gx.** 	**12.8**	**1.2'×1.0'**
IC 2106, Galaxy.	**Gx.** 	**13**	
NGC 1585, & a companion galaxy **IC 2068** only 11' NW.	**Gx.** 	**13**	**1.3'×0.9'**
Cam CAMELOPARDALIS ka-mel-o-PAR-da-lis The Giraffe	**10-Jan**		
β Cam, Beta Camelopardalis, brightest in Cam. Double star, primary is a yellow-hued Σ 385, supergiant @1000 ly from earth.	**Ds.** 	**4.03 (4.0 +8.6)**	
CS Camelopardalis, HIP 16228, 2nd brightest, a binary, blue-white B-type supergiant + companion @ 2.9". Located in the reflection nebula **vdB 14**. Is an **Alpha Cygni type variable:** exhibits non-radial pulsations (which means that some portions of the star's surface expand while others contract).	**Ds.** 	**4.19to4.23 & 8.7**	
Σ 1694 (Struve 1694, 32 Cam), Sigma Camelopardalis, binary, white A-type subgiant and a spectroscopic binary that consists of two A-type main sequence stars.	**Ds.** 	**5.3 + ?**	
11 Camelopardalis or **BV Camelopardalis** + **12 Camelopardalis, HIP 23743,** @ 3', **B**-type mainsequence ("whitish-lemon"), a Gamma Cassiopeiae type variable star + **K**-type giant ("citrus orange").	**Ds.** 	**5.2+6.1**	
Σ384 + Σ385, "double-double": "gold + blue…", sep 2.0" and 2.5", **RA 03h28.5m DEC +59⁰ 54'.**	**Ds. x 2.** 	**8.1+8.9 & 4.2+7.8**	
1 Cam, showcase pair, "pearly white + dim silver", sep 10.5", **RA 04h 32m DEC +53⁰ 55'.**	**Ds.** 	**5.8+6.8**	
32 Cam, showcase pair, "pair of lucid-white stars", sep 21.5", **RA 12h 49.2m DEC +83⁰ 25'.**	**Ds.** 	**5.3+5.7**	
BD Camelopardalis. HIP 17296, carbon star.			

S Camelopardalis, HIP 26753, carbon star, period 327 days.	C	7.7to11.6	
NGC1502 (Oc.) + **Kemble's Cascade**. Chain of 6stars - the waterfall - that ends in the open cluster NGC 1502 (the pool).	Oc. + Ast.	5.7 + 5 to 10	2.5^0
Stock 23. Open Cluster. **RA 03:16:30.8 Dec +60:02:12**	Oc.	5.6	
Tombaugh 5, open cluster. **RA 3h 47m 42s Dec 59º 04' 59''**	Oc.	8.4	17’
NGC 1501. The **Blue Oyster nebula**. A ring neb.	Pn.	11.5	52”
IC3568. Planetary nebula.	Pn.	12.0	
NGC2403. Intermediate spiral. Connected to it is a Neb: **NGC2404.**	Gx.	8.9 & 14.5	
IC 342. Intermediate spiral.	Gx.	9.1	
NGC 2146, The Dusty Hand Galaxy. Barred spiral.	Gx.	10.6	5.4x4.5’
NGC 1569, dwarf irregular galaxy, approximately 11 million light years distant, notable for the two super star clusters which it contains.	Gx.	11.9	
NGC 1530. Barred spiral.	Gx.	12.3	4.4x2.5’
Col COLUMBA koh-LUM-bah The Flying Star-Dove	**20-Jan**		
α Columbae, Alpha Columbae, Phact, “Ring-necked dove”, blue-white, spectral type B. Faint optical companion at 13.5”. A suspected **Gamma Cassiopeiae type variable**.	Ds.	2.62to2.66 + 12.3	
β Columbae, Beta Columbae, Wazn, giant star, spectral class K.		3.1	
Ghusn al Zaitun, δ Columbae, Delta Columbae, spectroscopic binary - a yellow giant as primary component, spectral class G. The close companion has an orbital period of 2.38 years.		3.853	
γ Columbae, Gamma Columbae, a blue subgiant, class B, located about 854 light years from the solar system.		4.35	
ε Columbae, Epsilon Columbae, a giant star, spectral class K.		3.875	
η Columbae, Eta Culumbae, a yellow-orange giant, spectral type K.		3.946	
μ Columbae, Mu Col. Runaway star, expelled from the Iota Orionis system in the Trapezium Cluster. Fast rotating: full revolution every 1.5 days, Rare **naked eye O-class** stars.		5.15	
Asterism (Streicher), situated only 20’ east of mag 4.8 lambda Columbae. A handful of stars can be seen in a half square shape with the open end towards the east. **RA05h54m.7 DEC-33°47’.3**	Asterism.	9	18’
NGC 2061. Open Cluster.	Oc.	11	10’
NGC 1963. Open Cluster.	Oc.	11	14’
ESO 424-SC25. Open Cluster. **RA 05h49m.8 DEC-32°28’.0**	Oc.	10.5	8’
NGC 1851 ASSA15. Bennett 32. Bright core, faint halo.	Gb.	7.3	11’
NGC 1808. A barred-spiral,"warped disc". Complex nucleus - **(Seyfert Gx** = “Normal” looking spirals with quasar-like nuclei: very bright in other wavelengths).	Gx.	9.9	
NGC 1792.Bennett 29, Spiral Galaxy.	Gx.	9.9	5.5’×2.5’
NGC 1808, Bennett 31, Galaxy.	Gx.	9.9	5.2’×2.3’
NGC 1892. Spiral.	Gx.	10.2 (12.2?)	
NGC 2090, Galaxy.	Gx.	11	4.5’×2.3’
NGC 2188, Galaxy.	Gx.	11.6	5.5’×1.0’
IC 2135, Galaxy.	Gx.	13	2.8’×0.6’

Dor DORADO doh-RAH-doh The Goldfish	01-Jan		
Alpha Doradus. α Doradus, Blue-white. A binary star, a giant class A, and a subgiant type B, has an optical companion 77 arc seconds away.		3.26to3.3 (3.8&4.3)	
β Doradus, Beta Doradus. Bright Cepheid **variable star**, yellow-tinged supergiant, period of 9 days and 20 hours. Its **spectral type varies** from F-type to G-type.		4.1-3.45	
γ Doradus, Gamma Doradus, serves as a prototype of stars known as the **Gamma Doradus variables.** These stars are pulsating variables whose brightness varies by less than a tenth of a magnitude as a result of nonradial gravity wave oscillations.		4.25	
δ Doradus, Delta Doradus, spectral type A, is notable for being the Moon's South Pole star.		4.34	
ζ Doradus, Zeta Doradus, yellow-white main sequence star of the spectral type F, will move to the constellation Pictor around the year 6400 AD.		4.68	
S Doradus. Hypergiant, a **prototype** of the group S Doradus class of **variable** stars, is the **brightest member** of the open cluster **NGC 1910**: latter visible in binoculars as a bright condensation within the main bar of the LMC. Is usually classified as spectral type A, but has the spectrum of a F class star.		8.6 – 11.5	
R Doradus, HIP 21479, a red giant star spectral class M, **Mira variable**, believed to be the star with the **second largest apparent size** when observed from Earth, second only to the Sun, period 338 days, **RA04h36m.8 DEC-62°05'.0**		4.8to6.6	
NGC 2100. In LMC. Approximately round, sometimes mistaken for a globular cluster.	**Oc.**	9.6	
NGC 1850. Is a **double cluster** (Like **NGC 868,884?: Per**) and a **super star cluster** (like **NGC 3603:Car, Wd1:Ara**). **Unusual**: distribution of stars as in a globular, but composed of **young** stars. The only similar object in the MWG is Westerlund 1 (Ara Cluster).	**Oc.**	9.3	
NGC 1763, Bennett 27, emission nebula and open cluster in LMC.	**N & Oc.**	8	5'×3'
NGC 2004. Open Cluster.	**Oc.**	9.6	2.7'
NGC 1810. Open Cluster.	**Oc.**	11.9	1.2'
NGC 1818. Bennett 30. Open Cluster.	**Oc.**	9.7	3.4'
NGC 1901. Open Cluster.	**Oc.**	7	40'
NGC 1783, Bennett 28. Globular Cluster.	**Gb.**	11	3'
NGC 1978.	**Gb.**	9.9	3.9
NGC 1818. [LMC]	**Gb.**	9.7	
NGC 1748. [LMC]	**N.**	?	30"
NGC 2032 – 35 - 40. Brightest part: **Southern Seagull nebula**. **[LMC]**	**N.**	?	
NGC 2032. Emission Nebula**.**	**N.**	10	3'
LHa 120-N59C. Reflecting Nebula. **RA05h35m.6 DEC-67°37'.1**	**N.**	14	1'
NGC 2020: close to Seagull: "Wheel-like" **[LMC]**	**N.**	?	
N44. The Crazy Frog Mouth Nebula. An emission nebula with super-bubble structure. Houses numerous massive bright stars, spans about 1000 Ly. In **LMC**. **Ra: 5h 21m 37s Dec: -67d 53m 45s**	**N.**		

LMC. ASSA 16.	**Gx.** 	**0.5**	
NGC 2070. ASSA20. Bennett 35, TarantulaNeb, The True Lover's Knot, a LARGE emission nebula in the LMC**.**	**Gx. & N.** 	**LMC: 0.5; Tar:8.2**	**30'×20'**
NGC 2080. "Ghost head" nebula in the LMC, a star-forming region and emission nebula to the south of the 30 Doradus (Tarantula) nebula. Two distinct white patches. [NGC 2080 should **not be confused** with the **Ghost Nebula (**Sh2-136), reflection neb in Cepheus or the **Little Ghost Nebula** (NGC 6369), Pn in Oph.]	**N.** 	**?**	**?**
N49 or LMC N49, the brightest supernova remnant in the Large Magellanic Cloud, has been assessed to be roughly 5,000 years old**.** **RA 05h 23m 34.5s DEC −69° 45′ 22″**	**N.** 	**?**	**?**
NGC 1566. Seyfert Gx. "Spanish Dancer". Face on, intermediate spiral, dominant member of the Dorado Group.	**Gx.** 	**9.4**	**8.3 × 6′.6**
NGC 1672. Bennett 26. Galaxy.	**Gx.** 	**9.7**	**6.6'×5.5'**
Dorado group: NGC 1549, 1553, 1566 (Brightest member), **1672….**	**Gx.** 	**10.3**	**3.0x1.7'**
NGC 1617. Bennett 25a. Galaxy.	**Gx.** 	**10.4**	**4.3'×2.1'**
NGC 1546. Spiral galaxy.	**Gx.** 	**10.9**	**3.0'×1.7'**
Lep LEPUS LEE-pus Hare	**10-Jan**		
Arneb, α Leporis, Alpha Leporis. A lower luminosity yellow-white supergiant star, class F, is a very old, dying star which is either still expanding or has passed through the supergiant stage and is in the process of contracting and heating up. It is expected to end its life in a supernova explosion.		**2.589**	
Gamma Leporis, γ Leporis, Yellow + orange. **(Gamma Leporis).**	**Ds.** 	**3.6 & 6.2**	
Nihal, β Leporis, Beta Leporis, class G, a yellow bright giant, a double star system, possibly a binary star, composed of two stars separated by 2.58", companion is a suspected variable.	**Ds.** 	**2.84**	
ε Leporis, Epsilon Leporis, an orange giant, class K.		**3.166**	
μ Leporis, Mu Leporis, a blue-white subgiant, classB, a suspected variable star of the **Alpha-2 Canum Venaticorum** type, a period of about two days.		**3.259**	
ζ Leporis, Zeta Leporis, class A, the star is a **rapid spinner**, has a rotational velocity of 245 km/s. White main sequence star, evolving into a subgiant. A massive asteroid belt was confirmed in the star's orbit in 2001. This was the **first extra-solar asteroid belt** discovered.		**3.524**	
17 Leporis, SS Leporis, a **spectroscopic binary**, components belong to the spectral classes A and M, have a period of 260.34 days.		**4.82to5.06**	
δ Leporis, Delta Leporis, an orange subgiant, class K.		**3.81**	
RX Leporis, a **semi-regular pulsating star**, stellar class M, a red giant, can be found next to Iota Leporis, four degrees south of star Rigel.		**5to7.4**	
ADS 4260. Double star. (Aitken Double Star catalogue). Seperated 11". **RA 05h39m.7 DEC-20°26'.0**	**Ds.** 	**6.9&7.9**	
Hind's Crimson star: R Leporus, HIP 23203. Variable. Carbon star. Bright red. Period 445days. **RA 04h 59m 36.3487s Dec−14° 48′ 22.518**		**5.5 to 11.7**	

ASTERISM. The Throne of Jawza. Sometimes, it is also called **the Camels,** stars that form the asterism, quadrilateral in shape, are α, β, γ and δ Leporis.	**Asterism.**		
STREICHER 91, one degree south of NGC 1904, perfect half-moon of faint stars curves its way down to the south from the magnitude 8.4 star HD 35285 at the northeastern tip, contains approximately a dozen colourful stars in various magnitudes. **RA05h22m.4 DEC-25°40'.6**	**Asterism.**	**7**	**13'**
NGC 2017. Multiple colourful stars: yellow, blue and dark orange color…, including doubles. **Not an Oc.**		**6.4**	**4.5'**
ESO 489-SC01, Open Cluster. **RA 06h05m.0 DEC-26°44'.**	**Oc.**	**9.5**	**10'**
M79 ASSA17. Extra-galactic? (From Canis Major dwarf Gx?) (Also extra galactic in origin is M54 in SGT). 41 000ly. Starfish shape.	**Gb.**	**7.7**	**9.6'**
IC 418. Spirograph neb. / Raspberry neb. Intricate pattern. **AP**	**Pn.**	**11**	**14"**
Abell 7, faint planetary nebula located 1800 Ly, spherical shape about 8 Ly in diameter. Within the sphere are complex details that are brought out by narrowband filters. Estimated to be only 20,000 years old, but the central star, a fading white dwarf, is estimated to be some 10 billion years old. **RA 05h 03m 07.53s DEC −15° 36′ 22.7″. AP**	**Pn.**	**12.2, Cs.15.4**	**12′.733**
NGC 1964. Galaxy.	**Gx.**	**10.8**	**5.0'×2.1'**
NGC 1744. Galaxy.	**Gx.**	**11.3**	**8.7'×5.1'**
NGC 1832. Galaxy.	**Gx.**	**11.9**	**2.3'×1.5'**
NGC 1821, irregular galaxy.	**Gx.**	**14.5**	

Men MENSA MEN-sah The Table Mountain	**10-Jan**		
Alpha Mensae, α Mensae. Brightest star. At a magnitude of 5.09, it is the **dimmest lucida** (**a constellation's brightest star**) in the sky. Class G, yellow main sequence dwarf & red dwarf companion at a separation of 3.05".	**Ds.**	**5.09+?**	
γ Mensae, Gamma Mensae is the 2nd brightest star in Mensa. Double star class K, the primary component in the system is an orange giant.	**Ds.**	**5.18**	
β Mensae, Beta Mensae, a yellow giant star, class G.		**5.302**	
θ Mensae, Theta Mensae, a blue-white giant, class B.		**5.45**	
μ Mensae, Mu Mensa, blue giant, class B.		**5.54**	
ζ Mensae, Zeta Mensae, white giant, class A.		**5.61**	
π Mensae, Pi Mensae, a yellow subgiant, class G.		**5.67**	
λ Mensae, Lambda Mensae, an orange giant, class K, only the 24th brightest star in Mensa constellation.		**6.54**	
W Mensae, Yellow-white supergiant, class F, classified as an **R Coronae Borealis type variable star,** located in the LMC, R Coronae Borealis variables are a rare class of stars, often called **"inverse novae"** because they exhibit sudden and dramatic drops in brightness**.**		**13.8to18.3**	
STREICHER 29, faint group of stars displays the **letter G** in an amazingly realistic representation, globular cluster IC 2134 is situated towards the	**Asterism.**	**8**	**14'**

southern end of the group. **RA: 05h17m.5 – DEC: -75°07'.6**			
NGC 1520, open cluster, three stars in the centre of the cluster form a type of triangle with some fainter members towards the north.	**Oc.**	**9**	**5'**
NGC 2122, open cluster.	**Oc.**	**10**	**4'**
NGC 2103, emission neb.	**N.**	**11**	**3'**
NGC 1987, globular star cluster.	**Gb.**	**12**	

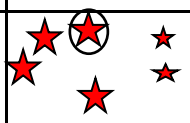
Ori ORION oh-RYE-un The Hunter	**10-Jan**		
α Orionis, Betelgeuse. Alpha Orionis (2nd brightest in Orion, 9th in night sky), **Red supergiant**, spectral type M. Semi-regular variable. Period of +/- 6 yrs, one of the largest stars known, with an apparent diameter between **0.043 and 0.056"**, part of two prominent winter asterisms: the **Winter Triangle** and the **Winter Hexagon**.The other two stars forming the Winter Triangle, also known as the **Great Southern Triangle**, are Sirius and Procyon, same stars are also part of the Winter Hexagon, along with Rigel, Aldebaran, Capella, Pollux and Castor.		**0.0 to 1.2**	
β Orionis, Beta Orionis, Rigel. 7th (6th) brightest in sky. Blue-white supergiant, class B, composed of three stars. Also classified as a **slightly irregular variable**, period 22 – 25 days. Rigel B, a spectroscopic binary star, a pair of B class main sequence star that orbit a common centre of gravity every 9.8 days. Rigel illuminates the **Witch Head Nebula,** a faint reflection nebula located about 2.5 degrees to the northwest of Rigel, **IC2118,** ancient **SN remnant**.		**0.2 (0.03to0.3) & 6.8 13**	
γ Orionis ,Gamma Orionis, Bellatrix, the "**Amazon Star**", latter name from Latin word for "the female warrior." A hot, luminous blue-white giant star, classified as an **eruptive variable**, spectral class B.		**1.59to1.64**	
κ Orionis, Kappa Orionis, Saiph. Blue super-giant, class B.		**2.06**	
ORION'S BELT, asterism, Mintaka, Alnilam and Alnitak (Delta, Epsilon and Zeta Orionis).	**Asterism.**		
ζ Orionis, Zeta Orionis, Alnitak. Brightest class "O" star. Blue supergiant (mag 2.04) & 2 x 4th mag. bluish companions. Alnitak A: a close binary: O class supergiant and a blue dwarf class O.	**Triple.**	**1.72 (2.04+ 4th+4th)**	
ε Orionis, Epsilon Orionis, Alnilam. Blue-white super giant, class B, surrounded by the reflection nebula **NGC 1990**, a molecular cloud illuminated by the light emitted by the star. **[NGC 1990 reflection neb (Faint: REAL or an optical ILLUSION?)]**	**?**	**1.7 & ?**	
δ Orionis, Delta Orionis, Mintaka. Blue-white. **Multiple** star system: Classified as an **eclipsing binary variable**. Primary a double: class B giant and a hot class O star, orbit each other every 5.63 days and **eclipse** each other slightly, causing a 0.2 mag drop in luminosity. The system also contains a magnitude 7 star separated by about 52" from the primary, and a very faint 14th mag in between.		**2.23 (3.2/3.3), 6.85, 14.0.**	
σ Orionis, Sigma Orionis. Multiple star. Primary is a double star, Sigma Orionis **AB**, two dwarfs separated by only 0.25", brighter star is blue, type O and has an apparent mag 4.2, companion class B mag 5.1, orbit each other every 170 years, Sigma Orionis **C** is a dwarf, type A, mag 8.79. Sigma Orionis **D** and **E** are also dwarfs, type B, mag 6.62 and 6.66.		**4.2+5.1+ 8.79+6.62 +6.66**	

Hatsya, ι Orionis, Iota Orionis, a quadruple star, brighest in Orion's sword, its tip. (The "bottom sword star"). The primary component a massive **spectroscopic binary** that has an eccentric 29-day orbit, a blue giant class O and a class B.		**2.77**	
Struve 747. Double star: separation 35.7". Lies 8' SW of **Iota**.	**Ds.** 	**4.8+5.7**	
Meissa, λ Orionis, Lambda Orionis, blue giant, type O, aka **Heka.** **Double star**: companion, a hot blue-white dwarf class B, @ 4.4".	**Ds.** 	**3.39+5.61**	
φ Orionis, Phi Orionis: refers to two star systems: Phi-1 Orionis and Phi-2 Orionis, separated by 0.71°, **Phi-1** Orionis is a double, main component is a main sequence star, type B. **Phi-2** Orionis is a K class giant.	**Ds.** 	**4.39&4.09**	
π Orionis, Pi Orionis: relatively loose group of stars, **Orion's shield**. Pi-1 Orionis and Pi-6 Orionis are separated by almost nine degrees. **Pi-1 Orionis,** a white main sequence dwarf, type A. **Pi-2 Orionis,** main sequence dwarf, class A. **Pi-3 Orionis:** aka **Tabit,** is the brightest of the six, white dwarf class F. **Pi-4 Orionis:** a **spectroscopic binary** star (very close), composed of two hot class 2 stars, a giant and a subgiant. **Pi-5 Orionis:** blue-white double, class B, **ellipsoidal variable**, period 3.007 days, mag varies by 0.07 **Pi-6 Orionis:** bright orange giant, class K, a **variable star** with a mean visual magnitude of 4.45.	**Asterism.** 	**4.6+4.35 + 3.16+3.69 + 3.72 + 4.45**	
η Orionis, Eta Orionis, Saiph, aka Algjebbah, Ensis is an eclipsing binary, two blue stars, type B, classified as a **Beta Lyrae variable**, a type of close binary star with variations in brightness caused by one component occasionally passing in front of the other one.		**3.38**	
τ Orionis, Tau Orionis, class B.		**3.59**	
22 Orionis, separated 242", **RA 5h 21.8m DEC-0° 23'**	**Ds.** 	**4.7+5.7**	
V380 Orionis, a triple star system, spectral type A, lights the reflection nebula **NGC 1999,** the nebula has a huge hole of empty space appearing as a **black patch** in its central region. See below.			
Klingon Battlecruiser. Open Cluster **NGC 1662** forms the running lights of a Klingon Battlecruiser. **RA 04h 49.0' DEC10° 58'**	**Asterism.** 		**12' x 6'**
Lambda-Lambda. Lambda Orionis + Collinder 69 in the shape of the Greek letter Lambda. **RA 05h 36.0' DEC 10° 00'**	**Asterism.** 		**50'x20'**
W Orionis. SAO 112406/ **HIP 23680. Carbon star -** Defocus for colour. **Period 212 days. Ra 05 05 23 Dec +01 10 39**		**5.8to10.0**	
RT Orionis GSC 126:161. **Carbon star**, orange-red. Near Bellatrix. **Ra 05 33 13 Dec +07 09 12**		**8.0to8.9**	
BL Orionis, HIP 30564, SAO 95659. **Carbon star**, **fiery orange-red.** Period 254 days. **Ra 06 25 28 Dec +14 43 19**		**5.9to6.6**	
NGC 2169. "37 Cluster". Composed of components **Collinder 38** and **Collinder 83.**	**Oc.** 	**5.9**	**6'**
NGC 1662. Colours.	**Oc.** 	**6.4**	
NGC 2180. Open Cluster.	**Oc.** 	**9**	**6'**
NGC 2112. Open Cluster.	**Oc.** 	**8.4**	**11'**
NGC 2141. Very old.	**Oc.** 	**9.4**	
M42. ASSA18. Great Orion nebula + Trapezium (4+2) = NGC 1980.	**N. & Oc.** 	**2.9/ 4.0?**	**15'×10'**
The Trapezium, young, tight open star cluster, centre of the Orion Nebula, brightest five stars emits most of the light that illuminates the surrounding	**Oc.** 	**4.0**	**47"**

nebula, **Asterism:** four brightest stars, A, B, C and D. Brightest, most massive:**Theta-1 Orionis C**, a blue main sequence star, class O, mag 5.13, also **highest surface temp** of any **naked eye** star: 45,500 K.			
M43. De Mairan's Neb. NGC 1982, a star-forming **emission-reflection** neb.	**N.**	**9**	
M78. NGC 2068, Small, elongated: "comet" + **NGC 2071** (NE of M78), a reflection nebula, surrounds two 10th magnitude stars..	**N.**	**8.3**	**8'×6'**
Horsehead nebula. B33, **Barnard 33**. **Dark** neb in front of **emission** neb. **IC434.**	**DkN**	**7.3 & DkN**	**55'×10' & 4'**
NGC 2024 "Flame Nebula", an **emission nebula**, illuminated by the light of the hot blue supergiant **Alnitak** which emits ultraviolet light into the nebula, knocking electrons away from the hydrogen gas clouds inside the nebula, and the glow of the nebula is the result of the electrons and ionized hydrogen recombining.	**N.**	**7.2**	**30'**
NGC 2023 is a reflection neb, one of the brightest sources of fluorescent molecular hydrogen. It is lit by the B star **HD 37903**, the most luminous star lighting the surface of the molecular cloud Lynds 1630 (Horsehead Nebula, or Barnard 33), and one of the largest reflection nebulae in the sky. It is four light years wide.	**N.**		10′x10′
NGC 1977 ASSA19. "Running Man Neb".	**N.**	**4.6**	
NGC1999. Aka "The 13th Pearl Neb, Rubber Stamp Neb, Empty Hole Neb." Blue reflection nebula with dark obscuration near centre, and star **V380 Orionis**. (See above)	**N.**	**5**	2'×2'
NGC 2175 + NGC 2174. Oc. imbedded in Neb. See below.	**Oc.+ N.**	**6.8**	
Monkey Head Nebula, NGC 2174 is an emission nebula classified as an H II region, associated with the **open cluster NGC 2175**, known as the **Monkey Head Nebula** because of its unusual shape in widefield images.	**N.**		
Barnard's Loop. (Wide field AP @50mm).			
NGC 2022. Brightest Pn in Orion. Ring.	**Pn.**	**12**	**28″**
Abell 12. Pn neb.VERY close to (in the glare of) **4th mag mu Orioni. Ra 06 02 20.0 Dec+09 39 15**	**Pn.**	**13.9 (12.0?) Cs.19.7**	**0.6'**
Abell 13, very **faint**, reddish colour**. RA06h 04m 47.9s DEC+03° 56′ 36**	**Pn.**	**19.87**	**2' 32".**
NGC 1762. Spiral galaxy.	**Gx.**	**12.6**	**1.6'×1.0'**

Pic PICTOR PIK-tor The Painter's Easel	10-Jan		
α Pictoris, Alpha Pictoris. White main-sequence star class A, is a Lambda Boötis type star: a peculiar star with a very low abundance of iron peak elements in its surface layers. It is a fast spinner, with a projected rotational velocity of 206 km/s, and it is classified as a **rapidly rotating shell star**, one that may have ejected mass from its outer atmosphere. Also notable for being the **south pole star on Mercury**.		**3.27**	
β Pictoris, Beta Pictoris. White main sequence star of spectral type A, is classified as a **Delta Scuti variable**, which means that it exhibits variations in brightness as a result of both radial and non-radial pulsations of its surface.		**3.86**	
γ Pictoris, Gamma Pictoris. Orange giant, of spectral type K.		**4.5**	
δ Pictoris, Delta Pictoris, class B, is classified as a **Beta Lyrae variable**: a close binary - variations in luminosity because the two components periodically block each other's light as they orbit, a period of 40.08 hours.		**4.59to4.8**	
Kapteyn's Star, is a red sub-dwarf (**ruddy colour**), spectral class M, only 12.76 light years from Earth. Second highest proper motion, **> 8"** per year. (Highest is **Barnard's Star** in Ophiuchus.) Classified as a **BY Draconis type variable,** a star whose brightness varies as a result of magnetic activity in its chromosphere coupled with rotation. Orbits the Milky Way **retrograde** and is the nearest halo star to the Sun. **RA: 5h11m.7 – DEC: –45°01'.1**		**8.853**	
AB Pictoris, HIP 30034, orange main sequence star, class K, a **BY Draconis variable,** a main sequence variable star that exhibits variations in brightness as a result of rotation coupled with star spots and other chromospheric activity.		**9.16**	
ALESSI 0530.8-4938, ASTERISM. Three magnitude 9 stars in a line from north to south. A few stars towards the northern field of view complete a half-moon appearance. **RA 05h30m.8 – DEC: -49°38'.8**	**Asterism.**	**9**	**5.2**
ESO 252-SC14, Open cluster: Mag 11 stars in a very realistic arrow shape pointing west, evenly spaced. The brightest star in this group is the magnitude 10.3 (TYC 8085 778) with an orange coloured hue**.** **RA: 05h16m.0 – DEC: -45°14'.0**	**Oc.**	**11**	**3'**
NGC 1705. A peculiar lenticular galaxy and a **Blue Compact Dwarf**, 30' towards the east of the double star Iota Pictoris, two mag 11 field stars.	**Gx.**	**12.8**	**1.9x1.4'**

Tau TAURUS TORR-us The Bull	01-Jan		
Aldebaran, Alpha Tauri. Class K orange giant, foreground vs. Hyades. Irregular **variable**.		**0.75 to 0.95**	
Beta Tauri:**Alnath, Elnath**. Formerly γAurigae. Blue-white giant, class B.		**1.7**	
Zeta: ζ. Blue giant, slightly **variable, erratically**.		**2.9 to 3.2**	
Lambda (λ) Tauri, Pectus Tauri. Algol eclipsing binary: class B star being orbited by class A every 3.95 days.		**3.37to 3.91**	
Ain, Oculus Borealis, ε Tauri, Epsilon Tauri, an orange giant, class K, an 11th magnitude **companion** @ 182", a member of the Hyades cluster.	**Ds.**	**3.53**	
Hyadum I, γ Tauri, Gamma Tauri, member of the Hyades cluster, giant star, class G.		**3.654**	
T Tauri, (1.8° west of Epsilon (ε). **Prototype** of a class of variables: **T Tauri stars.** Erratic changes in luminosity, over a period of weeks or months.		**99 - 13**	

Associated reflection neb **NGC1555**: see below. Spectrum G-K.			
Ushakaron. ξ Tauri, Xi Tauri is a **triple star**, three blue-white main sequence dwarfs, type B, a spectroscopic and eclipsing star system. Two of the three stars are in a close orbit, revolve around each other once every 7.15 days. The pair orbits the third star in the system every 145 days.		**3.70to3.79**	
δ Tauri, Delta Tauri consists of **three star systems**, in Hyades cluster: **Delta-1 Tauri, Eudora or Hyadum II,** primary component is an orange giant class K, companion @ 107", orbits the primary star with a period of 530 days. **Delta-2 Tauri,** main sequence dwarf, class A. **Delta-3 Tauri, Kleeia**, 0.72° from **Delta-1 Tauri,** primary a white subgiant star type A, an **Alpha-2 Canum Venaticorum** type variable, period 57.25 days. **Two companions**.		**3.77+12th & 4.80 & 4.29to4.32 +8&11th**	
Theta 1 and 2: θ. Part of Hyades. Orange and white. Both spectroscopic binaries.	**Ds.** 	**3.84 & 3.40**	
Kappa 1 and 2: (κ). Whites, class A, part of Hyades. Brightest components a visual binary: two class A stars - subgiant and a dwarf, @ 5.8', & another binary: two 9th magnitude stars, between the two bright stars: separated 5.3", and 183" from brightest component. (& the system has two more 12th mag companions).		**4.21 & 5.27**	
Sigma 1 and 2: σ. Whites, part of Hyades. 7.3'.	**Ds.** 	**5.08 & 4.67**	
υ Tauri, Upsilon Tauri, triple star in the Hyades cluster. Primary is a main sequence dwarf, type A, its a **Delta Scuti type** variable, period of 3.56 hours, is a spectroscopic binary, components separated by 0.02".The third component @110".		**4.28to4.31 + 12th**	
119 Tauri, one of the largest stars known, diameter 600 x Sun's, also **one of the reddest** stars known: a red supergiant class M. A **semiregular variable**, a period of 165 days.		**4.23to4.54**	
ρ Tauri, Rho Tauri, a white main sequence star class A, in Hyades cluster. **Delta Scuti type variable**, brightness vary by 0.01 mag every 1.61 hours.		**4.65**	
ο Tauri, Omicron Tauri, a giant, class G, a binary, orbital period of 1,655 days.	**Ds.** 	**3.61**	
Ally's Braid. Chain of 7 sparkling stars SE of **Alcyone** (hence **Ally**). Often seen, rarely noticed! **RA 03h 47.0' DEC 23° 48'**	**Asterism.** 		**42'**
Davis' Dog. Between Hyades and Pleiades. Binoculars. 16 Stars. Includes 5th mag. stars 50, 51, 53, 65, 67, 69, 72 Tauri. **RA 04h 22.5' DEC21° 25'**	**Asterism.** 		**3.5° x 1.5°**
Spermatozoon. 35 Arc minutes East of the Zeta Tau: row of stars of about the same magnitude. The brightest star is at the tip of a triangular area. **RA: 05h 43m DEC: 21d 30m**	**Asterism.** 		**30'**
Stars in Pleiades: below:			
Alcyone, η Tauri, Eta Tauri, an eclipsing binary, stars separated by 0.031", main star **Alcyone A**, is a blue-white giant class B, the binary has **three companions**: **Alcyone B, Alcyone C,** and **Alcyone D. Alcyone B** and **Alcyone C** are white dwarfs type A, and **Alcyone D** is a yellow-white dwarf, class F. **Alcyone C** is a **Delta Scuti variable,** period of 1.13 hours.		**2.873 + 6.28 + 8.25to8.30 + 9.15**	
Atlas, 27 Tauri, a **triple star**: **Atlas A**, a blue-white giant class B, spectroscopic binary, orbital period 1250 days. Dim companion **Atlas B** @ 0.4".		**3.62 (4.1+5.6) & 6.8**	
Electra, 17 Tauri, a blue-white giant class B, **rapid rotator**, projected rotational velocity of 181 km/s: flattened at the poles and stretched at the equator, emits an excess level of radiation in infrared, likely as a result of having a **gaseous disk** which in turn is a result of the **mass loss** that comes with rapid rotation.		**3.705**	

Maia, 20 Tauri, a blue giant class B in the **Maia Nebula** (**NGC 1432**), Pleiades.		**3.871**	
Merope, 23 Tauri, a blue-white subgiant, class B, classified as a **Beta Cephei type variable** star, variations of 0.01 mag. In the **Merope Nebula**. [The **Pleiades** cluster is currently passing through the nebula, which appears brightest around Merope, which is how the nebula got its name.]		**4.113**	
Taygeta, 19 Tauri, triple star: primary a spectroscopic binary: **Taygeta A**, a blue-white subgiant class B, components separated by 0.012", orbit around each other every 1,313 days. **Taygeta B** @69		**4.30 (4.4+6.1) & 8th**	
Pleione, 28 Tauri, BU Tauri, binary, hot class B star, an extremely fast rotator: **close to its breakup velocity**. A **Gamma Cassiopeiae type variable**. It has the variable star designation **BU Tauri**.		**5.048 (4.8to5.5)**	
Celaeno, Celeno, 16 Tauri, a blue-white subgiant class BV. Aka **'Lost Pleiad': most difficult one of the seven Pleiades sisters to find.**		**5.448**	
Asterope, 21 and 22 Tauri: separated by 0.04°, **21** Tauri is a main sequence dwarf class B. **22 Tauri** main sequence dwarf, classA.		**5.76+6.43**	
M45, Pleiades. Seven sisters, +/- 100 stars, 380ly. **(Binos)**	**Oc.** 	**1.6**	**110'**
M45 + Nebulae: Merope neb, Temple's neb, NGC 1435 & Maia Neb – brightest part of nebula **NGC 1432**.	**Oc & N.** 	**1.6, 3.9, 4.2**	
Hyades. Collinder 50, Caldwell 41, Closest Oc. The four brightest stars in the cluster – **Gamma, Delta, Epsilon and Theta Tauri** – are red giants and they all lie within a few light years of each other. They form an **asterism** that represents the **bull's head**. **(Binos)**	**Oc.** 	**0.5**	
NGC 1647. The Pirate Moon Cluster. Big, sparse, open cluster located between the bull's horns, 3 ½° NE of Aldebaran. Stars 9th mag or less. **(Binos)**	**Oc.** 	**6.4**	**45'**
NGC 1807. (Forming single extended cluster with NGC 1817?)	**Oc.** 	**7.0**	**17'**
NGC 1817.	**Oc.** 	**7.7**	**16'**
NGC 1746: Asterism: **not Oc**: **BUT**, overlapping with it are two OCs: **NGC1750** & **NGC1757**.	**Ast & Ocs.** 	**6.1**	
M1, Crab neb. NGC1952. SN1054 AD. Pulsar: 30x/sec.	**N.** 	**8.4**	**6x4'**
IC 349. Reflection Nebula.	**N.** 	**6**	**30"**
NGC 1555 & 1554: same object. Hind's variable neb. & Struve's Lost nebula. Reflection neb around **T Taurii.**	**N.** 	**9.3 to 14**	**30"**
Simeis 147, the Spaghetti Nebula, SNR G180.0-01.7 or Sharpless 2-240: supernova remnant (SNR) between Auriga and Taurus. Difficult to observe due to its extremely low **brightness**. The nebulous area is fairly large with an almost spherical shell and filamentary structure. **RA 05h 39m 06s Dec +27° 59′ 55″.**	**N.** 	**?**	**3°**
Merope Nebula, Tempel's Nebula, NGC 1435. Diffuse reflection nebula. Merope Nebula envelops **IC 349** (**Barnard's Merope Nebula**).	**N.** 	**13**	
NGC 1514. Crystal Ball neb. Disc with Cs.	**Pn.** 	**9.4**	**1.9'**
NGC 1410 and **NGC 1409,** dim, a set of colliding galaxies, connected by a pipeline of gas spanning over 20,000 light years that is being funnelled from one galaxy to the other.	**Gx.** 	**15.4**	
NGC 1517. Galaxy.	**Gx.** 	**13**	**1.1'×1.0'**
IC 374. Galaxy.	**Gx.** 	**12.7**	**0.8'×0.4'**

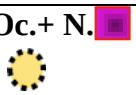
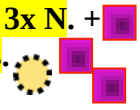
Constellation: Object/ Info.	@MERIDIAN/ Target Type.	App. Mag.	SIZE
FEB			
CMa CANIS MAJOR **KAH-nis MAY-jer The Greater Dog**	**01-Feb**		
α Canis Majoris, Alpha Canis Majoris, Sirius. The Dog star + Pup: Both class A: white main sequence star + white dwarf. Part of **2 asterisms**: see below. **Brightest star in the sky** and the fifth nearest star system to the Sun. Distance between the two stars varies between 8.1 and 31.5 AU.	**Ds.**	**-1.4 (+8.4)**	
Adhara (Epsilon). Class B blue giant. **Difficult binary:** 250 x brighter than companion. 2nd brightest in CMa, 24th in sky.	**Ds.**	**1.5 + 7.4**	
Mirzam. Murzim, (Beta). Class B blue giant. Near far end of Local Bubble: 150 parsecs. Beta Cephei **variable.**		**1.95 to 2**	
Wezen. (Delta). Class F yellow-white super giant: 215 x Sol radius.		**1.83**	
Furud, **Phurad**. (Zeta). Blue-white. Class B. Spectroscopic binary.		**3.02**	
Aludra. (Eta). Blue supergiant. Alpha Cygni type **variable**.		**2.38 to 2.48**	
Muliphein. (Gamma), γ Canis Majoris. Blue-white B-type giant.		**4.11**	
Menkelb Prior, Omicron-1. Class K. Super-giant, irregular **variable**, Surrounded by **Oc. Collinder 121. Cr121: RA 06 54 12 Dec -24 25 00**		**3.78to3.99 Oc 2.6**	**50'**
Menkelb Post. Omicron-2. Class B. An **Alpha Cygni variable**, **periodic non-radial pulsations,** 24.44-day interval.		**2.93to3.08**	
VY Canis majoris. Red hyper (super?)-giant. One of largest known stars… Jupiter orbit range…?		**6.5 to 9.6**	
145 CMa. HD 56577. HIP 35210, h3945. "Winter Albireo". (Our **SUMMER**). Colourful Ds. **K** and **F** stars, 26.8" apart**. "Bright citrus-orange + royal blue". RA 07h 16. 6" DEC -23°19' Danie Barnardo's favourite**	**Ds.**	**5.0 & 5.9**	
Nu[1], ν[1] CMa. "bright yellow-white + wide bluish companion & brilliant yellow (nu2) in same FOV", sep 17.8", **RA06h 36.4m DEC -18[0] 40'.**	**Ds.**	**5.8+7.4**	
H II 60, "bright banan-yellow + little blue-green companion", sep 9.2", **RA 06h 36.7m DEC -22[0] 37'.**	**Ds.**	**6.4+9.3**	
HV 108, "bright pale-yellow + wide bluish companion, several faint pairs in FOV", sep 42.7", **RA 06h 50.4m DEC -31[0] 42'.**	**Ds.**	**5.8+7.7**	
π CMa (pi), HIP 33302, "brilliant Sun-yellow star + tiny ash-white companion", sep 11.7", forms triangle with 15 & 17 CMa, **RA 06h 55.6m DEC -20[0] 08'.**	**Ds.**	**4.6+9.6**	
Mu Canis Majoris, μ CMa, HIP 33345, "bright grapefruit-orange star with close companion, sep 3.2", **RA06H 56.1M DEC -14[0] 03'.**	**Ds.**	**5.3+7.1**	
W Canis Majoris. HIP34413, SAO 152427. Carbon Star: Orange-red. Irregular variable. **Ra 07 08 03 Dec -11 55 23**		**6.4to7.9**	
Nagler 1. Shape of a **chevron**. Just above the galaxy **NGC 2217**, a "bit right of the back paw". Stars mag 7 to 10, yellow-orange and red-orange; beautiful binocular object.	**Asterism.**		

Winter Hexagon: Rigel in Orion, Aldebaran in Taurus, Capella in Auriga, Pollux/Castor in Gemini, and Procyon in Canis Minor, **Sirius**: forms the Winter Hexagon (or Winter Circle) (Our summer).	**Asterism.**		
Great Southern Triangle: Sirius, Procyon in Canis Minor and Betelgeuse in Orion constellation.	**Asterism.**		
STREICHER 80, Asterism, of a handful of mixed magnitude stars with a surprising **full oval impression**, brightest is mag 9.1 (HD 58055). **RA 07h23m.3 DEC-12°37'.5**	**Asterism.**	**9**	**8.5'**
Collinder 132, Cr 132, open cluster, just south Aludra and Adhara It's a group of perhaps a dozen stars spread out over a full degree of sky. **Ra 07:14:24 Dec -31:10:00**	**Oc.**		
Cr 140, open cluster. **RA 07h 24m 53s DEC−31° 52′ 23″**	**Oc.**	**3.5**	**60'**
M41. NGC 2287. ASSA21. Spiral chains. 80 stars. Brightest a K-type giant near the centre. (The **"Overlooked Open Cluster"**).	**Oc.**	**4.6**	**38'**
NGC 2327 (the head), **2343** (Oc in body)/ **2335** (Oc in N-wing). **Eagle or Seagull neb. IC 2177. Refers to the WINGS of the Seagull.**		**?**	
NGC 2362 ASSA22. Compact cluster, surrounds mag. 4.4 O-type blue supergiant **Tau CaM: 'Mexican Jumping Star'. The star is an O-type blue supergiant classified as a Beta Lyrae type variable. Its brightness varies between magnitude 4.32 and 4.37 with a period of 1.28 days**		**4.1**	
NGC 2354. Open Cluster	**Oc.**	**6.5**	
NGC 2360. Caroline's cluster. 3.5 deg. east of Gamma Canis Majoris.	**Oc.**	**7.2**	**13'**
NGC 2362. Open Cluster**.**	**Oc.**	**4.1**	**8'**
NGC 2204. Open Cluster.	**Oc.**	**8.6**	**12'**
NGC 2384. Open Cluster	**Oc.**	**7.4**	
TOMBAUGH 1. Open Cluster. **RA 07h00m.4 DEC -20°34'.2**	**Oc.**	**6.3**	**6'**
TOMBAUGH 2. Open Cluster. **RA 07h03m.6 DEC -20°49'.1**	**Oc.**	**12.5**	**3'**
RUPRECHT 1. Open Cluster. **RA 06h36m.4 DEC-14°09'.0**	**Oc.**	**11**	**6'**
NGC 2359. Thor's Helmet. Wolf-Rayet neb. **(**Expulsion of gas and **dust from a massive blue giant star (HD56925) at high velocities).** **WR** stars = heterogeneous set of stars with unusual spectra: prominent broad emission lines of highly ionised helium and nitrogen or carbon. Spectra indicate very high surface temp of 30,000 K to around 200,000 K, surface enhancement of heavy elements, and strong stellar winds. (Ex. **Gamma Velorum** and **Theta Muscae**)	**N.**	**9**	**9x6'**
Sharpless 2-301, emission nebula, 60 ESE of Sirius, within a diamond of six 6th to 8th mag stars. **RA 07h 09.8m DEC -18^0 29.8'.**	**N.**		**9x8'**
IC 2165. Planetary nebula.	**Pn.**	**10.6**	**4"**
NGC 2207 + IC2163. Colliding spirals, face-on. 80 (125?) mill Ly.	**Gx.**	**12.2+11.6**	**4.8x2.3' + 3x1.2'**
NGC 2217. Barred spiral, nearly face-on.	**Gx.**	**10.4**	
NGC 2325. Galaxy.	**Gx.**	**11.2**	
NGC 2223. Galaxy.	**Gx.**	**11.4**	

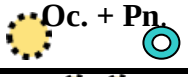
CMi CANIS MINOR **KAH-niss MY-ner The Lesser Dog**	**10-Feb**		
Alpha, Procyon. 8th brightest. 11.4 ly. "before the dog" or "preceding the dog" in Greek, as it rises an hour before the "Dog Star", a binary star system: yellow-white main sequence star, class F + **Procyon B**, faint white dwarf, in 41 yr orbit.		**0.34+10.7**	
β Canis Minoris, Beta Canis Minoris, Gomeisa. Blue-white, a hot, B type main sequence star, classified as a **Gamma Cassiopeiae variable**. Rotates rapidly and exhibits irregular variations in luminosity because of the outflow of matter. These stars are also known as **shell stars**: surrounded by a disk of ejected material, which is heated up by the stars' emissions.		**2.84to2.929**	
γ Canis Minoris, Gamma CMi, a double, a **spectroscopic binary**, main star in the system is an orange K-type giant and the unresolved companion has an orbital period of 389 days.		**4.33**	
Luyten's Star (GJ 273), a red dwarf, the 22nd nearest star system to our own. The closest approach was about 13,000 years ago, when the star was within 3.67 parsecs. It is now in the process of moving away from the solar system..		**9.87**	
NGC 2459. Faint: A group of five 13th and 14th -mag stars, close together, not related**?. Not Oc**	**Oc.** 	**?**	**1.5'**
NGC 2394. Faint, = a collection of fifteen unrelated stars of 9th -magnitude and fainter. **?. Not Oc.**	**Oc.** 	**?**	**6'**
Abell 24. Planetary neb. **RA 07:51:37.6 Dec +03:00:21**	**Pn.** 	**13.5**	**265x 180"**
NGC 2508. Elliptical Gx.	**Gx.** 	**12.7**	**1.4'x1.1'**
NGC 2402. Interacting pair. Elliptical & spiral. 245 mill Ly.	**Gx.** 	**15.5**	**1.23′ × 0.724′**
NGC 2485. Spiral, located 3.5 degrees northeast of **Procyon**.	**Gx.** 	**12.4**	**1.6 x 1.6'**
Gem GEMINI JEM-eh-nye The Twins	**01-Feb**		
Castor. Alpha Geminorum. Sextuple star system. Contain eclipsing and spectroscopic binaries: 2x blue-whites & wide red dwarf.		**1.6 (1.9+3.0) & 9.3**	
Pollux. **Beta Geminorum**. (Brightest). Orange giant.		**1.2**	
γ Gem, Alhena: a blue-white hued star.		**1.9**	
38 Geminorum. "**Exquisite pair**", pale yellow and lavender grey @ 7.3" apart. **Ra 06:54:36 Dec +13:11:00**	**Ds.** 	**4.8 & 7.8**	
Tejat Posterior, μ Geminorum, Mu Geminorum, aka Calx. Spectral class M, a red giant, classified as a **slow irregular variable**, variations in luminosity over 2,000 days.		**2.857 (2.73to3.02)**	
Tejat Prior, η Geminorum, Eta Geminorum. Multiple star: three components - a spectroscopic binary + class **G** dwarf star, orbit of 700 years. Primary component of the binary a **semiregular variable star**, period 234 days, a red giant class **M**, secondary is type **B**, orbits with period of 8.2 years.		**3.15to3.9 +?+?**	
ε Gem, Mebsuta. Optical double, the primary is a yellow supergiant +	**Ds.** 	**3.1 + 9.2**	

companion,			
Wasat, δ Geminorum, Delta Geminorum, class **F**, a yellow-white subgiant. In 1930, American astronomer Clyde Tombaugh **discovered Pluto only 0.5° to the east of the star**. Delta Geminorum is really a **triple star system**: inner stars form a **spectroscopic binary**, orbiting each other with a period of 6.1 years, class **K** companion that orbits with a period of 1,200 years.		**3.53+8.2**	
ζ Gem, Zeta Geminorum, Mekbuda. Double star, primary is a **Cepheid variable** star, intermediate luminosity supergiant and a variable star classified as a **Classical Cepheid**, or Population I Cepheid, yellow supergiants spectral class F-K, exhibit variations in brightness as a result of pulsation periods lasting from a few days to months. Period of 10.148 days.	**Ds.** 	**3.6 to 4.16 + 7.6**	
Alzirr, ξ Geminorum, Xi Geminorum, yellow-white subgiant, class F, is suspected to be a spectroscopic binary**.**		**3.35**	
η Gem, Propus. Binary star with a variable component: period of 500 years, only divisible in large amateur telescopes. Primary is a semi-regular red giant - period of 233 days + secondary.	**Ds.** 	**3.1 to 3.9 + 6**	
TU Geminorum, SAO 78066, carbon star, period 230 days.		**7.4to8.4**	
Kratz's cascade, small **asterism**, unrelated stars, 11' NW of planetary **PK 189+7.1, aka Minkowski 1-7,** same FOV. **Pn: RA 06h 37.3m DEC +24^0 00.6'.**	**Asterism+ Pn.** 	**Pn:13.4**	**Pn: 32x15"**
M35. NGC 2168. Open cluster. Many chain-like formations. Elongated. Size of full moon. Close to **NGC 2158. (Binos)**	**Oc.** 	**5.3**	**28'**
NGC 2129. Open cluster. Group dominated by two close B-Type stars.	**Oc.** 	**6.7**	**2.5'**
NGC 2420. Open cluster. (3000ly ABOVE Galactic disc).	**Oc.** 	**8.3**	
IC 2157. Open cluster.	**Oc.** 	**8.4**	
NGC 2355. Open cluster.	**Oc.** 	**9.7**	**5'**
NGC 2158. Open cluster. Very rich. **Close to M35. (Binos)**	**Oc.** 	**8.6**	**5'**
NGC 2331. Open cluster.	**Oc.** 	**9**	
NGC 2266. Open cluster.	**Oc.** 	**9.5**	
NGC 2395: open cluster + close PLANETARY: **Abell 21, Sharpless 2-274, Medusa Neb., low Sb**, on CMi border. [**Ditto** M46 in Pup & NGC 2818 in Pyx]. The nebula is quite old and quite large, more than four light years across.	**Oc .+ Pn.** 	**8; Pn:10.3 (?7.68) Cs.15.9**	**Pn:10.3'**
Jellyfish Nebula, IC 443 (Sharpless 248), a galactic supernova remnant, approximately 5,000 light years from Earth, near **Eta Geminorum**. Large.	**N.** 	**12**	**50'**
NGC 2392. Eskimo; Clown Face neb. Double ring. Cs	**Pn.** 	**10 (10.5*)**	**48x48"**
NGC 2371-72. Dual lobed: visually "2 objects". SW of Castor.	**Pn.** 	**13**	
Jonckheere 900, small planetary, near the feet of Gem. **RA 06h 26m DEC +17^0 47.4'.**	**Pn.** 	**12.4**	9.0"

Lyn LYNX LINKS The Lynx	**20-Feb**		
α Lyncis, Alpha Lyncis, an orange giant of spectral type K.		**3.13**	
38 Lyncis, HIP 45688, second brightest, a binary star composed of a close pair separated by only 2.6", brighter component is a class A + companion: class A.	**Ds.** 	**3.82+6th**	
12 Lyncis, type A, is really **a triple star** system: 2nd @ 1.7", period 166 yr & 3rd @ 8.7". **RA 06h 46m 14.13s DEC +59° 26′ 30.02″**		**5.0+6.0+7.2**	
19 Lyncis, triple star, two blue-whites @15" & third star @3.5'. **RA 07h 22m 52.062s DEC +55° 16′ 53.04″**		**5.80+6.90 & 7.6**	
Alsciaukat, only named star, aka **31 Lyncis, aka Mabsuthat,** an orange giant, class K. **Variable star,** aka **BN Lyncis**, brightness varies slightly: 0.05 mag. Will eventually turn into a long-period variable similar to **Mira** (Omicron Ceti) in the Cetus constellation.		**4.25**	
Y Lyncis. Red supergiant, **semiregular variable**.		**6.2to8.9**	
NGC 2419. Intergalactic Tramp"/ Wanderer" – 280 000ly: Incorrect, but the **truly inter-galactics are: M54 in Sgt, and M79 in Lep. Shapley class II cluster:** highly concentrated at the centre. It is 300,000 light years distant from the galactic centre and about 275,000 light years from the solar system.	**Gb.** 	**10.4**	
Abell 16, planetary neb**. Faint. Ra 06:43:55.5 Dec +61:47:25**	**Pn.** 	**15.4**	**143x 133"**
NGC 2683. "UFO" Gx. (Resembles classic Sci-Fi spaceship). Nearly edge-on spiral (Barred?)	**Gx.** 	**9.7**	**9.3x2.2'**
NGC 2537, Bear's Paw Galaxy, Arp 6, and Mrk 86. A blue compact dwarf galaxy, located around 3 degrees NNW of 31 Lyncis.	**Gx.** 	**12.3**	**1.7x1.5'**
NGC 2541. Unbarred spiral galaxy, 41 million light years, belongs to the **NGC 2841 group**, a group of galaxies located in Lynx and Ursa Major.	**Gx.** 	**12.3**	
Mon MONOCEROS moh-NO-ser-us The Unicorn	**01-Feb**		
α Monocerotis, Alpha Monocerotis, an orange giant, class K**.**		**3.94**	
Beta Mon. β Monocerotis. Triple (4) star system. **"Finest". ** All three components – Beta Monocerotis A, B and C – are B stars, also a fourth companion, a line-of-sight companion.		**3.74: 4.6/ 5.0/5.4 12th**	
γ Monocerotis, Gamma Monocerotis, orange giant, class K. It is the primary star in a multiple star system.		**3.98**	
δ Monocerotis, Delta Monocerotis, a white main sequence star, class A.		**4.15**	
ζ Monocerotis, Zeta Monocerotis, a massive, luminous, yellow supergiant, class G.		**4.37**	
ε Monocerotis, Epsilon Monocerotis, a double star, primary is a white, class A subgiant, companion is a yellow-white main sequence dwarf type F, separated by 12.1". The brighter star has a dim, line-of-sight companion.		**4.31 (4.44+6.72) & ?**	
13 Monocerotis, a white supergiant, class A. Originated from the cluster **NGC 2264**, which lies 3.5 degrees to the NE. Appears to be surrounded by a faint reflection nebula as a result of its light being scattered off interstellar dust in an area spanning over 10 light years.		**4.47**	

S Monocerotis, 15 Monocerotis, a massive **variable spectroscopic binary**, two stars that cannot be resolved, orbit period of 25 yrs.Class O. **S Monocerotis** is positioned in the **Christmas Tree Cluster** in **NGC 2264,** and is surrounded by the **nebula Sharpless 273**. It falls just to the north of the **Cone Nebula**.		**4.2to4.6**	
Plaskett's Star (HR 2422), a **spectroscopic binary**, consists of two massive, blue O-type supergiant stars, both class O. One of the **most massive binary systems** known, along with Eta Carinae in Carina.		**6.06**	
R Monocerotis, a T Tauri type variable, lies in **Hubble's Variable** Nebula, a diffuse reflection nebula formed of the gas and dust fanning from the star, has a smaller, dim companion**.**		**10to12**	
V838 Monocerotis, a red supergiant, a famous **variable star** in Monoceros. Class M. Was discovered when it experienced an outburst and suddenly brightened for a few weeks in 2002, is now 15,000 times more luminous than the Sun and has a radius 380 times solar. **Surrounding dust shells: light echo. Hubble. RA07h 04m 04.85s DEC−03° 50′ 50.1**		**6.7 to15.74**	
RV Monocerotis. HIP 32627. SAO 114704. Carbon star. **Strong orange** colour. Period 132 days. **Ra 06 58 21 Dec +06 10 01**		**7.0to8.9**	
Pakan's 3. Or is it a **McDonalds' "M"?** 18 Stars. Line between the stars γ and θ in CMa: Extend the nose of CMa 1/4e of the line you just draw. **RA 06h 52.5' DEC-10° 10'**	**Asterism.** 		**25'**
Arrowhead/ Unicorn's Horn. Six blue/white stars. Obvious shape of a triangle, the horn of the unicorn. All of the stars have the same colour and mag. **RA: 06h 40m DEC: -09d 00m 15'**	**Asterism.** 		
M50. Heart-shaped, rich. **Binos: M50 + NGC2353 + NGC2343.**	**Oc.** 	**5.9**	
NGC 2232, Open cluster. Centred on star **10 Mon.** Bright, scattered.	**Oc & St..** 	**3.9**	
NGC 2349. Open cluster.	**Oc.** 		
NGC 2506. Open cluster.	**Oc.** 	**7.6**	
NGC 2254, Open cluster, fewer than 50 stars, but appears to be fairly rich.	**Oc.** 	**9.7**	
NGC 2244 (Oc) **/2237** (Neb): **Rosetta.** Contains the **"Jaguar**". Rosette Nebula: SEVERAL NGC DESIGNATIONS: (NGC 2237, NGC 2238, NGC 2239, NGC 2244, NGC 2246; Caldwell 49) The Rosette Nebula: a large emission nebula. It is about 65 light years in radius**. NGC 2237** is also used to denote the **entire nebula**.	**Oc.+ N.** 	**4.8; N:9**	
NGC 2264 = Oc + Neb: Christmas tree Cluster and Cone nebula - two other objects fall within this designation, but are not officially included: the **Snowflake Cluster** and the **Fox Fur Nebula.** **S Monocerotis** marks the trunk of the Christmas tree, and another variable star, **V429 Monocerotis,** represents its top. **The Snowflake Cluster**: resembles the pattern of a snowflake. **The Fox Fur Nebula** is a diffuse dark nebula in NGC 2264.	**Oc + 3x N. + Stars.** 	**Oc:3.9**	
Hubble's Variable Nebula, NGC 2261, Caldwell 46, variable nebula illuminated by **R Monocerotis**.	**N.** 	**9.0**	
NGC 2261. Hubble's variable neb. Illuminated by **R Mon**. Small, fan-shaped, "comet"…	**N.** 	**9**	
NGC2170 (streamers of obscuring dust), a reflection nebula.	**N.** 	**?**	
Dreyer's Nebula, IC 447, a large reflection nebula**.**	**N.**		**25'**
Seagull Nebula, IC 2177, (GUM 1), emission nebula, **Sharpless 2-296** (officially Sh 2-296), form part of the "wings" of the celestial bird. It is an H2 region centred on the star **HD 53367**.	**N.** 		
NGC 2346. Butterfly Neb? (vs "Bug" in Sco.). Hourglass rather? - Vs. Musca's "Etched or Engraved Hour glass" (MyCn 18). The central star is	**Pn.** 	**11.6**	**0.9'**

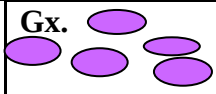
a **spectroscopic binary** with a period of about 16 days. It is a variable star, probably as a result of having dust in orbit around it.			
Hubble: Red Rectangle neb (vs Red Square neb in **Serpens). Red Rectangle Nebula (HD 44179),** a protoplanetary nebula. It is a compact bipolar nebula and it envelops the binary star completely, obscuring its light.When the cool star at the centre evolves into a hot white dwarf in the next few thousand years, HD 44179 will become a planetary nebula. **RA 06h 19m 58.2160s Dec −10° 38′ 14.691″**	**Pn.** 	**9.02**	

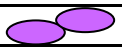
Pup PUPPIS PUP-iss The Stern	**20-Feb**		
π Puppis, Pi Puppis, a double: an orange supergiant class K classified as a **semi-regular variable** + companion. Pi Puppis is the brightest member of the **open cluster Collinder 135.**		**2.7to2.85 & 6.86**	
ρ Puppis, Rho Puppis, yellow-white bright giant, class F Classified as a **Delta Scuti type variable**, an amplitude of 0.15 over a period of 0.14088143 days as a result of periodic pulsations.		**2.78**	
τ Puppis, Tau Puppis, a **spectroscopic binary,** primary is an orange giant type K. Orbit with a period of 1 066.0 days, or 2.9 years.		**2.95**	
ν Puppis, Nu Puppis, a blue-white giant, class B.		**3.17**	
σ Puppis, Sigma Puppis, spectroscopic binary, classified as a **Beta Lyrae type variable** with a period of 130.5 days, The system has stellar class K, spectrum of an orange giant.		**3.25**	
HD 63032, c Puppis, an orange giant, class K, is a member of the open cluster **NGC 2451**.		**3.64**	
V Puppis, a **multiple star** system, at the centre: a binary - B class blue-white dwarf orbiting a blue-white class B subgiant, orbital period of 1.45 days. The system **moves back and forth**, suggestive of a massive object, likely a **black hole, orbiting it**. **RA 07h 58m 14.43s DEC −49° 14′ 41.68″**		**4.45**	
NGC 2423-3, a red giant, class K, member of the **NGC 2423** open cluster.		**9.45**	
Xi Puppis (ξ). **Asmidiske**. Yellow supergiant, class G + **unrelated** yellow. **RA: 07h 49m 17.66s Dec: -24° 51' 35.2"**	**Ds.** 	**3.3 + 5.3**	
Noas. **Suhail Hadar**, **Zeta Puppis (ζ). A naked eye class "O-type"** star. Class O, hot blue supergiant star. **RA: 08h 03m 35.08s Dec: -40° 00' 11.5"**		**2.21**	
k Puppis. Blue-whites. Striking. **Ra 07:38:49.9 Dec -26:48:14**	**Ds.** 	**4.5 + 4.6**	
M47. ASSA23. Binos: M47 + M46 + NGC2413.	**Oc.** 	**4.5**	
M46. ASSA 24 + NGC 2438 (Foreground Pn.) (Ditto NGC 2818 in Pyx & NGC2395 in Gem).	**Oc. + Pn.** 	**6.1 + 10.1**	
NGC 2451* ASSA25. A+B: 2 x Oc. Same line of sight. (*Centred on 4th mag orange giant c Puppis). [NGC **2451** + NGC **2477** same FOV: **Binos.**] The cluster is in fact two clusters, one at a distance of 197 parsecs and the other at a distance of 358 parsecs. Assoc. nebulosity. **AP wide field**.	**Oc.** 	**2.8**	
NGC 2477 ASSA27. IMPRESSIVE. NGC 2477 is an open cluster located near **NGC 2451** and 2.5 degrees to the NW Of the Zeta Puppis.	**Oc.** 	**5.7**	
Pi Puppis Cluster, Collinder 135, an open cluster, four stars that are visible to the naked eye. The main star in the cluster, Pi Puppis, is a bright orange supergiant, and the 5th magnitude stars are classified as variables: NV Puppis is a Gamma Cassiopeiae type variable and NW Puppis is a Beta Cephei variable. **RA 07h 08m Dec−37° 10′**	**Oc.** 	**2.1**	**50'**

M93, ASSA26. Starfish shape. Open cluster.	**Oc.**	**6.2**	
NGC 2509, open cluster.	**Oc.**	**9.3**	
NGC 2439, open cluster.	**Oc.**	**6.9**	**10”**
NGC 2546, open cluster..	**Oc.**	**6.3**	
ESO 309-SC03, open cluster. **RA 06h50m.7 DEC-42°23’.0**	**Oc.**	**12**	**6’**
ESO 429-SC02, open cluster. **RA 07h33m.4 DEC-28°11’.0**	**Oc.**	**10**	**5’**
ESO 493-SC03, open cluster. **RA 07h39m.7 DEC -27°18’.0**	**Oc.**	**10.6**	**4’**
ESO 429-SC13, open cluster. **RA 07h41m.1 DEC-30°44’.0**	**Oc.**	**11.3**	**4’**
ESO 368-SC14, open cluster. **RA 07h47m.0 DEC-32°58’.0**	**Oc.**	**13**	**4’**
ESO 561-SC05, open cluster. **RA 07h59m.3 DEC-22°41’.0**	**Oc.**	**12**	**7’**
NGC 2539, open cluster. Rich. Foreground 19 Puppis.	Oc.	**6.5**	
NGC 2467. Neb + Oc + Star. Skull and Crossbones Neb + massive type “O” star. The dominant star in the region is HD 64315, a massive young blue star, class O.	**Oc.+ N.**	**7.0**	
NGC 2579. Oc + nebulocity. Emission neb.	**Oc.+ N.**	**7.5**	
NGC 2298.	**Gb.**	**9.3**	
NGC 2440. **The Albino Butterfly Neb, The Kiss Neb**. : Irregular. The central star, **HD 62166**, is **possibly the hottest white dwarf known:** surface temperature of 200,000 kelvins and is 1,100 times more luminous than the Sun.	**Pn.**	**11 (9.4?) Cs 17.5**	
Vol VOLANS VOH-lanz The Flying Fish	**20-Feb**		
β Volantis, Beta Volantis, an orange giant, class K.		**3.77**	
ζ Volantis, Zeta Volantis, binary, an orange giant class K + companion @ 16.7”.	**Ds.**	**3.93+10th**	
γ Volantis, Gamma Volantis. Bright-gold & pale-yellow. “**Stunning**”. Primary, Gamma-2 Volantis, an orange giant **class K**, and Gamma-1 Volantis, a yellow-white main sequence star **class F** @ 14.1”. **RA: 7h 8min 42,2sec DEC: -70° 29' 50''**	**Ds.**	**3.78 + 5.68**	
ε Volantis, Epsilon Volantis. Blue-giant + companion, a **triple star** system: primary is a blue-white subgiant class B: is a **spectroscopic binary** star with an orbital period of 14.17 days & companion @ 6.05”. **RA: 8h 7min 55,8sec DEC: -68° 37' 2''**	**Ds.**	**4.35 + 8.1**	
δ Volantis, Delta Volantis, yellow-white bright giant, class F.		**3.97**	
α Volantis, Alpha Volantis, class A, a **chemically peculiar star** with a strong spectrum and variable absorption lines of metals.		**4.0**	
θ Volantis, Theta Volantis, a white main sequence star, class A**.**		**5.19**	
η Volantis, Eta Volantis, triple star system, primary is a white subgiant, type A + two companions @ 30.8 & 42.4”.		**5.28+12TH + 12TH**	

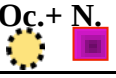
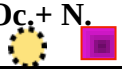
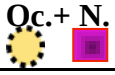
κ Volantis, Kappa Volantis, triple star system, a blue-white giant class B + @ 65" a white subgiant class A + companion at 37.3".		5.33+5.63 +8.5	
ι Volantis, Iota Volantis, blue-white subgiant, class B.		5.41	
STREICHER 33, ASTERISM: shape of a stick-figure Jumping Jack. The magnitude 8 star HD 56480 on the south-eastern tip forms the head, with the rest of the figure extending north-westward to completethe body and well-defined stiff legs. The string consists mainly of yellow and orange-coloured stars. **RA: 07h08m.9 – DEC: -72°14'.3**	**Asterism.**	8.5	20'
NGC 2348, Open cluster**,** combinationof many stars between magnitudes 11 to13 in a large roundish shape. I call this one a large flower bouquet. Prominent in this grouping is a star string runningmore or less through the middle of the cluster from north to south. (Magda Streicher)	**Oc.**	9	60'
NGC 2442. Barred spiral displays its famous unmistakable "S" shape.	**Gx.**	11	5.4x2.6'
NGC 2397, spiral galaxy.	**Gx.**	12.68	
Lindsay-Shapley Ring, AM0644-741, Graham's Ring Galaxy: an unbarred lenticular galaxy, **ring** is a starburst region and contains many hot blue stars**. RA 6h 43m 6.1s Dec −74° 13′ 35″.**	**Gx.**	13.96	1.7'
The Meathook Galaxy, NGC 2442, an intermediate spiral, distorted appearance is believed to be the result of an encounter with a smaller galaxy.	**Gx.**	11.2	
NGC 2434, an elliptical galaxy.	**Gx.**	11.2	

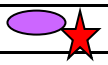
Constellation: Object/ Info.	**@MERIDIAN/ Target Type.**	**App. Mag.**	**SIZE**
MAR			
Ant, ANTLIA, ANT-lee-uh, The Machine Pneumatique, The Air Pump	**20-Mar**		
α Antliae, Alpha Antliae, classified as a K-type giant**.**		4.22to4.29	
ε Antliae, Epsilon Antliae, an orange K-type giant.		4.51	
ι Antliae, Iota Antliae, an orange K-type giant.		4.60	
θ Antliae, Theta Antliae, IDS 09397-2719 B, a **binary star**, Theta Antliae A, a white A-type main sequence dwarf, and Theta Antliae B, a yellow-white F-type bright giant.	**Ds.**	4.78	
η Antliae, Eta Antliae, a **binary star**, yellow-white F-type giant with feaint companion @ 31".	**Ds.**	5.2+11.3	
δ Antliae, Delta Antliae, double star, a blue-white B-type main sequence dwarf + fainter visual companion @ 11".	**Ds.**	5.57+?	
ζ Ant, ζ Antliae Zeta Antliae, wide optical **double star**. The brighter star, **Zeta1 Antliae** a true binary star system, two white main sequence stars, separated by 8.042" & **Zeta2 Antliae.**	**Ds.**	5.74 (6.2+7.1) & 5.9	
T Antliae, yellow-white supergiant, type F. **Classical Cepheid variable**. Period 5.9 days.		8.88to9.82	
S Antliae Variable, Period ?7 (15.6) hours, an **eclipsing binary,**classed as an **A-type W Ursae Majoris variable**—the primary is hotter than the secondary and the drop in mag caused by the latter passing in front of the		6.27to6.83	

former. The two stars will eventually merge to form a single fast-spinning star.**RA 09h32m.3 DEC-28°38'.0 6.4**			
u Antliae, HIP 51821, Variable, period 302 days, U Antliae is a r**ed C-type carbon star**, is classified as an **irregular variable** star. **RA 10h35m.2 DEC-39°34'.2**		**5.5+/-1.6**	
ESO 315-SC14, open cluster. **RA 09h35m.4 DEC-39°32'.0**	**Oc.** 	**10**	**3'**
ESO 435-SC09, open cluster. **RA 09h55m.5 DEC -28°59'.0**	**Oc.** 	**9**	**15'**
Zeta 1 + 2. Faint.	**Ds.** 	**5.76 &5.9**	
STREICHER 12: Asterism: "2° S of alpha Antliae, a small grouping, consists of two small groups with the larger towards the north.The stars vary between magnitudes 8 to 10". **RA 10h31m.7 DEC-33°04'.7**	**Asterism.** 	**11.4**	**5.5**
STREICHER 8 asterism: "exercises a firm grip on the southern edge of the border with Vela. Standing out against the background star field, consists of only a handful of stars in a half-moonshape with a difference. It reminds me of a set of headphones with brighter starsat the north-eastern and south-westernends. Fainter stars connect the shape tostrengthen the impression." **RA 10h13m.8 DEC-40°19'.8**	**Asterism.** 	**9**	**3.1**
O'NEAL 10, Asterism, RA 10h21m.5 DEC -32°44'.0	**Asterism.** 	**10**	**11'**
NGC 3267 Galaxy,	**Gx.** 	**12.5**	**1.9'×0.9'**
NGC 3268 Galaxy, elliptical.	**Gx.** 	**11.6**	**3.2'×2.4'**
Antlia Cluster (Abell S0636), a cluster of galaxies within the Hydra–Centaurus Supercluster which, in turn, is the closest neighbour to the Virgo Supercluster, in which the Milky Way Galaxy is located. The cluster is the third closest to our **Local Group**, with only the **Fornax Cluster** and **Virgo Cluster** lying closer. Contains about 234 galaxies and is dominated by two massive **elliptical galaxies**, **NGC 3258** and **NGC 3268.**	**Gx.** 		
NGC 3269 Galaxy,	**Gx.** 	**12.2**	**2.5'×1.1'**
NGC 3271 Galaxy	**Gx.** 	**11.7**	**2.8'×1.5'**
NGC 3250. Round, bright core.	**Gx.** 	**11**	
NGC 3175. Edge-on.	**Gx.** 	**11.3**	**5.0'x1.3'**
NGC 2997. Bennet 41B, Nearly face-on, 45°, a **Grand design Gx.:** kind of spiral galaxy with clearly defined spiral arms that extend around it. Only ten percent of spiral galaxies are grand design spirals.	**Gx.** 	**10.1**	**10'x6.3'**
NGC 3347 Galaxy,	**Gx.** 	**11.4**	**3.7'×1.9'**
NGC 3354 Galaxy,	**Gx.** 	**13.0**	**0.9'×0.8'**
NGC 3358 Galaxy,	**Gx.** 	**11.5**	**3.8'×1.7'**
Antlia Dwarf (PGC 29194), a dwarf spheroidal galaxy, located about 4.3 million light years from Earth, **very faint**, mag **16.2**, that was not discovered until 1997. It is tidally interacting with another small galaxy, NGC 3109, in the Hydra constellation.	**Gx.** 		
Cnc CANCER CAN-ser The Crab	**01-Mar**		
Acubens, α Cancri, aka Al Zubanah or Sertan, multiple star system, class A, brightest component, **Alpha Cancri A**, is a white A-type main		**4.26 (4.20+4.27) & 11th**	

sequence dwarf (suspected to be a very close binary itself, consisting of two stars separated by 0.1 arcseconds – a " stunning gold star") & @ 11.3" an eleventh magnitude companion, **Alpha Cancri B.** Pair: "Profound contrast"			
Al Tarf, β Cancri, brightest, a **binary**, an orange K-type giant + companion @ 29". "	**Ds.** 	**3.5+14th**	
Asellus Australis, "southern donkey colt", δ Cancri, Delta Cancri, orange giant, marks the location of Praesepe (Messier 44), the famous open cluster, also known as the Beehive Cluster. Also notable for its less famous name, **Arkushanangarushashutu**, the longest of all the known star names.		**3.94**	
Asellus Borealis, "northern donkey colt", γ Cancri, Gamma Cancri, a white A-type subgiant.		**4.66**	
Tegmine, ζ Cancri, Zeta Cancri is a multiple star system: at least four stars: two binary stars: Zeta-1 Cancri and Zeta-2 Cancri, separated by 5.06": **A & B** both yellow-white F-type main sequence dwarfs, separated by 1", **C & D**: yellow G-type star and a 10th magnitude red dwarf separated 0.3".		**4.67: 5.58+5.99 & 6.12+10th**	
λ Cancri, Lambda Cancri is a blue-white B-type main sequence dwarf.		**5.92**	
ξ Cancri, Xi Cancri, Nahn, a spectroscopic binary: Xi Cancri **A**, a yellow G-type giant, and Xi Cancri **B**, only 0.1" away. Orbital period of 4.66 years.	**Ds.** 	**5.16**	
Zeta Cancri. (ξ). (Both lemon-yellow). 5.0 (5.6 +6.2) + 6.2, sep 5.9".	**Ds.** 	**5.0+6.2**	
Iota Cancri. "Spring Albireo". Showcase pair: Sun-yellow giant + royal-blue. **Ra 08h 46m 41.81988s Dec +28° 45′ 35.6190**	**Ds.** 	**4.0 + 6.6**	
Rho Cancri: 55 (HIP 43587) & **56 Canceri** @ 278", **55 Canceri** is a (binary): 5 extra solar planets. **Binos: Iota + Rho.**	**Ds.** 	**5.9+13 & 6.3**	
Struve 1245, "bright yellow + yellowish-orange", sep 10.0"**.** **RA 08h 35.8m DEC +06^{0} 37'.**	**Ds.** 	**6.0+7.2**	
T Cancri, HIP43905, carbon star. **Deep orange red**.		**7.6to10.5**	
X Cancri, HIP 43811, carbon star.			
M44 (Beehive). Praesepe: "Manger". Experienced **mass** segregation, contains at least a thousand stars. More than a half of them red dwarfs, and about a third (30%) are Sun-like, classified as F, G and K-class stars. **Binos.**	**Oc.** 	**3.7**	
M67. Small, faint. Nearest **OLD** open cluster, between 3.2 and 5 billion years.	**Oc.** 	**6.1**	
Abell 31, an ancient planetary nebula, estimated to be about 2,000 light years away, one of the **largest** planetary nebulae in the sky, it is not very bright. **RA 08h 54m 11.4s DEC+08° 54′ 30″ AP**	**Pn.** 	**12.2**	**16.8'**
NGC 2775. Bright core, multiple spiral arms, faint halo.	**Gx.** 	**10.1**	
NGC 2535 and NGC 2536, interacting spiral galaxies.	**Gx.** 	**16.9+14.6**	
NGC 2500 is a barred spiral galaxy, belongs to the **NGC 2841 group** of galaxies, along with NGC 2537, NGC 2541, and NGC 2552 in the constellation Lynx.	**Gx.** 	**12.2**	
NGC 2608 is a barred spiral galaxy, considered a grand design spiral galaxy. It is approximately 93 million light years distant.	**Gx.** 	**13.01**	

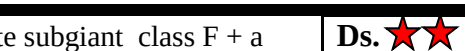
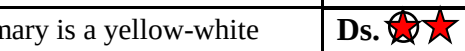
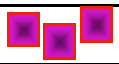
Car CARINA ka-RYE-nah The Keel	01-Mar		
η Carinae, Eta Carinae is a star system composed of at least two stars, aka: Tseen She ("heaven's altar" in Chinese) and Foramen. The star belongs to the spectral class WR pe, classified as a **luminous blue variable** (LBV) binary star, after **S Doradus variables**. (Also **P Cygni**). By 1730, it brightened significantly and became one of the most prominent stars in Carina. By 1782, it dimmed again. In 1843, it was the second brightest star in the sky (after Sirius), with an apparent visual magnitude of -0.8. **"The Great Eruption"**. Steadly brightening since 1940.	**Ds.** ★★	**4.5 (2014)**	
Miaplacidus, β Carinae, Beta Carinae, second brightest star in the constellation and the 29th brightest star in the sky. A-type subgiant, part of asterism: the **Diamond Cross**, along with Theta, Upsilon and Omega Carinae. Close to **IC 2448**, an elliptical planetary nebula.	★	**1.67**	
Avior, ε Carinae, Epsilon Carinae, a **double star**: K class orange giant + blue dwarf, spectral class B. The two components regularly eclipse each other, causing variations in luminosity by 0.1 magnitudes.	**Ds.** ★★	**1.86**	
Aspidiske, Turais and Scutulum, ι Carinae, Iota Carinae, spectral type A. It is a rare white supergiant, part of the **False Cross** asterism, along with Avior, and the stars Delta and Kappa Velorum in the constellation Vela.	★	**2.21**	
θ Carinae, Theta Carinae, N end of the **Diamond Cross**, a blue-white main sequence dwarf , spectral class B. Most prominent star in **IC 2602**, an open cluster, aka the **Southern Pleiades**.	★	**2.74**	
υ Carinae, Upsilon Carinae, showcase pair, a white A-type supergiant and a blue-white B-type giant, separated 5".	**Ds.** ★★	**3.01+6.26**	
Rmk 8, showcase pair, "whitish + deep-yellow", sep 3.6", **RA 08h 15.3m DEC-62^0 55'.**	**Ds.** ★★	**5.3+7.6**	
Dunlop 94, showcase pair, ""bright orange star with an obvious, fairly bright companion", sep 14.5", **RA 10h 38.7m DEC -59^0 11'.**	**Ds.** ★★	**4.9+7.5**	
ω Carinae, Omega Carinae, blue-white B-type giant, part of **Diamond Cross**.	★	**3.29**	
AG Carinae, a luminous blue variable star, one of the brightest stars known in the Milky Way, absolute magnitude of -10.3, surrounded by a large planetary nebula and believed to be undergoing the transitional evolutionary phase between an O-class supergiant and a Wolf-Rayet star.	★	**5.7to9.0**	
R Carinae, red giant, bright **Mira variable**, period is 309 days.	★	**10to4.0**	
S Carinae, red giant, bright **Mira variable:** period 150 days.	★	**10to5.0**	
PP Carinae, blue-white B-type main sequence dwarf, is a shell star, a **Gamma Cassiopeiae type variable** (fast rotating star with a disc of gas surroundinog it at the equator).	★	**3.30**	
V337 Carinae is a K-type bright giant, a **variable star**.	★	**3.36to3.44**	
χ Carinae (Chi Carinae), blue-white subgiant, a **Beta Cephei type** variable star (exhibiting variations in brightness due to pulsations on its surface), brightness varying by 0.015 mag. period of 2.42 hours.	★	**3.46**	
I Carinae (HD 84810), a yellow G-type supergiant, a **Cepheid variable** star, period of 35.54 days.	★	**3.69 (3.28to4.18)**	
V382 Carinae, a yellow G-type hypergiant, classified as a **Cepheid variable** star.	★	**3.84to4.02**	
NGC 3372, ASSA44 + Eta Carina Neb. Contains THE STAR **Eta Carina** (with the "**Homunculus** nebula"), several open clusters, **Keyhole** neb. Eta Carinae Nebula surrounds the massive stars Eta Carinae and HD	Nebs & Star & OCs.	**5**	**120'**

93129A, as well as several open star clusters. It is one of the largest diffuse nebulae known, being brighter and four times the size of the Orion Nebula.			
Upsilon (u) Carinae. Two sets of Ds. Bright & close vs. faint & wide. **Diamond cross.**		**2.97 (3.08/ 6.25) & 8.7 + 9.1**	
X-Carinae. Yellow hyper-giant, Cepheid **variable**.		**3.84 - 4.02**	
"THE STARRY CURTAIN", Between Miaplacidus and Alpha Volantis.	**Asterism.** 	**6th – 12th M.**	
Delphinus Australis/ Southern Ursa Major. Lies 20' north of planetary IC 2448. (See below)	**Asterism.** 	**8.4 to 11.4**	
STREICHER 7: 1.6° south of NGC 2516, group of stars that represents a small constellation Crux, with the long axis pointing towards the south-east. **RA 07h53m.6 DEC-62°20'.9**	**Asterism.** 	**4**	**6'**
NGC 3532. ASSA45. Wishing Well. Elliptical. Background yellow-white super-giant. The Wishing Well Cluster was the first object ever observed by the Hubble Space Telescope in May 1990.	**Oc.** 	**3**	**1'**
NGC 2516. ASSA28. Diamond cluster. Chain.	**Oc.** 	**3.8**	**29'**
NGC 3114. ASSA35.	**Oc.** 	**4.2**	**35'**
IC 2602. ASSA43. Southern Pleiades. Theta Carina Cluster.	**Oc.** 	**1.9**	**50'**
NGC 3293. ASSA41. Gem cluster & nebulosity. Colours…	**Oc.+ N.** 	**4.7**	**10'**
NGC3324. ASSA42. Neb + Oc.	**Oc.+ N.** 	**6.7**	
IC2581. ASSA40.	**Oc.** 	**4.3**	**5'**
IC 2714. Open Cluster.	**Oc.** 	**8.2**	**12'**
RUPRECHT 84. Open Cluster**, RA 09h49m.2 DEC-65°15'.1**	**Oc.** 	**11**	**3.6'**
TRUMPLER 14. Open Cluster**. RA 10h43m.9 DEC-59°34'.0**	**Oc.** 	**5.5**	**5'**
TRUMPLER 12. Open Cluster. **RA 10h06m.4 DEC-60°19'.2**	**Oc.** 	**8.8**	**4'**
TRUMPLER 17. Open Cluster. **RA 10h56m.2 DEC-59°12'.3**	**Oc.** 	**8.4**	**5'**
HOGG 9. Open Cluster**. RA10h58m.4 DEC-59°03'.5**	**Oc.** 	**10.6**	**1.5'**
TRUMPLER 15. Open Cluster**. RA10h44m.8 DEC-59°22'.0**	**Oc.** 	**7**	**4'**
BOCHUM 11. Open Cluster**. RA10h47m.3 DEC - 60°05'.0**	**Oc.** 	**7.9**	**21'**
MELOTTE 105. Open Cluster**. RA 11h19m.5 DEC-63°29'.1**	**Oc.** 	**8.5**	**4'**
HOGG 5. Open Cluster**. RA10h06m.9 DEC -60°23'.1**	**Oc.** 	**11.2**	**3'**
HOGG 6. Open Cluster**. RA 10h06m.5 DEC-60°29'.9**	**Oc.** 	**12**	**3'**
NGC 3572: Oc + Neb.	**Oc.+ N.** 	**6.6**	
NGC 3603: Oc + Neb.	**Oc.+ N.** 	**9.1**	
NGC 3247: Oc + nebulosity.	**Oc.+ N.** 	**7.6**	**4.5'**
NGC 3503. An Emission N.	**N.** 	**10.54**	
NGC 3199. Smile Neb. Interstellar "**Snow Plough**". Diffuse neb/ super nova remnant, "distorted bubble": Wolf-Rayet star's influence.	**N.**	**11.1**	
NGC 2808 **ASSA32.** Globular cluster, **10th** brightest in the sky.	**Gb.** 	**6.3**	**13.8'**

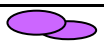
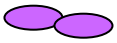
NGC 3211. Bluish-grey.	**Pn.**	**10.7**	
IC 2448. Elliptical. Close to Beta Carina. (Miaplacidus.)	**Pn.**	**11.5**	**8”**
IC 2553. Planetary Nebula.	**Pn.**	**10.3**	
IC 2220. Planetary Nebula.	**Pn.**	**7**	**5’x5’**
NGC 2867. Planetary Nebula. 1.2° NNE of the 2nd mag Iota Carinae**.** Small/ bright.	**Pn.**	**9.7**	**20”**
NGC 2822. Close to Miaplacidus. (Hides in glare)**.**	**Gx.** 	**12.7**	
NGC 2417. Galaxy.	**Gx.** 	**12.4**	**2.6’x2.0’**
Pyx PYXIS PIK-sis The Compass	**Mar**		
α Pyxidis, Alpha Pyxidis, giant blue-white, class B, classified as a **Beta Cephei variable**, which means that variations in its brightness are a result of pulsations of the star’s surface.		**3.67**	
β Pyxidis, Beta Pyxidis, binary star, class G, supergiant, yellowish in colour & visual companion @ 12.7”.	**Ds.** 	**3.954+12.5**	
γ Pyxidis, Gamma Pyxidis is an orange giant of the spectral type K3.		**4.026**	
T Pyxidis, a binary star, a white dwarf and a red dwarf that orbit each other every 1.8 hours, **recurrent novae**. T Pyxidis was observed erupting in 1890, 1902, 1920, 1944, 1966 and 2011. The two stars lie close together and the white dwarf draws mass off the Sun-like star, which causes the periodic eruptions, brightened to the 7th magnitude from a baseline of around 14th magnitude. **RA 09h04m.7 DEC-32°22’.8 6.3**	**Ds.** 	**15.5to6.4**	
κ Pyxidis, Kappa Pyxidis, multiple star, classi K, an orange giant. + companion @ 2.1”.	**Ds.** 	**4.62+10th**	
Θ Pyxidis, Theta Pyxidis, red giant, type M.		**4.71**	
ζ Pyxidis, Zeta Pyxidis, multiple star, primary is a yellow giant star of the spectral type G.		**4.86**	
δ Pyxidis, Delta Pyxidis, a multiple star, primary component is a white subgiant of the spectral type A.		**4.87**	
TY Pyxidis, eclipsing binary, components both pectral type G, class as a **RS Canum Venaticorum variable**, a binary system with prominent starspot activity.		**6.85to7.5**	
RZ Pyxidis, eclipsing binary system, both hot blue-white stars, type B, system is classified as a **Beta Lyrae variable**, period 0.66 days.		**8.83to9.72**	
XX Pyxidis, Delta Scuti variables, short period (six hours at most) pulsating stars, also a binary star system, main star is a white main sequence star type A, companion is most likely a red dwarf of spectral type M.		**11.49**	
AK Pyxidis, a red giant of spectral type M, and **semi-regular variable**, pulsations take place over multiple periods simultaneously of 55.5, 57.9, 86.7, 162.9 and 232.6 days.		**6.09to6.51**	
UZ Pyxidis, semi-regular variable red giant, a **carbon star**, period 159 days.		**6.99to7.83**	
VY Pyxidis, a BL Herculis variable (type II Cepheid), period of 1.24 days.		**7.13to7.40**	
STREICHER 50, Asterism, situated 1.2° north-west of NGC 2818: thirteen	**Asterism.** 	**8.3’**	**33’**

various magnitude look-a-like pairs are exhibited in a 40' FOV, centre of the field is characterized by a few magnitude 8 stars which appear as double. **RA09h11m.2 DEC -35°58'.4**			
Alessi J 0838.5-2502, a little asterism inside the western tip of nebula **LBN 1073.** Seven outstanding stars can be seen in a curved formation, with brightness ranging between magnitudes 8 to 9. They drape from northwest to south-east with a pair of coloured yellow stars claiming centre spot. The star eta Pyxidis with a magnitude of 5.2 is situated 1.2° south of this group of stars. **RA 08h38m.5 - DEC 25°02'.4 9 14'**	**Asterism.**		
ESO 432-SC03, Open Cluster**. RA 08h42m.9 DEC-27°52'.0**	**Oc.**	**8**	**11'**
NGC 2658. Open Cluster**.**	**Oc.**	**9.2**	**12'**
NGC2627. Open Cluster**.** Large, richer towards W.	**Oc.**	**8.4**	**11'**
Ruprecht 74 Open Cluster**. RA 09h21m.0 DEC -36°56'.7**	**Oc.**	**13**	**2'**
NGC 2635, Open Cluster**.**	**Oc.**	**11**	**3'**
Pyxis globular cluster. NEWLY IDENTIFIED, 1995. **RA: 09:07:57.8 Dec: -37:13:17**	**Gb.**	**12.9**	**6'**
NGC 2818 Pn. ASSA33 + Oc."NGC 2818A". (See M46 in Pup & NGC 2395 in Gem). AP	**Oc. + Pn.**	**8.2**	**9'**
PK 261+8.1, Planetary nebula.**RA 09h16m.1 DEC -36°37'.0**	**Pn.**	**11.9**	**58"**
Abell 29. Planetary neb. **Ra 08:40:18.9 Dec -20:54:36 AP**	**Pn.**	**14.3**	**482x 335"**
NGC 2613. "Appealing". Edge-on spiral.	**Gx.**	**10.4**	**7.6'×1.9'**
IC 2469. Galaxy.	**Gx.**	**11.3**	**4.7'×1.0'**
Sex SEXTANS SEX-tanz The Sextant	**20-Mar**		
α Sextantis, Alpha Sextantis, white giant, class A, informally considered to be an **"equator star,"** currently located less than a quarter of a degree south of the celestial equator. In 1900, it was 7 arcminutes north of the equator, but crossed over to the southern hemisphere in December 1923.		**4.48**	
γ Sextantis, Gamma Sextantis, triple star system, consists of a close binary, class A, two stars are separated by 0.38", orbit each other with a period of 77.6 years, companion orbits the binary from a distance of 36".		**5.07 (5.8+6.2) & 12th**	
β Sextantis, Beta Sextantis, blue-white main sequence dwarf with the stellar classification B, classified as an **Alpha-2 Canum Venaticorum** type variable star, period of variability of around 15.4 days.		**5.0to5.1**	
δ Sextantis, Delta Sextantis, blue-white main sequence dwarf, class B.		**5.19**	
ε Sextantis, Epsilon Sextantis, yellow-white giant, class F.		**5.25**	
9 Sextantis. "Pretty colours: bright **tangerine** + little **blue** companion", sep 52.5", **RA 09h 54.1m DEC 04° 57'.**	**Ds.**	**6.96+8.4**	
Rinnan's Run. From 35 Sextantis goes a row of stars 3degrees SSW. This row has a small curve on the upper side. **RA: 10h 46m DEC: 03d 26m**	**Asterism.**		**3°**
NGC 3169, spiral galaxy, approximately 70 million light years distant, just under the bright star Regulus in Leo, has a distorted shape as a result of gravitational interaction with nearby galaxy **NGC 3166.**	**Gx.**	**10.3**	

NGC 3166, about 50,000 light years from NGC 3169, two galaxies will eventually merge into one larger galaxy.	**Gx.**		
Sextans A (UGCA 205), a small dwarf irregular galaxy, only about 5,000 light years across, 4.31 million light years from Earth. **RA 10h 11m 00.8s DEC−04° 41′ 34**	**Gx.**	**11.9**	**5.9x4.9'**
Sextans B (UGC 5373), an irregular galaxy. **RA 10h 00m 00.1s DEC +05° 19′ 56″**	**Gx.**	**11.9**	**5.1x3.5'**
NGC 3115. ASSA36. Spindle Gx. Lenticular (S0) galaxy: disk and a central bulge, but without a detectable spiral pattern.	**Gx.**	**8.9**	**8.1'×2.8'**
NGC 2974, galaxy.		**10.9**	**3.0'×1.7'**
Vel VELA VEE-LAH The Sails	**10-Mar**		
γ Velorum, Gamma Velorum, Suhail, "**Regor**":("**Roger**" Chaffee Apollo 1, Gus Grissom practical joke). In line with short axis of **False Cross.** Multiple star, at **least six stars.** Brightest member**: γ² Velorum**: γ Velorum A: is a spectroscopic binary, a blue supergiant class O + a massive **Wolf-Rayet star**: (**Brightest**) an evolved, extremely hot, massive star which is rapidly losing mass as a result of a very strong stellar wind. The bright **γ¹** Velorum or γ Velorum **B**: a **spectroscopic binary**, period of 1.48 days, primary is a blue-white giant, separated from the Wolf-Rayet binary by 41.2". Companions: **C** is a white F star @ 62.3" + another **binary star** @ 93.5", composed of Gamma Velorum **D** and Gamma Velorum **E**. Gamma Velorum D is another white, class A star. (**South pole star for Neptune**).		**1.7+4.2+7.3+9.4+13th**	
δ Velorum, Delta Velorum, multiple star system. It is composed of Delta Velorum **A** and Delta Velorum **B**, which have a wide orbit and a 142 year orbital period. The primary component is itself a **spectroscopic binary** star with an orbital period of 45.15 days. It is the **brightest eclipsing binary** star system known. Another binary system can be found at a separation of 69", stars separated by 6".		**1.96+5.55 & 11th + 13th**	
X-Velorum: Dunlop 95. HIP 52154, Brilliant colour contrast: **electric blue and a deep gold. Southern Albireo/ Albireo Australe.**	**Ds.** 	**4.4 & 6.0**	
λ Velorum, Lambda Velorum, shares the traditional name Suhail with the brighter Gamma Velorum. Class K, an orange star, classified as an **LC-type slow irregular variable** star.		**2.14to2.30**	
Markab, Markeb (to distinguish it from Alpha Pegasi in Pegasus)**, κ Velorum, Kappa Velorum, spectroscopic binary**, has the combined stellar classification of B, matching a blue-white subgiant star.		**2.48**	
μ Velorum, Mu Velorum, binary, orbit each other with a period of 116.24 years, separated by 1.437", brighter component is a yellow giant, class G - companion also a class G (yellow) star, a main sequence dwarf.	**Ds.** 	**2.69 (2.7+6.4)**	
N Velorum (HD 82668), orange giant, class K.		**3.16**	
φ Velorum, Phi Velorum, a blue-white, class B.		**3.52**	
o Velorum, Omicron Velorum, blue-white subgiant, class B, classified as a variable star, a period of 2.78 days.		**3.60 (3.55to3.67)**	

ψ Velorum, Psi Velorum, binary: a yellow-white subgiant class F + a yellow-white main sequence dwarf, class F. orbit 33.99 yrs, @ 0.68".	**Ds.** 	**3.60 (4.1+4.6)**	
HD 74180: binary: combined classification F, primary is a yellow-white supergiant classified as an **irregular variable**, & companion, separated by 37.5".	**Ds.** 	**3.77to3.91 & 10th**	
The False Cross, asterism formed by the stars Delta Velorum, Kappa Velorum, Iota Carinae and Epsilon Carinae in Carina constellation. It was named the False Cross because it is often mistaken for the Southern Cross, which is frequently used in navigation to find true south.	**Asterism.** 		
NGC 2547. "Heart", ASSA29. (JohanS "heart")	**Oc.** 	**4.7**	**25'**
IC 2391. ASSA31. Omicron Velorum cluster.	**Oc.** 	**2.5**	**50'**
IC 2488. ASSA34	**Oc.** 	**7.4**	
NGC 2670, open cluster, consists of about 50 moderately bright stars.	**Oc.** 	**7.8**	
NGC 2669, open cluster.	**Oc.** 	**6.1**	**12'**
NGC 3228, open cluster.	**Oc.** 	**6.0**	**18'**
NGC 2645, open cluster.	**Oc.** 	**9**	**3'**
PISMIS 8, open cluster**. RA08h41m.6 DEC -46°16'.0**	**Oc.** 	**9.5**	**3'**
NGC 3033, open cluster.	**Oc.** 	**8.8**	**5'**
NGC 3201. ASSA38. Very low central concentration of stars.	**Gb.** 	**6.8**	**18'**
NGC 2626. Same FOV: Blue reflection, dark, pink. AP		**?**	
Gum 15, an emission nebula, about 3,000 light-years from Earth, shaped by aggressive winds flowing from the stars within and around it. The bright star in the center of the nebula is HD 74804, a double star: **HIP 42908.** **RA 08h 43m 52.5s Dec−41° 14′ 39**	**N.** 	**?**	**?**
The Pencil Nebula, NGC 2736, [near the **Vela Pulsar** in the **Vela Supernova Remnant**, (**Gum12**)], 815 light years from Earth. It is believed to have been formed from part of the shock wave of the supernova remnant. **RA 8h 29m Dec -44d 06'. AP**	**N.** 	**12**	**20x3'**
NGC 3132. ASSA37. Eight-Burst, Southern Ring. Central stars: mag 10 + 16: Binary. **Fainter = Cs**. Eight-Burst Nebula (Southern Ring Nebula) – NGC 3132 (Caldwell 74). The nebula contains two stars, a 10th and a **16th mag white dwarf** which has blown off its outer layers and whose ultraviolet radiation makes the nebula glow.	**Pn.** 	**8.2 Cs = 16**	
NGC 2899. Planetary. **Red?.** Just south of kappa Velorum.	**Pn.** 	**11.8**	**117"**
VBRC2 (Van Den Bergh), Wray 17-31, ESO 166-PN-21, RCW44. Evolved Pn neb. (Pinkish on **AP) RA 9h 31m 21s DEC -56°17'40"**	**Pn.** 	**?**	**2.5' (Halo 4')**
NGC 3256. Galaxy.	**Gx.** 	**10.8**	**3.2'×2.2'**

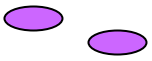
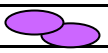
Constellation: Object/ Info.	@MERIDIAN/ Target Type.	App. Mag.	SIZE
APR			
Cha CHAMAELEON ka-MEE-lee-un The Chameleon	**01-Apr**		
α Chamaeleontis, Alpha Chamaeleontis, spectral type F..		**4.066**	
β Chamaeleontis, Beta Chamaeleontis, main sequence star, class B.		**4.24to4.30**	
ε Chamaeleontis, Epsilon Chamaeleontis, close binary, stars separated by 0.9".	**Ds.**	**4.88**	
Delta Chamaeleontis. Unrelated **orange+blue**. **δ1** Chamaeleontis, **Delta-1** Chamaeleontis: **spectroscopic double**, two similar stars, separated by 0.6''. Class K giant. Brighter star is **Delta2** Chamaeleontis, blue-hued star, a class B subgiant star.	**Ds.**	**6.3+4.4**	
λ Chamaeleontis, Lambda Chamaeleontis, an orange giant star class K.		**5.18**	
R Chamaeleontis, a **Mira-type variable**, period of 334 days.		**7.5to14**	
STREICHER 21, Asterism, between eta and zeta Chamaeleontis. A few various magnitude stars, in a well-formed line from north to south, shape of the stars resembles a reptile, complete with a tail pointing to the south. **RA 08h51m.0 DEC -80°09'.5**	**Asterism.**	**11**	**22'**
Eta Chamaeleontis Cluster, Mamajek 1, open star cluster centred on the Eta Chamaeleontis - the first open cluster discovered because of the X-ray emissions from its member stars. About 18 young stars, **brightest mag 5.46.** **[**The bright trio of hot stars **eta** Cha (B), **RS** Cha (A+A), and **HD 75505**(SAO 256544) (A)] **RA 8H 41M, DEC -78^0 58'**	**Oc.**	**(5.46)**	**30'**
ESO 37-01 E3 Globular Cluster. **RA 09h20m.9 DEC -77°16'.9**	**Gb.**	**11.4**	**4'**
IC 2631. Reflection neb around the young star HD 97300, star can be seen in small telescope, the surrounding nebula is too faint to be easily perceived, and shows itself best in photographs. **Nearby cooler stars in row**. **AP**	**N.**	**-**	**6.0'×5.0'**
Sa 156. Dark Nebula. **RA 12h59m.0 DEC-77°10'.0**	**DkN.**		**3°×2°**
NGC 3195. Planetary Nebula.	**Pn.**	**11.6**	**38"×30"**
NGC 3195. Faint, Jupiter size. **Most southerly of bright Pn**. Not visible from N-hemisphere, halfway between **Delta** and **Zeta** Chamaeleontis.	**Pn.**	**11.6**	
NGC 2915. Galaxy.	**Gx.**	**12.4**	**2.4'×1.3'**
NGC 3149. Galaxy.	**Gx.**	**12.8**	**2.0'×1.9'**
NGC 3620. Galaxy.	**Gx.**	**12.7**	**2.7'×1.1'**

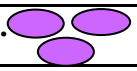
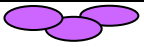
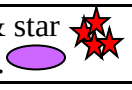
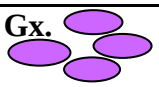
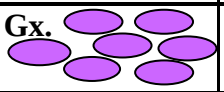
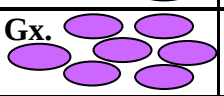
Crv CORVUS KOR-vus The Crow	20-Apr		
Gienah, (shares name with Epsilon Cygni), γ Corvi, Gamma Corvi, is suspected to be a binary star, giant spectral class B.		**2.59**	
Kraz, β Corvi, Beta Corvi, is a yellow-white G-type bright giant.		**2.6to2.66**	
Minkar, ε Corvi, Epsilon Corvi, is a K class star.		**3.02**	
Alchiba, α Corvi, Alpha Corvi, only the fifth brightest - the third faintest star with the Alpha designation in the sky, brighter only than Alkes (Alpha Crateris) and Alfecca Meridiana (Alpha Coronae Australis). A class F subdwarf.		**4.02**	
Algorab, δ Corvi, Delta Corvi. Showcase pair: Blue-white + purplish. Sep 24.9". Class A + class K optical companion @24.2".	**Ds.** 	**2.9 + 9.3**	
η Corvi, Eta Corvi, a main sequence star, spectral type F**.**		**4.31**	
Struve 1604, "broad triple star, triangle, grapefruit **orange** + sky **blue** + **silvery** nebulous". **RA 12h 09.5m DEC -11^0 51'.**		**6.9+9.4+ 8.1**	
Struve 1669, "bright peach-white twins", sep 5.3", **RA 12h 41.3m DEC -13^0 01'.**	**Ds.** 	**5.9+5.9**	
TV Corvi, Cataclysmic Variable, **Tombaugh's Star, RA 12h20m.4 DEC -18°27'.0**		**12to18**	
Stargate asterism. **Canali asterism. Two nested triangles**. One deg. SW of **M104.** Draw a line between the stars Porima in Virgo and Algorab in Corvus. At 1/4e distance of this line, you find the Stargate**. RA 12h35m.8 DEC-12°01'.0 (Thx to Michael Poll for introducing…).**	**Asterism.** 	**6.61–11.46**	**7.5'**
THE SAIL, (SPICA'S SPANKER), formed by the four brightest stars in Corvus – Delta, Gamma, Epsilon and Beta Corvi and also because Gamma and Delta Corvi point the way to Spica (Alpha Virginis).	**Asterism.** 		
STREICHER 23, Asterism, resembles a cowboy, situated about 5^o SE of delta Corvi.Two prominent stars of similar brightness stare back at one like two eyes, and form the northeastern end of the grouping. A faint string of stars running north to south resembles the longs slender arms. The brightest star, magnitude 7.2 (HD 111156), resembles the large, typical belt buckle, with the rest forming the sculptured legs positioned well apart **RA 12h47m.3 DEC-19°03'.0**	**Asterism.** 	**9.5**	**23'**
NGC 4361. ASSA48. Cs. Irregular. Galaxy shaped.	**Pn.** 	**10.3. Cs: 13th M**	**50"**
NGC4038/9. ANTENNAE. Ring-Tail Gxs. Interacting spirals**.**	**Gx.** 	**10.5+10.3**	**5.4'×3.9' 5.4'×2.5'**
NGC 4027. One armed spiral. A peculiar one: one of its spiral arms extends further outwards than the other, possibly as a result of a past collision with another galaxy.	**Gx.** 	**11.1**	**3.8x2.3'**
NGC 4782 + NGC 4783. Interacting ellipticals**.**	**Gx.** 	**11.7+11.5**	**1.8×1.7' +2.3×1.3'**

Crt CRATER KRAY-ter The Cup	20-Apr		
Labrum, δ Crateris, Delta Crateris, is an orange giant, class K.		3.56	
Alkes, α Crateris, Alpha Crateris, a class K orange giant.		4.07	
Al Sharasif, β Crateris, Beta Crateris, a white sub-giant, class A. [Shares the name with Nu Hydrae].		4.48	
γ Crateris, Gamma Crateris, close binary, brighter component is a white dwarf, a class A star + dimmer companion. "Bright white + grey".	**Ds.**	4.06 + 9.6	
Jc 15, "straw-yellow + small silvery azure", sep 8.2", **RA 11h 29.6m DEC -24^0 28'.**	**Ds.**	5.8+8.6	
SZ Crateris, variable star, is really a **binary star** system composed of two main sequence stars, types K and M. It is a **BY Draconis type variable:** a star exhibiting variations in luminosity as a result of its rotation, star spots and other activity in its chromosphere. The star's optical period is 11.58 days.		8.61to11	
R Crateris, a SRb-type semi-regular variable star belonging to the spectral class M7. Optical period of 160 days		9.8to11.2	
NGC 3962. Barred spiral.	**Gx.**	10.6	
NGC 3887. Spiral, lies about a degree and half from the star Zeta Crateris.	**Gx.**	10.7	3.5'
NGC 3762. Spiral.	**Gx.**	11	
NGC 3511, spiral galaxy, seen almost edge-on.	**Gx.**	11.1	
NGC 3513, spiral galaxy, in the same field of view as **NGC 3511**.	**Gx.**	12	

Hya HYDRA HY-dra The Water Snake	01-Apr		
Alphard, α Hydrae, Alpha Hydrae, class K. Is halfway between an orange giant and bright giant.		2.0	
γ Hydrae, Gamma Hydrae, yellow giant, class G.		2.993	
ζ Hydrae, Zeta Hydrae, class G, between a giant and bright giant.		3.10	
β Hydrae, Beta Hydrae, is a binary star, mag varies by 0.04 mags over 2.344 days. The primary is a giant B star, classified as an **alpha-2 Canum Venaticorum type variable**. **Sep 0.7**". ("bright pale-yellow pair").		4.276	
Minchir, σ Hydrae, Sigma Hydrae, class K orange giant.		4.44	
R Hydrae, a **Myra-type variable star**, a red pulsating variable star in the late stage of evolution, period of 389 days, class M red giant**.**		3.5to10.9	
ε Hydrae, Epsilon Hydrae, a multiple star: **RA 08h 46.8m DEC 06^0 25'.** **Epsilon Hydrae AB**, binary, class G + F, yellow giant and a yellow white dwarf, orbital period of 15 years, seperated 0.2", **Epsilon Hydrae C** is a spectroscopic binary: type F, @ 3", period of 9.9047 days and orbits the main pair with a period of 870 years. **Epsilon Hydrae D** @ 19", estimated orbital period of 10,000 years. **Epsilon Hydrae E** @ 340" and **Epsilon Hydrae F** @ 407".		3.38 +7.5 + 13th + 11th +11th	
ν Hydrae, Nu Hydrae, is an orange giant.		3.115	
π Hydrae, Pi Hydrae, class K, an orange star, halfway between the subgiant and giant stage of evolution.		3.25	

δ Hydrae, Delta Hydrae, binary star, class A, is a white dwarf. It is sometimes known as **Lisan al Shudja** or **Lingua Hydri**, which means "the tongue of the snake."		**4.14**	
27 Hydra. Sep 229.1", STRIKING: "bright grapefruit-orange + plum red". **RA 09h 20.5m DEC -09^0 33'.**	**Triple.**	**4.8 + 7.0 (7 + 11)**	
F Hya, "brilliant Sun-**yellow** + small **aquamarine**", sep 79", **RA08h 43.7m DEC -07^0 14'.**	**Ds.**	**4.7+8.2**	
54 Hydra. Showcase pair, Yellow + purple. **RA 14h 46m DEC -25^0 27'.**	**Ds.**	**5.3 + 7.4**	
h 4465, "bright red-gold + vaguely yellow", sep 66.1", **RA 11h 41.74m DEC -32^0 30'.**	**Ds.**	**5.4+8.3**	
Y Hydrae. HIP 48327. SAO 178088. Carbon star, period 303 days. Obvious red-orange**. Ra 09 51 03 Dec -23 01 02**	**C**	**6.5to9.0**	
V Hydrae, HIP 53085, a carbon star: one of reddest: deep copper red. Compare: T Lyrae and Hind's Crimson Star. Semiregular variable with a **curious light curve**: short term cycle varies by about **1.5 mag** over period of 533 days, from **7 to 8.5** mag. The second cycle introduces deep minima every 6500 days that can drop the star's brightness to **12th mag.**	**C**	**7.0 to 8.5 to 12.3**	
U Hydrae, HIP 52009, SAO 156110, carbon star, one of the **few** carbon stars that can be seen **without binoculars**. Strong orange. A bright giant, spectral class C. **Variable**: period of 114.8 days. **Ra 10 37 33 Dec -13 23 04.**	**C**	**4.5to6.2**	
Night Owl (Noctus). 47 and 48 Hydrae are the eyes – 8th mag. stars form the head. Sitting on the tail of Hydra. **RA 14h 00.0' DEC -25° 00'**	**Asterism.**		**1.3° x 0.7°**
Triangle. Faint stars: the brightest one mag 9.5, 6 stars mag 11 to 12. **RA: 14h 04m DEC: -28d 28m**	**Asterism.**		**0.5°**
M48. ASSA30. Large. M48 has at least 80 members, including three giant stars of spectral types G to K, hottest star in the cluster is class A, mag 8.8. [Charles Messier made a mistake with its positioning, hence credit for discovery is sometimes given instead to Caroline Herschel in 1783. Actually two subsequent independent rediscoveries occurred. The first was by Johann Elert Bode who found it before 1782 and then Caroline Herschel located it on March 8, 1783.].	**Oc.**	**5.8**	**54'**
M68. Class X globular, approximately 33,000 Ly, contains at least 2,000 stars, including 250 giants and 42 variables – one of which is actually a foreground star, is 106 light years in diameter, approaching us at a speed of 112 km/s, one of the most unusual features of Messier 68 is its **position– opposite our galactic center**.	**Gb.**	**7.8**	**11'**
NGC 5694. Tombaugh's Globular Cluster.	**Gb.**	**10.2**	
NGC 3242. ASSA39. A ring. **Ghost of Jupiter, Cat's Eye neb.** Hazy blue-green disc.	**Pn.**	**8.6**	**40"x 35"**
Abell 33 Ghostly, with foreground star near outer ring: aka **"Diamond Ring".** Round, large. **Ra. 09h 39m 09.1s Dec -02^0 48' 32" AP**	**Pn.**	**12.6, Cs 15.5**	**4.5'**
Abell 35. Very large and diffuse, bizarre looking: very unusal **"bow shock"** appearance due to the nebula and central star (9.6 mag G8 subgiant star SAO 181201; **HIP 62905**) drifting through the gas between stars. **RA: 12h 5m 3 32.79s DEC: -22^0 52' 22.6". AP**	**Pn.**	**?>12**	**>10'**
The Southern Owl Nebula. (PN K1-22 PLN 283+25.1, ESO 378-1). Resembles the Owl Nebula in Ursa Major notably symmetric, round, diameter four light-years . **RA 11h 26 m 42.0s DEC 34^O 22' 00.0"**	**Pn.**	**13.6 (12.1?)**	**3'**
M83. ASSA58. Face-on. "Southern Whirlpool Gx". The Thousand-Ruby Gx. Barred spiral. One of brightest and closest: 15 mill Ly. **AP**	**Gx.**	**7.5**	**13' x 11'**
NGC 3621. Spiral. Comparatively bright. Is a **pure-disc galaxy**: it **does not**	**Gx.**	**10**	

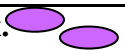
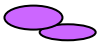
have a central bulge.			
NGC 3585. Elliptical.	**Gx.** 	**10**	
NGC 3923.	**Gx.** 	**10.1**	
NGC 3904.	**Gx.** 	**11**	
NGC 5101, Lenticular, face -on Gx + @ <0.5^0 **NGC 5078,** edge-on spiral.	**Gx.** 	**11.6+11.8**	**5.4 × 4′.6 + 4x1.9'**
NGC 3314 (a+b). Overlapping spirals.	**Gx.** 	**12.5**	
ESO 510-G13 (PGC 49473). Edge on spiral, **heavily warped** cloud of dust around equator. 150 mill Ly. **RA13h 55m 04.3s Dec−26° 46′ 50″**	**Gx.** 	**13.4**	
Leo LEO LEE-oh The Lion	**01-Apr**		
α Leonis,Alpha Leonis. Regulus: + Leo I Gx. A four-star system: **two pairs of stars**. **Regulus A**, a **spectroscopic binary**: a blue-white main sequence star class B + **unresolved** white dwarf. Orbit around their common centre of mass every 40 days. . **Regulus B** and **Regulus C** @ 177", dimmer main sequence stars class K star class M, orbital period of 2,000 years. Alpha Leonis is the **closest bright star to the ecliptic**: regularly occulted by the Moon and, rarely, by Mercury and Venus.		**1.35 +8.14 + 13.5 Gx: 7.7**	
Denebola, β Leonis, Beta Leonis, main sequence star, class A. It is classified as a **Delta Scuti variable**, its brightness varies slightly over a period of a few hours, exhibits variations in luminosity of 0.025 magnitudes about ten times a day. [The star belongs to the **IC 2391 supercluster:** a stellar association whose member stars share a **common motion** through space, but are **not gravitationally bound.** Other stars that belong to this association are Alpha Pictoris, Beta Canis Minoris, and the stars in the open cluster **IC 2391**, also known as the Omicron Velorum Cluster.]		**2.113**	
Zosma, δ Leonis, Delta Leonis, another **rapid rotator**, like Regulus and Denebola, it has an **equatorial bulge** and an **oblate shape**. A white main sequence star, type A.		**2.56**	
Chort, θ Leonis, Theta Leonis, white main sequence star, class A.		**3.324**	
Al Minliar, κ Leonis, Kappa Leonis, is a **binary**, class K.		**4.46**	
γ Leonis, Gamma Leonis. Algieba the "forehead", aka Juba. Exceptional": "Appears as a bright double star with **orange red** and **greenish yellow** components." Giant star, class K + dimmer class G. [Algieba, Adhafera (Zeta Leonis), and Al Jabbah (Eta Leonis) are sometimes collectively known as **the Sickle**.]	**Ds.** 	**1.98: (2.28+3.6)**	
Alterf, λ Leonis, a K class star**.**		**4.32**	
Subra, o Leonis, Omicron Leonis, a double star, classes F (a giant) and A (a main sequence star). Unresolved, need interferometry.	**Ds.** 	**3.53**	
Al Jabbah, η Leonis, Eta Leonis, white supergiant spectral class A.		**3.511**	
Adhafera, ζ Leonis, Zeta Leonis, a giant star, class F, has an optical (line-of-sight) companion, 35 Leo, @ 325.9".	**Ds.** 	**3.33+5.90**	
μ Leonis, Mu Leonis, Ras Elased Borealis, spectral class K**.**		**4.1**	
ε Leonis, Epsilon Leonis, Ras Elased Australis, Algenubi, "the southern star of the lion's head", a bright giant type G. It is classified as		**2.68**	

a Cepheid variable, changing by an amplitude of 0.3 mag every few days. (**Cepheid variables**, named after Delta Cephei in Cepheus constellation, are very luminous stars that have a direct relationship between their luminosity and pulsation period, which makes these stars important standard candles for establishing distance scales.)			
ρ Leonis, Rho Leonis, binary, class B blue supergiant + companion @ 0.11". Rho Leonis is a **runaway star** and has a peculiar velocity of 30 km/s at the minimum relative to the nearby stars.	**Ds.** 	**3.856+4.8**	
54 Leo, "showcase pair, "lovely contrast: bright banana-yellow + small sapphite-blue", sep 6.3". **RA 10h 55.6m DEC 24^0 45'.**	**Ds.** 	**4.5+6.3**	
81 Leo, "brilliant yellow + small red", sep 55.1", **RA 11h 25.6m DEC 16^0 27'.**	**Ds.** 	**5.6+10.8**	
ι Leonis, Iota Leonis, a **spectroscopic binary**, class F.		**4.0**	
σ Leonis, Sigma Leonis, a blue-white star, spectral class B.		**4.044**	
R Leonis is a red giant star, type M. It has a visual magnitude varying from 4.4 to 11.3 with a period of 312 days, classified as a **Mira variable**.		**4.4to11.3**	
Tau Leonis (τ), HIP 55945. **Orange-yellow** + blue. [& Nearby **Struve 1540/ 83 LEO**: yellow + red-orange].	**Ds x 2.** 	**5 + 8**	
Greg's 3. Remarkably **obvious 3** yet only "discovered" by Greg Parker in 2013. **RA 09h 38.0' DEC 15° 17'**	**Asterism.** 		**16' x 12'**
Frosty Leo Nebula, is a protoplanetary nebula (**PPN**). **RA 09h 39m 53.96s DEC +11° 58′ 52.4″**	**Pn.** 	**11**	**25"**
M65. Intermediate spiral. **[Leo Triplet]**	**Gx.** 	**10.3**	**8.7x2.5'**
M66. Intermediate spiral. **[Leo Triplet].**	**Gx.** 	**8.9**	**9.1x4.2'**
Leo Triplet: M65/ M66 / NGC3628. AP	**Gxs.** 		
NGC 3628.[Triplet] King Hamlet's Ghost. Also "Hamburger"…?	**Gx.** 	**9.5**	
M95. Barred spiral.	**Gx.** 	**11.4**	
M96. Intermediate spiral.	**Gx.** 	**10.1**	
M 105. Elliptical, 2 companions in same FOV. **(NGC3384/9).**	**Gx.** 	**10.2**	
NGC 2903. Barred spiral, nearly face-on. Bright. & Star cloud: **NGC 2905. AP**	Gx. & star cloud. 	**8.9**	
NGC 3521. **"Gorgeous spiral"**. "Characteristic patchy, irregular spiral arms laced with dust, pink star forming regions, clusters of young, blue stars. **AP**	**Gx.** 	**8.9**	
NGC 3384.	**Gx.** 	**10**	
NGC 3607.	**Gx.** 	**10**	
NGC 3758.	**Gx.** 	**14.3**	
Hickson 44, compact group. Gravitationally bound, 2^0 NNW of **Algieba: NGC 3190/ 93/87/85. AP**	**Gx.** 	**11.1.. <**	**Span 18'**
The Leo Cluster, Abell 1367, around 4.5 mag star: 93 Leonis, bright member **NGC 3842. Others: NGC 3861 / 3862 / 3837/ 3840… AP**	**Gx.** 	**11.8to13.7**	**1'**
Hickson 57, Copeland's septet. Ly 5.7^0 ENE of mag 2.6 Zosma (DELTA Leonis), 7 galaxies: **NGC 3745/ 3746/ 3748 / 3750 / 3751/3753 / 3754.**	**Gx.** 	**14.0to15.2**	**6'**
The Cosmic Horseshoe. HUBBLE, is the nickname given to a gravitationally lensed system of two galaxies**.** **RA11h 48m 33.1s DEC19° 30′ 03**		**20.3**	

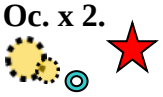
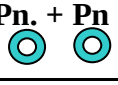
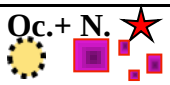
LMi LEO MINOR LEE-oh MY-ner The Lesser Lion	**01-Apr**		
Praecipua, 46 Leonis Minoris, the **brightest** star in Leo Minor, class K, an orange star halfway between the subgiant and giant stage of evolution.	★	**3.83**	
β Leonis Minoris, only star in Leo Minor that has a Greek letter name. A binary star, G and F, a yellow giant-subgiant and a yellow-white subgiant.	**Ds.** ★★	**4.40+6.13**	
21 Leonis Minoris, class A, a white dwarf.	★	**4.49**	
10 Leonis Minoris, a yellow giant, class G.	★	**4.60**	
20 Leonis Minoris, binary, a **yellow** dwarf class G and an old **red** dwarf of the spectral type M. The two stars are separated by 14.5".	**Ds.** ★★	**5.40**	
Struve 1374, "striking contrast: lemon **yellow** + powder **blue**", sep 3.0", **RA 09h 41.4m DEC 38^0 57'.**	**Ds.** ★★	**7.3+8.7**	
11 Leonis Minoris, primary is a yellow dwarf class G, a **RS Canum Venaticorum type variable,** which means that it is a close binary star with an active chromosphere which can cause large stellar spots, which in turn cause variations in brightness, luminosity varies by 0.04 mag., companion is a red dwarf type M.	**Ds.** ★	**5.41+13**	
Sailboat Cluster. 13 or 14 blue-white stars.. Boat shape with mast**.** Contain 22 Leonis. In the mast : 2 red coloured**.** **RA 10h 14.0' DEC 31° 30'**	**Asterism.** ★ ★ ★ ★		**45'**
NGC 3344. Sliced Onion Gx. Face-on spiral.	**Gx.**	**10.5**	
Hanny's Voorwerp (DIM) + nearby Gx **IC2497. Hanny's Voorwerp and IC 2497.** Hanny's Voorwerp is a **quasar ionization echo**. Both the object and the galaxy are about 650 million light years distant from Earth. A more recent theory suggests that the illumination comes from a supermassive black hole at the centre of the galaxy, and from the light produced by the interaction of the gas surrounding the galaxy and an energetic jet from the black hole. AP	**N. + Gx.**	**19, Gx = 15.8**	
NGC 3486. Spiral, appearing almost face-on.	**Gx.**	**10.3**	
NGC 2859. Lenticular galaxy in Leo Minor. The galaxy has a prominent bar and a bright central region, but the outer disc appears as a detached ring.	**Gx.**	**10.7**	
NGC 3414. Galaxy.	**Gx.**	**10.8**	
NGC 3344, galaxy.	**Gx.**	**10.5**	**7.1×6.5'**
NGC 3003 is a barred spiral, appears almost edge-on.	**Gx.**	**12.3**	**5.8'**
NGC 3432, aka the **Knitting Needle Galaxy,** lies 3 degrees southeast of the star 38 Leonis Minoris. It appears almost edge-on.	**Gx.**	**11.67**	

UMa URSA MAJOR ER-suh MAY-jer The Great Bear	20-Apr		
Alioth, ε Ursae Majoris, Epsilon Ursae Majoris, brightest in Uma, spectral class A. It is an **Alpha-2 Canum Venaticorum variable**, fluctuations in its spectral lines with a period of 5.1 days**.**		**1.76**	
Dubhe, α Ursae Majoris, Alpha Ursae Majoris, a giant star class K. It is a **spectroscopic binary**, companion is a main sequence star type F. It completes the orbit around the brighter star every 44.4 years from a distance of 23 astronomical units. There is another binary system about 90,000 AU away from the main pair, which makes Alpha Ursae Majoris a **four star system**.		**1.79**	
Merak, β Ursae Majoris, Beta Ursae Majoris, a main sequence star, class A. The star has a debris disk of dust orbiting it, one with a mass 0.27 percent that of the Earth.		**2.37**	
Alkaid (Benetnash, Elkeid), η Ursae Majoris, Eta Ursae Majoris, a young main sequence star class BV, notable for being one of the hottest stars that can be seen without binoculars. It has a surface temperature of 20,000 K.		**1.85**	
Phecda, γ Ursae Majoris, Gamma Ursae Majoris, a main sequence star type A.		**2.438**	
Megrez, δ Ursae Majoris, Delta Ursae Majoris, type A.		**3.12**	
Mizar and Alcor, ζ Ursae Majoris, Zeta Ursae Majoris and 80 Ursae Majoris, form a naked-eye double star in the handle of the Big Dipper asterism. Mizar is itself a quadruple system and Alcor is a binary, the pair together forming a **sextuple system**. The two stars are sometimes known as the "**Horse and Rider**."	**Ds.** 	**2.23 +3.99**	
VY Ursae Majoris. HIP 52577. Irregular variable**, carbon star.**		**5.9to7.0**	
W Ursae Majoris, prototype for a class of stars known as the **W Ursae Majoris variables.** It is a binary system composed of two close stars in a circular orbit with a period of 0.3336 days. The stars are **physically so close** that their outer envelopes are in direct contact. Each star orbits the other during each orbital cycle, resulting in a decrease in brightness. Both class F.		**7.75to8.48**	
M40. Messier 40, Winnecke 4, WNC4.A Double star. Unrelated.	**Ds.** 	**9.7**	**49"**
ASTERISM Sue French, 1.5° west of beta Ursae Majoris, looks rather like the Big Dipper asterism in miniature. The brightest star magnitude 7.4 (HD 93847), is situated in the northern part of this asterism of seven stars. **RA10h50m.6 DEC+56°08'.0 6.8 15'×9'**	**Asterism.** 		
Broken Engagement Ring (perhaps a Tiara?). An open or 'C' shaped grouping of 10 stars **RA 10h 51.0' DEC56° 09'**	**Asterism.** 		**20'**
NGC 3231. Open Cluster**.**	**Oc.** 	**9**	**4'**
M97. Owl Neb. The Owl Nebula has a 16th magnitude star at its centre. It got its name because of its appearance of owl-like eyes when observed through a large telescope.	**Pn.** 	**9.9**	**170"**
M81. "Bode's Nebula". Bode's Galaxy, NGC 3031, bright, large spiral galaxy, about 11.8 million light years distant from Earth.	**Gx.** 	**6.9**	**26.9 x 14.1**
M82. Cigar Galaxy. Messier 82 is an edge-on starburst galaxy about 11.5 million light years from the solar system.	**Gx.** 	**8.41**	**11.2'× 4.6'**
M101. Pinwheel Gx. Spiral. Messier 101 has five notable companion galaxies: NGC 5474, NGC 5204, NGC 5477, NGC 5585 and Holmberg IV.	**Gx.** 	**7.9**	**26'×27'**
M102: ID?: = M101 or NGC 5866 in Draco.	**Gx.** 		
M108. Barred spiral.	**Gx.** 	**10.7**	**8.1'×2.2'**
M109. Barred spiral.	**Gx.** 	**10.6**	

NGC 2841.	**Gx.**	**9.3**	
NGC 3184. Spiral.	**Gx.**	**7.0**	
Constellation: Object/ Info.	**@MERIDIAN/ Target Type.**	**App. Mag.**	**SIZE**
MAY			
CVn CANES VENATICI **KAH-nez ve-NAT-eh-see The Hunting Dogs**	**01-May**		
α Canum Venaticorum, Alpha Canum Venaticorum. Cor Caroli: "**King Charles's heart**". A binary, stars separated by 19.6", brighter component, Alpha-**2** CVn, is a chemically peculiar star that belongs to the spectral class A, a **prototype** of a class of variable star, the **Alpha-2 Canum Venaticorum variables**: notable for strong magnetic fields which are believed to produce enormous starspots which, in turn, cause the luminosity to vary significantly during the stars' rotation. The companion star, Alpha-**1** CVn, F-type main sequence star with an apparent magnitude of 5.60. **Double**: "bright white + bluish sea green: vivid". [Alpha CVn is part of the **Great Diamond** (or Diamond of Virgo) **asterism**, marking its northern vertex. Other stars forming the asterism are Denebola, Spica and Arcturus.]	**Ds.**	**2.84to2.98 & 5.60**	
Chara, β CVn, Beta Canum Venaticorum, a G-type main sequence dwarf, has been called a solar analogue or **solar twin**.		**4.26**	
AM Canum Venaticorum, AM CVn, classified as a cataclysmic variable star, one that irregularly has dramatic increases in luminosity and then drops back to a quiescent state. **AM CVn is a prototype** of a class of variables known as the **AM CVn stars**. These stars are cataclysmic variables consisting of two white dwarfs, with the accretion disc composed mainly of helium.		**14.18**	
RS Canum Venaticorum, RS CVn, serves as a **prototype** for the **RS Canum Venaticorum variables: close binary stars, variations in luminosity** caused by the stars' active chromospheres. The period of variations typically mirrors the orbital period of the star system. The stars' luminosity typically fluctuates by 0.2 magnitudes.			
Y CVn, Gamma Canum Venaticorum, HIP 62223. "La Superba", carbon star, one of the **reddest stars** in the sky: yellow-orange, believed to be in the last stages of fusing its secondary fuel, helium, into carbon. **Semi-regular variable star,** 268 day cycle. The brightest **J-star** known. (**J-stars** are the rare carbon stars that contain an abundance of carbon-13). **Ra 12h 45m 07.83s Dec +45° 26′ 24.92″**		**4.9to5.9**	
M3. One of largest and brightest.	**Gb.**	**6.4**	
M51 "Whirlpool Gx" + **NGC 5195** interacting satellite Gx. "Cross" in nucleus. **AP**	**Gx.**	**8.4 & 9.6**	
M94. Face-on spiral, tight arms, elliptical halo.	**Gx.**	**9**	
M106.	**Gx.**	**9.1**	
M63. Sun-flower Gx. Central disc, many short spiral arms segments. **AP**	**Gx.**	**9.3**	
NGC 4111. Lenticular.	**Gx.**	**10.8**	

NGC 4214. Lenticular.	**Gx.** 	**9.7**	
NGC 4244. Edge-on.	**Gx.** 	**10.2**	
NGC 4631. Whale Gx + NGC4627, edge-on spiral galaxy, nicknamed the Whale: has a slightly distorted shape that resembles a whale or a herring.	**Gx.** 	**9.8**	
NGC 4449. Irregular. LMC-like.	**Gx.** 	**9.4**	
NGC 5005.	**Gx.** 	**9.8**	
Hockey Stick Galaxies: NGC 4656 & NGC 4657 (Crowbar Galaxy, UGC 7907, PGC 42863), interacting galaxies. AP	**Gx.** 	**11.0**	**14x3'**
NGC 4490 + NGC 4485. Interacting.	**Gx.** 	**9.8**	

Cen CENTAURUS sen-TOR-US The Centaur	**10-May**		
α Centauri, Alpha Centauri, Rigil Kentaurus, 3rd brightest. Triple star system: Yellow type G (4th brightest on own) + orange type K + **Proxima Cen:** 2deg SW. (1.5 x bigger than Jupiter). **Alpha Centauri A**, is the fourth individual brightest star in the night sky, is similar to the Sun: it is a yellow-white main sequence star spectral type G, about 10% more massive than the Sun. **Alpha Centauri B** is a main sequence star, type K, slightly smaller than the Sun. **Proxima Centauri**, a red dwarf , forms a visual double with Alpha Centauri AB, designated Alpha Centauri C, spectral class M, 4.24 **light years** distant from the Sun, the **nearest star**, is classified as an UV Ceti type flare star, which means that it can have sudden changes in brightness. [**Abs mag:** 4.38]	**Ds.** 	**-0.28 (-0.01 &1.33 & 11.0to11.9)**	
β Centauri, Beta **Centaurii/ Hadar/ Agena.** 10th (11th) brightest. **Trinary star system**: three components. **Hadar A** is blue-white giant star, 392 **light years** distant spectral class B, **spectroscopic binary**, with the companion separated from the brighter component by 1.3", at least one of the stars is a **Beta Cephei type variable**, a star whose brightness varies as a result of the pulsations of its surface. **Hadar B** orbits the primary pair and takes a minimum of 250 to make the trip. [**Abs mag: -4.53]**	**Ds.** 	**0.6 + 4**	
3 Centaurii. H 3 101. HIP 67669. Two blue-whites, separated 7.9".	**Ds.** 	**4.56 + 6.1**	
Menkent, Haratan, θ Centauri, Theta Centauri, orange K-type giant.	**Ds.** 	**2.06**	
Muhlifain, γ Centauri, Gamma Centauri, a **binary**, two type A.		**2.2: (2.9+2.9)**	
ε Centauri, Epsilon Centauri, a blue-white giant, class B. It is a **Beta Cephei type variable** star, one exhibiting variations in brightness as a result of the pulsations of its surface.		**2.29to2.31**	
η Centauri, Eta Centauri, a very hot class B dwarf, also classified as a **Gamma Cassiopeiae type variable,** or a **shell star**, which is to say that it is a fast rotating star with a disc of gas surrounding it at the equator.		**2.33**	
Alnair, ζ Centauri, Zeta Centauri, a **spectroscopic binary**, class B, an orbital period of slightly over eight days**.**		**2.55**	
Ma Wei, δ Centauri, Delta Centauri, A is a B-type star, classified as a **Gamma Cassiopeiae type** variable. Visually: wide **group of 3 stars**: A+B		**2.51to2.65 & 4.4 &**	

+C: sep 268.9"and 216.9", **contrasting**: "blue-white, white,whitish-green".		**6.3**	
ν Centauri, Nu Centauri, a blue-white subgiant, type B, classified as a **Beta Cephei type variable**, with luminosity fluctuations attributed to the pulsations of its surface. Also classified as a **rotating ellipsoidal variable** star: a **close binary** star whose components are ellipsoidal, with variations in brightness occurring as a result of the changes in the amount of light emitting area visible to the observer. Period of 2.62 days. [Spica, the brightest star in Virgo, is the brightest rotating ellipsoidal star in the sky.].		**3.38to3.41**	
Ke Kwan, κ Centauri, Kappa Centauri, a **spectroscopic binary** star, type B, a blue-white subgiant, companion @ 0.12".		**3.13**	
BrsO 6, showcase pair, optical double, "bright pale-yellow + dull yellowish", sep 13.1", **RA11h 28.6m DEC -42^0 40'.**	**Ds.** 	**5.1+7.4**	
D Cen, showcase pair, "yellowish-orange + white", sep 2.9', **RA 12h 14m DEC -45^0 43'.**	**Ds.** 	**5.8+7.0**	
h 4569, "white + orange", sep 4.6", **RA 13h 08m DEC -56^0 41'.**	**Ds.** 	**7.5+9.1**	
J Cen, showcase pair, "pair of white suns", sep 60.7", **RA 13h22.6m DEC -60^0 59'.**	**Ds.** 	**4.5+6.2**	
Q Cen, showcase pair, "yellow-white + bluish", sep 5.5", **RA 13h 41.7m DEC -54^0 34'.**	**Ds.** 	**5.2+6.5**	
N Cen, showcase pair, "bright, unequal pale-yellow pair", sep 18.1", **RA 13h52.1m DEC -52^0 49'.**	**Ds.** 	**5.2+7.5**	
4 Cen, showcase pair, "pale yellow + ashy", sep 14.8", **RA 13h 53.2m DEC -31^0 56'.**	**Ds.** 	**4.7+8.5**	
NGC 3766. ASSA46. Pearl cluster.	**Oc.** 	**5.3**	**12'**
NGC 5662. ASSA61.	**Oc.** 	**5.5**	
NGC 5281. ASSA59.	**Oc.** 	**5.9**	**5'**
NGC 5460. ASSA 60.	**Oc.** 	**5.6**	**25'**
NGC 5316.	**Oc.** 	**6.0**	
NGC 5617. 1.2^0 W of Alpha Cen. **Colourful.** At edge: faint Oc **Pismis 19.** (Reddened by intervening dust). Between Oc & A-Cen**: Pn Hen 2-111**. Faint… **AP**	**Oc. x 2.** 	**6.3**	
NGC 5139, ASSA56. Dunlop 440, Bennett 61, Omega Centauri. 10 mill. stars, 150 ly across. At 15 800 ly distance. **Its core the remnant of a disrupted dwarf Gx? (Kapteyn's Star, a red dwarf in the constellation Pictor notable for its extremely high proper motion, is believed to originate from Omega Centauri.)**	**Gb.** 	**3.7**	**36.3'**
NGC 5286, Dunlop 388, Bennett 64. Globular Cluster.	**Gb.** 	**7.2**	**9.1'**
NGC 5307: planetary + nearby globular **NGC 5286.**	**Pn. + Gb.** 	**12th & 7.6**	**13"**
NGC 3918 ASSA47 Cs? Disc. **Blue Planetary/ Southerner.**	**Pn.** 	**8.4**	**12"**
ESO 172-7, Planetary Nebula. RA 12h41m.8 DEC-54°14'.9	**Pn**	**12**	**60"**
NGC 3699 and SA2-76. Two planetaries close to each other.	**Pn. + Pn** 	**11 & 13.2**	
IC2944 (Running Chicken Neb) + NGC 2948 + Lambda Cen. Contain Bok globules: Thackeray's Globules. AP	**Oc.+ N.** 	**4.5**	**1'**
NGC 5367. Reflection neb. - two parts: around 9th and 10th mag stars. Embedded in **cometary globule CG 12** + dark neb **B146E. For AP.**	**N + Dn + DS** 		**>1 deg**
NGC 5102	**Gx.** 	**9.7**	

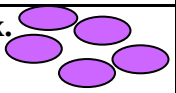
NGC 5128. ASSA55. Dunlop 482, Bennett 60, Centaurus A. Hamburger Gx. Peculiar. Colliding spiral/ elliptical. **(SN2016adj**.) **AP**	**Gx.**	**7**	**31'×23'**
NGC 4945. ASSA 54. Golden Coin Gx. Spiral Gx, energetic nucleus. **(**Between 2 bright stars: Closets = Zeta Centauri.). & Nearby, faint NGC 4945A: Close to a bright star. **AP**	**Gx.**	**8.3 & 12.5**	**19.8'×4. 0' & 2.5'×1.6'**
NGC 5090 and NGC 5091. Elliptical + a spiral galaxy that are in the process of merging and colliding, seen at a steep angle, nearly edge-on.	**Gx.**	12.6 + 13.9	
NGC 4603, spiral galaxy notable for containing more than 36 Cepheid variable stars.	**Gx.**	12.3	
NGC 4650A is a polar-ring galaxy: a type of galaxy in which the outer ring of stars and gas rotates over the poles of the galaxy. The polar rings are believed to form as a result of two galaxies gravitationally interacting with each other, or of a smaller galaxy orthogonally colliding with a larger galaxy's plane of rotation. **AP**	**Gx.**	13.9	
NGC 4976, Bennett 58, Galaxy.	**Gx.**	10.1	**5.4'×3.3'**
NGC 4622 is a face-on spiral galaxy, approximately 111 million light years distant. **Aka "backward galaxy."** Unlike most known spiral galaxies, it has leading spiral arms. This means that the tips of the galaxy's spiral arms point toward the direction of disk rotation. (In spiral galaxies, spiral arms usually trail.) Later, it was discovered that the galaxy had two new weak arms in the inner disk that were turning opposite the outer pair.	**Gx.**	12.6	

Com COMA BERENICES **KOH-mah bear-eh-NEE-seez Berenice's Hair**	**01-May**		
Diadem, α Comae Berenices, Alpha Comae Berenices, the gem in Queen Berenice's crown. A binary, **two stars**, both class F, separated at most by only 0.7".	**Ds.**	**4.32: 5.05+5.08**	
β Comae Berenices, Beta Comae Berenices, the brightest, a main sequence dwarf star.		**4.26**	
γ Comae Berenices, Gamma Comae Berenices, a giant star, class K..		**4.350**	
FK Comae Berenices, a variable, period of 2.4 days. **Prototype** for the **FK Com class**. These stars are believed to be variable as a result of having large cold spots on their rotating surfaces. Class G.		**8.14to8.33**	
24 Com. HIP 61415, Spring Albireo,"citrus-**orange** + fainter royal **blue**", sep 20.1". **RA: 12h 35.1m Dec: +18°23'**	**Ds.**	**5.1 + 6.3**	
Struve 1633, "bright pair of peach-white star", sep 8.9", **RA 12h 20.7m DEC 27^0 03'.**	**Ds.**	**7.0+7.1**	
Struve 1685, "blue-white + green-white", sep 16.0", **RA 12h 51.9m DEC $+19^0$ 10'.**	**Ds.**	**7.3+7.8**	
Coma star cluster. **Merlotte 111.** Star at top of the "triangle" is **gamma Com**. Contains double **17 Com**. (5.3 + 6.6 mag @ 145"). **RA 12h 22.5m Dec +25° 51' Binos.**	**Oc.**	**1.8**	**7.5^o**
M53 + NGC 5053.	**Gb.**	**8.3 + 9.8**	
NGC 4147.	**Gb.**	**10.4**	
M64. "Black eye Gx". It is sometimes also called the **Sleeping Beauty** Galaxy or **Evil Eye Galaxy**. The Black Eye Galaxy has a **bright nucleus** and	**Gx.**	**9.4**	

a **dark band of dust** in front of it, earned it the nickname the Evil Eye. AP			
M85. Messier 85, NGC 4382. Lenticular galaxy, it is **interacting** with two smaller neighbours; the spiral galaxy **NGC 4394** and elliptical galaxy **MCG 3-32-38.**	**Gx.**	**10**	
M100. Face on, grand design spiral, a brilliant core, two main spiral arms and a number of less prominent ones, as well as a few dust lanes, contains a satellite galaxy, **NGC 4323**.	**Gx.**	**10.1+15.7**	**7′.4 × 6′.3**
M88. Spiral galaxy.	**Gx.**	**10.4**	
M91. Barred spiral galaxy**.**	**Gx.**	**11**	
M99: FACE ON**.** Unbarred spiral galaxy**.** Abnormal looking and extended arm.	**Gx.**	**10.4**	
M98. Intermediate spiral galaxy**.**	**Gx.**	**11**	
NGC 4725. Intermediate barred spiral galaxy.	**Gx.**	**10.1**	
NGC 4494. Elliptical galaxy**.**	**Gx.**	**9.7**	**4,5′ × 4,3′**
NGC 4559. Spiral galaxy**.**	**Gx.**	**9.9 (10.4?)**	**10′.7 × 4′.4**
NGC 4565. The Spindle or Needle Gx. Edge-on spiral galaxies. **Being 16 arc minutes** in length, it has the **largest apparent length** of any edge-on galaxy discovered. AP	**Gx.**	**9.6**	**16’**
NGC 4473 /4477/ 4479.	**Gx.**	**10.2 (4473)**	
NGC 4676A & B. The Mice. Colliding, merging: long tails. AP	**Gx.**	**14.7 + 14.4**	
The Coma Cluster contains about 1,000 large galaxies and 30,000 smaller ones, a great majority of them brighter than 19.0. The brightest galaxies in the group are of thirteenth magnitude. They are **NGC 4889** and **NGC 4874**. Another notable member is **NGC 4921**, one of the comparatively few spirals in the group and the brightest spiral galaxy in the cluster.	**Gx.**		
Cru CRUX (Or Crux Australis) **KRUKS The Southern Cross**	**01-May**		
Acrux, α Crucis, Alpha Crucis, bluish-whites. Triple star. **12th brightest,** the southernmost first magnitude star. Acrux is a multiple star system composed of **Alpha-1** Crucis, spectroscopic double, B class subgiant , + **Alpha-2** Crucis, a B class dwarf, @ 4” & **Alpha-3** @ 90.0”. **“Close pair of blue-whites & contrasting yellow-green”.**		**0.77 (1.3+ 1.6) & 4.8**	
β Crucis, Beta Crucis, Becrux Mimosa. Spectroscopic binary, classified as a **Beta Cephei variable**. Spectral type B, is thought to be the hottest first magnitude star. (see below: Ruby Crucis)		**1.3**	
Ruby Crucis. DY Crucis. Carbon star – in the glare of **Mimosa**.	C	**8.9**	
γ Crucis, Gamma Crucis, Gacrux. Orange (Red giant), class M + white optical companion, class A + companion: this triple form a **triangle**: “**orange + bluish-white + bluish**”.		**1.59 + 6.4 + 9.5**	
Delta Crucis, δ Crucis, a subgiant, class B, classified as a **Beta Cephei type variable.**		**2.775**	

Epsilon Crucis. Orange giant.		**3.56**	
Mu Crucis, μ Crucis. Blue-whites. Wide binary.	**Ds.** 	**4 + 5.1**	
ζ Crucis, Zeta Crucis, double star, a blue-white dwarf class B, and a faint companion.	**Ds.** 	**4.04+12.49**	
ε Crucis, Epsilon Crucis, an orange giant, class K.		**3.56**	
θ Crucis, Theta Crucis, two distinct star systems: **Theta-1 Crucis** is a spectroscopic double, class A. **Theta-2 Crucis** is also a spectroscopic binary, a pair of stars that orbit each other with a period of 3.4280 days, class B. One of the stars is a **Beta Cephei variable**.	**Ds.** 	**4.30+ 4.72 (4.70to4.74)**	
λ Crucis, Lambda Crucis, a blue-white dwarf, class B, classified as a **Beta Cephei variable**, luminosity varies by 0.02 mag, period of 0.3951 days.		**4.6**	
ι Crucis, Iota Crucis, an orange giant, class K, has an optical companion, a class G star.	**Ds.** 	**4.69+10.8**	
BZ Crucis, class B subgiant. **Gamma Cassiopeiae type variable** star: a **shell star** that has a circumstellar gas disk around the equator. It is located **behind the Coalsack Nebula.**		**5.316**	
Baby Southern Cross. RA: 12h 4.96m Dec: -63° 36.38' **Thx to Percy Jacobs.**	**Asterism.** 	**7.0/7.5**	**10 – 20"**
NGC 4755. ASSA52. Herschel's Jewel box, Kappa Crucis cluster: The three brightest stars got the nickname "**traffic lights**" because of their different colours. The dominant star in the cluster is **Kappa Crucis** (HD 111973), a red, M-type supergiant, visual mag of 5.98.	**Oc.** 	**4.2**	**10'**
NGC 4609. Open Cluster.	**Oc.** 	**6.9**	**5'**
NGC 4103. Open Cluster.	**Oc.** 	**7**	
NGC 4349. Open Cluster.	**Oc.** 	**7.4**	**8'**
NGC 4439. Open Cluster.	**Oc.** 	**8.4**	**4'**
NGC 4337. Open Cluster.	**Oc.** 	**8.9**	**3.5'**
VAN DEN BERGHHAGEN 133. Open Cluster. **RA 12h27m.3 DEC-60°45'.7**	**Oc.** 	**7.1**	**5'**
HOGG 14. Open Cluster. **RA 12h28m.6 DEC-59°48'.0**	**Oc.** 	**9.5**	**3'**
HOGG 15. Open Cluster. **RA 12h43m.6 DEC-63°06'.1**	**Oc.** 	**10.3**	**2'**
HOGG 23. Open Cluster. **RA 12h28m.5 DEC -60°53'.7**	**Oc.** 	**9.5**	**7'**
NGC 4184. Open Cluster, with associated nebulocity? 1.5° W of alpha. **AP**	**Oc.** 	**12**	**3'**
Coalsack. ASSA51. It stretches across nearly seven by five degrees of the sky, crossing over into the neighbouring constellations, Centaurus and Musca.	**DkN.** 		

Mus MUSCA MUSS-kah The Fly	May		
α Muscae, Alpha Muscae, a blue-white, halfway between dwarf and subgiant evolutionary stages, class B, classified as a **Beta Cephei type** variable, which means that it exhibits variations in brightness as a result of pulsations of its surface.		**2.69**	
β Muscae, Beta Muscae, binary, blue-white main sequence dwarfs, class B, separated by 1.206". Confirmed **runaway star** system, moving through space with an abnormally high velocity compared to the surrounding interstellar medium.	**Ds.**	**3.05 (3.51 + 4.01)**	
δ Muscae, Delta Muscae, HD 112985, spectroscopic binary, primary star is an orange giant, class K.		**3.61**	
λ Muscae, Lambda Muscae, HD 102249, class A, a white giant star.		**3.68**	
γ Muscae, Gamma Muscae, blue-white main sequence dwarf, class B.		**3.84**	
ε Muscae, Epsilon Muscae, a red giant, class M.		**4.11**	
μ Muscae, Mu Muscae, an orange giant, class K.		**4.75**	
θ Mus, Theta Muscae. To small telescopes appears as a **double star**: blue-cream θ Muscae **A** & a class O companion θ Muscae **B** @ 5.3". [θ Muscae **A**: triple star system, two parts: a **spectroscopic binary** system: a **Wolf–Rayet star** + O-type main sequence star, orbit each other every 19 days **and** a blue supergiant @ 46 milliarcseconds. (Theta Muscae is the **second-brightest Wolf–Rayet star** in the sky after **Gamma Velorum**.).	**Ds.**	**6 &7.3**	
h 4432, showcase pair, pale yellow, sep 2.4", **RA11h 23.4m DEC -64^0 57'.**	**Ds.**	**5.4+6.6**	
STREICHER 39, Asterism: represents a sort of Japanese fan in shape. The brightest stars are to the south and from there it extends outwards to the north, where fainter stars complete the impression. **RA 12h32m.6 DEC-75°21'.1**	**Asterism.**	**13**	**9'**
NGC 4463. Open Cluster.	**Oc.**	**7.2**	**5'**
ESO 064-SC05. Open Cluster. **RA12h24m.5 DEC-68°28'.0**	**Oc.**	**9.8**	**10'**
NGC 4815. Open Cluster.	**Oc.**	**8.6**	**3'**
HARVARD 8. Open Cluster. **RA 13h18m.2 DEC -67°05'.0**	**Oc.**	**9.5**	**5'**
NGC 4833. ASSA53. Globular cluster. Partial ly dust obscured.	**Gb.**	**7.4**	**13.5'**
NGC 4372: Gb. + Dark Doodad, ASSA49. Dark nebula: more than 30 light years long and lies approximately 700 light years from Earth. (For wide field **AP**)		**Gb = 7.8**	**Gb:18.6, N:3^0**
NGC 5189.ASSA57. Cs. "The Spiral Pn" + a circlet of stars in FOV. **AP**	**Pn.**	**10.3**	**153"**
NGC 4071. Eyeball neb. Planetary nebula.	**Pn.**	**?12.8**	
IC 4191. Planetary nebula.	**Pn.**	**12**	**5"**
"Engraved or Etched Hourglass" Neb (vs Mon) MyCn 18 **Ra13h 39m 35.116s Dec −67° 22′ 51.45 AP**	**Pn.**	**13**	
Vir VIRGO VER-go The Virgin	**10-May**		

α Virginis, Alpha Virginis. Spica. Blue-white, types B, **15th brightest** star in sky.It is a **rotating ellipsoidal variable star**: a spectroscopic binary and rotating ellipsoidal variable—two main stars are so close together they are egg-shaped rather than spherical, and can only be separated by their spectrum. The primary is a blue giant and a **Beta Cephei type variable** star, changes in brightness as a result of pulsations of its surface, brightest at the point of maximum contraction. Orbit about each other every four days, apparent magnitude of the star system vary by 0.03 The secondary member of this system is one of the few stars whose spectrum is affected by the Struve–Sahade effect. This is an anomalous change in the strength of the spectral lines over the course of an orbit, where the lines become weaker as the star is moving away from the observer. It may be caused by a strong stellar wind from the primary scattering the light from secondary when it is receding.		**1.04**	
Porrima. Gamma (γ). Binary, aka Postvarta, Arich and Laouiyet al Aoua. Both type F. Revolve **169 years**, 1995: a small scope easily split this pair, 1996 through 2010, the two stars moved **too close together to resolve** in a small telescope, **by 2010**, they separated enough to once again split in a telescope on nights of very steady seeing. Together with Beta, Eta, Delta and Epsilon Virginis, the star forms an **asterism known as Barker**. (JohanS goes into low-earth orbit: Split by Old Longdrop: **March 2011**).	**Ds.** 	**2.74: 3.56 + 3.65**	
Beta Virginis. Zavijava. (Einstein/ speed of light, 1922…), class F, only the fifth brightest star in the constellation.		**3.61**	
Auva, δ Virginis, Delta Virginis, red giant, class M, it is a **high-velocity star**, moving at the speed of more than 30 km s–1 relative to the motion of the neighbouring stars. Classified as a **semiregular variable**, suspected binary star with K-type dwarf @ 80".	**Ds.** 	**3.32to3.4 + 11th**	
Vindemiatrix, ε Virginis, Epsilon Virginis, the third brightest, a giant, class G.		**2.826**	
Syrma, ι Virginis, Iota Virginis, class F.		**2.44**	
Rijl al Awwa, μ Virginis, Mu Virginis, a yellow star, class F.		**3.87**	
χ Virginis, Chi Virginis, class K, an orange giant, three visual companions, a K type star @ 173.1", a 10th magnitude star @ 221.2" and a K-type star @ 321.2".		**4.652 +9.1+10th +9.1**	
Zaniah. η Virginis, Eta Virginis, a triple star system, class A, connot be resolved in telescope.		**3.89**	
SS Virginis. Carbon star, period 361 days**.** **RA12h25m02" DEC 0⁰ 46'**		**7.4to9.5**	
Jaws. 1 deg NW of **M104** .Close to **Stargate**. 21Stars.Tight group of 4 stars = mouth. **RA: 12h 38m DEC: -11d 30m**	**Asterism.** 		**27'**
Quasar 3C 273. HIP 60936, brightest, 1st to be detected. Lies ¾ ° E of SAO 119392. Looks like "another dim, slightly bluish star" @ 2.4 billion Ly. **RA 12h 29m 06.7s Dec+02° 03′ 09″** **AP**	Q 	**12.9**	
NGC 5634. Globular cluster, unresolved.	**Gb.** 	**9.5**	
Abell 36 is a planetary nebula located 780 light years away. **RA 13h 40m 41.34369s DEC −19° 52′ 55.3200″** **AP**	**Pn.** 	**12.2, Cs15.4**	**6′.117**
IC 972, Abell 37, small planetary.	**Pn.** 	**14.9**	**42"**
Virgo Cluster, a galaxy cluster found in the constellations Coma Berenices and Virgo, at the centre of the **Virgo Supercluster**, the larger cluster of galaxies that also contains the **Local Group**, which in turn includes the Andromeda Galaxy and the Milky Way.	**Gx.** 		
M104. Sombrero. ASSA50. Spiral, edge-on, unbarred. NGC 4594 Bennett 52. Not part of Virgo cluster. **AP**	**Gx.** 	**8**	**7.2'×4.4'**
M49. Brightest of Virgo Cluster. Elliptical Gx. **AP**	**Gx.** 	**9.4**	**10.2x8.3'**

M58. Barred spiral, 62 million light years distant.	**Gx.**	**10.5**	
M59. Elliptical.	**Gx.**	**10.6**	
M87. Super giant elliptical.	**Gx.**	**9.6**	
M89. Elliptical.	**Gx.**	**10.7**	
M90, Spiral.	**Gx.**	**10.3**	
M60 + NGC 4647. Interacting elliptical + spiral. Aka **Arp 116.** AP	**Gx.**	**9.8**	
Markarian chain: Incl. our Karoo "**Smiley Face**" **(Or upside-down pyramid: Bosman O)** **M84 + 86 = "Eyes", NGC 4387 = "Nose", NGC 4388 = "Mouth".** **(M86.** Highest **blue-shifted** Messier obj.) (For wide field **AP**)	**Gxs:**	**10.1 + 9.8**	
M61: Barred spiral, FACE ON, arms tight.	**Gx.**	**10.2**	
NGC 4567 + 4568. "Siamese Twins / Butterfly Gxs". AP	**Gx.**	**10.9**	
NGC 5426/5427. Arp271. Close passing/ interacting pair of spirals.	**Gx.**	**11.4+12.1**	**3.0x1.6' 2.8x2.4'**
NGC 5584. Barred spiral, face-on.	**Gx.**	**11.4**	**3.4x2.7'**
NGC 5548: an unbarred lenticular galaxy with tightly-wound spiral arms, 250 mill Ly away. **Supermassive black hole binary** in nucleus (2016).	**Gx.**	**13.3**	**1.7x1.5'**
NGC 4216. Silver Streak Gx.	**Gx.**	**11.0**	
NGC 4636. Elliptical.	**Gx.**	**9.6**	
NGC 5746. Barred spiral, edge on (20'N of 4th mag **109 Virginis**) + nearby **NGC 5740: Gxs aka "Blade and Pearl". AP**	**Gx.**	**11 + 11.8**	**7.4x1'**
NGC 4535. Barred spiral. Aka "The **Lost Galaxy**" because of hazy, phantom-like appearance in amateur scopes.	**Gx.**	**10.7**	**7x6.4'**
NGC 4536. Spiral.	**Gx.**	**10.6**	
NGC 4697. Elliptical.	**Gx.**	**10.97**	
NGC 4699. Barred spiral.	**Gx.**	**10.4**	
NGC 4753. Lenticular, peculiar?	**Gx.**	**9.9**	
NGC 4438/35. "THE EYES".	**Gx.**	**10**	
NGC 4452. Thin: almost perfectly edge-on.	**Gx.**	**12.4**	
NGC 4762: Flattest Gx?: Edge-on, **no dust lane**. **AP**	**Gx.**	**10.1**	

Constellation: Object/ Info.	**@MERIDIAN/ Target Type.**	**App. Mag.**	**SIZE**
JUN			
Aps APUS ay-pus The Bird of Paradise	**20-Jun**		
α Apodis, Alpha Apodis, K-type giant.		**3.825**	
γ Apodis, Gamma Apodis, 2ND brightest star Aps, yellow G-type giant star.		**3.872**	
κ Apodis, Kappa Apodis, two star systems, Kappa-1 Apodis (HR 5730) and Kappa-2 Apodis (HR 5782).		**5.43to5.61 +12**	

Kappa-1 blue-white B-type subgiant, **a Gamma Cassiopeiae type** variable, a fast rotating **shell star**, variations in luminosity caused by the outflow of matter, a companion, @ 27". **Kappa-2 Apodis, binary**, a blue-white B-type giant and an orange K-type main sequence dwarf @ 15", optical companion.		**&** **5.64+12.5**	
β Apodis, Beta Apodis, orange K-type giant star, 3rd brightest.	★	**4.23**	
ζ Apodis (Zeta Apodis) is an orange K-type giant.	★	**4.76**	
η Apodis, Eta Apodis, class A, **chemically peculiar** and whose spectrum has strong absorption lines of some metals and deficiencies of others.	★	**?**	
ε Apodis (Epsilon Apodis), blue-white B-type main sequence star, **Gamma Cassiopeiae type variable**, brightness varies by 0.05 mag.	⊛	**5.06**	
Delta 1 delta2: **Delta-1**: an **irregular variable** an M-type red giant. **Delta-2** : an orange K-type giant, @102.9".	**Ds.** ⊛★	**4.66to4.87** **& 5.27**	
BrsO 21, light yellow type G + deep blue companion, sep 37.1", **RA 15h 59.5m DEC -71^0 07'.**	**Ds.** ★★	**7.9+8.7**	
STREICHER 13, ASTERISM, A dozen stars of various magnitudes create the shape of an arrow, stands out against the background star field in a north to south direction. **RA: 16h07m.4 – DEC: -77°20'.0**	**Asterism.**★ ★ ★ ★	**11**	**20'**
S0 021-SC06, Open cluster**. RA: 14h15m.9 – DEC: -78°30'.0**	**Oc.**	**9.2**	**9'**
NGC 6101, small globular cluster.	**Gb.** ⊕	**9.3**	**10.7'**
IC4499, small, faint globular cluster, the **southernmost globular** cluster.**AP**	**Gb.** ⊕	**10.7**	
NGC 6392. Galaxy.	**Gx.** ⬭	**12.5**	**1.3'×1.3'**
IC 4633, spiral, face on + nearby faint **IC4635**, both partially obscured by dust. (For wide field **AP**)	**Gx.** ⬭	**11.8**	**4x3'**
NGC 5799. Galaxy.	**Gx.** ⬭	**13**	**1.2'×1.0'**
Boo BOÖTES boh-OH-teez The Herdsman	**01-Jun**		
Arcturus. α Boötis, Alpha Boötis. Orange giant, 3rd brightest individual star (or 4th: because alpha Centauri is a binary) brightest star in sky, **brightest star in the northern hemisphere**. Type K orange giant, believed to be an **old disk star:** Stars within the **thick disk** may be called **old-disk stars**. Compared to stars in the thin disk, these typically have significantly lower levels of metals—that is, the abundance of elements other than hydrogen and helium. It appears to be travelling with a group of 52 other old disk stars, commonly known as the **Arcturus Stream.**	★	**-0.04**	
Nekkar, Nakkar, Meres, β Boötis, Beta Boötis, yellow G-type giant, a **flare star**, a type of **variable star** that shows dramatic increases in luminosity for a few minutes.	⊛	**3.5**	
Seginus, γ Boötis, Gamma Boötis, a **Delta Scuti type variable star**, one showing variations in brightness as a result of both radial and non-radial pulsations on its surface, period of 6.97 hours, spectral class A.	⊛	**3.02to3.07**	
Muphrid, Saak, η Boötis, Eta Boötis, **spectroscopic binary** star with a period of 494 days, spectral class G.	★	**2.68**	
Epsilon Bootes, ε Boötis, Izar, Pulcherrima, Mirak, Mizar, Orange (amber-yellow) + deep blue, sep 2.9".	**Ds.** ★★	**2.5 + 4.6**	

Merga, h Boötis (38 Boötis), class F.		5.74	
Nadlat, ψ Boötis, Psi Boötis, an orange K-type.		4.52	
τ Boötis, Tau Boötis, binary, a yellow-white dwarf (F) and a dim red dwarf (M).	**Ds.**	4.5	
Mu Bootes. Alkalurops, μ Boötis, a triple star, brightest component is a yellow-white F-type subgiant, companion is a binary star @ 108	**Triple.**	4.31 + 7 (+7.6)	
ξ Bootes, Xi Bootes: Showpiece: Yellow + orange. Sep 6.3".	**Ds.**	4.7 + 7	
Nu (ν) Boötis, HIP 75973, optical double, **orange** K-type giant + a **white** class A star: a spectroscopic binary.	**Ds.**	5.04+4.98	
Napoleon's Hat. 7 Stars form the outline of the Emperor's hat. Difficult if Arcturus (40' to N) is in the FOV. **RA 14h 14.0' DEC 18° 33'**	**Asterism.**		20' x 7'
NGC 5466. Loose, 51,800 light years from Earth, is believed to be the source of a star stream called the 45 Degree Tidal Stream, which was discovered in 2006.	**Gb.**	9.1	
NGC 5248. Compact intermediate spiral.	**Gx.**	10.97	
NGC 5676. Unbarred spiral, elongated, featureless.	**Gx.**	10.9	
NGC 5557 + 5529: Elliptical + Spiral.	**Gx.**	11.1	
NGC 5899.	**Gx.**	11.8	
Boötes I (Boötes Dwarf Galaxy), a dwarf spheroidal galaxy located approximately 197,000 light years from Earth, orbits the Milky Way and, because of its distorted shape, believed to be tidally disrupted by the MWG. **RA 14h 00m 06s DEC+14° 30′ 00″ ± 15″**	**Gx.**	13.1	
Cir CIRCINUS SUR-seh-nus The Compasses	**01-Jun**		
α Circini, Alpha Circini: a visual binary: Yellow + red. Sep 15.7".	**Ds.**	3.19 + 8.5	
β Circini, Beta Circini, a main sequence star, spectral class A.		4.069	
Gamma (γ) Circini. Blue + yellow. (Red star 3'to N)	**Ds.**	5.1 + 5.5	
Dunlop 169, "**white** + dull **orange**", sep 69.2", **RA 14h45.2m DEC -55^{0} 36'.**	**Ds.**	6.1+7.6	
Golden Horseshoe. 14 stars in a 'U' shape; located 1.5 degrees SE of **Alpha Circincus**. **RA 14h 50.0' DEC -66° 00'**	**Asterism.**		50'
VdBerg Hagen 164, asterism, RA14 44.1 DEC -66 24	**Asterism.**	7	29'
NGC 5823. ASSA63.	**Oc.**	7.9	12'
NGC 5715.	**Oc.**	10	7'
NGC 5359	**Oc.**	10	8'
Pismis 20, RA15 15.4 DEC-59 04	**Oc.**	7.8	4.5′
VAN DEN BERGHHAGEN 164. Open Cluster. **RA 14h44m.1 DEC -66°24'.**	**Oc.**	7	29'
Bernes 145 is a **dark** neb **&** to the NE is **vdBH 63,** a small **reflection** nebula (reflected by the light of the mag 10.4 star HD 130079). **B145** is 2′	**DkN.**	RefN 10.4	12x5'& 1.5′x1.5′

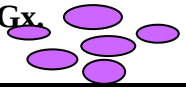
ESE from **Alpha Circini**, fairly black oval patch, slightly elongated in an ESE-NNW direction. **RA 14 48.6 DEC-65 15 / RA14H 45M 29S DEC65O 15'54" & RA 14 49.4 DEC -56 14 AP**			
NGC 5315 (Bright) +Cs.	**Pn.**	**9.6. Cs= 11.3**	**14"**
ESO 097-G13, Circinus Galaxy, RA14 13.2 DEC -65 20	**Gx.**	**10.6**	**6.9′x3.0′**
CrB CORONA BOREALIS **cor-OH-nah bor-ee-AL-is The Northern Crown**	**30-Jun**		
Wide Field AP: Star colours.			
Alphecca, Gemma, α Coronae Borealis, Alpha Coronae Borealis, brightest of the seven stars in crown, an eclipsing binary, classified as an EA **variable**, with a period of 17.36 days, primary is a white class A main sequence star, companion is a young, yellow main sequence star, class G.		**2.21to2.32**	
Nusakan, β Coronae Borealis, Beta, a **spectroscopic binary**, with a period of 10.5 years, a Alpha-2 Canum Venaticorum (**ACV**) type variable, period of 18.487.		**3.65-3.72**	
γ Coronae Borealis, Gamma, Struve 1967, a **close binary – 0.7"**, orbit of 91 years, only 0.2'' apart. A **Delta Scuti variable** (or a so-called dwarf cepheid), showing variations in luminosity as a result of both radial and non-radial pulsations of its surface. Class A. The star's apparent magnitude varies with a period of 0.03 days (43 minutes and 12 seconds).		**3.80to3.86 + 5.6**	
ζ Coronae Borealis, Zeta CrB, double, pair of blue and white stars 7.03'' apart.	**Ds.**	**5 + 6**	
T Coronae Borealis, the Blaze Star, a recurrent nova, a spectroscopic binary, period of 227.6 days. Usually has a magnitude of about 10-10.8, but it was seen reach magnitude 2.0 on May 12, 1866 and magnitude 3.0 on February 9, 1946. Red giant, spectral type M.		**10to10.8**	
ρ Coronae Borealis, Rho CrB, yellow dwarf, class G, is considered a solar twin.		**5.4**	
R Coronae Borealis, Fade-Out Star, a yellow supergiant, class F, variable, brightness fading by several mag at irregular intervals. R Coronae Borealis serves as a **prototype of a class of stars** known as the **RCB variables. V**ariability is the result of a cloud of carbon dust created in the line of sight that dims the star's apparent visual magnitude by several magnitudes – with such dramatic changes of brightness, R Coronae Borealis is also known as the **Fade-Out Star** or **Reverse Nova**.		**6.46 (5.71-14.8)**	
κ Coronae Borealis, Kappa CrB, orange subgiant, class K.		**4.82**	
Eta Coronae Borealis, Struve 1937, double, orbit of 41.5 years, primary class G and companion a class G.	**Ds.**	**5.02+6**	
Delta Coronae Borealis, is an RS type variable**.**		**4.57to4.69**	
Nu^1Nu^2. Red + Orange giants, optical binary, wide separation.	**Ds.**	**5.2 + 5.4**	
Sigma CrB. HIP 79607, bright, vivid pair of lemon-white stars", sep 7.0".	**Ds.**	**5.6 + 6.6**	
Struve 1932, "pair of identical yellow-whites, figure 8", sep 1.6". **RA 15h 18.3m DEC +26^0 50'.**	**Ds.**	**7.3+7.4**	
V Coronae Borealis. **HIP 77501**, SAO 64929. Carbon star. Deep orange-red. **Ra 15 49 31 Dec +39 34 17**		**6.9to12.6**	
NGC 5315. Planetary neb. **Bright +Cs.**	**Pn.**	**9.6. Cs= 11.3**	

ESO 097-G13, RA14 13.2 DEC -65 20	**Gx.** 	**10.6**	**6.9′x3.0′**
Lib LIBRA LEE-bra The Scales	**10-Jun**		
Alpha Librae. α Librae, Zubenelgenubi, spectral type F & A, 3’51” apart, **Alpha-1**: spectroscopic binary, orbital period of 5,870 days, separated by 0.383”, **Alpha-2** Librae also a **spectroscopic binary**. The star **KU Librae** might be a fifth component in the Alpha Librae system, lying at a separation of 2.6°.	**Ds.** 	**5.15+2.74**	
Beta Librae, Zubeneschamali, β Librae, greenish tinge, brightest in Lib., class B, a blue-white dwarf, classified as a single star, but it shows small periodic variations in luminosity (0.03mag), indicating a **companion.**		**2.61**	
Brachium, σ Librae, Sigma Librae, aka Cornu, Zubenalgubi, red giant, class M, a **semi-regular variable star**, single pulsation period of 20 days: small variations in magnitude of 0.10 to 0.15 over short periods of 15 to 20 minutes every 2.5 to 3 hours.		**3.29**	
Methuselah, HD 140283, oldest known star in the Universe, believed to have been created shortly after the Big Bang, a subgiant star, very metal poor and consists **almost entirely of hydrogen and helium**. Its iron content is less than 1 percent that of the Sun’s.		**7.223**	
υ Librae, Upsilon Librae, class K, an orange giant, is a multiple star system.		**3.60**	
τ Librae, Tau Librae, a blue-white dwarf, class B2.		**3.66**	
Zubenelakrab, γ Librae, Gamma Librae, orange giant, class K.		**3.91**	
θ Librae, Theta Librae, an orange giant, class K.		**4.136**	
ι Librae, Iota Librae, composed of Iota-1 (quadruple star), & Iota 2. Iota 1: pair of B subgiant (0.13” apart), another pair in the Iota-1 system @57”, two 10th and 11th magnitude class G dwarfs (1.9” apart) & Iota-2 Librae, a class A dwarf, line of sight coincidence.		**4.54 (5.1+5.5) & 10th+11th & 6**	
Zuben Elakribi, δ Librae, class B, blue-white main sequence star, classified as an **eclipsing variable** star. It has a period of 2.3272 days.		**4.43to5.8**	
Mu Librae, “striking contrast, bright straw-yellow and little blue-green star”, sep 1.9”, **RA 14h 49.3m DEC -14^0 09’.**	**Ds.** 	**5.6+6.6**	
18 Lib, “bright orange + small silver”, sep 19.7”, **RA 14h 58.9m DEC -11^0 09’.**	**Ds.** 		
SHJ 195, view shows **3 bright stars in a triangle:** straw-yellow + pearly white (26 Lib) + pure yellow (with small companion): latter pair is SHJ 195**. RA15h 14.5m DEC -18^0 26’.**		**6.8 +8.3**	
HM Librae. Carbon star. HD 137 613. **Ra 15h 27m 48.32s Dec −25° 10′ 10.1″**		**7.42-7.63**	
Baby Scorpion. **S** of **Sigma Librae**.	**Asterism.** 	**5 to 8**	
NGC 5897. Loose.	**Gb.** 	**9**	

NGC 5745. Side on, bulge, dust lane.	**Gx.**	**14**	
NGC 5885, a barred spiral galaxy.	**Gx.**	**11.8**	
NGC 5792, barred spiral galaxy, approximately 83 million light years distant from the Sun. Mag 9.2 star GSC 4987:827 on NW edge of Gx.	**Gx.**	**12.1**	
NGC 5890, an unbarred lenticular galaxy.	**Gx.**	**14**	
Lup LUPUS LOO-pus The Wolf	**10-Jun**		
α Lupi, Alpha Lupi, a blue-white giant star class B, a **Beta Cephei variable:** exhibits periodic variations in luminosity as a result of pulsations in the atmosphere. It has a period of 0.29585 days.		**2.3(+/-0.03)**	
β Lupi, Beta Lupi, a Beta Cephei variable. It is a **multi-period variable**, with a dominant period of 0.232 days. Its a blue-white giant (B).		**2.68**	
γ Lupi, Gamma Lupi, blue-white subgiant, class B, a **close binary** system in which the primary component is itself a **spectroscopic binary**.		**2.77**	
δ Lupi, Delta Lupi, blue-white subgiant class B, classified as a **Beta Cephei variable**. It has a period of 0.1655 days, or six cycles per day.		**3.22**	
ε Lupi, Epsilon Lupi, so-called double-lined **spectroscopic binary 2 class B: blue-white subgiant + blue-white dwarf**, share a close orbit with a period of 4.55970 days, the binary system has a companion (A, white dwarf) separated by 26.5", orbiting the binary star with a period of 64 years.		**3.41**	
ζ Lupi, Zeta Lupi, a yellow giant, class G.		**3.41**	
η Lupi, Eta Lupi, a blue-white subgiant, class B, + companion: white + ashy pair, sep 14.8", **RA16h 00.1m DEC -38^0 24'**.	**Ds.**	**3.4+7.5**	
ι Lupi, Iota Lupi, class B subgiant.		**3.54**	
φ Lupi, Phi Lupi. Wide binary. **Phi-1** Lupi is an **orange** giant (**K**), **Phi-2** Lupi is a **blue-white** main sequence star class **B.**	**Ds.**	**3.58+4.52**	
π Lupi, Pi Lupi is a star in a **double system**, spectral class B.	**Ds.**	**3.98**	
KT Lupi (114 G. Lupi), a blue-white subgiant star class B.		**4.54**	
τ Lupi, Tau Lupi, Tau-1 Lupi, a blue-white subgiant, a **Beta Cephei variable star**, class B. Tau-2 Lupi, F class star.	**Ds.**	**4.55+4.36**	
ν Lupi, Nu Lupi, Nu-1 Lupi is a yellow-white star halfway between the subgiant and giant evolutionary stage, class F, **Nu-2** Lupi is a yellow main sequence star (G).	**Ds.**	**5.00+5.78**	
h 4690, showcase pair, orange + blue-white, sep 19.1", **RA 14h 37.3m DEC -46^0 08'.**	**Ds.**	**5.6+7.7**	
Dunlop 178, yellow-orange + white", sep 30.9", **RA 15h 11.6m DEC -45^0 17'.**	**Ds.**	**6.5+7.3**	
Streicher 28. Asterism, resembling an arcade, 30' SW of **Delta Lupi** and consists of 10 stars, brightest is 8.6-mag HD 135814 with fainter stars about 10' in a downward string: NW to SE. RA15h19m.1 DEC-40°55'.7 10.5 16'	**Asterism.**	**11**	**16'**
NGC 5822 ASSA62. Contains asterism: "Pinky and The Brain". Thx	**Oc+Asterism**	**6.5**	**39'**

to **Michael Moller**.			
NGC 5749, open cluster.	**Oc.** 	**11.23**	**8’**
NGC 5986, a globular cluster, 33 900 LY from Earth. Notable because it contains two very bright A-F class stars, 2.5 degrees to the WNW of Eta Lupi.	**Gb.** 	**7.52**	**9.8’**
NGC 5927.	**Gb.** 	**8.0**	
NGC 5824.	**Gb.** 	**9.1**	**6.2’**
Barnard 228. ASSA64. Dark Wolf Nebula. **Ra 15:44:00 Dec -34:30:00 AP**	**DkN.** 		**5º**
NGC 6026. Cs.	**Pn.** 	**12.5**	
IC 4406. Retina Neb. Rectangular shape. If we were viewing it from the top, it would appear similar to the Ring Nebula (Messier 57) in Lyra constellation.	**Pn.** 	**11**	**28”**
NGC 5873. Planetary Nebula.	**Pn.** 	**11**	**3”**
NGC 5882, planetary nebula**.**	**Pn.** 	**9.4**	
NGC 5530. Galaxy.	**Gx.** 	**11.1**	**4.9’×2.2’**
IC 4402. Galaxy.	**Gx.** 		**4.2’×1.0’**
ESO 274-1, a spiral galaxy seen from edge-on that requires an amateur telescope with at least 12 inches of aperture to view. It can be found by using Lambda Lupi and Mu Lupi as markers. Small, elliptical nucleus. **RA 15 14.2 Dec -46 49**	**Gx.** 	**11.7**	**9x0.7’**
Nor NORMA NOR-muh The Set Square	**10-Jun**		
γ Normae, Gamma Normae, optical double, Gamma-2: a close optical binary, brightest star in the constellation, class **G**, a yellow giant star. Gamma-1: yellow-white supergiant, class **F**.	**Ds.** 	**5.09+4.02**	
ε Normae, Epsilon Normae, spectroscopic binary, class B - a blue-white main sequence dwarf. A **third star** @ 22”, a smaller B-type main sequence star.	**Ds.** 	**4.53+7.5**	
ι1Normae, Iota-1 Normae, white subgiant class A, rapid binary star: orbital period of 26.9 **&** a third component in the same line of sight.	**Ds.** 	**4.63 (5.6+5.8) & 8.75**	
η Normae, Eta Normae, yellow giant, class G.		**4.65**	
δ Normae, Delta Normae, white A-class star.		**4.73**	
μ Normae, Mu Normae, blue-white supergiant, class B**.**		**4.914**	
κ Normae, Kappa Normae, yellow giant star, G.		**4.94**	
R Normae, Mira variable, a pulsating red giant star that will expel its outer envelope to form a planetary nebula and become a white dwarf in the next few million years. Class M, period of 507.5 days.		**6.5to13.9**	
S Normae (47 G. Normae), Cepheid variable, class F, period of 9.75411 days. Located at the centre of the **open cluster NGC 6087**, AKA the **S Normae Cluster.**		**6.12to6.77**	
STREICHER 34, a degree W of NGC 6031. Only five stars, resembles an aeroplane or a fish face. The brightest member (HIP 78355) is magnitude 6.1.	**Asterism.** 	**7**	**2.3’**

RA15h59m.9 DEC-54°01'.9			
NGC 6087. ASSA67. Binocular.	**Oc.** 	**5.4**	
NGC 6067. ASSA66.	**Oc.** 	**5.6**	**12'**
NGC 6087. Centred on the Cepheid variable **S Normae**.	**Oc.** 	**5.4**	**12.5'**
NGC 6025. Open Cluste.	**Oc.** 	**5.1**	**12'**
NGC 6031. Open Cluster.	**Oc.** 	**8.5**	**2'**
Lynga 8. Open Cluster. **RA16h22m.9 DEC-50°10'.9'**	**Oc.** 	**11**	**1'**
Pismis 23. Open Cluster. **RA16h23m.9 DEC-48°53'.5**	**Oc.** 	**12**	**1'**
NGC 6115. Open Cluster.	**Oc.** 	**9.8**	**3.4'**
NGC 6134. Bennett 76. Open Cluster.	**Oc.** 	**7.2**	**8**
NGC 5999. Bennett 71 Open Cluster**.**	**Oc.** 	**9**	**5'**
Trumpler 23. Bennett 72a. Open Cluster. **RA 16h00m.5 DEC-53°31'.8**	**Oc.** 	**11.2**	**9'**
NGC 6169. Open Cluster	**Oc.** 	**6.6**	
NGC 6167.Bennett 79a Open Cluster**.**	**Oc.** 	**6.7**	**7'**
NGC 5946.	**Gb.** 	**9.6**	**7'**
NGC 6164/65. Bipolar emission neb. Luminous, centre: "O-type" star. **Appearance of a Pn. AP**	**N.** 	**12.6**	**2.5'**
RCW 103. Supernova Remnant. RA 16h17m.6 DEC -51°07'.0	**N.** 	**13**	**570"**
Shapley 1. Cs. Lies 5deg WSW of gamma 2 Normae. Donut shaped. Fine-Ring Nebula.**R.A. 15h 51m 41s; Dec. 11° -51°' 31' 29" AP**	**Pn.** 	**12.6, Cs14**	**1.1'**
PK 331-1.1. Planetary Nebula. **RA 16h17m.2 DEC -51°59'.0**	**Pn.** 	**9.2**	**25"**
Ant Nebula, Mz 3 (Menzel 3), a bipolar planetary nebula: nickname the Ant Nebula because its shape resembles the head and thorax of an ant. **RA 16h 17m 13.392s Dec −51° 59′ 10.31″ AP**	**Pn.** 	**13.8**	
Norma Cluster, **Abell 3627**, a rich cluster, 221.1 million light years, very **difficult to observe**: both nearby and bright, BUT located in the **Zone of Avoidance**: obscured by dust. **RA 16h 15m 32.8s Dec −60° 54′ 30″**	**Gx.** 		
Ser Cap SERPENS CAPUT SIR-penz The Serpent	**20-Jun/'20-Jul**		
Alpha Serpentis, α Ser, Unukalhai, red giant of spectral type K, 2 companions: @ 58" and @ 2.3'.		**2.630+/- 0.009 & 11.8+13th**	
Lambda Serpentis, λ Ser, rather similar to the Sun.		**4.42+/- 0.05**	
Beta Serpentis, β Ser, a white main-sequence star, class A, two companions: & 31", (201"). "Brilliant whitish yellow + distant pinpoint".		**3.65+9.9+ 10.7**	
R Serpentis, Mira variable, situated between Beta and Gamma.		**5th - < 14th**	
Gamma Serpentis, γ Ser, F-type subgiant, shows **solar-like oscillations**.		**3.84+/- 0.05**	
Delta Serpentis, δ Ser, HIP 76276, four stars: a pair of binaries, the system, **total apparent mag** of 3.79: two of the stars, with a combined		**3.79 + 5.2 &**	
			

apparent mag of **3.80**, provide nearly all the light, primary, a white subgiant, is a **Delta Scuti variable** with an average apparent magnitude of **4.23.** **("Brilliant pair of unequal stars, both yellow-white", sep 4.0".), & second pair at 66": D & C, sep from each other 4.4".**		**14th + 15th**	
Chi Serpentis, an **Alpha² Canum Venaticorum variable,** midway between Delta and Beta, period of approximately 1.5 days.		**5.33+/- 0.03**	
ε Ser. Epsilon Serpentis, type A main-sequence star.		**3.7**	
Mu Serpentis, type A.		**3.54**	
VY Serpentis, RR Lyrae variable		**10th**	
Tau4 Serpentis, a cool red giant that pulsates 87 days: has been found to display an **inverse P Cygni profile:** where cold infalling gas on to the star creates redshifted hydrogen absorption lines next to the normal emission lines.		**5.89to7.07**	
M5 + Ds. 2nd most impressive for Northerners. (After **M13**). Approximately 8° southwest of **α Serpentis,** next to the star **5 Serpentis**. [3rd brightest Messier globular, after **M22** in Sgt & **M4** in Sco]. **DS**: "brilliant yellow + light gray", sep 11.4". **AP**	**Gb.** 	**6.7 (5.1 & 10.1)**	
Dark nebula complex L134/L183(L134N): pre-stellar core: are the nurseries of new stars, and are an early phase in the formation of low-mass stars, before gravitational collapse produces a central protostar. **RA 15h 51m 30s Dec -2° 32' 30". AP**	**DkN.** 		**??**
Abell 41, planetary, appears to have a bipolar structure, binary central stars. **Ra 17:29:02.0 Dec -15:12:59**	**Pn.** 	**13.9, Cs=16.5**	16"
NGC 5921. Galaxy.	**Gx.** 	**10.8**	
NGC 5970. Galaxy**.**	**Gx.** 	**11.4**	
Arp 91: interacting galaxy pair, in an early stage **NGC 5953** and **5954.**	**Gx.** 	**12+12.2**	
NGC 5962, Flocculent spiral structure.	**Gx.** 	**11.4 (12)**	
NGC6028. Hoag's Object: a Ring Gx. Luminous core surrounded by a faint, **apparently detached, ring**. **AP**	**Gx.** 	**13.5**	
NGC 6027/ 6027a/ b/c/d/e. Seyfert's Sextet: 4 are interacting, 2 in line of sight. **AP**	**Gx.** 	**13.4 – 16.5**	
TrA TRIANGULUM AUSTRALE **tri-ANG-gyu-lum os-TRAH-lee The Southern Triangle**	**20-Jun**		
Alpha Trianguli Australis, Atria, orange giant, class K, the 42nd-brightest star in the night sky.		**1.91**	
Beta Trianguli Australis. White main sequence stars, class F + comp. @ **3'** away.	**Ds.** 	**2.85 + 13th Mag.**	
Gamma (γ) Trianguli Australis. Class A.		**2.87**	
Delta (δ) Trianguli Australis, yellow giant of spectral type G, binary star: companion star @30".	**Ds.** 	**3.8+12th**	
Epsilon (ε) Trianguli Australis, double star, an orange K-type sub-giant + white main sequence star of spectral type A**.**	**Ds.** 	**4.11+9.32**	
Cepheid variables: these 3 are yellow-white giants of spectral type F: **R Trianguli Australis:** a period of 3.389 days,		**6.4to6.9**	

S Trianguli Australis: a period of 6.323 days, and **U Trianguli Australis:** a period of 2.568 days.		**6.1to6.8 7.5to8.3**	
RT Trianguli Australis: is an unusual cepheid variable - classified as a **carbon cepheid** of spectral type R, period 1.95 days.		**9.2to9.97**	
X Trianguli Australis. HIP 74582, (near Gamma): is a variable carbon star, two periods of around 385 and 455 days, and is of spectral type C 5.	C	**5.63**	
NGC 6025. ASSA65. Zig-zag line of stars. **AP**	**Oc.**	**5.1**	**14'**
NGC 5979. Blue-green hue.	**Pn.**	**11.5**	
Henize 2-138. A smaller planetary nebula. **RA: 15 h 56 m 00s Dec: −66^{O} 09'**	**Pn.**	**11.0**	**2"**
NGC 5844.	**Pn.**	**12.1**	**1'**
NGC 5938. Barred spiral.	**Gx.**	**11.9**	**2.8'x2.5'**
NGC 6183, galaxy.	**Gx.**	**13**	**1.6'×0.6'**
UMi URSA MINOR The Little Bear	**Jun**		
Alpha UMi. Alpha Ursae Minoris, Polaris. Variable, 3.97 days, yellow-white super giant, spectral types F, the **brightest Cepheid variable star visible from Earth**. It is a triple star system: supergiant primary star has two yellow-white main-sequence star companions @ 17 and 2,400 astronomical units (AU), taking 29.6 and 42,000 years respectively to complete one orbit,		**1.97to2.0**	
Beta UMi, Beta Ursae Minoris, Kochab. Orange giant, spectral type K, slightly variable: period of 4.6 days.		**2.08**	
Pherkad, Gamma Ursae Minoris, A white bright giant, type A class of stars known as **Delta Scuti variables**: short period (six hours at most) pulsating stars. Its magnitude varies roughly every 3.4 hours. It and **Kochab** have been termed the "**guardians of the pole star**".		**3.04to3.09**	
Zeta Ursae Minoris, Akhfa al Farkadain, white star of spectral type A, also a **Delta Scuti variables.**		**4.28**	
Eta Ursae Minoris, dimmest of the seven stars of the Little Dipper, yellow-white main-sequence star of spectral type F.		**4.95**	
Theta Ursae Minoris, an orange giant of spectral type K.		**5.00**	
Delta Ursae Minoris, Yildun, a white main-sequence star of spectral type A, triple star system.		**4.35**	
Epsilon Ursae Minoris. A yellow giant of spectral type G: the primary is an **RS Canum Venaticorum variable star**, a spectroscopic binary, with a companion @ 0.36 AU. A third star, an orange main-sequence star of spectral type K @ 8100 AU.		**4.22**	
Lambda Ursae Minoris, a red giant of spectral type M, a **semiregular variable.**		**6.34to6.45**	
A few **asterisms** for our northern colleagues to research: **Engagement Ring; Mini-Coathanger; The Shark…**	**Asterism.**		
UMi Dwarf Gx. Spheroidal. **RA 15h 09m 08.5s Dec +67° 13′ 21″**	**Gx.**	**11.9**	**30.2x19.1'**
NGC 6217. Barred spiral.	**Gx.**	**11.2**	

NGC 6251. Elliptical.	**Gx.**	**14.3**	
Constellation: Object/ Info.	**@MERIDIAN/ Target Type.**	**App. Mag.**	**SIZE**
JUL			
Ara ARA AR-uh The Altar	**10-Jul**		
Alpha Arae, α Ara, 2nd brightest, a massive B-type main + visual companion @ 50".	**Ds.**	**2.93+11**	
Beta Arae, β Ara, Vasat-ül-cemre, brightest star in Ara, class K.		**2.8**	
Gamma Arae. γ Arae. Double: B + A-type main sequence star.Tight: optical companion @ 17.9".	**Ds.**	**3.3 + 10.2**	
Delta Arae, δ Arae, δ Ara, massive B-type main sequence star + companion G-type main sequence star: binary star system with Delta Arae, & optical companion @ 47.4".	**Ds.**	**3.62+9.5 & 12th**	
Zeta Arae, ζ Ara, ζ Arae, Tseen Yin. Stellar class K.		**3.1**	
R Arae. Eclipsing Binary, period 4.4 days. **RA 16h39m.7 DEC -56°59'.5**		**6to6.9**	
μ Arae, Mu Arae (HD 160691), main sequence G-type star.		**5.12**	
ε Arae, Epsilon Arae, binary star system. **Epsilon-1** Arae is an orange K-type giant, **Epsilon-2** Arae is a binary star: primary a yellow-white F-type main sequence dwarf, close companion @ 0.6". Third component @ 25" from the primary.	**Ds.**	**4.06 & 5.27+8.6 & 13th**	
STREICHER 15, Asterism: 1.5° NE of alpha, contains a few stars, well defined, brightest star - mag 6.3 - appears light yellow and visible at the north of the string of stars snaking southwards. A magnitude 10 double star ends off the southern tip of the string, resembles swallows diving in flight. **RA 17h34m.7 DEC -48°35'.0**	**Asterism.**	**6**	**17'**
NGC 6250. Open cluster.	**Oc.**	**5.9**	
IC 4651. Open cluster.	**Oc.**	**6.9**	
NGC 6193: ASSA 70 + NGC 6188 (nebulosity, emission). + **NGC 6144** = emission neb, **"looks like a planetary neb". AP**	**Oc.+ N.**	**Oc = 5.2**	**20' (6188)**
NGC 6208. With an age of 1.17 Gigayears, it is **one of the oldest known** open clusters.	**Oc.**	**7.2**	
NGC 6204. Open cluster.	**Oc.**	**8.2**	
NGC 6253. Open cluster.	**Oc.**	**10**	**5'**
NGC 6200. Open cluster.	**Oc.**	**7.4**	
NGC 6167. Bennett 79a. Open cluster.	**Oc.**	**6.7**	**7**
NGC 6204. Open cluster.	**Oc.**	**8.2**	**5'**
Hogg 22. Open cluster. **RA 16h46m.6 DEC -47°04'.8**	**Oc.**	**6.7**	**2'**
IC 4651. Open cluster.	**Oc.**	**6.9**	**2'**
NGC 6397 ASSA79. Highly resolved. One of 2 nearest. (vs. M4). Many Blue Stragglers. **AP**	**Gb.**	**5.9**	**25.7'**

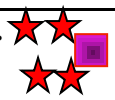
NGC6362. Irregular.	**Gb.**	**8.2**	
NGC 6352. Loose.	**Gb.**	**8.2**	**7.1'**
The Stingray Nebula (Hen 3-1357), youngest known planetary nebula as of 2010, first observable around 1987. **RA17h 16m 21.071s DEC −59° 29′ 23.64″ AP**	**Pn.**	**10.75**	**1.6"**
NGC 6326, complex and irregularly structured planetary nebula.	**Pn.**	**12.2**	**14"**
HENIZE 1357. Planetary Nebula. **RA 17h16m.4 DEC-59°29'.4**	**Pn.**	**10.7**	**90"**
NGC 6300. Galaxy.	**Gx.**	**11**	**5.2'×3.3'**
NGC 6221 and NGC 6215, two spiral galaxies**,** are near star **η Arae** + same FOV, 12' eastwards: **NGC 6215A**	**Gx.**	**10.1+10.5 + 13.4**	**4.9'×3.2' 2.7'×2.2' 1.9'×0.6'**
NGC 6305 . Galaxy.	**Gx.**	**13**	**1.8'×1.2'**
Dra DRACO DRAY-koh The Dragon	**01-Jul**		
Thuban, α Draconis, was the **northern pole star** from 3942 until 1793 BC, due to precession, will again be the pole star around the year AD 21000, Class A.		**3.65**	
Gamma Draconis, Etamin or Eltanin. Brightest, an orange giant (K) star, sometimes known as **the Zenith Star** because it lies close to the zenith point directly overhead in London.		**2.2**	
Beta Draconis, Rastaban, a yellow giant star.		**2.8**	
η Draconis, Eta Draconis, Aldibain, double star, yellow-hued primary (G) + white-hued secondary (K), @ 4.8".	**Ds.**	**2.73+8.2**	
Mu Draconis, Alrakis, a **binary** star with two white components, orbit each other every 670 years.	**Ds.**	**5.6+5.7**	
Nu Draconis, binary, two white components,	**Ds.**	**4.9+4.9**	
Omicron Draconis, double star, primary is an orange giant + secondary.	**Ds.**	**4.6+7.8**	
Psi Draconis, binary, primary is a yellow-white star, the secondary is a yellow star.	**Ds.**	**4.6+5.8**	
RY Draconis, HIP 63152, carbon star. Period 200? days.	C	**6.0to8.0**	
UX Draconis, HIP 95154, carbon star, fiery orange-red, period 175 days.	C	**5.9to7.1**	
Mini-Cassiopeia. Shaped just like the 'W' of his bigger brother. Stars mag 7 and 8. Between υ en χ Draconis.**RA: 18h 35m DEC: 72d 25m**	**Asterism.**		**20'x10'**
Cat's Eye Nebula, NGC 6543, appears as a fuzzy blue-green disk in an amateur telescope. **Very complex shape** due to gravitational interactions between the components of the multiple star at its center.	**Pn.**	**9th**	
NGC 6742, Abell 50. Planetary neb. (One of 2 NGC Pn).	**Pn.**		**33"**
M102: ID? NGC5866 OR M101 in **UMa**?	**Gx.**		
NGC 4125. Galaxy.	**Gx.**	**9.8**	
NGC 4236. Galaxy.	**Gx.**	**9.7**	
Tadpole Galaxy, Arp 188, a disrupted (collided) barred spiral galaxy, is notable for its **enormous trail of stars**, about 280 thousand light years long. **RA 16h 06m 03.9s Dec +55° 25′ 32″**	**Gx.**	**14.1**	**3.6x0.8'**

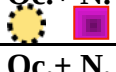
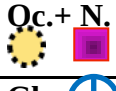
Her HERCULES HER-kyu-leez Hercules	**10-Jul**		
α Her, Alpha Herculis. Rasalgethi or Ras Algethi. Red (M) + blue-green. Erratic variable. α1 and α2. **α1** relatively massive red bright giant. **α2** is a double star: system with a primary yellow giant star (G) and a secondary, yellow-white dwarf (A).	**Ds.** ★★	**(3 to 4) + 5.4**	
Beta Herculis, β Her, Kornephoros, the brightest in Her., suspected variable star, a yellow giant (G).	★	**2.81to2.76**	
Gamma Herculis, double star, primary is a white giant, optical companion, widely separated.	**Ds.** ★★	**3.8+10th**	
Sarin, δ Herculis, Delta Herculis, composed of **between two and five** stars, primary star is main sequence subgiant, class A.	★★★ **?**	**3.126**	
π Herculis, spectral class K, classified as a **variable**: variations in luminosity by about 0.0054 mag every 24 hours, has unconfirmed substellar companion.	★	**3.15**	
Sophian, η Herculis, Eta Herculis, main sequence star, type G, a **double:** companion in the same line of sight.	**Ds.** ★★	**3.487+ 12.5**	
Zeta Herculis (ζ). Yellow-white + orange, components will widen to their peak in **2025**.	**Ds.** ★★	**2.9 + 5.4**	
Atia, ο Herculis, Omicron Herculis, 103 Herculis, class B, classified as an **eruptive variable** of the **Gamma Cassiopeiae type**, which means that it is a B-class star that rotates very rapidly, which results in mass outflow.	★	**3.83**	
Rukbalgethi Genubi, θ Herculis, Theta Herculis, spectral type K, an irregular variable: exhibits variations in mag over period of 8 to 9 days.	★	**3.7to4.1**	
Kappa Herculis, κ Herculis, Marfik, Marfak, or Marsic, double star, primary is a yellow giant -G, secondary is an orange giant -K, separated 27".	**Ds.** ★★	**5.0+6.3**	
Rho Herculis (ρ), Blue-whites. Rho Herculis is a binary star 402 light-years from Earth, divisible in small amateur telescopes. Both components are blue-green giant stars; the primary is magnitude 4.5 and the secondary is magnitude 5.5	**Ds.** ★★	**4.5 + 5.5**	
95 Herculis. Silver + gold**.**	**Ds.** ★★	**4.9 + 5.2**	
"Keystone" asterism: Hercules's torso, quadrangle formed by π Her, η Her, ζ Her and ε Her. **(Pi, Eta, Zeta, and Epsilon)**	**Asterism.** ★ ★ ★ ★		
Zig Zag. 7 Stars. Wiggly line of 8th and 9th mag. stars. 2° west of ω (Omega) Herculis. **RA 16h 8.0' DEC 13° 00'**	**Asterism.** ★ ★ ★ ★		**1.6° x 0.25°**
Backwards 5. Backwards 5 of letter S. Mag 11 stars –the first and last stars of the 5 are mag 7 and 9. Located 1° SW of ζ Herculis. **RA: 16h 37m DEC: 30d 45m**	**Asterism.** ★ ★ ★ ★		**20'**
Markov 1 looks like the teapot shape of Sagittarius. 9 stars of magnitude 9 and 10 and around the teapot. NNW of the yellow star Xi (ξ) Herculis**.** **RA: 17h 57m DEC: 29d 29m**	**Asterism.** ★ ★ ★ ★		**15'**
Ruby Ring. Fairly faint stars. The ruby is an **orange star**, mag 7. **RA: 18h 03m DEC: 26d 20m**	**Asterism.** ★ ★ ★ ★		**25'**
Webb's Wreath. About 2.7° SSW of Xi (ξ) Herculis is golden mag 7 star - forms the eastside of Webb's Wreath. 13 stars of mag 11 and 12. **RA: 18h 02m DEC: 26d 18m**	**Asterism.** ★ ★ ★ ★		**11'x7'**

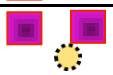
M13. The Hercules Globular Cluster; the Great Globular Cluster: Brightest in N-skies. It is also very large, with an apparent diameter of over 0.25 degrees	**Gb.**	**5.9**	**0.25°**
M92. One of **oldest** known Gb.:14.2 billion years.	**Gb.**	**6.5**	
NGC 6229. Mottled. Compact.	**Gb.**	**9.4**	
NGC 6210. Cs. Turtle neb., High SB, Sky-blue. Disc is E-W elongated, oval shaped.	**Pn.**	**9.2 Cs= 12.7**	
NGC 6058. Dim.	**Pn.**	**12.9**	
IC 4593: "White Eyed pea". Cs. Blue halo.	**Pn.**	**10.7 Cs= 11.1**	
Abell 39. Low sb. **RA16h 27m 33.737s DEC+27° 54′ 33.44″**	**Pn.**	**13.7. Cs15.5**	**155"**
Arp 272: NGC 6050 + IC 1179. Colliding spirals, face-on. A third, small Gx background/ edge. (Part of the **Hercules cluster**: see below).	**Gx.**	**14.7**	
NGC 6482.	**Gx.**	**11.3**	
Hercules Cluster (Abell 2151): a cluster of about 200 galaxies, 500 million light-years. Part of the larger **Hercules Supercluster**, which is itself part of the much larger **Great Wall** super-structure.	**Gx.**		
Oph OPHIUCHUS oh-fee-U-cus The Serpent Bearer	**10-Jul**		
Rasalhague, α Ophiuchi, Alpha Ophiuchi, binary star with an orbital period of 8.62 years, primary is a white giant, class A, companion is an orange main sequence dwarf, class K.	**Ds.**	**2.07**	
Celbalrai, β Ophiuchi, Beta Ophiuchi, orange gian, class K, fifth brightest, star in the constellation.		**2.75to2.77**	
η Ophiuchi, Eta Ophiuchi , Sabik, Class A, **binary**, two white main sequence dwarfs, classes A, orbital period of 87.58 years.	**Ds.**	**2.43 (3.05+3.27)**	
ζ Ophiuchi, Zeta Ophiuchi is the third brightest, extremely large blue main sequence star, class O, a **Beta Cephei variable**.		**2.569**	
Yed Prior, δ Ophiuchi, Delta Ophiuchi, red giant, class M, forms an **optical double** with the star **Epsilon Ophiuchi, or Yed Posterior. Epsilon Ophiuchi** is a yellow giant, class G**.**	**Ds.**	**2.75+3.22**	
κ Ophiuchi, Kappa Ophiuchi, an orange giant, class K.		**3.20**	
θ Ophiuchi, Theta Ophiuchi, is a **multiple star** system, primary is a spectroscopic binary, class B, a blue-white subgiant star, classified as a **Beta Cephei variable** & tertiary class B component @ 0.15".		**3.26&5.5**	
Sinistra, ν Ophiuchi, Nu Ophiuchi, orange giant, class K.		**3.332**	
γ Ophiuchi, Gamma Ophiuchi, white main sequence dwarf, class A.		**3.75**	
Marfik, λ Ophiuchi, Lambda Ophiuchi, is a **binary**, class A, white main sequence dwarf.	**Ds.**	**3.9**	
67 Ophiuchi is a blue-white supergiant, class B, member of the open cluster **Collinder 359.**		**3.93**	
19 Oph, "dramatic contrast, brighter member is a brilliant yellow-white star", sep 23.6", **RA 16h 47.2m DEC 02^0 04'.**	**Ds.**	**6.1+9.7**	
70 Ophiuchi is a binary, primary an orange dwarf, class K, a BY Draconis type variable, a star showing variations in brightness as a result of rotation		**4.03+6**	

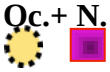
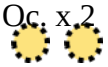
coupled with star spots and other chromospheric activity, companion is another orange dwarf, class K, @ 4.7". The **two stars** have an orbital period of 88.3 years, pair of "tangerine-orange"stars. **RA 18h 05.5m DEC 02^0 30'**.			
χ Ophiuchi, Chi Ophiuchi, class B, a **Gamma Cassiopeiae type variable.**		**4.18to5**	
36 Ophiuchi, HIP 84405/84478, a **triple star**, all three are orange dwarfs, class K, primary and secondary separated by 4.6", tertiary star @ 700".		**5.29+ 5.33+ 6.34**	
Barnard's Star, red dwarf, class M, the fourth closest known individual star to the Sun, the **largest proper motion** of any star relative to the Sun, 10.3" per year. Around the year 9,800, the star will make its closest approach to the Sun and come within 3.75 light years. **RA 17h57m.8 DEC +04°43'.6**		**9.54**	
Rho Ophiuchi, HIP 80473. Two blue subgiants, class B, plus 2 or 3 other blue subgiants. Part of the **Rho Oph Cloud Complex**: see below.		**4.63**	
V Ophiuchi. SAO 159916. HIP 80550. Carbon star. **Strong orang**e colour. **Ra 16 26 43 Dec -12 25 35**		**7.3to11.6**	
TW Ophiuchi. HIP 85617, GSC 6243:462. Very **strong orange-red. Ra 17 29 43 Dec -19 28 22**		**7.0to9.0**	
IC 4665. Black Swallowtail Butterfly Cluster, Little Beehive + Barnard's Star* BD+04 3561, close to beta Oph: Cebalrai. Aka **"HI"Cluster. AP**	**Oc.**  ***2nd closest.**	**4.2 (M:7 & < stars) *9.5**	
NGC 6633. Double with **IC4756** (in Ser Cauda). Contains about 30 stars and is almost the size of the full Moon.	**Oc.** 	**4.6 & 5**	
DOLIDZE 27. Open Cluster. **RA16h36m.5 DEC-08°56'.0**	**Oc.** 	**7**	**25'**
ESO 587-SC04. Open Cluster**. RA 17h04m.4 DEC -19°27'.4**	**Oc.** 	**11**	**2.5'**
M10. ASSA73, NGC 6254, core is quite bright and spans about 35 light years across, and the cluster's spatial diameter spans about 83 light years.	**Gb.** 	**6.6**	**15.1'**
M12. ASSA71, NGC 6218. AP	**Gb.** 	**6.6**	**14.5'**
M14. NGC 6402, Elongated. Contains several hundreds of thousands of stars, the brightest of which are of 14th magnitude.	**Gb.** 	**8.3**	
M9. Messier 9, NGC 6333, one of the nearest, 5500 light years.	**Gb.** 	**8.4**	**9.3'**
M19. ASSA75. Most oblate. **AP**	**Gb.** 	**7.1**	**13.5'**
M62. ASSA74. NGC 6266, Irregular shape, about 22,200 light years	**Gb.** 	**6.6 (7.39?)**	
M107. Messier 107, NGC 6171, the last globular cluster entered in Messier's catalogue, relatively loose.	**Gb.** 	**8.9**	
NGC 6356.	**Gb.** 	**8.2**	
NGC 6284. Mottled.	**Gb.** 	**8.8**	**5.6'**
NGC 6287. Old. Unresolved.	**Gb.** 	**9.4**	
NGC 6293.	**Gb.** 	**8.2**	
NGC 6304.Unresolved.	**Gb.** 	**8.2**	
NGC 6316. Unresolved	**Gb.**	**8.4**	
NGC 6342. 80'SE of M9.	**Gb.** 	**9.7**	
NGC 6355. Unresolved.	**Gb.** 	**9.1**	
NGC 6366. Loose.	**Gb.** 	**9.2**	
NGC 6401. Unresolved	**Gb.** 	**9.5**	
Palomar 6, a relatively loose cluster, and **one of only four** globular clusters known to **contain a planetary nebula**. **RA 17h 43m 42.20s Dec −26° 13′ 21.0″ AP**	**Gb.** 	**11.55**	**8.4'**
B 59, 65–67, and 78: = Pipe neb. ASSA77. Ra 17h 27m Dec −26° 56' [17h11m.1 -27°23'.0] AP	**DkN.** 		**5'**

Dark Horse Nebula, near the border Sagittarius and Scorpius, and obscures a part of the upper central bulge of the Milky Way Galaxy, its shape resembles that of a side silhouette of a horse, one of the largest.	**DkN.**		
B72, Barnard 72, Snake neb. Near Theta Oph. It is small, a distinctive **S-shape** of a snake, can be found in the NW part of the bowl of the **Pipe Nebula** and is part of the larger **Dark Horse Nebula**. It lies to the left of the Molecular cloud Barnard 68. **17h23m.5 -23°38'.0 AP**	**DkN.**		**4'**
Rho Ophiuchus Cloud complex. Including: IC 4603-4604, a reflection nebula, lies near **Antares**, **IC 4604** contains several bright stars, the brightest of which is **Rho Ophiuchi.** It is one of the nearest star-forming regions to the Sun, nebula covers an area of **4.5°x6.5°,** and consist of two major regions of dust and gas where new stars are being formed, about 425 infrared sources, presumably young stellar objects, have been detected in one of them. **AP**	**N. & DkN & Stars.**		**4.5°x6.5°**
NGC 6572. Emerald-, Blue-, Racquetball neb. Irregular.	**Pn.**	**8.1**	
NGC 6309. The Box: square.	**Pn.**	**11.5 Cs= 14th M**	
NGC 6369. Little Ghost. Round, relatively small.	**Pn.**	**11.4 Cs= 16th M**	**>30"**
IC 4634.	**Pn.**	**11**	
Wings of butterfly neb/ Twin jet neb. Pn M2-9, Minkowski's Butterfly, bipolar nebula, twin lobes of material ejected from the central star, star at the centre is a binary system. **Ra 17 05 37.952 Dec -10 08 34.58 AP**	**Pn.**	**12.7 (14.6?)**	**115" x 18"**
Abell 43: Blue. Ra 17:53:32.3; Dec +10:37:24 (Percy's challenge) AP	**Pn.**	**14.6 ; Cs 14.7**	**80" x 74"**
Abell 72. Ra 20 50 02.1 Dec. +13 33 29	**Pn.**	**14.7 Cs.16.1**	**2.1'**
NGC 6240, ultraluminous infrared galaxy (**ULIRG**), a peculiar, butterfly- or lobster-shaped galaxy: two smaller merging galaxies. The galaxy has two nuclei, both active galactic nuclei (AGN).	**Gx.**	**12.8**	**2.0'×0.8'**
NGC 6384. Faint spiral.	**Gx.**	**10.6**	
Sco SCORPIUS SKOR-pee-us The Scorpion	**01-Jul**		
Alpha Scorpii. Antares, "anti-Ares," "rival of Mars," or "like Mars," 16th brightest, or 15th brightest if the two brighter components of Capella are counted as one star. Is a slow variable - **LC slow irregular variable**, red supergiant, with companion, Antares B: class B. ("Mulberry **red** + little **green** cloud").	**Ds.**	**0.96: 0.88to1.16 + 5.5**	
Beta-Scorpii, β Sco, **Acrab, Akrab, Elacrab, Graffias** - shares name with **Xi Scorpii**. In small telescopes: a **binary star**, 2 components separated 13.5". The 2 most massive stars are main sequence class B stars. ("Brilliant **white** + small **cobalt blue**").	**Ds.**	**2.62+4.92**	
Xi Scorpii (ξ). HIP 78727 + HIP 78738 + HIP 78739: 5 stars in **2 groups**. **Yellow-whites** vs. **orange**. (**Visually**: "bright amber **yellow** + royal **blue** & pretty pair of tangerine-**orange** stars") **RA 16h 04.4m DEC -11^0 22'.**		**4.2 + 7.3**	
Shaula, λ Scorpii, Lambda. 2nd brightest, **multiple star system**, **3** visible components, λ Sco **A**: is a triple star: two class B stars and a pre-main sequence star. λ Sco **B** @ 42", λ Sco **C** @ 95".		**1.62+14.9 +12.0**	

Dschubba, Dzuba, δ Scorpii, Delta Scorpii, class B + class B companion orbiting it every 20 days, another star that orbits every 10 years. Companion passed close by in 2011: peaking at mag 1.65 between 5 and 15 July 2011.	**Ds.** 	**2.307 (1.65)**	
Nu Scorpii, Jabbah, ν Sco, 14 Scorpii. Quintuple: 2 close groups @ 41", Nu Scorpii A and B (Type B subgiants), split by 1.3" **&** Nu Scorpii C and D, type B main sequence dwarfs split by 2.4". Illuminates the reflection nebula **IC 4592. [Cat's eye**: λ Sco and υ Sco]. **Southern version of the Lyra "double-double"**. **AP**	**Ds.** 	**4.4+6.9 & 6.5+7.9**	
Sargas, θ Scorpii, Theta Scorpii, bright yellow giant star belonging to the spectral class F, a companion @ 6.47".	**Ds.** 	**1.87+5.36**	
ε Scorpii, Epsilon Scorpii, a giant K star, classified as a variable: only slightly: 0.01-0.02 magnitudes.		**2.31**	
Girtab, κ Scorpii, Kappa Scorpii, a spectroscopic binary, combined spectrum of B, primary component is a **Beta Cephei variable** - which is to say it is a star that exhibits variations in brightness as a result of pulsations of its surface.		**2.39**	
π Scorpii, Pi Scorpii, triple star, brightest components an eclipsing binary, classified as a **Beta Lyrae type variable**. **Beta Lyrae variables** are close binary stars that exhibit variations in total brightness because they orbit each other and periodically block each other's light. Both stars class B. The third component in the system is a distant companion.		**2.9+ 12.2**	
ξ Scorpii, Xi Scorpii, multiple star system, at least 6 stars forming **two groups** @ 4.67', **ABC:** two yellow-white class F stars, a subgiant, and a main sequence dwarf and a companion @ 7.6". The other group: **DEF**: two class K stars separated by 11.5", the sixth component in the Xi Scorpii system is not confirmed to be gravitationally bound to the other stars.		**4.8+5.1+ 7.6 & 7.4+8.1+ 11**	
ι Scorpii, Iota Scorpii, Apollyon, two stars. **Iota-1**: evolved star, class F, a companion at 37.5". **Iota-2** a supergiant, class A + distant companion at a separation of 32.6".	**Ds.** 	**3.03+10th & 4.78+11th**	
σ Scorpii, Sigma Scorpii, Al Niyat (shares with **Tau Scorpii**), brightest star in the system is a spectroscopic binary, primary star in the spectroscopic binary system is a giant of the spectral type B, is classified as a **Beta Cephei type v**ariable. The other component in the system is a main sequence star, class B. There is another star @ 20": a class B dwarf. **("Brilliant amber-yellow + tiny speck: looks like star + planet").**		**2.8+8.7**	
Al Niyat, τ Scorpii, Tau Scorpii, class B, popular target for astronomers because it is so **luminous** and **hot**, and also because, as a result of its **slow rotation**, the star shows a very **clear spectrum**.		**2.82**	
U Scorpii, the **fastest known nova,** one of the 10 known **recurring novae**. A **nova** is a cataclysmic nuclear explosion in a white dwarf star that occurs as a result of accretion of hydrogen on the star's surface: normally has a visual magnitude of 18, but during outbursts it reaches magnitude 8. The last eruption was observed in 2010 and the next one is expected: 2020.		**18(8)**	
Lesath, υ Scorpii, Upsilon Scorpii, subgiant, spectral class B.		**2.7**	
Jabhat al Akrab, ω Scorpii, Omega Scorpii, two stars separated by 0.24°, Omega-1 Scorpii is blue-white dwarf, class B, Omega-2 Scorpii: yellow bright giant, type G.	**Ds.** 	**3.93+4.31**	
G Scorpii, orange giant, K, used to be known as Gamma Telescopii.		**3.21**	
η Scorpii, Eta Scorpii, yellow-white subgiant, F, is a rapid rotator.		**3.33**	
ρ Scorpii, Rho Scorpii, binary, class B, primary is a blue-white subgiant, secondary separated of 38" .	**Ds.** 	**3.87+12.8**	

ζ Scorpii, Zeta Scorpii, two stars, line of sight, separated by 7', Zeta-1 Scorpii is a hypergiant star, class B, member of the open cluster **NGC 6231**. Zeta-2 Scorpii is an orange giant, class K. **AP**		**4.705 (4.6to4.86) + 3.59to3.65**	
μ Scorpii, Mu Scorpii, binary, @ 0.1°, Mu-1 is an **eclipsing binary**, of the Beta Lyrae type, primary component is a main sequence star, class B, companion is also a class B star, Mu-2 Scorpii, a subgiant star, belonging to the spectral class B.	**Ds.** 	**3.04+3.56**	
18 Scorpii, HIP 79672, a solar analog: a yellow main sequence star, spectral class G.		**5.503**	
Gliese 667, 142 Scorpii, HIP 84709, a **triple star** system, two brighter components, Gliese 667 A and Gliese 667 B, orbit with a period of 42.15 years, the third component, Gliese 667 C at 30". Gliese 667 A: is a main sequence star class K, B is class K, Gliese 667 C is a red dwarf – class M.		**5.89: 5.91+ 7.20+ 10.20**	
Scorpius X-1, the first X-ray source discovered outside the solar system and it is the strongest source of X-rays in the sky, second only to the Sun. The X-ray flux is associated with the **star V818 Scorpii**, a blue variable which is the optical counterpart to Scorpius X-1. **RA 16h 19m 55.07s DEC−15° 38' 24.8"**	**Star:** 	**Star: 12-13**	
Pismis 24-1, HDE 319718, the largest **star** in the **open cluster Pismis 24,** located within the **nebula NGC 6357 (War and Peace)**. Consists of at least three objects, stellar class O.		**10.43**	
Fried Egg Nebula: closest known yellow hyper-giant star, dust shells. IRAS 17163-3907. Dim. **A 17h 19m 49.330s Dec −39° 10′ 37.94″]**		**12.45**	
M6 ASSA78. Butterfly cluster. AP	**Oc.** 	**4.2**	**33'**
M7. ASSA80. Ptolemy's cluster. Between 2 dark neb: **B283 & B287. AP**	**Oc.+ DkN.** 	**3.3**	**80'**
NGC 6416. 50' E of **M6.**	**Oc.** 	**5.7**	
NGC 6231. See IC4628 ASSA72. Northern Jewel Box. Also contains **"The Chicken"** asterism - thx to **Neville Young. AP**	**Oc.+Asterism** 	**2.6**	**14'**
NGC 6322.	**Oc.** 	**6**	
NGC 6124. ASSA69.	**Oc.** 	**5.8**	
NGC 6178.	**Oc.** 	**7.2**	
NGC 6192, Bennett 79b, Open Cluster.	**Oc.** 	**8.5**	**7'**
Trumpler 27, Open Cluster. **RA 17h36m.2 DEC -33°29'.3**	**Oc.** 	**7**	**6.7'**
NGC 6383: Oc associated with nebulosity. AP	**Oc.+ N.** 	**5.5**	
NGC 6281 ASSA76. AP	**Oc.+ N.** 	**5.4**	
M4. ASSA68. Spiral chains, Central bar, first globular cluster discovered in which individual stars could be resolved. **Closest** globular cluster to our solar system. **AP**	**Gb.** 	**5.8**	**26.3'**
M80. One of the most densely populated clusters.	**Gb.** 	**7.9**	**8.9'**
NGC 6388. Mottled.	**Gb.** 	**6.9**	
NGC 6380.	**Gb.** 	**11.5**	
NGC 6144. Just N of Antares.	**Gb.** 	**9**	
NGC 6441. Close star **G Sco** and stellar like **Pn** Haro 1-36.	**Gb.** 	**7.2**	
NGC 6139.	**Gb.** 	**9**	
IC 4628. Prawn Neb. & Ocs: NGC 6231 (Northern Jewel Box). ASSA72, NGC6242. (Prawn rather resembles a Praying mantis…?)	**N. + Oc x 2** 	**Oc: 2.6 & 6.4**	

The "**False Comet**": Open clusters **NGC 6231** + **Cr 316** (Associated with IC 4628). **AP**			
NGC 6357.War and Peace -, Lobster Neb. + Pismis 24. (In the tail of Sco). It got the name **War and Peace** Nebula because, when observed in **infrared**, the nebula's western part resembles a **dove**, while the eastern part resembles a **skull**. **AP**	**N.** + Oc. 		
NGC6334. Cat's Paw. AP	**N.** 	**6**	**35'×20'**
NGC 6559/ IC 1274/ IC 1275/ IC 4685/ B 303: Same FOV: Stellar nursery: Clusters and nebulocities: **for AP**	**N.** 		
IC 4592. Blue Horse Head nebula. In the same WIDE FOV as the **Rho Oph cloud complex**. Bluish reflection neb. Lit by **Nu Scorpii**. Resemble **horse or dragon**… **AP**	**N.** 		
The Wolf, SL17, dark nebula: a dark nebula near **Gum55** and **The Dark Tower**. **RA 16h 52m 59s DEC -43º 34' 59'', AP**	**N.** 		
NGC 6153.	**Pn.** 	**9.9**	
NGC 6302. Bug Neb, Butterfly Neb. Bipolar, irregular, one of the most structurally complex nebulae known. **AP**	**Pn.** 	**7.1**	**50"**
NGC 6337. Ring. **Cheerio neb**.	**Pn.** 	**12.3**	
NGC 6072.	**Pn.** 	**11.7**	
IC 4596. Galaxy.	**Gx.** 	**14**	**1.5'×0.5'**
IC 4600. Galaxy.	**Gx.** 	**15**	**0.4'×0.3'**

Ser **SERPENS CAUDA** **SIR-penz** **The Serpent**	20-Jun/ '20-Jul		
Eta Serpentis - brightest star in the tail, a red giant of spectral class K, exhibits **solar-like oscillations** over a period of +/- 2.16 hours		**3.26**	
Theta Serpentis, Alya, Alga, two A-type main-sequence stars, separated 0.5'	**Ds.** 	**4.62+4.98**	
Xi Serpentis, a **triple** star, Xi Serpentis A is a yellow-white F-type giant, a **spectroscopic binary**, angular separation of only 2.2 milliarcseconds, orbital period of 2.29 days. Companion @ 25".	**Ds.** 	**3.54+13TH**	
Zeta Serpentis, type F.		**4th**	
Nu Serpentis, type A + companion.	**Ds.** 	**4th+9th**	
Omicron Serpentis, type A, **Delta Scuti variable** with amplitude variations of 0.01 magnitudes.	**Ds.** 	**4th +/- 0.01**	
59 Serpentis, d Serpentis, Shows irregular variations in brightness: a **spectroscopic binary**: an A-type star and an orange giant + an orange giant **secondary**.	**Ds.** 	**5.17to5.2**	
M16 / NGC 6611 (Oc.) + Neb: IC4703: Eagle nebula, Star Queen nebula. Contain the **"Pillars of Creation".** 50 x70 Ly. The star-forming regions in the neb are often evaporating gaseous globules; unlike Bok globules they **only hold one** protostar. **AP**	**Oc.+ N.** 	**6**	
IC4756. Double with **NGC6633** in OPH. Contains at least one naked-eye star, HD 172365.	Oc. x 2 	**5 & 4.6**	
NGC 6604 = Oc. & **nebulosity = Sh2-54:** an extended bright emission nebula about 140 arcminutes in size. Located 2^{o} N of **Eagle Neb**. This Oc. thought to simply be the densest part of the **surrounding OB association**. **AP**	**Oc.+ N.** 	**6.5**	**N=140'**
NGC 6539.	**Gb.** 	**9.6**	
NGC 6535. Small and sparse, **contains no** known RR Lyrae variables, which is unusual for a globular cluster.	**Gb.** 	**10.6**	
Abell 41. Contains the binary star **MT Serpentis** at its centre. **RA 17m 29' 02.2" Dec -15^{o} 13' 07"**	**Pn.** 	**17.2, Cs16.5**	**0.3'**
[MWC 922 , star surrounded by Pn. Dubbed the **Red Square Nebula** due to its similarities to the **Red Rectangle Nebula (Mon),** appears to be a nearly perfect square. MWC 922 itself is an **FS Canis Majoris variable**. **AP Hubble.]**	**Pn.** 		
Lynds Dark Nebula 483, or LDN 483, RA: 18:17:35.00, Dec: -4:39:48.00 AP	Dark Nb 		

Constellation: Object/ Info.	@MERIDIAN/ Target Type.	App. Mag.	SIZE
AUG			
Aql AQUILA uh-KWI-luh The Eagle	**10-Aug**		
Altair, alpha Aquilae (Summer Triangle). 16ly, 12th brightest star in the sky, an A-type main sequence star (hydrogen fusing dwarf), three optical companions, along the same line of sight in the sky.		**0.77**	
β Aql, Alshain, is a yellow-hued star, seventh brightest star in Aquila, class G subgiant, visual companion, Beta Aquilae B, a class M red dwarf, @ 13".	**Ds.** 	**3.7+13th**	
γ Aql, Gamma, Tarazed, is an orange-hued giant, second brightest, a class K.		**2.72**	
ε Aquilae, Epsilon Aquilae, Deneb el Okab Borealis, is a triple star system, an orange K-type giant, companions, suspected optical binaries, are 10th magnitude stars..		**4.02+ 10th x 2**	
ζ Aql, Zeta Aquilae, Deneb el Okab Australis, blue-white-hued star, a triple star system, white A-type main sequence dwarf for a primary + companions x2.		**2.99+ 2x 12th**	
η Aql, Eta Aquilae, Bezek, yellow-white-hued supergiant star. Among the brightest **Cepheid variable** stars, a period of 7.17664 days. One of the easiest Cepheids to distinguish by the naked eye.		**3.5to4.4**	
Tseen Foo, θ Aquilae, Theta Aquilae, spectroscopic binary star, blue-white B-type giant.		**3.24**	
Al Thalimain, ι Aquilae, Iota Aquilae, blue-white B-type star.		**4.36**	
Al Thalimain Prior, λ Aquilae, Lambda Aquilae, blue-white B-type main sequence dwarf. In 1973 NASA launched a probe, **Pioneer 11**, will presumably approach Lambda Aquilae in about **four million** years.		**3.43**	
Tso Ke, ρ Aquilae, Rho Aquilae, a white A-type main sequence dwarf - **no longer belongs to the constellation Aquila**, as it crossed the border into **Delphinus** in 1992.		**4.94**	
15 Aquilae, HIP 93717, showcase pair, an optical double star. The primary is an **orange**-hued, secondary @ 39.1" a **purple**-hued star. ("amber-yellow + bluish-turquoise"). **RA 19h 05.0m DEC -04^0 02'.**	**Ds.** 	**5.4 + 7.0**	
57 Aql is a binary star. Showcase pair. "Pure white + scarlet tinted white", sep 35.9", **RA 19h 54.6m DEC -08^0 14".**	**Ds.** 	**5.7+6.3**	
5 Aql, HIP 92117, quadruple star forming an optical double. "whitish straw-yellow + pure sapphire", spectroscopic binary type A + companion & type F companion @ 12.5", **RA 18h 46.5m DEC -00^0 58'.**	**Ds.** 	**5.9+7.0**	
Σ2446, " bright lemon star+ dim greenish sapphire", sep 9.4", **RA 19h05.8m DEC 06^o 33'.**	**Ds.** 	**7.0+8.9**	
28 Aql, "bright straw-yellow + dim ocean blue", sep 59.7", **RA 19h 19.7m DEC 12^0 22'.**	**Ds.** 	**5.5+9.0**	
Σ2494, "ruddy **orange** + **blue**", sep 25.6", **RA 19h 20.0m DEC -06^0 38'.**	**Ds.** 	**7.0+10.4**	
Σ2644, grand: "pair of gloss-white stars", sep 2.6", **RA 20h 12.6m DEC 00^0 52'.**	**Ds.** 	**6.9+7.1**	
S 740, "pair of grapefruit-orange stars, look like a pair of eyes", sep 43.5"**,** **RA 20h 14.2m DEC 06^0 35'.**	**Ds.** 	**7.8+8.1**	
h 1529, contrasting, primary a brighr red-orange star, sep 32", **RA 20h 33.4m DEC -06^0 13'.**	**Ds.** 	**7.4+9.6**	
R Aql, HIP 93820, a red-hued giant, a **Mira variable** with a period of approximately **9 months. [Period 284 days].**		**6to12**	
FF Aql, HIP 93124, is a yellow-white-hued supergiant star, a **Cepheid variable** star, period of 4.5 days.		**5.2to5.7**	

V Aquilae, HIP93666. Carbon star.	C	6.78	
STREICHER 49. Asterism: only a degree south-east of **NGC 6843.** The point of action is the brighter magnitude 6.9 star (HD 190070), situated at the south-western end of this group. From this, fainter stars fan out towards the north-east in layers to complete what looks like a water sprinkler in action. **RA 20h02m.9 DEC +10°56'.0**	**Asterism.**	10.5	6'
NGC 6738. Asterism.	**?not Oc**	8	
NGC 6840. Star Group/ Asterism: faint stars in two linked groupings, south-western part of the cluster appears loose with stars that connect the stringy group towards the northeast, giving an impression of hangingon a string.	**not Oc**	10	4'
NGC 6843. Star Group/ Asterism: a grouping of faint stars in a bent string. The brightest star in the field is the magnitude 7.7 (HD 188527) situated south of the star group**.**	**not Oc**	10.5	4'
NGC 6709. 3 stars: right triangle. It lies five degrees southwest of Zeta Aquilae. The stars are loosely arranged into a diamond-like shape.	**Oc.**	6.7	13'
NGC 6755. Dark rift splits it in two.	**Oc.**	7.5	
NGC 6756.	**Oc.**	11	
NGC 6760. Unresolved.	**Gb.**	9.1	6.6'
NGC 6749. Reputation as the **most difficult** NGC globular in the sky.	**Gb.**	11.1	6.3'
NGC 6741. **Phantom Streak neb.** Rectangular. **AP**	**Pn.**	11	6"
NGC 6781. Pn. Beautiful. Large, ring. **Ghost of the Moon** neb. On a line btw Delta & Zeta Aquilae. **AP**	**Pn.**	12	109"
NGC 6778.	**Pn.**	12	37"
NGC 6772	**Pn.**	12.7	70x56"
NGC 6790. Compact. Small.	**Pn.**	10	
NGC 6803. Small - "out of focus green star"	**Pn.**	11	6"
NGC 6804 is a planetary nebula that appears as a small, bright ring. 5 degrees west of Altair.	**Pn.**	12.2, Cs14.3	35"
NGC 6751: also known as the **Glowing Eye,** a planetary nebula.	**Pn.**	11.9	0.43'
Abell 56. Planetary neb. Ra 19:13:06.1 Dec +02:52:48 AP	**Pn.**	14.1 Cs.19.7	188x 174"
Abell 70 + Gx behind it: "**Diamond Ring Shape**". **Ra 20 31 33.2 Dec -07 05 18 AP**	**Pn.**	14.7. Cs 19.1	0.7'
B143. Within 3° **NW of Altair**, accompanied by a large number of other **Barnard dark** nebulae: **B142, B340, B334, B336 and B337,** within a 2° circumference. This particular nebula has the general shape of a **square** approximately 0.5° wide and with the W side missing. The combination of **B142 and B143** are commonly referred to as the **"E" nebula** - Aka the "**Tripple Cave Nebula**": wide field views reveal a combined formation which is similar to the letter "**E**". Close to **Gamma.** **RA: 19:39:41 Dec. +10:31:00 AP**	Dark Nb		45x65'
NGC 6814. Face-on. (a Seyfert Gx).	**Gx.**	11.2	3.0'×3.0'

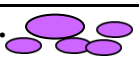
CrA CORONA AUSTRALIS **kor-OH-nah os-TRAH-lis The Southern Crown**	**01-Aug**		
Alfecca Meridiana, Alpha CrA, Meridiana, a white main sequence star spectral type A.		**4.10**	
Beta (β) Coronae Australis, orange giant, spectral type is K.		**4.11**	
Gamma (γ) Coronae Australis. Yellow-whites (F), separated by 1.3 arcseconds, at an angle of 61 degrees	**Ds.**	**4.2 (4.9 + 5)**	
Epsilon (ε) Coronae Australis, eclipsing binary: **WUrsae Majoris variables**, known as **contact binaries**. Varying by a **quarter of a magnitude** around an average apparent magnitude of **4.83** every **seven hours**, Type F.		**4.83 (+/-0.25)**	
η: Eta¹ and Eta² Coronae Australis, an **optical double**, are separable with the naked eye and are both white.	**Ds.**	**5.1+5.5**	
Kappa. Blue-whites, unrelated, easily resolved optical double,separated by 21.6 arcseconds. Kappa², brighter, more bluish white (B) - Kappa¹ is of spectral type A.	**Ds.**	**5.7 + 6.3**	
ESO 281-SC24, 1.6 deg SW of η Coronae Australis, SE of Theta. Composed of the yellow 9th magnitude star GSC 7914 178 1 and five 10th to 11th magnitude stars.	**Oc.**	**9.5**	**6'**
The Coronet cluster. R CRA, G359.93-17.85; RA 19h 1m 54s Dec −36° 57.2'	**Oc.**	**8**	**26'**
NGC 6541. ASSA 85. Large and bright. **AP**	**Gb.**	**6.6**	**13.1'**
Bernes 157. ASSA 93, a boomerang-shaped dark nebula that stretches around the **CrA nebula** like a huge, draping black scarf. **Ra 19h 02m 54s Dec -37° 08' AP**	**DkN.**		
Corona Australis Molecular Cloud, a dark molecular cloud with many embedded **reflection nebulae** @ N end of the dark nebula **Bernes 157.** **NGC 6726/7 + NGC 6729** (See below), **IC4812, (Below)** + close globular **NGC 6723. Sgt. AP**	**N.**		
NGC 6729 variable neb & R Coronae Australis, an irregular variable, blue-white, spectral type B. Obscured by, and illuminate **NGC 6729**, which brightens and darkens with it. The nebula is often compared to a comet for its appearance in a telescope, as its length is five times its width **AP**		**Star: 9.7to13.9**	**1'**
IC 4812. Nebula. Contain double star **BSO 14**. **AP**	**N.**	**6.5**	**10'**
NGC 6726–7, reflection neb & variable star, **TY Coronae Australis,** blue-white, spectral type B, illuminates nebula, the brightness of the nebula varies with it.		**Star: 8.7to12.4**	**4'**
IC 1297 is a planetary nebula, small, "a square with rounded edges". Surrounds the variable star **RU CrA**, a WC class Wolf–Rayet star.	**Pn.**	**10.7 Star 12.9**	**7"**
PNG 352. Ra 18 00 11.819 Dec -38 49 52.74 AP	**Pn.**	**11.4**	
NGC 6768, (35′ south of Pn. IC 1297). **Two galaxies merging**, one elongated elliptical + lenticular galaxy.	**Gx.**	**11.2,**	**1.2'×1.1'**
IC 4808, 3.9 degrees west-southwest of Beta Sagittarii. Spiral.	**Gx.**	**12.9**	**1.9x0.8'**

Cyg CYGNUS SIG-nus The Swan	20-Aug		
Albireo. Beta Cyg: Orange giant: Class **K** (+ close class B @ 0.4 arc sec - 20"scope needed) & at 35" **blue-green** class **B. Showpiece.**	**Ds.**	**3.18 (+5.82) & 5.09**	
α Cyg, α Cygni, Deneb. Blue-white (A) super-giant. **Furthest 1st mag** star (3000ly). Summer (Our **winter**) **Triangle**: **Deneb, Vega, Altair**. Prototype for the **Alpha Cygni variables**.		**1.21to1.29**	
Sadr. Gamma Cygni (γ Cyg). Lies in the centre of **Cygnus's cross**. Super giant. Class F. Surrounded by diffuse emission nebula, **IC 1318**, also known as the **Sadr region**. (See below).		**2.23**	
Delta Cyg. (δ). Rukh. **Triple** star: Blue-white (B) + yellow-white (F) + distant orange (K).		**2.9 + 6.6 +12th**	
Eta Cygni: A close by **black hole**: **Cygnus X-1:** orbits a blue supergiant variable star, HDE 226868, and the two form a binary system**.**		**3.89**	
Epsilon Cygni, ε Cyg, Gienah, a giant star, class K. Shares traditional name, Gienah, with **Gamma Corvi**.		**2.48**	
Mu Cyg (μ). Class F + G stars.	**Ds.**	**4.50: 4.69 + 6.12**	
Omicron[1] (ο) Cyg. 31 Cyg. HIP 99675. "Wider Albireo". Between Deneb & Delta Cygni. **Orange** (with closer **blue** comp) + **turquoise**.	Ds.	**3.8 (7)+ 4.8**	
Psi Cyg (φ). White stars.	**Ds.**	**5 + 7.5**	
61 Cyg. HIP 104214. Orange K-type dwarfs.	**Ds.**	**5.2 + 6.1**	
ζ Cygni (Zeta Cygni), yellow star spectral class G + white dwarf comp.	**Ds.**	**3.2+12th**	
τ Cygni (Tau Cygni), double star, yellowish white subgiant spectral class F + a yellow main sequence star, of the spectral type G.	**Ds.**	**3.84+6.44**	
π Cygni, Pi Cygni, Pi-1 Cygni, Azelfafage, a type B + **Pi-2 Cygni, Pennae Caudalis, Sama al Azrak,** a spectroscopic binary - main component is a B-type blue giant.	**Ds.**	**4.67+4.23**	
16 Cyg, showcase pair of whitish gold stars, alike, sep 39.1", RA 19h 41.8m DEC 50^0 32'.	**Ds.**	**6.0+6.2**	
17 Cyg, wide pair, golden **yellow** + pale **blue,** sep 26.3", **RA 19h46.4m DEC 33^0 44'.**	**Ds.**	**5.1+9.3**	
26 Cyg, "brilliant **citrus-orange** + **whitish-lilac**", sep 41.4", **RA 21h 01.4m DEC 50^0 06'.**	**Ds.**	**5.2+8.9**	
Struve (Σ) 2666, blue and **gold,** sep 2.8", **RA20h 18.1m DEC 40^0 44'.**	**Ds.**	**6.0+8.2**	
OΣΣ 207, color contrast: **deep yellow** + **deep blue**, sp 86.9", **RA 20h 22.9m DEC 42^0 59'.**	**Ds.**	**6.4+8.0**	
OΣ 414, nice colour contrast: **yellow** and **blue,** sep 9.9". **RA 20h 47.2m DEC 42^0 25'.**	**Ds.**	**7.4+8.9**	
34 Cygni, P Cygni, a hypergiant luminous blue variable (**LBV**). **Luminous blue variables** are rare, only found in regions of intense star formation. Usually short lived. Because of enormous mass and energy, they exhaust their nuclear fuel quickly and erupt into supernovae after only a few million years. P Cygni belongs to the spectral class B**.**		**4.8 (3to6)**	
Ruchba, ω Cygni , Omega Cygni, two visual doubles, 1/3^O apart. A hot subgiant, spectral class B + red giant type M.	**Ds.**	**4.95+5.22**	
U Cygni, HIP 100219, carbon star, dim rich red, period 463 days. Forms **beautiful contrast** with close 8th mag **white** star. (Faint surrounding nebulosity). **AP**	C	**5.9to12.1**	

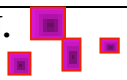
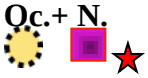
V Cygni, HIP 102082, carbon star, period 421 days.	C	7.7to13.9	
LW Cygni, HIP108205, carbon star.	C		
V460 Cygni, SAO 71613, carbon star, period 180 days.	C	5.6to7.0	
The Northern Cross, Cygnus's cross: 5 stars: Deneb (Alpha Cygni), Delta Cygni, Albireo (Beta Cygni), Gienah (Epsilon Cygni) and Sadr (Gamma Cygni) at the centre.	**Asterism.**		
Horseshoe. U-shape. Contains a few double stars. **RA: 21h 08m DEC: 47d 14m**	**Asterism.**		**25'**
Leiter 9/ Little Orion. A little **below Deneb**, in the Mexican Gulf of the North America Nebula (NGC 7000). **RA: 20h 56m DEC: 43d 34m**	**Asterism.**		**1^0**
Meerschaum Pipe. It lies 3/4° of NGC 6834. **RA: 19h 51m DEC: 30d 07m**	**Asterism.**		**22'**
Red Necked Emu. Just below the open cluster Dolidze 3. The stars are mag 9. All stars are blue/white ,except 1 star in the neck: this one is red. **RA: 20h 14m DEC: 36d 30m**	**Asterism.**		**45'**
The Fairy Ring. Chaple's Arc. A few degrees south of the star Sadr: 1.6° west of the Cresent Nebula. A lot of double stars. **RA: 20h 04m DEC: 38d 14m**	**Asterism.**		**20'x20'**
Vultus Irrisorie. Shape of a **smiley face**. Located NW in Cygnus. It consists of 5 stars that form the face with a mage of 6 to 8, eyes are shaped by two stars west of the asterism. **RA: 19h 53m DEC: 47d 16m**	**Asterism.**		**1.4°**
M39. Large, loose: binos.	**Oc.**	**5.5**	
NGC 6871.	**Oc.**	**5.2**	
M29. Coarse, less impressive.	**Oc.**	**7.1**	
NGC 6811. Dense cluster.	**Oc.**	**6.8**	
IC 1369.	**Oc.**	**6.8**	
NGC 6910, The Rocking Horse Cluster	**Oc.**	**7.4**	**10'**
NGC 7063.	**Oc.**	**7.0**	
Cygnus Loop (Sharpless 103). A large SN remnant, 3^Oacross, forms an emission nebula. **AP** **The Veil Nebula** is the visual component of the **Cygnus Loop**. It consists of several components: **the Western Veil, Witch's Broom: NGC 6960,** **the Eastern Veil: NGC 6992, NGC 6995, IC 1340,** **and Fleming's Triangle: Pickering's Triangle.** **NGC 6974 and NGC 6979:** regions of nebulosity located in a cloud at the northern edge of the nebula.	**N.**	**7.0**	**3^O**
IC 1318. The Sadr region. The diffuse emission nebula surrounding Sadr. The Sadr region is one of the surrounding nebulous regions; others include the **Butterfly Nebula** and the **Crescent Nebula**.	**N.**		
Crescent Nebula, NGC 6888, Caldwell 27, Sharpless 105. Emission nebula formed by the strong stellar wind of HD 192163 (WR 136), which is a **Wolf Rayet star** : a hot, old, massive star that is rapidly losing mass by means of a fast stellar wind.	**N.**	**7.4**	**18x12'**
IC5146 + B168: Coccoon nebula (emission/ reflection) + **dark neb**. **AP**	**N+DkN:**	**7.2**	**N:12'** **B:100x10'**
Cygnus rift. Northern Coal Sack. **[Great Rift** : Starts in **Cygnus**, where it is known as the **Cygnus Rift** or **Northern Coalsack**, stretches to **Aquila**; to **Ophiuchus**, where it broadens	**DkN.**		

out; to **Sagittarius**, where it obscures the Galactic Center; and finally to **Centaurus**.]			
NGC 7000 North American neb +	**N.**	**4**	**120 x 100'**
IC 5070/ 5067: Pelican neb.	**N.**	**8**	
Sh2-106, an emission nebula and a star formation region, 2,000 ly (600 pc) from Earth, in center of the nebula is a young and massive star that emits jets of hot gas from its poles, forming the **bipolar** structure, also ionizing surrounding dust, spans about 2 light-years across. RA 20h 27m 27.1s DEC +37° 22′ 39	**N.**		**3′ × 3′**
NGC 6826. Cs. Blinking Planetary.	**Pn.**	**10**	
NGC 7027. The Magic Carpet nebula.	**Pn.**	**10**	
NGC 7026. The Cheesburger neb, The Tiny Dumbell nebula.	**Pn.**	**10.9**	**21"**
Campbell's Hydrogen Star. PK64+5.1. Planetary, 2½^0 N of Albireo. Difficult: 10th mag central star "overpowers" the tiny disc. **RA 19h 34.8m DEC +30^0 31.0'.**	**Pn.**	**9.9**	**7.5"**
NGC 7048.	**Pn.**	**11**	
NGC 7008. Fetus Neb, large, irregular bright spots, colourful.	**Pn.**	**12**	
Abell 61. Planetary neb. Large & faint. **Ra: 16hr 19m 31s Dec: +46d 15m 49s**	**Pn.**	**13.5**	3.4'
Abell 78. Planetary neb, fainter halo (mostly hydrogen) and an inner elliptical ring that is mostly made of helium: one of the **rare planetary** nebula (including Abell 30) know to contain inner zones of nearly pure **helium** embedded into large (**H, He**) normal nebulosity. **RA 21h 35m 29.38s DEC +31° 41′ 45.3 AP**	**Pn.**	**13.4 Cs. 13.1**	113x88"
PK 80-6.1. The Egg Nebula. RA 21h 02m DEC 36^0 42'.	**Pn.**	**13.5**	16"
NGC 6946. Spiral. "**Fireworks** Gx": > **9 super novae** observed. **In Cygnus and in Cepheus AP**	**Gx.**	**9.7**	
Lyr LYRA LYE-rah The Lyre	**01-Aug**		
Vega. Part of the "Summer Triangle" (Our winter). 5TH Brightest, 2nd in N-hemisphere, after Arcturus. Close: 25ly, Class A. Was the North pole star +/- 12000BC. **Delta Scuti variable**, period 0.2 days.		**−0.02 to 0.07**	
Beta Lyrae. Cream (Eclipsing Binary) + blue companion.	**Ds.**	**3.3 to 4.4, +7.2**	
Delta Lyrae (δ). Unrelated Blue-white & Orange.	**Ds.**	**5.6 & 4.2**	
Gamma Lyrae (γ). Sulaphat. Spectroscopic binary.		**3.3**	
Zeta Lyrae (ζ). Double: Classes A + F.	**Ds.**	**4.36 +5.23**	
μ Lyrae, Mu Lyrae, Alathfar, a white subgiant star (A).		**5.12**	
Epsilon Lyrae (ε). Double-double: ε1 (Separated 2.6") & ε2 (2.3").	**Ds.**	**4.7+ 6.2 & 5.1+ 5.5**	
STRUVE 2470. Double star. Separation 13.4". **RA 19h08m.8 DEC+34°46'.0**	**Ds.**	**6.6+8.6**	

STRUVE 2474. Double star. Separation 16.2". **RA 19h09m.1 + DEC 34°36'.0**	**Ds.**	6.7+8.8	
R Lyrae, 13 Lyrae. Red giant star (M). **Semi-regular variable**: low-level long period pulsating variables like Mira. Period 46 days.		3.9to5	
RR Lyrae, the **eponym f**or the **RR Lyrae variables,** pulsating variables similar to Cepheids, but are evolved population II stars of spectral types A and F. RR Lyrae varies between mag 7 and 8, exhibits **Blazhko effect**, aka long-period modulation: a variation in period and amplitude.		7to8	
T Lyrae. SAO 67087. HIP 90883. Irregular variable. Carbon star. Very deep red. One of reddest, compare R Lep (Hind's Crimson star) and V Hydrae. Ra 18 32 20 Dec +36 59 55	C	7.5to 9.2	
STREICHER 73. Asterism: Resembles "Mopani worm" typically found in the northern Bushveld. Two magnitude 10 stars form a double to the NW of the group, with fainter members stringing along to the SE **RA18h59m.3 DEC+29°46'.0**	**Asterism.**	9	4'
"Summer's (Winter's) Other triangle": Vega + Epsilon + Zeta.	**Asterism.**		
NGC 6791. Properties of Oc. + Gb. Old, metal rich.	**Oc.**	9.5	15'
NGC 6743. Open Cluster.	**Oc.**	8.2	8'
STEPHENSON 1. Open Cluster. **RA 18h54m.5 DEC+36°53'.8**	**Oc.**	3.8	40'
M56. Globular cluster.	**Gb.**	8.3	7.1'
M57 "Ring nebula". AP	**Pn.**	8.8	1.5x1'
NGC 6765.	**Pn.**	12.9	38"
M 1-64 (PN G064.9+15.5, PK 064+15.1). Minkowski 1-64 RA: 18h 50m 2.1s Dec: +35° 14' 36"	**Pn.**	13.3	17"
Abell 46 is a planetary. **Ra 18:31:18.9 Dec +26:56:17**	**Pn.**	14.3, Cs 14.9	63x60"
NGC 6703. Galaxy.	**Gx.**	11.4	
NGC 6745. Irregular.	**Gx.**	13.3	
NGC 6662. Galaxy.	**Gx.**	13.5	1.7'×0.5'
IC 1296. Galaxy.	**Gx.**	14.8	1.1'×0.8'
NGC 6740. Galaxy.	**Gx.**	13	0.9'×0.8'
Pav PAVO PAH-voh The Peacock	**10-Aug**		
Alpha Pavonis, Peacock. Blue-white, class B. Spectroscopic binary.		1.94	
Beta Pavonis, white giant of spectral class A.		3.43	
Delta Pavonis, a nearby Sun-like but more evolved star, a yellow subgiant of spectral type G.		3.56	
Eta Pavonis, luminous orange giant of spectral type K**.**		3.6	
Xi (ξ) Pavonis: a brighter orange (K) star and fainter white companion	**Ds.**	4.38	
Lambda Pavonis, λ Pav, bright irregular variable, classed as a **Gamma Cassiopeiae variable** or shell star, of spectral type B.		3.4to4.4	

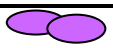
Kappa Pavonis. Bright **Cepheid variable**. Yellow-white super-giant. Kappa Pavonis is a W Virginis variable—a subclass of Type II Cepheid.[28] It ranges from magnitude 3.91 to 4.78 over 9 days and is a yellow-white supergiant pulsating between spectral classes F5I-II and G5I-II		**3.9 to 4.8**	
V Pavonis. Pulsating semiregular variable red giant, **carbon star**, with a **prominent red hue,** periods of 225.4 and 3735 days concurrently. **RA 17h43m.3 DEC-57°43'.4**		**6.3to8.2**	
STREICHER 10. Asterism: a star string straddling the boundary between the constellations Pavo and Apus 2° W of zeta Pavonis, consists of eight stars, the beautiful white magnitude 6.7 star HD 165861 marks the south-western end of the string with seven fainter stars extending towards the north-east. The stars in the centre area are somewhat fainter, but globally seen, this uneven string is well defined against the background star field. **RA18h15m.3 DEC-70°42'.5**	**Asterism.** 	**5.5**	**12'**
STREICHER 35. Asterism: 2.2° N of globular cluster **NGC 6752**. Prominent against the star field is a half-moon shape consisting of five stars, with the brightest member the magnitude 6 star HD 176522 on the southern tip, shaped like a Japanese fan, the open side of the half-moon, facing NE, appears to be filled with a handful of faint splinter stars. **RA 19h03m.7 DEC-57°50'.5**	**Asterism.** 	**8**	**19'**
ALESSI J2053.8-5939. Asterism: situated on the northern boundary between Pavo and Indus, a beautiful, exceptional grouping in north-south direction, resembling the shape of a mini-Cassiopiaeconstellation (see sketch). The brightest member is the magnitude7.5 white coloured star HD 198534situated towards the south of this small group of seven stars. **RA 20h53m.8 DEC-59°39'.5**	**Asterism.** 	**9.1**	**7'×3'**
The Wedge of Cheese. Tip of the wedge: **Alpha Indii**, side lines pass through **Alpha Pavonis** (Peacock) and **Beta Indii** respectively, the base formed by **Gamma-, Beta-** and **Delta Pavonis**. **Thx to Michael Poll.**	**Asterism.** 		
NGC 6752. ASSA95. Cartwheel or Starfish cluster. Only smaller in ang. size than Omega and Tuc. Highly resolved. **Impressive**. Star chains. About 100 light years across, thought to contain 100,000 stars. **AP**	**Gb.** 	**5.4**	**20.4'**
GN 20.24.5. Reflection Nebula**. RA20h28m.5 DEC-59°14'.5 AP**	**N.** 	**?**	**4'**
PK 332-16.2. Diffuse Nebula. **RA17h54m.4 DEC -60°49'.5 AP**	**N.** 	**-**	**1'**
PK 332.8-16.4. Planetary Nebula. **RA 17h47m.3 DEC-60°22'.6 AP**	**Pn.** 	**14**	**36"**
PK 320.3-28.8. Planetary Nebula. **RA19h27m.5 DEC -74°39'.4**	**Pn.** 	**13**	**10"**
NGC 6744. ASSA94. Intermediate spiral, one of the most **Milky Way-like** spiral galaxies in our immediate vicinity, with flocculent (fluffy) arms and an elongated core. At least one distorted companion galaxy (**NGC 6744A**) superficially similar to one of the Magellanic Clouds. **AP**	**Gx.** 	**8.6 + 14**	**15'.5×10' + 1.8'×0.7'**
NGC 6753. Galaxy.	**Gx.** 	**11.1**	**2.9'×2.5'**
NGC 6398. Galaxy**.**	**Gx.** 	**13.4**	**2.0'×1.7'**
NGC 6684. Galaxy.	**Gx.** 	**10.4**	**4.5'×3.3'**
NGC 6403. Galaxy**.**	**Gx.** 	**13.5**	**1.1'×1.2'**
NGC 7020. Galaxy.	**Gx.** 	**11.8**	**3.8'×1.7'**
NGC 6872. Condor Gx. Largest, 5x MW. **Integral sign** shape + **IC4970**. (6.0′ × 1.7′). **AP**	**Gx.** 	**10.7**	**6.0′ × 1.7′**
IC 4965. Spiral, 1.7 degrees W of Alpha Pavonis, is a central member of the **Shapley Supercluster.**	**Gx.** 	**14.6**	**1.1'×1.0'**

Sge SAGITTA sa-GIT-ah The Arrow	**20-Aug**		
γ Sagittae, Gamma Sagittae. Brightest star in Sge, orange giant (K).	★	**3.51**	
δ Sagittae, Delta Sagittae, class M + B - a close multiple star: red bright giant primary, secondary a white or blue-white.	**Ds.** ★★	**3.68**	
α Sagittae, Alpha Sagittae, Sham or Alsahm, 3rd brightest, a yellow bright giant (G).	★	**4.39**	
β Sagittae, Beta Sagittae, yellow giant (G).	★	**4.387**	
ζ Sagittae, Zeta Sagittae, triple star. Primary is a white main sequence star (A).	★ ★ ★	**5.01**	
ε Sagittae, Epsilon Sagittae, multiple star system, primary a yellow giant (G).	★ ★ ★	**5.67**	
S Sagittae. Cepheid variable, an F - G spectrum, period of 8.38 days.	★	**5.5to6.2**	
13 Sge Group. Asterism.	**Asterism.** ★ ★ ★ ★	**5**	
15 Sagittae, binary star: yellow main sequence dwarf and a brown dwarf. **RA 20h 04m 06.22s Dec17° 04′ 12.6.**	**Ds.** ★★	**6th**	
Leiter 4. Arrow shaped, shares FOV Gamma, 3/4˚ SW. Brightest star is gold and with 6 other stars form the top of the arrow. The arrow points SSW. The stem of the asterism is curved and is shaped by 7 stars. **RA: 20h 01m DEC: 20d 03m**	**Asterism.** ★ ★ ★ ★	**6.4**	**7' x 5'**
NGC 6839, an asterism, Not an Oc. About 11 stars mag 11 and fainter.	**Asterism.** ★ ★ ★ ★	**8.4**	**4'**
M71. 3rd closest after **M4 & M22. "Very loose":** Can be mistaken for Oc.	**Gb.** ⊕	**6.1**	
Sh 2-82, "**Little Cocoon** or **Trifid**". Emission, surrounded by reflection nebula. **R.A. 19 hr 31 min Dec +18 17⁰ 54' AP**	**N.**	-	
Sharpless 2-084, Little California Nebula. Emission nebula Ra 19:46:00 Dec +18:15:00 AP	**N.**	**?**	**15x3'**
NGC 6886. Compact.	**Pn.**	**11.4**	
NGC 6879.	**Pn.**	**12.5**	
IC 4997. Small.	**Pn.**	**10.4**	
Necklace nebula (PN G054.2-03.4) FAINT, **DIM Ra 19 43 59.5 Dec +17 09 01 (Hubble). AP**	**Pn.**	**? 18**	
Sgr SAGITTARIUS sadge-ih-TAIR-ee-us The Archer	**01-Aug**		
Alpha Sagittarii, α Sagittarii, Alrami and Rukbat. Blue, class B dwarf star.	★	**3.97**	
Beta Sagittarii. Arkab. Blue + yellow. 0.36° apart. **β¹ Sgr Prior** since it leads β² across the sky, is a binary star. Arkab Prior A is a type B main sequence dwarf. Arkab Prior B is a type A dwarf, 28" apart. β² Sgr, **Arkab Posterior**, is a spectral type F giant.	**Ds.** ★★ ★	**3.96+7.4& 4.27**	
Epsilon Sagittarii, ε Sgr, is Kaus Australis, the brightest star in the constellation. Class B.	★	**1.85**	
Sigma Sagittarii, σ Sgr, Nunki. Class B.	★	**2.05**	
Zeta Sagittarii, ζ Sgr, Ascella. Binary star system, period of 21 years. Spectral class A giant + A subgiant. Faint, 10th magnitude companion,	**Ds.** ★★ ★	**3.27+3.48 and 10th**	

separated from the primary by a distance of 75".			
Delta Sagittarii δ Sgr, Kaus Media, Kaus Meridionalis, and Media. Giant star with a stellar classification K. It has three dim companions @ 26", 40" and 58".		**2.70 +13th, 14th, 15th**	
Eta Sagittarii, η Sgr, binary star system, formerly "Beta Telescopii". Primary, η Sagittarii A, is a red giant, **M**, companion, η Sagittarii B is an **F**-type main sequence star @ 3.6". "Brilliant **orange** + **white**".	**Ds.** 	**3.11+7.77**	
Pz 6, showcase pair, "mustard yellow + deep yellow", sep 5.8 **RA 17h 59.1m DEC -30^0 15'.**	**Ds.** 	**5.4+7.0**	
β 245, showcase, "bright orange + dimmer companion, nice **contrast", sep 3.9". RA18h 10.1m DEC -30^0 44'.**	**Ds.** 	**5.8+8.0**	
Sh 263, Howe 42, Sh 264: "3 pairs in a field that includes cluster **NGC 6603**: a cluster within starcloud **M24**".	**Ds.** 	**6.8+9.3 8.5+10 6.9+7.6**	
21 Sgr, "orange + greenish pair", sep 1.5"**.** **RA 18h 25.4m DEC -20^0 33'.**	**Ds.** 	**5.0+7.4**	
54 Sgr, "bright citrus-orange + small dot of silver", sep 44.7", **RA 19h 40.7m DEC -16^0 18'.**	**Ds.** 	**5.4+7.7**	
Asterisms: Teapot, Teaspoon.	**Asterism.** 		
The Terebellum (Ptolemy). A quadrilateral of stars. Formed by four 4th magnitude stars, all within two degrees of each other: **Omega Sagittarii**: NE corner; **59** Sagittarii or b Sagittarii: SE; **60** Sagittarii or A Sagittarii: NW, **62** Sagittarii or c Sagittarii, at SW corner.	**Asterism.** 		
M20, NGC6514, ASSA82. Trifid Neb. 7th mag. Ds (multiple star at heart – HD 164492). **Emission & reflection & dark N**. Rare **cloud-cloud collision** HII region, star-forming region. **AP**	**N.** 	**8.5**	**20'×20'**
M21. ASSA84: Oc. Young, only 4.6 mill years old **AP**	**Oc.** 	**5.9**	**13'**
M23. ASSA81. AP	**Oc.** 	**5.5**	**27'**
M24. ASSA88. Aka **Small Sagittarius Star Cloud** to distinguish it from the Great Sagittarius Star Cloud located to the north of Gamma Sagittarii and Delta Sagittarii. It is 600 ly wide. (**See double star pairs above**). **AP**	**Star cloud** 	**3.1**	
M18.	**Oc.** 	**7.5**	**9'**
M25. ASSA89. AP	**Oc.** 	**4.6**	**28'**
NGC 6645. Open Cluster.	**Oc.** 	**8.5**	**10'**
M8. Lagoon neb, ASSA 83 + Oc. **NGC 6530. Hourglass** = brightest part (vs hourglass neb in Musca). **Bok globules'** discovery (dark, collapsing clouds of protostellar material). **AP**	**Oc.+ N.** 	**5.8 & Oc = 4.6**	**15'**
IC 1284/3 (EMISSION) + NGC 6589/90 (REFLECTION). Triplet Nebs…Part of the FOV is a loose **Oc.: NGC 6595 AP**	**N.** 	**?**	
NGC 6559. Star forming region, showing both **emission** (red) and **reflection** (bluish) regions, 1.4^0 east of the **Lagoon neb**. Nearby, in the same FOV are**: IC 4685/1274/ 1275/ B303…** [**for AP**]	**N.** 		8'
B86: "Inkspot": Dark neb + Oc. NGC 6520, aka **the Castaway Cluster", + 7th mag type K star. AP**	**Oc.+ N.** 	**7.6 & Oc. stars 10-13th**	**B: 5' Oc: 6'**
M17, Messier 17, ASSA87, (Emission neb + Oc.), Aka: NGC6618, "Omega..., Swan..., Lobster…, Check mark…, Horseshoe nebula, Sharpless 45, RCW 160, Gum 81"… (Why not also "The Resident Schizophrenic"…?). One of the brightest and most massive star-forming regions of our galaxy. Local geometry is similar to the Orion Neb but viewed edge-on rather than face-on. **AP**	**Oc.+ N.** 	**7**	**20'×15'**

M22. NGC6656. ASSA90. One of brightest and nearest (10 600 ly).	**Gb.** 	**5.1**	**24’**
M28.	**Gb.** 	**7.7**	**11.2’**
M54. Not resolvable. **(At centre of the Sgr Dwarf Gx, its core?) - extra-galactic: Ditto M79 in Lep.**	**Gb.** 	**7.7**	**9.1’**
M69.	**Gb.** 	**8.3**	**7.1’**
M70.	**Gb.** 	**9.1**	**8’**
M75. Very dense.	**Gb.** 	**9.18**	
M55. ASSA96. Aka **The Summer Rose Star**. Relatively loose and grainy. Low surface brightness. **AP**	**Gb.** 	**7.42**	
NGC 6642.	**Gb.** 	**8.8**	
NGC 6723. ASSA92. Close to the **Corona Australis molecular cloud**. (See above)	**Gb.** 	**7.2**	
IC 4732. Stellar.	**Pn.** 	**12.8**	
NGC 6563.	**Pn.** 	**11**	
NGC6445, Box Neb: Square shaped, + close Gb NGC6440. AP	**Pn.** 	**12 & 9.2**	**34”**
NGC6537. Red Spider. Two lobed. **AP**	**Pn.**  	**9.3**	
NGC6818. Little Gem. Green Mars Neb. **Ring.**	**Pn.** 	**13.0**	
NGC 6567. Compact Pn.	**Pn.** 	**12.0**	
NGC 6822. Barnard's Gx. Resembles the **SMC**.	**Gx.** 	**8.8**	**19’×15’**

Sct SCUTUM SKU-tum The Shield	01-Aug		
Alpha Scuti, Ionnina, brightest star, an orange K-type giant. Previously 1 Aquilae. Variable star, with its brightness varying by about 10 percent.		3.85	
Beta Scuti, β Sct, a yellow G-type bright giant. Previously 6 Aquilae.		4.22	
Delta Scuti, δ Sct, fifth brightest. Class F, yellow-white giant. Delta Scuti is the prototype of the **Delta Scuti type variable stars (dwarf cepheids).** Two **line-of-sight companions**, @ 15.2" and 53".		4.72 + 12.2 + 9.2	
ζ Scuti, Zeta Scuti, a yellow giant (G). It's an **astrometric binary system**: a binary star that seemingly **orbits around an empty space**, without a visible or detectable companion. The star has an orbital period of 6.5 years.		4.68	
Struve 2313, "lemon-orange + small green-white", sep 5.9". **RA 18h 24.7m DEC -06^0 36'.**	**Ds.**	7.5+8.7	
S Scuti, HIP92442, carbon star. Period 148 days.	C	6.3to9.0	
The Button Hook. Shape of a wavy line of bright stars that runs through the Scutum Star Cloud. **RA: 18h 43m DEC: -6d 50m**	**Asterism.**		75'x45'
Essertoo String. A row stars in the shape of an 'S'. About 12 stars visible of mag 10 to 12. The asterism goes from NNE to SSW. **RA: 18h 45m DEC: -10d 36m**	**Asterism.**		6'
M11. ASSA91. "Wild Duck" cluster. One of the richest, most compact. Brightest stars form a triangle: could represent a flock of wild ducks.	**Oc.**	5.8	13'
M26, Nucleus: low density/ obscured? Compressed star grouping, aka the **Deer-Tick cluster**, about 30 stars, well resolved. Faint stars towards the middle area forms a bar in an eastwest direction, mag 9.7 double star ADS 11441 on the southern edge of the grouping. AP	**Oc.**	8	6.6'
NGC 6712. Highly resolved.	**Gb.**	8.1	7.2'
IC 1295 is a planetary nebula.	**Pn.**	12.7	1.7x1.4'
Abell 45, planetary neb, Ra 18:30:15.4 Dec -11:36:56	**Pn.**	12.8 Cs.21	
Tel TELESCOPIUM tel-eh-SKO-pee-um The Telescope	**10-Aug**		
Alpha Telescopii, brightest, a blue-white subgiant of spectral type B		3.5	
Delta (δ)Telescopii. Optical double. Close to Alpha Tel. Two blue-whites. Both spectral type B.	**Ds.**	4.9+5.1	
ζ Telescopii, Zeta Telescopii. Yellow giant star, class G**.**		4.10	
ε Telescopii. Epsilon Telescopii. Binary star system, K, the primary is an orange giant, separated from companion by 21".	**Ds.**	4.52+13th	
h 5033. Multiple star (Close to alpha): four members, deep yellow primary star occupies the SW corner of the square formation with a slightly darker yellow companion in position angle (PA) of 115^o. The much fainter C companion appearing grey is N of the primary in a position angle of 10^o. To complete this multiple system, the plain white D companion is in a position angle of 46^o. **RA18h15m.4 DEC-48°51'.0**		-	
STREICHER 51. Asterism: consists of fifteen stars resembling a praying mantis looking back at me with a pair of white stars situated on the north-eastern side of the asterism. The brightest star is HD 165987, thenorthern "eye". The group is situated 10' S of the **galaxy IC 4679**.	**Asterism.**	8.5	28'×13'

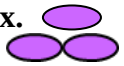
RA 18h10m.4 DEC-56°29'.7			
ESO 231-SC30. Open Cluster. **RA 19h16m.9 DEC -51°29'.**	**Oc.** 	**11.5**	**20'**
NGC 6584. ASSA86.	**Gb.** 	**9.2**	**7'**
IC 4699. Pn: midway between Alpha and Epsilon Telescopii.	**Pn.** 	**13th**	**14"**
NGC 6850 is a spiral galaxy.	**Gx.** 	**12.6**	
NGC 6861. A lenticular galaxy, is the second brightest object in the **Telescopium Group.** Interacting with the brighter elliptical Gx **NGC 6868**.	**Gx.** 	**11 + 10.6**	**3x2' + 4.0'×3.3'**
Vul VULPECULA vul-PECK-you-lah The Fox	**20-Aug**		
Alpha Vulpeculae, α Vul. Lukida, Lucida Anseris, or Anser, Optical double: Red giant (M) + 8 Vulpeculae: (K), orange giant.	**Ds.** 	**4.44 + 5.81**	
HD 189733, V452 Vulpeculae. Binary, 0.3° E of **M27**. Primary an orange dwarf (K) + red dwarf. **RA 20h 00m 43.71s Dec. +22° 42′ 39.1″**	**Ds.** 	**6.07+10.12**	
Coat hanger. Aka. Brocchi's Cluster. Ten stars. In the hook is an obvious orange star. Binoculars. **RA: 19h 25m DEC: 20d 11m**	**Asterism.** 	**5th – 7th**	**90'x60'**
NGC 6940. Football shaped.	**Oc.** 	**6.3**	
Sh2-86 an emission nebula, surrounds the open cluster **NGC 6823. Trunk-like pillar** of dust and gas protruding from the east side of the nebula towards the open cluster. **Bok globules. AP**	**Oc + N.** 		**40'**
Sh 2-88, diffuse HII region excited by massive O class star. Nearby, to the SE: 2 nebular knots: **Sh 88A/B**. Plus neighbouring + **Sh 2-87**. **RA 19h 45m 59s DEC 250 20'00" Wide field AP**	**N.** 		
NGC 6820: Sh2-86 is usually misidentified as NGC 6820. NGC 6820 is a **small** bluish reflection nebula in one "corner" of **Sh2-86. AP**	**N.** 		
M27. Dumbbell neb. AP	**Pn.** 	**7.5 (Cs =13)**	
Hen 2-437. Pn, "Ice-blue wings". RA 19h 32m 57.657s Dec 26° 52′ 43.35″	**Pn.** 	**15**	
Abell 74. Planetary neb. Extremely **LARGE** and faint (LOW surface brightness). Contain background 15.2 magnitude galaxy, PGC 66741. **Ra: 21h 16m 52s Dec: +24d 08m 05s AP**	**Pn.** 	**12.2 Cs.17.1**	**871x 791"**
NGC 7052. Edge-on spiral.	**Gx.** 	**13.4**	

Constellation: Object/ Info.	@MERIDIAN/ Target Type.	App. Mag.	SIZE
SEP			
Aqr AQUARIUS ah-KWAIR-ee-us The Water Carrier	**20-Sep**		
α Aquarii, Sadalmelik, G spectral type, yellow supergiant, 2nd brightest**.**	★	**2.94**	
β Aquarii, Sadalsuud, G spectral type, yellow supergiant, brightest. **Triple star**: primary, Beta Aquarii A, has two optical companions, @ 35.4" and @ 57.2" away	★ ★ ★	**2.89 + 11 +11.6**	
γ (Gamma) Aquarii, Sadachbia, blue-white, A spectral type star.	★	**3.84**	
δ (Delta) Aquarii, Scheat or Skat, blue-white A spectral type star. [Shares its traditional name with Beta Pegasi (Scheat)]. Assoc. with Delta Aquariids meteor shower.	★	**3.27**	
ε (Epsilon) Aquarii, Albali, blue-white A spectral type star.	★	**3.77**	
ζ (Zeta) Aquarii, F spectral type double sep 2", both are white, " whitish citrus-orange", bright pair of identical stars in a figure-8. **Showcase** binary.	**Ds.** ★★	**3.6 (4.59+4.42)**	
12 Aqr, binary, **bright yellow** class G + **ocean blue**, sep 2.5", **RA 21h 04.1m DEC -05^0 49'.**	**Ds.** ★★	**5.8+7.5**	
41 Aqr, showcase pair: "yellowish peach" class K + "pale violet", sep 5.1", **RA 22h14.3m DEC -21^{o}04'.**	**Ds.** ★★	**5.6+6.7**	
S 808, "straw-yellow paired with fainter whitish green", sep 6.9", **RA 22h25.8m DEC -20^{0}14'.**	**Ds.** ★★	**6.9+7.1**	
h 5355, triple: "pure white + beige + reddish silver", sep 82" and 107.6", **RA 22h38.6m DEC -14^0 04'.**	★★ ★	**7.5+8.8 +9.4**	
94 Aqr, showcase pair: "banana-yellow + greenish", sep 12.3", **RA 23h19.1m DEC -13^0 28'.**	**Ds.** ★★	**5.3+7.0**	
h 3184, " yellowish peach + whitish green", sep 5.1", **RA 23h20.9m DEC -18^0 23' .**	**Ds.** ★★	**7.3+8.4**	
107 Aqr, showcase pair, "white or yellowish and blue", sep 6.8". **RA 23h 46.0m DEC -18^0 41'.**	**Ds.** ★★	**5.7+6.5**	
θ (Theta) Aquarii, Ancha, G spectral type star.	★	**4.16**	
λ (Lambda) Aquarii, Hudoor or Ekchusis, M spectral type star.	★	**3.74**	
ξ (Xi) Aquarii, Bunda, A spectral type star**.**	★	**4.69**	
Π (Pi) Aquarii, Seat, B spectral type star.	★	**4.66**	
R Aquarii (R Aqr), HIP 117054. Variable + Neb. A **symbiotic star** - white dwarf and a **Mira-type variable** in a binary system. Orbital period +/- 44 years. Main Mira-type is a red giant, varies in brightness by a factor of several hundred and with a period of slightly more than a year. PLUS **Cederblad 211**, an **extremely faint** nebula, surrounds R Aquarii.	★	**5.72 - 12.4**	
M73. Asterism: 4 stars. Not an Oc.	**OC?, Asterism** ★ ★★★	**9**	**2'**
M2. ASSA98. One of largest, **elliptical**. Rich. 5deg N of Beta. **AP**	**Gb.** ⊕	**6.5**	**12.9'**
M72. Resolve in 20" scopes.	**Gb.** ⊕	**9.4**	**5.9'**
NGC 7492.	**Gb.** ⊕	**11.5**	
NGC 7009. Saturn Neb.	**Pn.** ◎	**8.3 Cs = 11.5**	**25"**
NGC 7293, ASSA100, Helix nebula. Closest Pn at 650 Ly. It covers 0.25 square deg, making it also the largest: **Faint. AP**	**Pn.** ◎	**6.3**	**12.8'**
IC 5217. Planetary nebula.	**Pn.** ◎	**12.6**	

NGC 7727. Small spiral.	**Gx.**	**10.6**	**3x3”**
NGC 7606. Spiral.	**Gx.**	**10.8**	
NGC 7184.	**Gx.**	**10.9**	**6.5’×1.4’**
NGC 7600. Elliptical, **shells**. **AP**	**Gx.**	**?**	
NGC 7377.	**Gx.**	**11.1**	
NGC 7252. Peculiar Gx - resulting from an interaction between two Gxs. **Atoms-for-Peace Gx**: loop-like structure, resembles diagram of an electron orbiting an atomic nucleus. **AP**	**Gx.**	**12.7**	**1.9x1.6”**
Cap CAPRICORNUS kap-reh-KOR-nuss The Sea Goat	**01-Sep**		
δ Capricorni, Delta, Deneb Algedi. Brightest. **Delta Scuti type** variable, a star that varies in brightness due to both radial and non-radial pulsations of its surface. **Spectroscopic** binary: Changes 0.2 mag, period of 24.5 h.		**2.9**	
Alpha Capricornii. Algedi or Giedi. Unrelated yellow-super giants (Each = Ds.). **α^1** accompanied by a star of mag 9.2; **α^2** accompanied by a star of mag 11.0; this faint star is itself a binary star with two components of magnitude 11. **Visually: showcase double**: “stunning pair of whitish-gold stars, super wide apart”: 381.2”.	**Multiple**	**4.3 (+9.2) & 3.6 (+ 11+11)**	
Beta Capricornii. Dabih. Showcase pair: “bright grapefruit-orange and vivid whitish-blue”; sep 207”. **Dabih Major** (Beta-1 Cap), and **Dabih Minor** (Beta-2 Cap).	**Ds. (Multiple).**	**3.1 + 6.1**	
γ Capricorni, Gamma Capricorni. Nashira. White-hued giant.		**3.7**	
Π (Pi) Capricorni. Double: blue-white hued and a white-hued.	**Ds.**	**5.1 + 8.3**	
ASTERISM. Streicher?: Six stars in a prominent north-south arrow shape with the brightest star magnitude 8 (HD 194412). The asterism is prominent against a bare star field and just 15’ east of **NGC 6907** **RA: 20h26m.7 DEC: -24°57’.7**	**Asterism.**	**8**	**10’**
M30. ASSA99. 1 degree south of the galaxy group **NGC 7103. M30** has undergone a **core collapse (Like M15, M70).** Core only 0.12’ in size, half cluster’s mass contained in a spherical radius 17.4 Ly across**. AP**	**Gb.**	**7.5**	**11’**
NGC 6907 barred spiral + NGC **5908** in line of sight.	**Gx.**	**11.3**	**3.2’×2.3’**
NGC 6903. Galaxy.	**Gx.**	**11.9**	**2.1’×1.9’**
NGC 7103 group: Quintet: NGC 7104 (13.8m), NGC 7103 (14.3m),IC 1393 (14.3m), IC 5122 (14.8m), IC 5124 (15.5m) AP	**Gxs.**	**13.8-15.5**	
Del DELPHINUS del-FIE-nus The Dolphin	**01-Sep**		
Alpha Delphini, Sualocin. Multiple star, seven components: A and G, a physical pair, and B, C, D, E, and F, which are optical binaries.		**3.77**	
Beta Delphini, Rotanev. Pair of F-type stars stars, orbit each other with a	**Ds.**	**3.6**	

period of 26.66 yr. Angular separation of about **0.44”** (**challenging**).			
Gamma Delphini: Golden + @ 10” yellow-white, **&** in the **same FOV @15’** is the **“Ghost Double”**: **Struve 2725:** Yellow + @ 6”an orange star. “**Delphinus double-double**”. Compare to **Epsilon Lyra.**	**Ds.** ★★ + **Ds.** ★★	**4.3 + 5.1 & 7.5 + 8.2**	
Struve 2735, “bight Sun-yellow + bright pearly white”, sep 1.9”, **RA20h 55.7m DEC 04^{0} 32’.**	**Ds.** ★★	**6.5+7.5**	
Delta Delphini is a type A star.	★	**4.43**	
Epsilon Delphini, Deneb Dulfim, meaning "tail of the Dolphin", is a star of spectral class B.	★	**4**	
R Delphini is a **Mira-type variable** star with a period of 285.5 days	★	**7.6to13.8**	
Job's Coffin, formed from the four brightest stars: Alpha, Beta, Gamma, and Delta Delphini.	**Asterism.** ★ ★★★		
Theta Delphinus Group. Looks like a bucking horse with a cowboy on his back. Left of the imaginary line between the β and ε Delphini, contains the θ Delphini. **RA: 20h 38m DEC: 13d 10m**	**Asterism.** ★ ★★★		**60’ x 30’**
Toadstool. Dolphin’s Diamonds. 13 stars. Near NGC 7025. **RA: 21h 07m DEC: 16d 20m**	**Asterism.** ★ ★★★	**11**	**15’**
Poskus 1. Mag. 11.5 to 12.8 stars. Shape of a flyswatter. Right above the star Gamma (γ) Delphini. **RA: 20h 46m DEC: 16d 20m**	**Asterism.** ★ ★★★		**6.5’**
ALESSI 11. Asterism: situated 1.7º south of planetary nebula NGC 6905. This beautiful group of stars could be called the **Broken Heart cluster**, it is slightly difficult to lift out the group of stars against the very busy field stars. TheV-shape of the heart point towards the south with a well-shaped eastern lob and somewhat distorted westernlob. **RA 20h21m.4 DEC +18º21’.2**	**Asterism.** ★ ★★★	**9**	**7.5’**
NGC 6950. Open Cluster.	**Oc.**	**10**	**12’**
NGC 6934. Globular cluster.	**Gb.**	**8.83**	**8.4’**
NGC 7006. One of furthest – 135 000 ly.	**Gb.**	**10.6**	**2.8’**
NGC 6905. Blue Flash Nebula. Slightly elongated. Disc.	**Pn.**	**10.9**	**1.2’**
NGC 6891. Disc.	**Pn.**	**10.5**	**14”**
IC 4997.	**Pn.**	**12**	
Abell 72, planetary neb. Three stars form nice triangle. Faint background **Gx.** **Ra 20:50:02.0 D ec +13:33:28** AP	**Pn.**	**13.8 Cs.16.1**	**134x 121”**
NGC 6928. Galaxy.	**Gx.**	**12.2**	**2.0’×0.6’**
NGC 6930. Galaxy.	**Gx.**	**12.2**	**1.5’×0.5’**
NGC 7025. Galaxy.	**Gx.**	**12.8**	**2.1’×1.4’**
Equ EQUULEUS eh-KWOO-lee-us The Little Horse	**01-Sep**		
Alpha Equulei, Kitalpha, a yellow star. Spectroscopic binary.	★	**3.9**	
Beta Equulei. Main sequence star spectral class A. It has four visual companions, are not physically related to the main star.	★★★★★	**5.159**	
Gamma Equulei. An **alpha CVn star**, ranging between magnitudes over a period of around 12½ minutes. A white star and has an optical companion 6 Equulei.	**Ds.** ★★	**4.58to4.7 & 6.1**	
Epsilon Equulei. Triple star also designated 1 Equulei. Primary is itself a	★★	**5.4**	

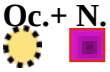
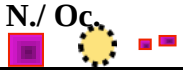
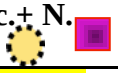
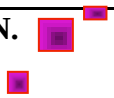
binary star (F stars); period of 101 years. The components of the primary are becoming closer together and will not be divisible in amateur telescopes beginning in 2015. Plus G class companion at 10".		**(6.0+6.3) &7.4**	
Some very faint galaxies between magnitudes 13 and 15 include **NGC 7015, NGC 7040, and NGC 7046 (NGC 7045 Not a Gx, nebula, = double star).**	**Gx.**		
Gru GRUS GROOS The Crane	**20-Sep**		
Alpha Gruis, Alnair, a blue-white star spectral type B.		**1.7**	
Beta Gruis, Gruid, a red giant of spectral type M. It has a diameter of 0.8 astronomical units (AU) (if placed in the Solar System it would extend to the orbit of Venus) It is a variable.		**2to2.3**	
Gamma Gruis, Al Dhanab, a blue-white subgiant of spectral type B.		**3.0**	
Delta^1 Delta^2. 45". Delta1 is a **yellow** giant (G) with own **orange** dwarf companion. Delta2 is a **red** giant of spectral type M, **semiregular variable**.	**Ds.**	**4+12 & 3.99to4.2**	
Mu^{1}Mu^2. Unrelated yellow giants (G).	**Ds.**	**4.8 + 5.1**	
Pi^{1}Pi^2. Pi^1:Deep-red (S) **semi-regular variable (191 days) + own companion (G)** + **Pi^2** : white giant (F).	**Ds.**	**5.3-7.01 and 5.6**	
ASTERISM Streicher?: the flipped **capital letter J** is easy to distinguish, with the top horizontal barrunning from north-west to east, located 3° NW of **NGC 7410**, brightest star in this grouping is magnitude 9 HD 214875**.** **RA 22h41m.6 DEC-38°08'.7**	**Asterism.**	**8.5**	**16'**
IC 5148/ 5150, same object. The **Spare Tyre nebula**, around 1 degree west of Lambda, expanding at 50 kilometres a second, one of the fastest rates of expansion of all planetary nebulae. Faint, large. **AP**	**Pn.**	**13**	**120"**
NGC 7410. Large.	**Gx.**	**10.4**	**5.8'×1.7'**
IC 5267.	**Gx.**	**10.5**	
IC 5170 Galaxy	**Gx.**	**13**	**1.8'×0.8'**
NGC 7424, barred spiral, has well defined spiral arms, so it is called a "**grand design**" galaxy.	**Gx.**	**10.4**	**7.6'×6.2'**
NGC 7232. Galaxy.	**Gx.**	**11.6**	**3.0'×1.1'**
NGC 7233. Galaxy.	**Gx.**	**12**	**1.8'×1.4'**
NGC 7213. Face-on.	**Gx.**	**10.5**	**4.8'×4.2'**
NGC 7404. Galaxy.	**Gx.**	**12.6**	**1.7'×0.9'**
IC 1459.Bennett 129b. Galaxy.	**Gx.**	**10**	**4.9'×3.6'**
Grus Quartet. NE of **Theta Gruis**. Four interacting galaxies: **NGC 7552, NGC 7590, NGC 7599, and NGC 7582. (Grus Triplet) AP**	**Gx.**		
NGC 7590. Galaxy.	**Gx.**	**11.3**	**2.9'×1.2'**
NGC 7599. Galaxy.	**Gx.**	**11.1**	**4.7'×1.5'**
NGC 7582. Galaxy.	**Gx.**	**10.6**	**6.9'×2.6'**

Ind INDUS IN-dus The Indian	**01-Sep**		
The Persian, α Indi, Alpha Indi. The brightest star in Indus. Orange giant (K). It has a couple of 12th and 13th magnitude red dwarf companions.		**3.1 + 12th& 13th**	
Beta Indi. Orange giant (K). Has a visual companion.	**Ds.** 	**3.66+12.5**	
Delta Indi (δ Ind) is a white star. Class A.		**4.4**	
Epsilon Indi. A main sequence dwarf spectral class K, 11.83 light years ant from Earth, Two companions, **brown dwarfs** of the spectral type T1V and T6V**.** Has **3rd highest proper motion** of any naked eye star, 9th highest overall. Around 2640 it will be in Tuc.			
T Indi is a **semi-regular variable**, red giant, period of 11 months.		**5to7**	
Theta Indi (θ). Showcase pair, "light yellow + reddish brown", sep 6.7". **RA 21h 19 m 51.9s DEC -53^0 26' 57.4".**	**Ds.** 	**4.5+6.9**	
STREICHER 74. ASTERISM: The group displays a long string containing a few bright stars, quite prominent against the background star field. I call this asterism "the foot-long". The top north star is magnitude 8.3 (HD 204597) and runs from north to south for almost 18', where it turns around to the east to complete a stockman's foot. **RA: 21h32m.6 – DEC: -58°53'.7**	**Asterism.** 	**9**	**20'**
NGC 7049. Dust ring. [Indus Triplet: Brightest].	**Gx.** 	**10.7**	**4.3'×3.2'**
NGC 7007. Galaxy, an uneven half-moon string of stars south of the galaxy.	**Gx.** 	**11.9**	**2.2'×1.4'**
NGC 7064. Galaxy. Thin.	**Gx.** 	**12.2**	**3.7'×0.6'**
NGC 7090.	**Gx.** 	**11**	
NGC 7205.	**Gx.** 	**11**	
NGC 7041. Triplet: 7041/7029/7049: Ellipticals. **AP**	**Gx.** 	**11.1; 11.1; 11.7**	
NGC 7196. Face-on.	**Gx.** 	**11.5**	
IC 5152. About 3 million light years away, this **irregular dwarf** galaxy could be an outlying member of our local group.	**Gx.** 	**11**	
Mic MICROSCOPIUM my-cro-SKO-pee-um The Microscope	**01-Sep**		
Alpha Microscopii. The 4th brightest star in Mic. It is a **variable star**. A yellow giant belonging to the stellar class G. It has a visual companion at a separation of 20.4 seconds of arc..	**Ds.** 	**4.88to4.94 & 10th**	
Gamma Microscopii. Depicting the **eyepiece** of the microscope, the brightest star, yellow giant of spectral type G. It has a visual companion at an angular separation of 26 ".	**Ds.** 	**4.68+13.7**	
Theta1 and Theta2 Microscopii, a wide double, both white A-class**.**	**Ds.** 	**4.81+5.76**	
AX Microscopii, Lacaille 8760, HIP 105090, a red dwarf (M), only 12.9 Ly from the Solar System. At mag 6.68: the **brightest red dwarf in the sky.**		**6.68**	

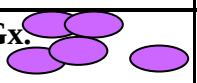
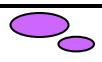
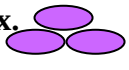
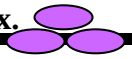
BO Microscopii, is a rapidly rotating star that has 80% the diameter of the Sun. Variable**: Flare star**. Nicknamed **"Speedy Mic", ** it has a rotation period of 9 hours 7 minutes. **RA 20h 47m 45.00732s DEC −36° 35′ 40.7905**		**9.39**	
STREICHER 61. ASTERISM: elongated grouping of various-magnitude stars in a NW to SE direction. The brightest star in this asterism is (HD 199672), which shines with a magnitude of 8.6. It looks quite a lot like a mini-Gemini constellation in shape. The stars extend towards the north-west to complete the elongated impression of the grouping. **RA: 20h59m.8 DEC: -34°46'.0**	**Asterism.** 	**9**	**21'**
STREICHER 62. ASTERISM: grouping elongated in a north-south direction. The asterism also displays a sort of **W shape**. The bright variable star BX Microscopii is situated towards the north of the grouping. This is probably just a busy star field. **RA: 20h45m.3 DEC: -35°17'.8**	**Asterism.** 	**9**	**18'**
NGC 6925. Barred spiral, is lens-shaped as it lies almost edge on to observers on Earth. Lies 3.7 degrees WNW of Alpha Microscopii.	**Gx.** 	**11.3**	**3.1x1.12'**
IC 5011 & IC 5013. Galaxies. Situated virtually on top of each other.	**Gx.** 	**12.3**	**2.4'×1.3'**
Oct OCTANS OCK-tanz The Octant	**10-Sep**		
σ Octantis, Sigma Octantis. Closest naked eye star to SCP. Yellow-white giant, class F, currently the southern pole star, and is sometimes known by the name **Polaris Australis**, 25 times fainter than the North Star, which makes it is too dim to be used for navigation, so it is the Southern Cross, which is usually used for establishing the position of the South Celestial Pole. Classified as a **Delta Scuti variable**: variations in brightness as a result of both radial and non-radial pulsations of its surface. Sigma Octantis exhibits a variation of 0.03 magnitudes over a period of 2.3 hours.		**5.42**	
Lambda Octantis. Yellow + white.	**Ds.** 	**5th & 7th**	
θ Octantis, Theta Octantis, orange giant, class K.		**4.79**	
α Octanti, Alpha Octantis, a **spectroscopic binary**, two F-class giants orbital period of 9.073 days. Classified as a **Beta Lyrae-type** eclipsing binary system, one in which variations in luminosity are caused by one component periodically passing in front of the other and blocking its light.		**5.15**	
β Octantis, Beta Octantis, white star, halfway between the dwarf and subgiant stage of evolution, class A.		**4.14**	
δ Octantis, Delta Octantis, an orange giant, class K. Delta Octantis is the **southern pole star on Saturn**.		**4.31**	
ν Octantis, Nu Octantis, brightest in Oct. Spectral class K orange giant, has a binary companion, a K class dwarf, orbit each other with a period of 2.9 years.		**3.73**	
μ2 Octantis, Mu-2 Octantis, binary system, two yellow dwarf stars, separated by 17". The system shares the Mu designation with Mu-1 Octantis, from which it is separated by 50'. **[Mu1 & Mu2:** "two beautiful, easily visible butter-yellow colored stars, underlined by a string of faint stars in an east-west direction".**]**	**Ds.** 	**6.51**	
R Octantis. Variable. Period 406 days. [The first variable star discovered in a constellation is designated with the letter R.]. **RA 05h26m.1 DEC -86°23'.0**		**6.4to13.2**	

STREICHER 41. Asterism: 50’ W of nu Octantis, resembles a glass filled with stars. **RA 21h26m.9 DEC-77°53’.0 8 26’**	**Asterism.**		
Melotte 227. ASSA97. (Collinder 411). **Ra 20:17:19 Dec -79:02:00 AP**	**Oc.**	**5.3**	**50’**
ESO 008-SC06. Open Cluster. **RA 14h55m.2 DEC -83°25’.0**	**Oc.**	**10.5**	**10’**
NGC 7098. Barred ring, with ansae. (“Handles”). **AP**	**Gx.**	**11.3**	**4.0’×2.3’**
NGC 2573. Polarissima Australis. Galaxy.	**Gx.**	**13**	**2.0’×0.7’**
NGC 6438. Galaxy.	**Gx.**	**12.4**	**1.7’×1.4’**
NGC 6438A. Galaxy.	**Gx.**	**12.1**	**3.5’×1.4’**
NGC 2573B. Galaxy.	**Gx.**	**130.5**	**1.3’×0.3’**
NGC 2573A. Galaxy.	**Gx.**	**13.8**	**1.1’×0.4’**

Constellation: Object/ Info.	**@MERIDIAN/ Target Type.**	**App. Mag.**	**SIZE**
OCT			
Cep CEPHEUS SEE-fee-us Cepheus	**01-Oct**		
Delta Cephei. Double star, also the **prototype Cepheid variable.** The Cepheids are a class of pulsating variable stars. Its spectral type varies from F to G over a period 5 days, 8 hours, 47 minutes and 32 s. The brighter component is a yellow-white F-class supergiant. Companion is a B-class star @ 41”.		**3.5 to 4.4 + 7.5**	
Alderamin, α Cephei (Alpha Cephei). It is a white class A star, currently evolving from a main sequence star into a subgiant. **Rotates at a very high speed**, at least 246 km/s, and completes one revolution within 12 hours or less.		**2.514**	
Alfirk, β Cephei (Beta Cephei). (B). Class stars known as the **Beta Cephei variables.** The mag varies within a period of 0.1904844 days. A **triple** star. Alfirk A, is a blue giant class B, is a **slow rotator** and takes about 51 days to complete a single revolution, at a rotational speed of 28 km/s.		**3.15 to 3.21**	
Alrai, γ Cephei. Alrai, Er Rai and Errai, Gamma Cephei. Binary. star in Cepheus.” Orange subgiant (spectral type K) The companion is M class red dwarf. Will **replace Polaris as the northern pole** star around the year 3,000 AD.	**Ds.**	**3.22 (?+?)**	
ζ Cephei, Zeta Cephei, an orange subgiant, type K, a **suspected binary** as well as a suspected variable star.		**3.39**	
η Cephei, Eta Cephei, Al Kidr, an orange giant type K, is notable for its high proper motion.			
S Cephei, HIP 106583, carbon star, period 487 days, **deep cherry red.**	C	**7.4to12.9**	
mu (μ) Cephei. HIP 107 259. Red supergiant. It is a **semiregular variable**, (2-3 yrs). **Herschel's Garnet Star. A carbon star.** Runaway. Largest star visible to naked eye, on the“edge” of **IC1396. (see below)..**	C	**3.4to5.1** **IC: 3.5?**	
7 Sisters of the Pole. Pleiades pattern of 6th mag. stars NW of cluster **NGC 188**. Larger than the original. **RA 00h 00.0’ DEC 86° 45’**	**Asterism.**		**4° x 2°**

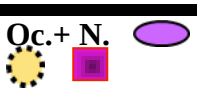
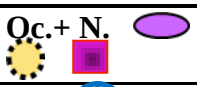
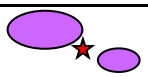
NGC 188 is an open cluster, the **closest open cluster** to the **north** celestial pole (<5^{o}), **one of the oldest** known open clusters.	**Oc.** 	**10**	**15'**
NGC 7129 star-forming region, lit by open cluster. The nebula has the shape of a **rosebud**. "**The Small Cluster Nebula**". **AP**	**N+ Oc.** 	**11.5**	**7′ x 7**
NGC 7380: developing Oc, surrounded by **Wizard Neb. AP**	**Oc.+ N.** 	**7.2**	
NGC 7142. Open cluster. Lies in the vicinity of the nebula **NGC 7129**	**Oc.+ N.** 	**9.3**	
NGC 7822. Complex encompasses an emission region (arc shape) and an Oc and a pair of emission nebulae: **Cederblad 214**. (1^{o} across). **AP**	**N./ Oc.** 		
NGC 7023: Oc. in Iris Neb. Near Beta Cephei and T Cephei.	**Oc.+ N.** 	**6.8**	
NGC 7160. Dominated by 2 x Ds.	**Oc. + Ds.** 	**7.1**	
NGC 7538 is an emission and reflection nebula, near the **Bubble nebula**. Contains the **biggest protostar** (a large mass formed when gas inside a giant molecular cloud contracts) discovered to date.	**N.** 		**9x6'**
IC 1396: Emission Neb in southern Cepheus. Contains dark **Elephant's Trunk neb**: IC 1396A + B: concentration of interstellar gas and dust within the much larger ionized gas region. Flanked by two other large, faint, emission nebulae, **Sh2-129** and **Sh2-132**.	**N.** 		**3.5x 2.36^{0}**
Gyulbudaghian's nebula, (gyoolbu day' gee an's), GM 1-29, variable refelection neb, illuminated by variable **PV Cephei** ('Young Stellar Object' or **YSO**). Lies 6^{0} N of **Eta Cephei**. **RA 20h 45m 53.943s DEC +67° 57′ 38.66". AP**	**N.** 	**?**	**30"**
Sharpless 2-155. The Cave Nebula. Emission nebula, RA 22h 57m DEC 62^{0} 37'	**N.** 	**?**	**50x30'**
Ghost Nebula (Sh2-136), reflection neb, lies near the cluster **NGC 7023. RA 21h 16m 26s Dec +68° 15′ 37".**	**N.** 	**?**	**?**
NGC40. Bow-Tie neb, close gamma Cephei, Cs11.6, Disc, N-S lobes.	**Pn.** 	**10.7 vs. 11.6?**	
IC 1454, Abell 81, planetary neb.	**Pn.** 	**14**	0.63'
NGC 7076, Abell 75, RA21h 26m 24s DEC 62º 53' 00"	**Pn.** 	**17**	2'
NGC 6946. Spiral. "**Fireworks** Gx": **> 9** super novae observed.	**Gx.** 	**9.7**	
Lac LACERTA la-SIR-tah The Lizard	**01-Oct**		
Alpha Lacertae. Blue-white hued main-sequence (A). An optical double star. Companion type A @ 35".	**Ds.** 	**3.777 + 11.8**	
Beta Lacertae. Yellow giant (G), 4th brightest.		**4.4**	
2 Lac, "fantastic contrast – pale yellow + orange tint", sep 47.6", **RA 22h 21m DEC 46^{0} 32'.**	**Ds.** 	**4.6+11.6**	
h 1791, SAO 34602, fantastic view: "wide pair, pure **white** + small **blue-white**, between bright **orange** and **red** star"**, sep 17.3", RA 22h 35.7m DEC 56^{0} 52'.**	**Ds.** 		

NGC 7243, open cluster, nearby is **alpha** and 4 Lacertae, & **Pn IC5217** (Below).	**Oc.**	**6.4**	
NGC 7209. **Large, rich.**	**Oc.**	**6.7**	
IC1434.	**Oc.**	**9**	
IC1442. Loosely scattered.	**Oc.**	**9.1**	
IC 5217.	**Pn.**	**13.0**	
NGC 7331, barred spiral, + dimmer background Gxs.	**Gx.**	**13**	1.9' x 42"
Peg PEGASUS PEG-a-sus The Winged Horse	**01-Oct**		
Epsilon Pegasi, Enif ("nose"), Orange supergiant spectral type K, **brightest** star in Pegasus. A **slow irregular variable.**		**2.37 to 2.45**	
Markab, α Pegasi. Giant star, spectral class B, 3rd brightest.		**2.48**	
Scheat. B Pegasi. Class M. Semi-regular **variable**.		**2.42 (2.31–2.74**	
Algenib, γ Pegasi. Subgiant star of the spectral type B**. Beta Cephei variable.** It has a radial pulsation period of 0.15175 days during which its brightness varies from 2.78 to 2.89.		**2.84 (2.78 – 2.89)**	
Homam, ζ Pegasi (Zeta Pegasi). Main sequence star, type B. Slowly pulsating. A rapid rotator. It has two visual companions, a mag 11.6 star at 68" away and an 11th mag @ 177".		**3.414 + 11.6 + 11th**	
Baham, θ Pegasi. Theta Pegasi. Class A.		**3.53**	
Sadalbari, μ Pegasi. Mu Pegasi. Yellow giant star, type G.		**3.514**	
Matar, η Pegasi. Eta Pegasi. Two stars that orbit each other with a period of 813 days. Type G + F.	**Ds.**	**2.94**	
Struve 2978, "vivid colours, pure **yellow** and arctic **blue**", sep 8.3", **RA 23h 07.5m DEC 320 50'.**	**Ds.**	**6.4+7.5**	
The Square of Pegasus: Alpha (Markab), Beta (Scheat), and Gamma (Algenib), together with Alpha Andromedae (Alpheratz or Sirrah).	**Asterism.**		
Delphinus Minor. Looks like the const. Del. Stars mag 7 and 8. Draw a line between Scheat and Markab, halfway, located just outside the square. **RA: 23h 03m DEC: 23d 12m**	**Asterism.**		**1.1°**
Stephan's Test is a jagged asterism of faint stars 17' NE from Stephan's Quintet. Faintest star = mag 14.7. This stargroup was used by Stephan to test the atmosphere's transparency. **RA: 22h 37m DEC: 34d 08m**	**Asterism.**		**3'**
The Mini-Cross. The shape of the Northern Cross/ Cyg. 5 stars: mag 8 – 10.5. Near Algenib, on extension of a lineconnecting Markab and Algenib. **RA: 00h 10.5m DEC: 15d 18m (Rather in Pisces?)**	**Asterism.**		**16.5'**
M15. Cumulo de Pegaso. Fairly rich and concentrated towards its centre. **"Experienced core collapse".** One of oldest, 12 bill y. **Pn: Pease 1** was the first planetary nebula discovered **within** a globular cluster. **AP**	**Gb.**	**6.2 (Pn;15.5)**	
NGC 7742. Unbarred face-on, small spiral: **"target" - "sunny-side UP egg".**	**Gx.**	**12.4**	
NGC 7217. Unbarred spiral, Stars forming **rings.**	**Gx.**	**11**	
NGC 1. Spiral, 1.4deg S of alpha AND.	**Gx.**	**12.9**	
NGC 7626/ 7919. Ellipticals – part of small Pegasus super cluster.	**Gxs.**	**11.5/11.1**	

NGC 7331. **An analogue to our MWG? "Big, beautiful". AP**	**Gx.** 	**10.4**	
NGC 7814. Spiral, seen edge-on, approximately 40 mill Ly.	**Gx.** 	**11.6**	
NGC 7479, Propeller Galaxy. A barred spiral galaxy. Tightly wound arms create an 'S'. **AP**	**Gx.** 	**11.6**	
NGC 7320: spiral in **Stephan's Quintet**. **Not an actual member**, but a much closer line-of-sight Gx at 40 mill vs 300 mill Ly for rest. **AP**	**Gx.** 	**13.2**	**2.2'**
Stephan's Quintet grouping of five galaxies of which **four** form the first compact galaxy group ever discovered: **Hickson Compact Group 92**. **NGC 7317/18a+b /19/20c … AP**	**Gx.** 	**13.9 to 16.7**	
Einstein's Cross: Gravitational lens, **Huchra's Lens**, **small.** A quasar (QSO 2237+0305) that has been lensed by a foreground galaxy (PGC 69457). The elliptical galaxy is 400 million light-years away with a redshift of 0.0394, but the quasar is 8 billion light-years away. **RA 22h40.5m DEC +03^{0} 21.5'. Hubble. AP**		**15.1**	1.6"
PsA PISCIS AUSTRINUS (or PISCIS AUSTRALIS) **PIE-sis OSS-trih-nuss The Southern Fish**	**01-Oct**		
Alpha Piscis Austrini, Fomalhaut. "FOAM-a-lot/ low". White. "Fish's mouth". Rises as Antares sets and sets as Sirius rises. 18th brightest in sky. It is a white main sequence star, class A. Fomalhaut and the star TW Piscis Austrini form a **binary system. (Below**).		**1.16**	
TW Piscis Austrini, Fomalhaut B, an orange dwarf, class K. Classified as a **BY Draconis variable:** a flare star that exhibits slight variations in brightness, period of 10.3 days.		**6.44to6.49**	
β Piscis Austrini, Beta. White main sequence dwarf, spectral type A. 4th brightest in PsA. Plus companion @ 30.4", "pale-yellow + white".		**4.29+7.1**	
ε Piscis Austrini, Epsilon Piscis Austrini, 2nd brightest star in PsA. Blue-white main sequence dwarf, class B**.**		**4.18**	
δ Piscis Austrini, Delta Piscis Austrini, a **multiple star system** with the stellar class G, primary component in the system is a yellow giant.	**Ds.** 	**4.20**	
ι Piscis Austrini, Iota Piscis Austrini, multiple star, spectral class B, the primary star in the system is a B-type subgiant.	**Ds.** 	**4.35**	
γ Piscis Austrini, Gamma Piscis Austrini, multiple star system, class A, brightest component is a white giant.	**Ds.** 	**4.46**	
ASTERISM, Streicher?: outstanding lopsided question mark or number 2. The brightest member is the magnitude 9 orange coloured star HD 215903 situated more or less towards the middle of the group**.** **RA: 22h49m.5 DEC: -33°59'.4**	**Asterism.** 	**9.5**	**12'**
NGC 7314 is a spiral galaxy. Seyfert (active) galaxy. Elongated in a north-south direction, faint star is embedded at the northern tip, companion **NGC 7313** appears as a curly extension toward the south-western end.	**Gx.** 	**11.9**	**4.2'×1.7'**
NGC 7225. A lenticular galaxy, elongated in a north-south direction, with a very bright small nucleus. The field of view is dominated by a magnitude 6.2 star 10' towards the south.	**Gx.** 	**12.2**	**2.2'×1.1'**
NGC 7130. Galaxy, + **NGC 7135**, 17' towards the E **+ IC 5121** located 11' towards the NW.	**Gx.** 		
NGC 7173 is an elliptical. 114.8 million light years**.** Together with **NGC**	**Gx.** 	**11.9**	

7174 and NGC 7176, it is one of the **three interacting** galaxies in the **Hickson Compact Group 90. AP**			
NGC 7172, NGC 7174, spiral galaxies.	**Gx.**	**11.9, 12.5**	
Scl SCULPTOR SKULP-tor The Sculptor	**20-Oct**		
α Sculptoris, Alpha Sculptoris, an **SX Arietis-type variable star**. Type B, blue-white giant, class B. [High-temperature star that exhibits a strong magnetic field and strong H2e I and Si III spectral lines. The star's brightness varies by 0.01 magnitudes.].		**4.3**	
β Sculptoris, Beta Sculptoris, a blue-white subgiant class B**.**		**4.38**	
γ Sculptoris, Gamma Sculptoris, spectral class K.		**4.41**	
δ Sculptoris, Delta Sculptoris, is a **triple star** system, class A. The primary component is a white main sequence dwarf star, first companion @ 4", second companion is a yellow, class G @ 74".		**4.59+11th+ 9.4**	
η Sculptoris, Eta Sculptoris, a red giant, class M, classified as an **irregular variable star.**		**4.80to4.90**	
ζ Sculptoris, Zeta Sculptoris, is a **binary star**, primary is a blue-white main sequence dwarf and class B companion @ 3".	**Ds.**	**5.04+13th**	
ι Sculptoris, Iota Sculptoris, an orange giant, class K**.**		**5.18**	
ε Sculptoris, Epsilon Sculptoris, brightest star in the system is a yellow-white class F subgiant + a yellow dwarf star, type G, orbit 1200 yr. & companions @ 15" + 142".		**5.29+8.6 & 15th+11th**	
κ Sculptoris, Kappa Sculptoris: two systems separated 0.53°. **Kappa-1** Sculptoris: **triple star system**: a **binary pair** of yellow, class F giant stars + companion @ 70". **Kappa-2** Sculptoris is a **binary** star, an orange giant and a companion 46".		**6.2+6.3+ 18th & 5.41+21st**	
λ Sculptoris, Lambda Sculptoris. (Another Bayer designation shared by two separate star systems). Lambda-1 Sculptoris and Lambda-2 Sculptoris: @ 0.29° apart. **Lambda-1**: binary: primary is a blue-white main sequence dwarf, class **B** + a white star, spectral type **A**, & **Lambda-2**, an orange giant class **K**.		**6.05: 6.7+7.0 & 5.90**	
R Sculptoris. HIP 6759. Variable Star, an **asymptotic** giant branch **semi-regular variable** red giant, period 370 (207?) days. One of most **brilliant red** stars. (Surrounded by unusual spiral structur: Hubble. Companion?) [**Asymptotic** giant branch (AGB): the region of the Hertzsprung–Russell diagram populated by evolving low- to medium-mass stars. This is a period of stellar evolution undertaken by all low- to intermediate-mass stars (0.6–10 solar masses) late in their lives.] **RA01h27m.0 DEC-32°33'.0 AP**	C	**5.7? 6.8? (9.1to12.8)**	
S Sculptoris. HIP 1236, carbon star.	C	**?**	
STREICHER 90. Asterism: 2.2° south of eta Sculptoris. Six faint stars evenly spaced in a north-west to south-east direction in perfect symmetry but a few stars to the north spoil this shape to some extent. In the far southeastern part of the grouping a magnitude 10.5 star displays a very red colour. **RA 00h27m.5 DEC -35°17'.3**	**Asterism.**	**11**	**20'**
ALESSI J01232-3330. Asterism: eight stars, all are slightly yellowish in colour. The brightest is the magnitude 6.7 (HD 8474), which is situated towards the south. **RA 01h23m.2 DEC -33°30'.0**	**Asterism.**	**6.7**	**8'**

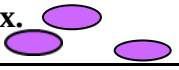
BLANCO 1. Open Cluster. **RA 00h04m.3 DEC-29°56'.0** **AP**	**Oc.**	**4.5**	**70'**
NGC 288. ASSA6. Highly resolved, but core is dense.	**Gb.**	**8.1**	**13.8'**
NGC 253. ASSA5. "**SILVER COIN/ DOLLAR** ". **"Caroline's Gx",** Star burst Gx. **AP**	**Gx.**	**7.1**	**30'×6.9'**
NGC 55. Bennett 1, ASSA1. Southern Cigar Gx. (Vs. Cigar Gx, M82 in UMa). Edge-on barred, irregular + **IC 1537**:Nebula: **small** hazy patch. **AP**	**Gx.**	**7.9, N:11**	**30'×6.3', N:1.3'**
NGC 300, Southern Pinwheel Gx, Bennett 6. Spiral, face-on, close, large. **AP**	**Gx.**	**9**	**20'×13'**
NGC 134: Giant Squid Gx, barred spiral + small **NGC 131** **AP**	**Gx.**	**10.4 + 13.78**	
NGC 7793. Bond's Galaxy. "Chaotic" Spiral, approximately 12.7 million light years distant. The galaxy has a black hole in the outer spiral. **AP**	**Gx.**	**10**	
The **Sculptor Dwarf Irregular Galaxy**, is a companion to the galaxy **NGC 7793**, another bright member of the Sculptor Group.	**Gx.**	**15.5**	
NGC 7, spiral galaxy, possibly barred, and appearing edge-on.	**Gx.**	**13.5**	
PGC 3589, Sculptor System Dwarf. RA 00h59m.6 DEC -33°44'.1	**Gx.**		
The Cartwheel Galaxy (also known as ESO 350-40) is a lenticular galaxy and ring galaxy, at about 500 million light-years. **(Hubble).** **RA00h 37m 41.1s Dec −33° 42′ 59″** **AP**	**Gx.**	**15.2**	**1.5'×1.2'**
Abell 2744. Pandora's Cluster. Gx Cluster. **Ra. 00h 14m 19.51s Dec−30° 23′ 19.18″ HUBBLE!**	**Gx.**		
Tuc TUCANA too-KAN-ah The Toucan	**Oct**		
Alpha Tucanae. Orange subgiant (K), spectroscopic binary.		**2.86**	
Beta Tucanae. **Multiple (6).** Brightest 2**: β1** (Blue-white) & **β2** (White). 4.36 & 4.53.			
Gamma Tucanae. Yellow-white giant (F), the second brightest star in Tucana.		**3.99**	
ζ Tucanae (Zeta Tucanae). Third brightest star in the constellation, yellow-white main sequence dwarf, spectral class F.			
Delta Tucanae. Bright White + reddish.	**Ds.**	**4.51: 4.49/9.3**	
κ Tucanae, Kappa Tucanae. Multiple star system, combined apparent magnitude of 4.25, composed of **two binary pairs** separated by 5.3': **(1).**Primary component is a yellow-white subgiant (F), its binary companion is located at 5**". (2)** The **other binary star** in the system: mag 7.8 and 8.2 star separated by 1.12 arcseconds.	**Ds. x 2:**	**4.25 (5.1 + 7.3) and (7.8 + 8.2)**	
NGC 330. Open Cluster**.**	**Oc.**	**9.6**	**1.9'**
NGC 395. Open Cluster**.**	**Oc.**	**9.6**	**2'**
IC 1624. Open Cluster**.**	**Oc.**	**12.9**	**1.7'**
NGC 249. Emission Nebula. Small. SMC. **AP**	**Oc.+ N.**	**12 (13.8?)**	**1'**
NGC 261. Open Cluster**.** Emission Nebula. Small. SMC. **AP**	**Oc.+ N.**	**13**	**1'**

NGC 346. **Oc with Nebulocity in SMC**. **AP**	**Oc.+ N.** 	**10.3**	**5.2'**
NGC 371. Open Cluster + surrounding nebulosity. SMC. Nebulosity**.** **AP**	**Oc.+ N.** 	**12**	**7.5'**
47 Tuc. NGC104. ASSA2. Bright core. Sky's 2nd finest. **AP**	**Gb.** 	**4.5**	**40'**
NGC 362 ASSA8. Highly resolved. Fore ground to (NE border of) SMC. **AP**	**Gb.** 	**6.6**	**12.9'**
NGC 7205.Spiral Galaxy + 8' towards W: **NGC 7205a.** Mag 8.8 orange star between the two galaxies. **AP**	**Gx.** 	**11.1 +13.6**	**3.7'×1.9' + 1.2'×0.8'**
NGC 7329. Barred spiral.	**Gx.** 	**11.8**	**3.2'×2.0'**
SMC ASSA7. 200 000ly, 7000ly across.Irregular.7 bill solar masses. **AP**	**Gx.** 	**2.3**	

Constellation: Object/ Info.	@MERIDIAN/ Target Type.	App. Mag.	SIZE
NOV			
And ANDROMEDA an -DROH-me-duh Andromeda	**01-Nov**		
α Andromedae, Alpha Andromedae, Alpheratz, Sirrah. Previously "Delta Pegasi", a binary: blue-white class B subgiant + class A, two stars orbit each other within a period of 96.7 days.	**Ds.** ★★	**2.06: 2.1 + 4.21**	
Mirach, Beta Andromedae, β And. + NGC 404 (Lenticular Gx)**: Mirach's Ghost**, **@ 7'.** Mirach: a cool, bright red class M giant, semi-regular variable star. (It has a magnitude 14 hydrogen fusing star for a companion.). Mirach is part of an asterism called the **girdle**.	**Gx.** ⬭★	**2.10 to 2.01; Gx:11.2**	
Gamma And, γ Andromedae: Almach. Showpiece double: golden (citrus orange) + greenish-blue. **Gamma-1**, is a golden yellow giant class K + @ 9.8" **Gamma-2**: a tripple star: 5^{th} + 6^{th} mag white dwarf stars, brighter component = a spectroscopic binary.	**Ds.** ★★	**2.2 + 4.8(5^{th}+6^{th})**	
δ Andromedae, Delta Andromedae: long-period **spectroscopic binary**, brighter component is a K-type giant.	★	**3.28**	
υ Andromedae, Upsilon Andromedae,binary: a yellow-white F-type main-sequence star (**Titawin**) **and** a smaller red dwarf class M.	**Ds.** ★★	**4.09**	
Nembus, 51 Andromedae, fifth brightest, an orange K-type giant. [Even though Ptolemy originally included the star in the Andromeda constellation, Johann Bayer later moved it to Perseus as Upsilon Persei. English astronomer John Flamsteed moved it back to Andromeda].	★	**3.57**	
36 Andromedae, HIP 4288, close (1") visual binary, class K.	**Ds.** ★★	**5.46: 6.12+6.54**	
Σ3004, striking contrast, primary bright dusty gold, sep 13.5". Primary a class A star. **RA 23H20M7S DEC 44^0 07'**	**Ds.** ★★	**6.3+10.1**	
Σ47, 1½^0 W of Zeta And, whitish banana-yellow + faint powder blue, primary a type A, sep 16.8", **RA 00H 40.3M DEC 24^O 03'.**	**Ds.** ★★	**7.3+8.8**	
Σ79, between Phi And & M31, pearly white + pale blue-violet, sep 7.8". **RA 01h 00.1m DEC 44^0 43'**	**Ds.** ★★	**6.0+6.8**	
Σ104, optical double, pale yellow + green, sep 13.8", primary type G star, **RA 01h 17.0m DEC38^0 28'**	**Ds.** ★★	**8.0+9.8**	
Σ245, optical double, primary type F star, "pale pumkin-orange + fainter bluish turquoise, sep 11.4", **RA 02h 18.6m DEC 40^{0}17'**	**Ds.** ★★	**7.3+8.0**	
Pi Andromedae, binary star.	**Ds.** ★★	**4.3+11^{th}**	
R Andromedae, a **Mira type variable** star, 4^o SW of the Andromeda Galaxy. Period 409 days.	★	**5.8to14.9**	
RX Andromedae. Z Camelopardalis type variable star, 14 day periods.	★	**10.3to14**	
56 Andromedae, HIP 9021, two yellow giants, sep 199.5", near Oc **NGC 752**	**Ds.** ★★	**5.7+5.9**	
VX Andromedae. HIP 1593. Carbon star. **Medium red**. Period 375 days.	★	**7.5to9.7**	
Golf Putter (and ball). 14 Stars. Line of stars with two brighter stars for the club head. **NGC 752** = the ball. **RA 01h 53.0' DEC 37° 20'**	**Asterism.** ★ ★ ★ ★		**1.6° x 0.3°**
NGC 752. Twisted "X". See above.	**Oc.**	**5.7**	
NGC 956.	**Oc.**	**8.9**	
NGC7686. Sparse.	**Oc.**	**5.6**	

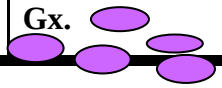
NGC 7662 Blue Snowball. Ring neb. "Out of focus" blue-green disc.	**Pn.** 	**8.6**	
M31. Andromeda Gx, NGC 224. Elongated spiral, 77° relative to the Earth; 2.4mill LY.	**Gx.** 	**3.44**	
M110. Dwarf elliptical, M31 satellite.	**Gx.** 	**9**	
M32. Compact dwarf elliptical.	**Gx.** 	**8.1**	
NGC 891."**Outer Limits Gx", Silver Sliver, GOOD edge-on.** First light image of the Large Binocular Telescope.	**Gx.** 	**9.9**	
Ari ARIES AIR-eez The Ram	**20-Nov**		
α Arietis, Hamal. Orange giant (K), 66 light-years from Earth.		**2.0**	
β Arietis, Sheratan. Blue-white star, **spectroscopic binary**.		**2.64**	
Gamma Arietis, γ Ari, Mesarthim. Binary, whites, classes **B** and **A**, 7.7" apart, **"Ram's eyes"** & third component, K-type star, 221" away.		**3.89: 4.75 + 4.83 & 9.6**	
Lambda Arietis, λ Ari, HIP 9153. White **F** + yellow class **G**, @ 37.4".	**Ds.** 	**4.79: 4.9 + 7.4**	
Epsilon Arietis, ε Ari, HIP 13914, both type A main sequence stars, separated 1.4".		**4.63: 5.2+5.5**	
1 Arietis, HIP 8544, double, class **K** and **A,** separation 2.8".	**Ds.** 	**5.8+6.6**	
Pi Arietis + Open cluster: **Do-Dz 1** @1/2 deg. WSW. **AP**	**Ds.** 	**5 + 8**	
V Arietis: carbon star. HD 13826 / HIP 10472. Pale orange. **Ra 02 15 00 Dec +12 14 23**		**8.45 (8.3 – 10.8**	
NGC 772. The Fiddlehead Galaxy. Unbarred spiral. Single elongated outer spiral arm.	**Gx.** 	**10.3**	
NGC 821. Elliptical, flat, edge-on, bright core.	**Gx.** 	**10.8**	
NGC 972. Edge-on spiral.	**Gx.** 	**11.3**	

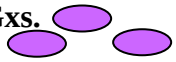
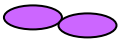
Cas CASSIOPEIA kass-ee-oh-PEE-uh Cassiopeia	01-Nov		
Alpha Cassiopeiae, Shedir/ Schedar. Orange-hued giant (K), secondary is widely separated.	**Ds.**	**2.2 + 8.9**	
Beta Cassiopeiae, Caph. White-hued (F). Delta **Scuti type variable** star.		**2.3**	
Gamma Cassiopeiae. Central star in the W shape, brightest star. Blue (B). **Eruptive variable** star, serves as a **prototype** of a class of stars.		**1.6 to 3.0**	
Delta Cassiopeiae, Ruchbah or Rukbat. Algol-type eclipsing **variable** star. Period is 2 years and 1 month. Blue-white hue.		**2.68 to 2.74**	
Eta Cassiopeiae, η Cas, η Cassiopeiae, HIP 3821, Achird, double, G + K stars, separated 12.9".	**Ds.**	**3.44+7.51**	
Iota Cassiopeiae, ι Cas, triple: white + yellow–orange + white, sep: AB 2.5" & AC: 7.4", classes A + F + K		**4.65+6.9+ 8.7**	
Struve 45, Σ45, "Sun-yellow + delicate sky=blue", sep 18.3", **RA 00h 38.7m DEC+46^0 57'.**	**Ds.**	**6.9+9.9**	
Struve 70, Σ70, "bright whitish-lemon + faint companion"sep 8.2", **RA 00h 53.8m DEC +52^0 42'.**	**Ds.**	**6.3+9.5**	
Psi Cassiopeiae, ψ Cas, HIP 6692, triple star, "orange tint, blue, reddish", 3 pairs: sep 22.1" + 22.4" + 2.6".		**4.7+9.2 & 4.7+10 & 9.4+10**	
ET Cluster. NGC 457, formerly known as the **Owl Cluster**. ET features two eyes and outspread arms. **RA 01h 20.0' DEC 58° 20'**	**Asterism.**		**20'**
Kemble's Kite. 15 Stars**.** Diamond shaped kite with tail**.** **RA 03h 28.0' DEC 72° 00'**	**Asterism.**		**1.5° x 0.5°**
Lucky 7. Large/ bright. Shape of the **number '7'**. Located at the border of Cassiopeia and Perseus. 13 stars of magnitude 5 to 7, incl stars 1 and 2 Cas.	**Asterism.**		**2^0**
M52. NGC 7654. Binos. Kidney-shaped.	**Oc.**	**5**	
Cr 34. RA 2h 59m 24s Dec 60º 33' 59''	**Oc.**	**6.8**	**25'**
M103. NGC 581. Struve 131: prominent star, not a member of the cluster. Far.	**Oc.**	**7.4**	
NGC 7789. Aka: The White Rose Cluster, the Crab Cluster, the Screamimg Skull, Herschel's Spiral Cluster.. .	**Oc.**	**6.7**	15'
NGC 7635. Bubble neb. Cs +/- M 15.	**N.**	**+/- 10**	
NGC 281. The Pacman Nebula.	**N.**		
Westerhout 5 (Sharpless 2-199, LBN 667, Soul Nebula) is an emission nebula. Several small **open clusters** are embedded in the nebula: **CR 34, 632**, and **634** (in the head) and IC 1848 (in the body). The object is more commonly called by the c**luster designation IC 1848.** This complex is the eastern neighbor of **IC1805** (**Heart Nebula**) and the two are often mentioned together as the "**Heart and Soul**".	**Oc.+ N.**	**6.5 + 7.0**	150x' 150
Abell 85. LBN 576.NOT planetary, but SN remnant. **Ra 23:58:53.5 Dec +62:30:28**	**N.**		30x2'
Abell 82, "Mini-Dumbell neb", planetary neb. **Ra 23:45:47.8 Dec +57:03:59**	**Pn.**	**12.7 Cs.14.9**	94"
Abell 84, planetary neb**. Ra 23:47:44.3 Dec +51:23:56**	**Pn.**	**13 Cs.18.4**	147x 114"
IC10. Irregular dwarf.	**Gx.**	**10.4**	
NGC 147. Elongated, dwarf spheroidal. Like **NGC 185**, a satellite galaxy of Andromeda Gx (M 31) and a member of the Local Group.	**Gx.**	**9.3**	
NGC 185. Round.	**Gx.**	**9.2**	

Cet CETUS SEE-tus The Whale	**10-Nov**		
Gamma Ceti: γ. **Yellow + bluish**. A **triple star system**: inner pair separated 2.6", primary an **A**-type main sequence star, fainter secondary component is an **F**-type main sequence star + @ 840": dim K-type.		**3.6 + 6.6 & 10.2**	
Menkar, Menkab, α Ceti, Alpha Ceti: Red + bluish: Binocular double with **fainter** blue-white optical companion, **93 Ceti**, line of sight, 2x further. Alpha Ceti is a **very old red giant star**, [Often used in works of **science fiction**, most notably in **Star Trek**: The Original Series. Alpha Ceti V was the planet on which Khan and his crew were exiled. In Star Trek: Enterprise, the same planet provided refuge to Humanity after the Xindi destroyed the Earth.]	**Ds.** 	**2.54+?**	
Deneb Kaitos, Diphda, β Ceti, Beta Ceti, brightest, an orange giant spectral type K.		**2.04**	
τ Ceti, Tau Ceti: a cool class G dwarf, one of the nearest stars to our solar system, lying only 11.9 light years away.		**3.5**	
χ Ceti, Chi Ceti, class F and G stars, separation 184". **RA 01h 49m 35.10s Dec -10 deg 41' 35"**	**Ds.** 	**4.7+6.7**	
MIRA, Omicron Ceti, o Ceti: The "**Amazing One**". Red giant (M), binary: + compact white dwarf (Mira B) – resolved by **Hubble**. Mira is the **proto-type long-period variable**". Period avg. 330 days.		**3 – 9**	
The Cosmic Question Mark. Big. Binoculars. Inside the 5 stars that form Cetus head; towards one side: **Nu Ceti (ν Ceti)** at its bottom.	**Asterism.** 		
NGC 246 "Skull Nebula". ASSA 4.	**Pn.** 	**8.5 Cs 11.8**	**225"**
NGC 936. Darth Vader's Galaxy. Resemblance to the Twin Ion Engine (TIE) Starfighters + asterism. **AP**	**Gx.** 	**10.1**	
M77. ASSA9. Face-on barred spiral, AGN. **AP**	**Gx.** 	**8.9**	
NGC 1055. Edge-on spiral, forms celestial "smirk" with 2 stars. **AP**	**Gx.** 	**11.4**	
NGC 247. ASSA3. Large, elongated, intermediate spiral. Gravitationally bound to the Sculptor Galaxy (NGC 253). **AP**	**Gx.** 	**8.9**	
IC 1613. Irregular dwarf.	**Gx.** 	**9.0**	
NGC 584 + companion **NGC 586 +** nearby **NGC 596. AP**	**Gx.** 	**10.4/-/10.9**	
NGC 45, a barred spiral.	**Gx.** 	**10.4**	
NGC 47 (NGC 58) – same object. Barred spiral galaxy.	**Gx.** 	**13.5**	
NGC 1073. Barred spiral. "Milky Way twin".	**Gx.** 	**11**	**4.9'**

Eri ERIDANUS eh-RID-an-us The River	Nov		
Achenar, blue-white, (B). **9th brightest**, "End of the river". Spins so fast: **"oblate spheroid"**: diameter at the equator is 56% greater than its polar diameter. The hottest, bluest star among the ten brightest stars in the sky.	★	**0.455**	
Beta Eridani, Cursa, is a blue-white (A), to the south of Orion's foot - gives it its name, which means "the footstool".	★	**2.8**	
Acamar, θ, Theta, a binary star. Blue-whites, both class A, separated 8.3".	**Ds.** ★★	**3.2&4.3**	
Zaurak, γ Eridani, Gamma Eridani, class M.	★	**2.95**	
Rana, δ Eridani, Delta Eridani, is a subgiant star, spectral type K.	★	**3.54**	
τ4 Eridani, Tau-4 Eridani, a binary star class M x2	**Ds.** ★★	**3.70+3.66**	
40 Eridani. Keid. Omicron2. Orange primary, white dwarf comp, latter has red dwarf comp. **OmicronB** is considered the easiest white dwarf for amateur telescopes. Star Trek: Vulcan home star.	**Triple.** ★ ★ ★	**4.4/ 9.5/ 11**	
32 Eridani. Yellow & blue. Attractive.	**Ds.** ★★	**5.0 , 6.3**	
SY Eridani. SAO 131832. Orange red. Carbon star. **Ra 05 09 48 Dec -05 30 55**	C	**8.3 – 10.0**	
ESO 485-SC20. Open Cluster. **RA 04h50m.4 DEC -25°57'.8**	**Oc.**	**8**	**5'**
ESO 551-01. Globular Cluster. **RA 04h24m.5 DEC-21°11'.3**	**Gb.**	**13.5**	**1'**
NGC 1535.ASSA14. Ring with **Cs. Cleopatra's Eye. AP**	**Pn.**	**9.3**	**18"**
IC 2118. Witch head neb. (Reflection: Rigel). AP	**N.**	**13**	**180'×60'**
NGC 1291(NGC1269?) ASSA11. A ring Gx. The Snow Collar Gx. AP	**Gx.**	**9**	**11.0'×9.5'**
The **Eridanus Group,** also known as the **Eridanus Cloud**, is a group of galaxies roughly 75 million light years distant in Eridanus. The group consists of about 200 galaxies, and about 70% of them are categorized as spiral and irregular galaxies. The other 30% are lenticular and elliptical galaxies. The brightest galaxy in the Eridanus Cloud is **NGC 1407**. **AP**	**Gx.**		
NGC 1407.	**Gx.**	**9.8**	
NGC 1395. Bright, large elliptical galaxy**.**	**Gx.**	**9.8**	
NGC 1232. Large diffuse halo with brighter core, + satellite **NGC 1232A**	**Gx.**	**9.9**	**6.8'×6.3'**
NGC 1531 and **NGC 1532**: Dwarf, interacting with spiral. (Latter seen edge-on).	**Gx.**	**12.9**	
NGC 1332. Spiral. Elongated.	**Gx.**	**10.3**	
NGC 1187, spiral, almost face-on.	**Gx.**	**11.4**	
NGC 1300. **Squashed "S".** Barred spiral.	**Gx.**	**10.4**	**5.5'×2.9'**
NGC 1234, barred spiral galaxy.	**Gx.**	**15.3**	
NGC 1309. Face-on spiral.	**Gx.**	**12**	

Phe PHOENIX FEE-nicks The Phoenix	**01-Nov**		
α Phoenicis, Alpha Phoenicis, Ankaa. K-star, spectroscopic binary.		**2.377**	
Beta Phoenicis, β Phoenicis, binary, 2 class G yellow giants, orbital period of 168 years.	**Ds.**	**3.32: 4.0+4.1**	
ζ Phoenicis, Zeta Phoenicis. Eclipsing **binary**, **Algol-type variable**. Period: 1.66977. Is really a **four star system**: two other dim components @ 0.8" and 6.4".		**3.9to4.4 +7.2 + 8.2**	
γ Phoenicis, Gamma Phoenicis, type M, a red giant, a variable star.		**3.39to3.49**	
κ Phoenicis, Kappa Phoenicis, main sequence star, type A.		**3.90**	
ν Phoenicis, Nu Phoenicis, a main sequence dwarf, type F.		**4.96**	
SX Phoenicis, serves as a **prototype** for a group of stars known as the **SX Phoenicis variables.** **[**These stars belong to spectral classes in the range A2-F5, vary in mag by up to 0.7, and exhibit short period pulsation over periods of 0.7-1.9 hours (0.03-0.08 days). Generally have lower metallicity than the Sun, a relatively high space velocity, and low luminosities relative to their stellar classification. Mostly found in galactic halos and globular clusters. All SX Phoenicis variables located in globular clusters are blue stragglers, stars that have a higher temperature and as a result appear more blue than the main sequence stars in the same cluster that have similar luminosities**.]**		**6.76to7.53**	
ASTERISM: Streicher?: 40' SE of pi Phoenicis, represents a pair of earphones, consisting of seven relatively faint stars, but still noticeableoutstanding against the field of view. The brightest star (HD 12003) is situatedtowards the south. **RA 01h56m.0 DEC -43°06'.0**	**Asterism.**	**11**	**13'**
ESO 245-SC09. Open Cluster. **RA 01h53m.7 DEC-45°57'.0**	**Oc.**	**11.5**	**12'**
IC 1625. Galaxy.	**Gx.**	**12.8**	**1.6'×1.2'**
Robert's Quartet is a compact group, 160 million light years, four galaxies are in the process of colliding and merging: **AP** **NGC 87,** barred irregular Gx**.** **NGC 88,** spiral. **NGC 89,** spiral. **NGC 92.** Largest, spiral.	**Gx.**	**13: - 14.1+ 14.1+ 14.2+ 13.8**	
NGC 625, barred spiral galaxy, a member of the **Sculptor Group**, a loose group of galaxies located near the south galactic pole in the constellations Sculptor and Cetus.	**Gx.**	**11.7**	**6.5'×2.1'**
Psc PISCES PIE-seez The Fishes	**Nov**		
Eta Piscium, η Piscium, Kullat Nunu. Brightest. Class G. Yellow giant. Class G, has a faint companion about an arcsecond away.		**3.62**	
γ Piscium, Gamma Piscium. Yellow giant, class G, second brightest, part of an asterism called the **Circlet of Pisces**, which represents the head of the western fish in Pisces.		**3.699**	
Zeta Piscium: **optical** & **spectroscopic binary** system, three components: Zeta Piscium A, Zeta Piscium B and Zeta Piscium C. Zeta Piscium B and C are spectroscopic binaries with each other, optical binaries with A. Separation between A and B + C system is 23". A is a	**Ds.**	**5.21 & 6.44+?**	

subgiant, class A; B is an F type dwarf; C is a white dwarf.			
ω Piscium, Omega Piscium, a yellow-white subgiant, class F. It is the first star to the east of the Circlet of Pisces		**4.036**	
ι Piscium, Iota Piscium, Iota Piscium, a yellow-white dwarf, class F, a **suspected variable** star, has **two line-of-sight companions**.		**4.13**	
Alrescha, α Piscium, Alpha Piscium, a close binary, challenging pair: separation 1.8", primary + companion = whites, class A, orbital period > 700 years. Closest approach to each other around **2060**.	**Ds.** 	**3.82: 4.33+5.23**	
ε Piscium, Epsilon Piscium, an orange giant, class K, a suspected **occultation double**, two stars with the same magnitude separated by 0.25".		**4.59**	
θ Piscium, Theta Piscium, class K, orange giant.		**4.27**	
δ Piscium, Delta Piscium, is a **binary**, an orange giant, class K, & @ 2", K-class dwarf, in the same line of sight.	**Ds.** 	**4.43&13th**	
ν Piscium, Nu Piscium, an orange giant, class K.		**4.448**	
Fum al Samakah, β Piscium, Beta Piscium, a blue-white main sequence star, classB.		**4.53**	
Psi Piscium, ψ Psc, ψ Piscium. Psi¹ Psc: HIP 5131, class A, double, 29.8" separation.	**Ds.** 	**5.3+5.6**	
Van Maanen's star, a white dwarf, class DZ8, third closest white dwarf to the Sun, after Sirius B and Procyon B, the **nearest known solitary white dwarf**, about two degrees south of Delta Piscium.		**12.374**	
19 Piscium, TX Piscium, HIP 117245. One of the reddest stars known, classification of C5III, **"yellow-red, bright"**, is a irregular variable **carbon star:** a late type star that resembles a red giant (or less frequently a red dwarf), that has an atmosphere with more carbon than oxygen. **RA 23h 46m 23.54s DEC +03° 29' 13"**		**4.8to5.2**	
Z Piscium. HIP 5914. Strong orange tint. Period 144 days.		**6.5to10**	
ASTERISMS: Pisces: four subdivisions: the **North Fish** (Piscis Boreus), the **North Cord** (Linum Boreum), the **South Cord** (Linum Austrinum), and the **South Fish** (Piscis Austrinus). **Piscis Boreus: The North Fish:** formed by the stars σ, 68, 65, 67, ψ1, ψ2, ψ3, χ, φ, υ, 91, τ, 82 and 78 Piscium. **Piscis Austrinus, The South Fish:** formed by the stars ω, ι, θ, 7, β, 5, κ, 9, λ and TX(19) Piscium. **Linum Boreum, The North Cord:** formed by the stars χ, ρ, 94, VX(97), η, π, ο and α Piscium. **Linum Austrinum, The South Cord:** formed by the stars α, ξ, ν, μ, ζ, ε, δ, 41, 35 and ω Piscium. **The Circlet:** located south of Pegasus constellation, in the western fish of Pisces: formed by the stars Gamma, Kappa, Lambda, TX, Iota and Theta Piscium. **Testudo, The Turtle:** formed by the stars 24, 27, YY(30), 33 and 29 Piscium. In 1754, the astronomer John Hill suggested that this region of Pisces should be a separate constellation, called Testudo, or the Turtle. His proposal was neglected by most astronomers at the time.	**Asterism.** 		
Renou 18. Lies 37' W of Tau (τ) Piscium. Looks like the letter 'S' from Superman through large telescopes. **RA: 01h 14.5m DEC: 30d 00m**	**Asterism.** 		**18'**
Testudo – The Turtle. Stars 24, 27, YY(30), 33 and 29 Piscium. In 1754, the astronomer John Hill suggested it be a separate constellation …	**Asterism.** 		
NGC 246. Pn ring neb. AP	**Pn.** 	**8.0**	
The M74 Group (or NGC 628 Group) is a small group of 5 to 7	**Gx.** 		

galaxies in Pisces constellation, the brightest of which is **Messier 74.** Other members of the group include **NGC 660,** a peculiar spiral galaxy, and a few smaller irregular galaxies.			
M74. Phantom Gx: Low SB. Face-on spiral. Difficult. It is located 1.5 degrees east-northeast of Eta Piscium, the brightest star in the constellation.Textbook example of a grand design spiral galaxy. **AP**	**Gx.** 	**10**	
NGC 488. Face-on, prototypical spiral.	**Gx.** 	**10.3**	
NGC 524. Spiral.	**Gx.** 	**10.4**	
NGC 676.	**Gx.** 	**11.9**	
NGC 7619. Elliptical.	**Gx.** 	**11.1**	
NGC 474/ 470 + nearby **467. Elliptical (with shells) + Spirals. "Pisces Galaxy Trio". NGC 474,** a large elliptical galaxy. **AP**	**Gxs.** 	**11.3 & 11.7 & 12.1**	
NGC660. A peculiar and unique polar-ring Gx.	**Gx.** 	**10.7**	
NGC 520. Colliding spirals.	**Gx.** 	**12.2**	
NGC 507. Elliptical.	**Gx.** 	**11.3**	
NGC 741. Elliptical.	**Gx.** 	**11.1**	
NGC 7840. LAST NGC. Unbarred Spiral. DIM.	**Gx.** 	**15**	
NGC 7562. Elliptical.	**Gx.** 	**11.6**	
NGC 7537, spiral galaxy.	**Gx.** 	**13.9**	
Arp 284: NGC 7714 and NGC 7715 : a pair of interacting galaxies.	**Gx.** 	**12.2**	
NGC 60, a spiral galaxy, notable for its unusually distorted spiral arms.	**Gx.** 	**14.85**	
Tri TRIANGULUM tri-ANG-gyu-lum The Triangle	**20-Nov**		
α Trianguli, Caput, Alpha Trianguli, Ras al Muthallath. A yellow-white subgiant with close dimmer companion, a very close binary star system, one in which individual stars **cannot be resolved**. The stars complete an orbit around their centre of mass every 1.736 days, primary is either a subgiant or giant star, classF.The primary star is classified as an **ellipsoidal variable**.	**Ds.** 	**3.42**	
Beta Trianguli. Brightest. It is a white giant class A at 127 Ly distant. Is a **spectroscopic binary** system.		**3.0**	
γ Trianguli, Gamma Trianguli, lies along the same line of sight as **Delta Trianguli** and **7 Trianguli**: forms an **optical triple** star with them. Gamma Trianguli is a white main sequence star, class A.		**4.01**	
δ Trianguli, Delta Trianguli, spectroscopic binary, a yellow dwarf class G and an orange dwarf class ranging from G to K. They complete an orbit every 10.02 days.		**4.865**	
ε Trianguli, Epsilon Trianguli, is a binary star, primary is a white dwarf belonging to the spectral class A, secondary @ 3.9".	**Ds.** 	**5.50+11.4**	
Struve 183: 1 deg. SE of **Caput**. **Yellow + blue**. 6" apart.	**Ds.** 	**7.7+8.4**	
6 Iota Tri, 6 Trianguli, ι Trianguli (Iota Trianguli): 4 Deg SE of	**Ds.** 	**4.49 + 6.44**	

Struve 183. **Yellow + pale blue**, 3.8" apart. G type giant and a F class dwarf. **6 Triangulum A**: binary star with a class F dwarf companion orbiting it every 14.732 days. **6 Triangulum B**, believed to consist of a pair of class F stars, orbital period of 2.24 days. 6 Trianguli has the variable designation TZ Trianguli, classified as an **RS Canum Venaticorum type variable**: a close binary star with an active chromosphere that causes large stellar spots, which in turn cause variations in luminosity.			
David's D. Actually **Collinder 21.** A genuine asterism, not an open cluster. **RA 01h 50.0' DEC 27° 04'**	**Asterism.** 		**6'**
Triangulum Minor. A small triangle, shaped by the stars 6, 10 and 12 Triangulii. **RA: 02h 20m DEC: 30d 00m**	**Asterism.**		**90'x60'**
NGC 604, an **emission nebula**, NE of the central core of the **Triangulum Galaxy**, is about 1,500 light years in diameter, which makes it one of the **largest H II regions** known and the brightest H II region **in the** Triangulum Galaxy, more than **6,300 times more luminous** than the more famous **Orion Nebula** in Orion.	**N.** 	**13**	
M33. The Pinwheel / Triangulum Gx. + NGC 604: Emission neb NE of the central core. **AP**	**Gx.** 	**5.7 + 13**	
NGC 925. Barred spiral.	**Gx.** 	**10**	
NGC 672 & close pair IC1727. Spirals. AP	**Gx** 	**10.7 + 11.4**	
NGC 634, spiral galaxy.	**Gx.** 	**14**	
NGC 784, barred spiral galaxy.	**Gx.** 	**12.23**	

Constellation: Object/ Info.	@MERIDIAN/ Target Type.	App. Mag.	SIZE
DEC			
Aur AURIGA oh-RYE-gah The Charioteer	**20-Dec**		
α Aurigae, Alpha Aurigae, Capella. 6th brightest. Yellow giants. (4 stars 2 binary pairs: Giants Aa &Ab + dim H&L: Binary red dwarfs).	**Ds.** 	**0.1**	
Beta Aurigae, β Aurigae, Menkalinan, Menkarlina. A-type subgiant. Spectroscopic binary. The **galactic anticenter** is located about 3.5° to the **E**. **Triple star system**: brightest two components: white A-type subgiant stars (**eclipsing spectroscopic binary**) and the third star is a red dwarf.		**1.85to1.93 & ?**	
Kabdhilinan, Hassaleh, ι Aurigae, Iota Aurigae, an orange K-type bright giant.		**2.69**	
Haedus II, η Aurigae, Eta Aurigae, blue-white B-type main sequence dwarf.		**3.18**	
Sadatoni, Haedus, ζ Aurigae, Zeta Aurigae, an **eclipsing binary**, a red supergiant and a B type companion, a period of 972 days.		**3.61to3.99**	
Prijipati, δ Aurigae, Delta Aurigae, a **binary**: an orange K-type giant and a companion star 115.4" away.	**Ds.** 	**3.72+9.7**	

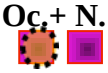
AE Aurigae: a **runaway star** (one moving through space at an extremely high velocity when compared to the neighboring stars), a blue O-type main sequence dwarf, an **Orion type variable** (a star with eruptive, irregular variations in luminosity, usually associated with a nebula), along with Mu Columbae and 53 Arietis, AE Aurigae is suspected to have been ejected when two binary star groups collided. The collision presumably occurred in the Trapezium Cluster, located in the Orion Nebula, about two million years ago. AE Aurigae lights the **Flaming Star Nebula** (**IC 405**, Caldwell 31, SH 2-229), an emission/reflection nebula.		**5.78to6.08**	
Al Hurr, λ Aurigae, Lambda Aurigae, a **double** star, a G-type subgiant.	**Ds.**	**4.71**	
θ Aurigae, Theta Aurigae, Mahasim. Blue-white & yellowish: Tough, primary component is an **Alpha-2 Canum Venaticorum type variable**, a white A-type main sequence dwarf + a yellow G-type main sequence dwarf, & the binary star has an optical companion @ 49".	**Ds.**	**2.6 + 7.1 & 11th**	
4 Aurigae. 4.99" apart.	**Ds.**	**5.0 + 8.1**	
Almaaz, ε Aurigae, Epsilon Aurigae. White super-giants: eclipsing binary, composed of an F class supergiant + companion B-class star **inside a disk.** The apparent magnitude of the system drops for about 66 days every 27 years.	**Ds.**	**2.92to3.93**	
14 Aur, "bright straw-yellow and royal blue", primary class A. Sep 10.0"**, RA 05h 15.4m DEC +32^0 41'.**	**Ds.**	**5.0+11.1**	
Σ698, bright yellow + blue, sep 31.5", primary type K, **RA 05h 25.2m DEC +340 51'.**	**Ds.**	**6.7+8.3**	
26 Aur, "straw-yellow + dim Atlantic blue", sep 12.1". **RA 05h 38.6m DEC +30^0 30'.**	**Ds.**	**5.5+8.4**	
UU Aurigae, HIP 31579. Carbon star, fiery, bright. Period 234 days.		**5.1to6.6**	
Flying Minnow. 4 Stars. Includes 16; 18 and 19 Aurigae. SE of the Flaming Star Nebula. **RA 05h 19.0' DEC 33° 40'**	**Asterism.**		**1.25°**
Smiley Face, aka the **Cheshire Cat.** South-west of **M38** lies this Smiley Face. **RA 05h 28.0' DEC 35° 00'**	**Asterism.**		**1.5° x 0.5°**
NGC 2281. Loose.	**Oc.**	**5.4**	
M37. "Salt-and-Pepper Cluster". Dense, large, rich. Many red giants. **Binos FOV: M36/38/NGC1893.**	**Oc.**	**6.2**	
M36. The Pinwheel Cluster. Spiral chains, spiderlike appearance. **AP**	**Oc.**	**6.3**	
M38. Large, scattered, forming letter Pi/ **oblique cross. AP**	**Oc.**	**7.4**	
NGC 1857. Near anti-galactic centre.	**Oc.**	**7**	
NGC 2197.	**Oc.**	**11**	
NGC 1893 Oc. Embedded in emission nebula **IC410**: lies approximately 1200 light years away and spans 100 light years. **NGC 1893** is a young star cluster; its stellar winds distort the denser, cooler clouds of gas that form the "**Tadpoles**". **AP**	**Oc.+ N.**	**7.5, 14.4**	
NGC 1931. "Miniature Orion Nebula": mixed emission-reflection nebula, with small version of the Trapezium in its cluster. **AP**	**Oc.+ N.**	**11.3**	
IC 405. Flaming Star Neb. It surrounds the irregular variable star **AE Aurigae - a runaway star**. Forms **pair with IC 410. AP**	**N.**	**6.0?**	
IC 2149. Cs. Small, bright.	**Pn.**	**10.6 Cs:11th**	

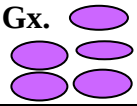
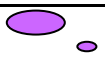
For FORNAX FOR-nax The Furnace	**01-Dec**		
α Fornacis, Alpha Fornacis. Dalim. Yellow-white (F) & deeper yellow. A subgiant star, class F. Really a binary star, and it may have a circumstellar disk of debris, as it exhibits an excess of infrared emission.	**Ds.** ★★	**3.9 + 6.5**	
β Fornacis, Beta Fornacis. Yellow-hued giant. Class G, + an optical companion.	**Ds.** ★ ★	**4.465+14**	
HD 20781 and HD 20782: wide binary system, both class G, **first binary star discovered with both components known to have orbiting planets**.	**Ds.** ★★	**8.44+7.38**	
J0343.5-2924. Asterism: in E part of the constellation, forming a triangle to the north-east with **NGC 1350** and **alpha Fornacis**. Can be found more easily situated midway between **tau** and **sigma Fornacis**. The group displays a **modified letter J** with a few,approximately mag 9 yellow coloured stars. The top bar is towards the south and also houses a double star. The grouping stands out well against the starry field accompany by the galaxy NGC 1425 towards the south-west. (see sketch). **RA03h43m.5 DEC-29°24'.9**	**Asterism.** ★ ★ ★ ★	**8**	16'
NGC 1049. Globular, extra-galactic: It is **in the** Fornax Dwarf Galaxy. At a distance of 630,000 light years, it is still visible in moderate sized telescopes but the parent galaxy is nearly invisible.	**Gb.** ⊕	**12.9**	**4'**
NGC 1360. Robin's Egg Nebula. Elliptical, can look like a Gx. It is **5 x size** of the **Ring** in Lyr.	**Pn.** ◎	**9.4 Cs=11.3**	**6.5'**
NGC 1316. ASSA12. Lenticular. **Fornax A** (Radio source).	**Gx.** ⬭	**8.5**	**13.5'×9.3'**
NGC 1097 + 1097A. A Seyfert Gx. Interacting: Spiral + peculiar dwarf.	**Gx.** ⬭ ●	**9.3**	**10.5'×6.3'**
NGC 1365 ASSA13; Aka "The Great Barred Spiral", Finest in S-hemisphere. Ring-like "Z"-shaped halo. Also Seyfert Gx. Assoc with **Fornax Cluster**.	**Gx.** ⬭	**9.5**	**10.9'×6.5'**
The Fornax Cluster is a cluster of galaxies, most of which are located in the Fornax constellation. It is relatively small, yet the second richest galaxy cluster within 100 million light years. It has about 58 members. The **central** galaxy in the cluster is **NGC 1399**. Other bright members of the cluster include **NGC 1404** and **NGC 1427A** in Eridanus.	**Gx.** ⬭ ⬭ ⬭ ⬭		
NGC 1399. Large elliptical, central in Fornax cluster.	**Gx.** ⬭	**9.9**	**8.1'×7.6'**
NGC 1404. Elliptical.	**Gx.** ⬭	**10.3**	**4.8'×3.9'**
NGC 1317. Galaxy.	**Gx.** ⬭	**10.8**	**3.5'×3.0'**
NGC 1398. Barred spiral.	**Gx.** ⬭	**9.7**	**7.1'×5.2'**
NGC 1344. Elliptical.	**Gx.** ⬭	**10.3**	
NGC1350. "**Beautiful spiral**". **Pronounced ring structure**.	**Gx.** ⬭	**11.4**	**6.2'×3.2'**
NGC 1326. Barred spiral.	**Gx.** ⬭	**10.5**	
NGC 1380. Bennett 17. Galaxy.	**Gx.** ⬭	**10**	**4.8'×2.8'**
NGC 1381. Galaxy.	**Gx.** ⬭	**11.5**	**2.6'×1.0'**
NGC 1385. Galaxy.	**Gx.** ⬭	**10.7**	**3.6'×2.4'**
NGC 1387. Bennett 18. Galaxy.	**Gx.** ⬭	**10.8**	**3.1'×2.8'**
NGC 1371: also listed as **NGC 1367, 1° N of the planetary NGC 1360.**	**Gx.** ⬭ ◎	**10.6**	**4.9'×3.4'**

Hor HOROLOGIUM **hor-oh-LOH-jee-um The Pendulum Clock**	**10-Dec**		
Alpha Horologii, an orange giant. Only star > 4th mag. in Hor.		**3.85**	
Beta Horologii. A white giant.		**5.0**	
δ Horologii, Delta Horologii, class A.		**4.93**	
ι Horologii, Iota Horologii, a yellow dwarf, type G.		**5.40**	
R Horologii, HD 18242, HIP 13502. A red giant **Mira variable**. One of the widest ranges in brightness known.		**4.7 to 14.3**	
TW Horologii. HIP 14930. Carbon star. Close to NGC 1252. Membership questioned? **RA 03h12m.6 DEC -57°19'.0**		**5.71**	
NGC 1252. Open Cluster.	**Oc.** 	**8.4**	**20'**
NGC 1261. ASSA10. "Well condensed".	**Gb.** 	**8.4**	**6.8'**
Arp-Madore 1. One of **MOST remote** globular cluster in the Milky Way?: 398,000 light years. **RA 03h 55m 02.70s DEC −49° 36′ 52.0″**	**Gb.** 	**15**	**1'**
GN 02.34.4. Emission Nebula. RA 02h36m.1 DEC -53°02'.8	**N.** 	**8.3**	**250"**
NGC 1433. Elongated, bright core. An intermediate-type barred spiral.	**Gx.** 	**10**	**6.5'×5.9'**
NGC 1512/ 1510. **NGC 1512:** large, metal-rich **barred spiral**, **NGC 1510** is a low-metallicity **blue compact dwarf** (BCD) galaxy.	**Gx.** 	**10.6/ 12.7**	**8.9'×5.6' + 0.9'×0.9'**
NGC 1448. Edge-on spiral.	**Gx.** 	**11**	**7.6'×1.7'**
Hyi HYDRUS HY-drus The Lesser Water Snake	**01-Dec**		
β Hyi, Beta Hydri. Brightest star in Hyi. Yellow class G. Closest "bright" (> 3rd mag.) star to the SCP.		**2.8**	
α Hydri, Alpha Hydri, AKA the Head of Hydrus, class F, a yellow-white subgiant star.		**2.90**	
γ Hydri, Gamma Hydri, a luminous red giant, class M.		**3.24**	
δ Hydri, Delta Hydri, a white dwarf, type A.		**4.08**	
ε Hydri, Epsilon Hydri, a blue-white giant, class B.		**4.06**	
ν Hydri, Nu Hydri, an orange giant, class K**.**		**4.75**	
ζ Hydri, Zeta Hydri, class A, it is a white star halfway between the subgiant and dwarf stage of evolution.		**4.83**	
Pi^1Pi^2. Unrelated **red (M) & orange (K)**.	**Ds.** 	**5.6 + 5.7**	

Eta Hydri, optical double. Blue-white (B) main sequence star + yellow giant (G), 218 Ly.	**Ds.**	**6.76 +4.68**	
STREICHER 27. ASTERISM: Four relatively bright stars in a **semi circle** with fainter members stringing out to the SE. This grouping is clearly visible against the background starfield. **RA: 01h46m.5 DEC: -64°47'.8**	**Asterism.**	**9**	**9.5'**
STREICHER 37. ASTERISM: There seem to be more hangers in the sky than the Coat Hanger asterism in Vulpecula and the Mini Coat Hanger in UrsaMinor. Twelve stars of various magnitudes in an old fashioned **hanger shape:** positioned in a NW to SE direction, with the hook pointing S. The brightest star in the grouping is mag 9 (SAO 255920). **RA: 02h44m.2 – DEC: -78°21'.8**	**Asterism.**	**10.5**	**13'**
NGC 602 Oc + **N90** emission neb. Outlying component on E edge of the **SMC**. Contain the "**elephant trunks**".	**Oc.+ N.**	**Oc:10.5, 15.44**	**Oc 34'**
NGC 1466. Distant and faint – outlying member of the **LMC**.	**Gb.**	**11.4**	
NGC 1511. Spiral, edge on to observers on Earth.	**Gx.**	**11**	**3.5x1.3'**
NGC 1473, an irregular galaxy**.**	**Gx.**		
PGC 6240, aka AM 0139-655. The White Rose Gx. (Hubble). 345 mill Ly. **RA 01h 41m 30.906s RA −65° 36′ 56.4″**	**Gx.**	**13.0**	

Per PERSEUS PURR-see-us Perseus	**Dec**		
α Persei, Alpha Persei, Mirphak, Algenib. Melotte 20: in middle of **Alpha Persei Cluster (Easy in binos)**. A supergiant star, class F. which can easily be seen in binoculars.		**1.79**	
Algol, β Persei, Beta Persei. Demon star. Eclipsing binary: one of the first (non-nova) variable stars to be discovered. A **prototype** for a class of stars known as **Algol variables.** Usually near-constant at 2.1, but regularly dips to 3.4 every 2.86 days (stays dimmer for about 10 hours, which is how long the eclipses last). A **secondary eclipse** occurs when the primary component occults the dimmer star. Beta Persei is in fact a **triple star** system: Beta Persei A (class B), is eclipsed by Beta Persei B (class K). Algol C is 3.69 AU away from the pair.		**2.12 to 3.4**	
Miram, Eta (η) Persei. Yellow-red class K, + **several line of sight** "companions": one = white dwarf, **9th** M @ 29".		**3.76 & 9th…**	
Atik, ζ Persei, Zeta Persei, a blue-white supergiant, class B, + 9th mag companion @ 12.9".	**Ds.**	**2.86+9TH**	
ε Persei, Epsilon Persei: composed of several stars, primary star classfied as a **Beta Cephei variable** with a primary pulsation period of 0.1603 days. The two main components in the Epsilon Persei system orbit each other with a period of 14 days. Third component, but its existence has not been confirmed. The primary component is a main sequence star belonging to the spectral type B.		**2.88**	
γ Persei, Gamma Persei, a **double star**: a giant type G + a companion class A, the system is a **wide eclipsing binary** star, with the two stars orbiting each other every 14.6 years. The primary component passes in front of the companion and the combined magnitude of the system drops by 0.55.	**Ds.**	**2.93**	
δ Persei, Delta Persei, a **binary star**, class B, a blue-white giant star, a double star - even a triple star system: a visual companion about 0.330".	**Ds.**	**3.01+6.17+?**	

Gorgonea Tertia, ρ Persei, Rho Persei, classified as a **semiregular Mu Cephei type** variable star.		**3.3to4.0**	
Misam, κ Persei, Kappa Persei, a triple star system: a K class star, consisting of a spectroscopic binary star and a companion in a wider orbit.		**3.8+?**	
ν Persei, Nu Persei, a luminous yellow-white giant star, class F.		**3.77**	
Atik, ο Persei, Omicron Persei, spectroscopic double: a giant star type B1 and a dwarf class B. The two orbit each other with a period of 4.5 days. Has been featured in a number of works of **science fiction**, most famously in the TV series Futurama, but also in Transformers, Star Trek and Mystery Science Theater 3000**.**		**3.83**	
Menkib, ξ Persei, Xi Persei, a blue giant, class O, one of the hottest naked eye stars known: surface temperature of 37,000 kelvins.		**4.042**	
Seif, φ Persei, Phi Persei is a double star: a B-class main sequence star & a subdwarf, in 126.7 days orbit. Phi Persei is also classified as a **variable star**. It shows rapid variations in luminosity and spectrum.Its a "**shell star**" in which the disk is presented more or less edge on. Phi Per is **spinning madly**, with an equatorial velocity of at least 430 km/sec, making it one of the fastest-rotating stars known. Approximately 716 light years distant.		**4.03to4.11 &**	
θ Persei, Theta Persei, star system composed of a yellow dwarf type F and a red dwarf class M.	**Ds.** 	**4.12+10**	
ψ Persei, Psi Persei, a main sequence star class B, is **a shell star**: it is surrounded by a **disc of gas** at the equator line. It is a **rapid rotator**, with an estimated rotational velocity of 390 km/s or more along the equator.		**4.310**	
Gorgonea Quarta, ω Persei, Omega Persei, class K.		**4.63**	
Gorgonea Secunda, π Persei, Pi Persei, class A. .			
Double Cluster NGC884/ 869, often designated **h and χ Persei.** Located physically close to one another, only a few hundred light years apart. The clusters are also **blueshifted**, with NGC 869 **approaching Earth** at a speed of 39 km/s, and NGC 884 at 38 km/s. **(Binos)**	**Oc.** 	**5.3 + 6.1**	
M34. Slightly N of line joining Algol and Gamma Andromedae. **(Binos)**	**Oc.** 	**5.2**	
NGC 1528.	**Oc.** 	**6.4**	
NGC 1545.	**Oc.** 	**6.2**	
NGC 1342.	**Oc.** 	**6.7**	
Alpha Persei Cluster, Melotte 20, Collinder 39, an open star cluster, contains several blue stars, the brightest one of which is **Mirfak**, other bright members of the cluster include Delta, Epsilon, and Psi Persei. **(Binos)**	**Oc.** 	**1.2**	
IC 348. Oc with reflection neb**. + NGC1333** reflection nebula.	**Oc.+ N.** 	**7.0; 5.6**	**N: 6'x3'**
NGC 1499. California neb. Nearby is bright, hot, bluish **Xi Persei**. View with Hβ filter.	**N.** 	**6.0**	
NGC 1333, the Embryo Nebula, the Phantom Tiara. Emission and reflection nebulae.	**N.** 		**6x3'**
M76. Little Dumbbell Faintest Messier object**.The Cork Nebula, and the Barbell Nebula.**	**Pn.** 	**10.1**	
Abell 5, Planetary neb**. RA 02:52:15.1 Dec +50:35:54**	**Pn.** 	**?**	**134x 121"**
NGC 1023. Barred spiral.	**Gx.** 	**9.5**	
NGC 1260, a spiral galaxy. It is notable for being home to supernova SN 2006gy, a supernova event in 2006 that was the second brightest object in the observable universe.	**Gx.** 	**14.3**	

NGC 1058, a Seyfert Type 2 galaxy. [Seyfert galaxies are one of the two largest groups of **active** galaxies, along with quasars. They have quasar-like **nuclei (**very **luminous**, distant and bright sources of electromagnetic radiation) with very **high surface brightnesses** whose spectra reveal strong, high-ionisation emission lines, but unlike quasars, their **host galaxies are clearly detectable.**]	**Gx.** 	**11.82**	
PERSEUS cluster, Abell 426, has a recession speed of 5,366 km/s and a diameter of 863'. One of the most massive objects in the universe, containing thousands of galaxies immersed in a vast cloud of multimillion degree gas. **NGC 1275, P**erseus A, Caldwell 24: corresponds to the radio galaxy Perseus A, situated near the center of the large Perseus Cluster of galaxies. NGC 1275 consists of two galaxies: a central elliptical galaxy + a so-called "high velocity system" (HVS) which lies in front of it. The HVS is moving at 3000 km/s towards the dominant system, and is believed to be merging with the Perseus Cluster.	**Gx.** 	**12.6**	**863'** **2′.2 × 1′.7**
NGC 7319/ 18a/ 18b/ 17 (Stephen's Quintet) + NGC 7320	**Gx.** 	**13.9 – 16.7**	
Ret RETIKULUM reh-TIK-u-lum The Net	**10-Dec**		
Alpha Reticuli, α Reticuli, α Ret. Has companion at 48", Alpha Reticuli is halfway between the giant and bright giant stage, class G, is a known X-ray source.	**Ds.** 	**3.3 + 12th**	
Beta Reticuli, Beta Ret, β Ret. Triple star system, about 100 Ly away. Primary is an orange giant, class K.		**3.84 +?**	
Epsilon Reticuli. Orange subgiant and a white dwarf. Primary is a class K star.	**Ds.** 	**4.44+12.5**	
γ Reticuli, Gamma Reticuli, is a red giant star, class M.		**4.48**	
δ Reticuli, Delta Reticuli, red giant class M.		**4.56**	
κ Reticuli, Kappa Reticuli, a **binary**, primary component is a yellow-white subgiant class F.	**Ds.** 	**4.714**	
ζ Reticuli, Zeta Reticuli, a wide binary system, wo yellow G-class stars, (a yellow main sequence star, ano a yellow dwarf), both are solar analogs, which means that they share similar characteristics with the Sun. Sep 309.2".	**Ds.** 	**5.22 x 2**	
ι Reticuli, Iota Reticuli, an orange giant class K.		**4.97**	
η Reticuli, Eta Reticuli, a yellow giant class G.		**5.24**	
θ Reticuli, Theta Reticuli, a **double star**, primary component is a blue-white star type G halfway between the subgiant and giant stage of evolution.	**Ds.** 	**5.88**	
R Reticuli, HIP 21252, a Mira variable, a **strikingly red pulsating variable star**. Class M. Period 281 days. (Designation S Reticuli no longer in use). **RA 04h 33m 32.8321s DEC−63° 01′ 45.003″**		**6.35to14.2**	
Reticulum Globular Cluster. Globular Cluster. **RA 04h36m.1 DEC-58°51'.8**	**Gb.** 	**11.3**	5'
NGC 1313. Topsy Turvy Gx. Barred spiral, starburst Gx. Very uneven in shape and its axis of rotation is not located in its centre, beyond the rim of the northern arm. The galaxy **NGC 1313A** is just visible as a very faint speck of light to the south-east.	**Gx.** 	**9 + 13**	**9.2'×6.9' + 1.3'×0.4'**
NGC 1599. Barred spiral, classified as a **Seyfert** Gx. 50 mill Ly.	**Gx.** 	**10.5**	
NGC1574. Galaxy. **Lenticular** galaxy. [**Lenticular** galaxies, designated **S0**,	**Gx.** 	**10.5**	**4' x 3.6'**

also consist of a bright central bulge surrounded by an extended, disk-like structure but, unlike spiral galaxies, the disks of lenticular galaxies have no visible spiral structure and are not actively forming stars in any significant quantity].			
NGC 1543. Galaxy.	**Gx.** 	**9.7**	**7.2'×4.9'**
NGC 1559. Galaxy.	**Gx.** 	**10.4**	**4.3'×2.2'**
IC 2022. Galaxy.	**Gx.** 	**14**	**1.1'×0.2'**
PGC 14214, Fairall 19. Galaxy. **RA 03h58m.9 DEC -59°03'.7**	**Gx.** 	**12.9**	**1.0'×1.0'**

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