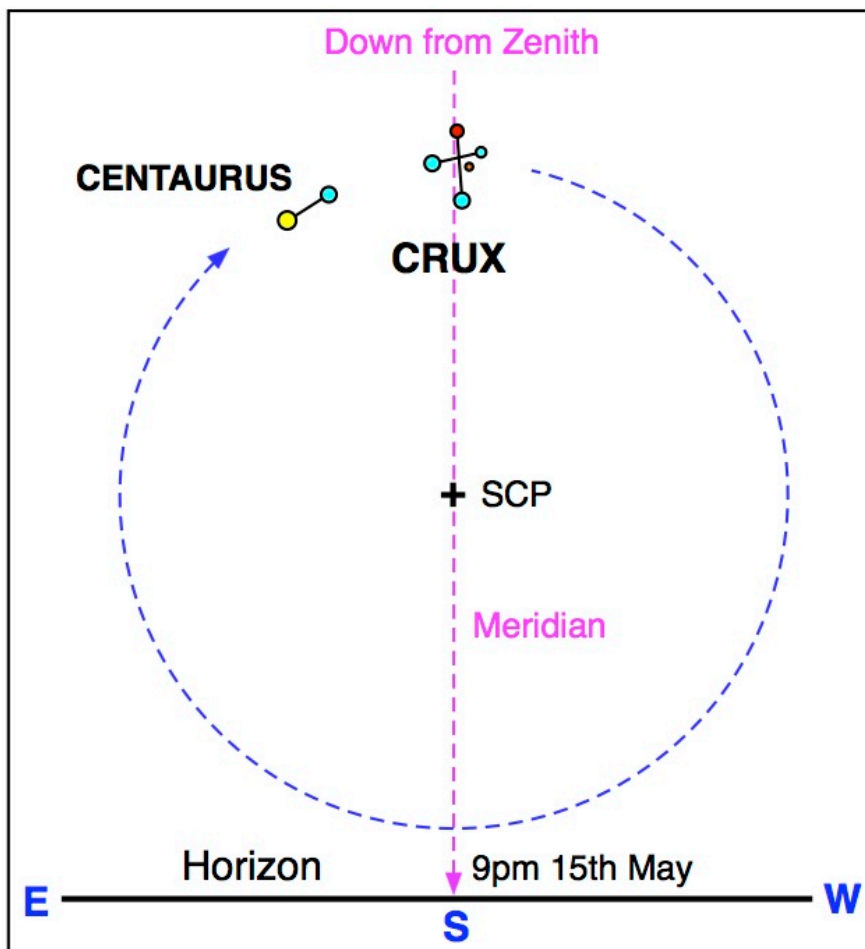
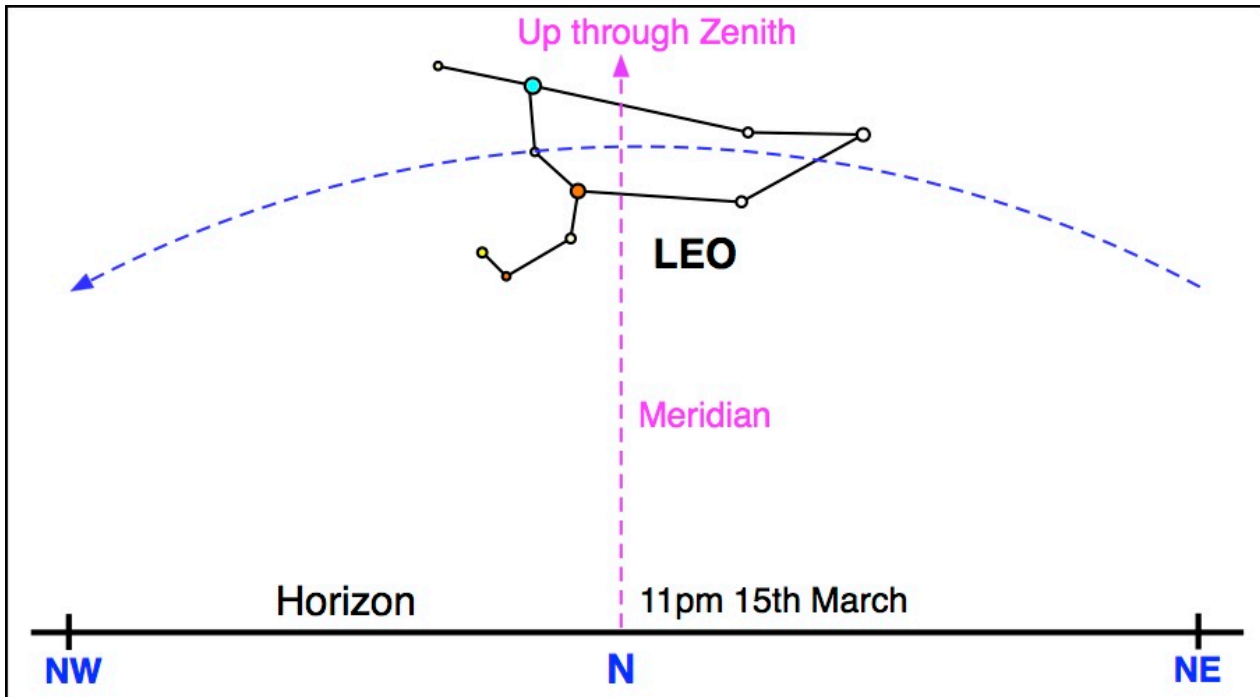


Culmination of a Constellation

Over any night, stars and constellations in the sky will appear to move from east to west due to the Earth's rotation on its axis. A constellation will **culminate** (reach its highest point in the sky for your location) when it centres on the **meridian** - an imaginary line that runs across the sky from north to south and also passes through the zenith (the point high in the sky directly above your head).

For example:



Sun-	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rise	5am	5:30	6am	6am	7am	7am	7am	6:30	6am	5am	4:30	4:30
Set	7pm	6:30	6pm	5:30	5pm	5pm	5pm	5:30	6pm	6pm	6:30	7pm
Leo	3am	1am	11pm	9pm	7pm							
Lep	10pm	8pm								4am	2am	12
Lib			4am	2am	12	10pm	8pm					
Lup			4am	2am	12	10pm	8pm					
Lyn	12	10pm	8pm									2am
Lyr				5am	3am	1am	11pm	9pm	7pm			
Mon	11pm	9pm	7pm								3am	1am
Mus		3am	1am	11pm	9pm	7pm						
Nor			4am	2am	12	10pm	8pm					
Oph				3am	1am	11pm	9pm	7pm				
Ori	10pm	8pm								4am	2am	12
Pav					4am	2am	12	10pm	8pm			
Peg						5am	3am	1am	11pm	9pm		
Per	8pm								4am	2am	12	10pm
Phe							5am	3am	1am	11pm	9pm	
Psc							5am	3am	1am	11pm	9pm	
PsA						5am	3am	1am	11pm	9pm		
Pup	12	10pm	8pm									2am
Ret	8pm								4am	2am	12	10pm
Sge					4am	2am	12	10pm	8pm			
Sgr				5am	3am	1am	11pm	9pm	7pm			
Sco				3am	1am	11pm	9pm	7pm				
Scl							5am	3am	1am	11pm	9pm	
Sct				5am	3am	1am	11pm	9pm	7pm			
Ser1			4am	2am	12	10pm	8pm					
Ser2				4am	2am	12	10pm	8pm				
Sex	3am	1am	11pm	9pm	7pm							
Tau	9pm									3am	1am	11pm
Tri								4am	2am	12	10pm	8pm
TrA			4am	2am	12	10pm	8pm					
Tuc							4am	2am	12	10pm	8pm	
Vel	2am	12	10pm	8pm	6pm							
Vir		3am	1am	11pm	9pm	7pm						
Vol	12	10pm	8pm									2am
Vul					5am	3am	1am	11pm	9pm	7pm		

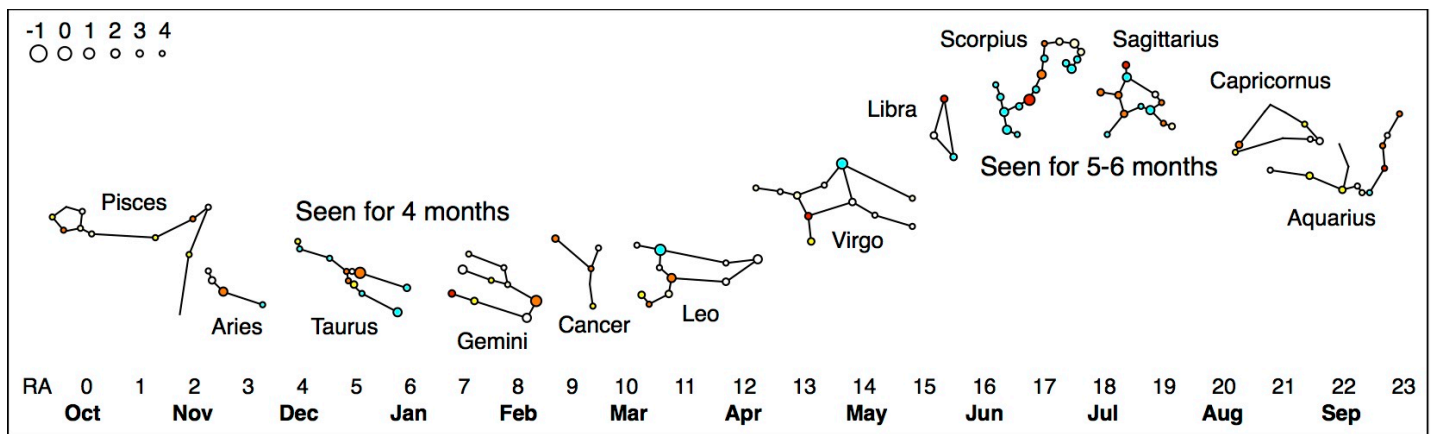
Charts Depicting Constellations Seen Each Month

These charts can be used to get a rough idea of which constellations are in the sky for any month of the year. The charts are oriented for the southern observer with Celestial South to the top.

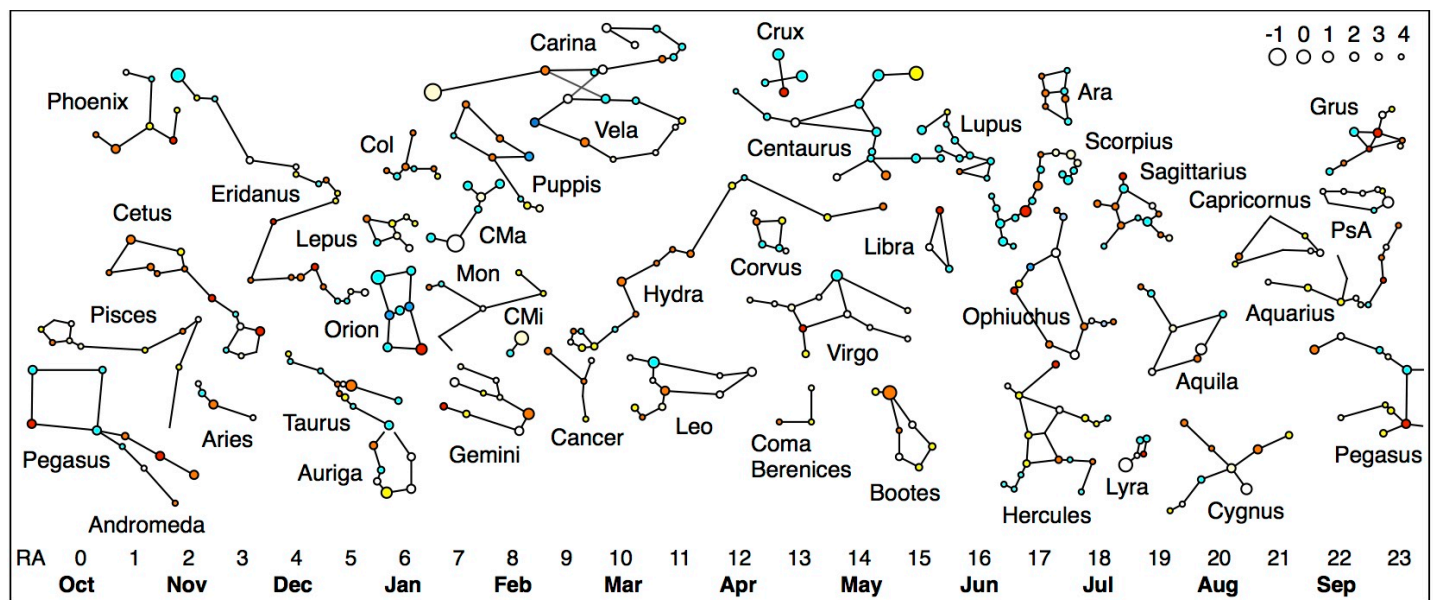
Stars or constellations shown above any even-numbered RA and month will be on the meridian (north/south line through zenith) **at about 10pm (or 11pm daylight saving time) on the 20th day of that month.** This is when the star or constellation is highest in the sky. Note: objects sitting near RA = 0 will be on the meridian at approximately 10pm (11pm daylight saving time) on the 20th of October.

These 12 Constellations are on the Ecliptic

The ecliptic is the path the Sun appears to trace out in the sky.



This map is similar to the one above but shows more constellations



Key to Abbreviations for Monthly Observing Targets

Each of the following tables is a list of approximately 45 of the best observing targets for that month. They are designed for southern observers (we are based in Penrith, Western Sydney, Australia). Targets are grouped into their respective constellations (**Con**), which in turn are listed alphabetically. **VMag** is short for Visual Magnitude. C1 – C109 are **Caldwell objects** and M1 – M110 are **Messier objects**.

Object Types:

Aster = **Asterism of stars**. This is a group of stars that form a recognisable pattern e.g. the Great Square of Pegasus or the Teapot in Sagittarius. However, these stars are generally at very different distances and do not form a gravitationally connected group.

BS = **Binary Star**. Consists of two stars in close proximity to each other, with one star assumed to orbit the other. In reality, many have orbits that have only been partially observed or are so slow that the orbit is only inferred. Separations (Sep) for binary stars is given in arcseconds (").

CS = **Carbon Star**. These are red giants with a high level of carbon compounds in their atmosphere. M-class supergiants such as Antares and Betelgeuse appear more orange than red. However, carbon stars exhibit a noticeable reddish hue. The B-V **colour index** is an indicator of how red a star is. Antares and Betelgeuse have a colour index of 1.9. In comparison, B-V for carbon stars is often greater than 3. The carbon star DY Crucis (near Mimosa) has a colour index of 5.8 and is one of the reddest known stars. Carbon stars are given the classification Cm,n where m is from 0 to 9 (decreasing temperature) and n is from 1 to 5 (indicating the strength of the carbon bands). For example, R Leporis is of type C7,6.

DS = **Double Star**. Includes both optical doubles and binaries. However, here given specifically where it is not known if the two stars form a binary system or it is known that they are an optical double (a chance line of sight) because the stars are at very different distances. Sep in arcseconds.

GC = **Globular Cluster**. A tight group of 10,000s, 100,000s or millions of stars, which pack into a spherical volume. These are the oldest objects in the galaxy, some being around 13 billion years of age. Globular clusters can be classified according to the degree of central stellar concentration. Class 1 globs have the highest degree of central concentration and brighten noticeably towards centre. Class 12 globs are very homogeneous in appearance with no apparent brightening towards centre. Diameters are given in arcminutes (').

GX = **Galaxy**. Excluding the dwarfs, they often contain 100s of billions of stars. Broadly classified into elliptical, spiral or barred spiral galaxies. Dimensions given in arcminutes (').

MS = **Multiple Star**. Three or more stars in the same system. Separations given in arcseconds (").

NB = **Diffuse Nebula**. These are large clouds of interstellar gas and dust. Many, like the Orion Nebula and the Tarantula, are well-known star-forming regions. Dimensions are usually given in arcminutes (').

OC = **Open Cluster**. A family of maybe a few hundred stars loosely tied to each other by gravitation. The stars will generally disperse over a few hundred million years. Size in arcminutes.

PN = **Planetary Nebula**. Many stars, such as the Sun, will eventually expand into red giants and then shrink to become hot white dwarfs. The expanding outer shell of gas and dust left behind at the red giant stage is called a planetary nebula.

VS = **Variable Star**. A star that varies in observed magnitude. This could be due to changes in the star's luminosity as it periodically swells and shrinks or because it has a companion that sometimes eclipses it.

JANUARY		Observing targets by constellation.				
Object	Type	Con	Vmag	Size, Sep, Class	Comments	
omega (4) Aurigae	BS	Aur	5/8.2	4.8"	Contrasting pair (A1/F9).	
M38	OC	Aur	6.4	20'	Starfish Cluster ~ 100 stars.	
M36	OC	Aur	6	12'	Pinwheel Cluster ~ 60 stars.	
M37	OC	Aur	5.6	24'	Richest of the trio > 150 stars.	
HJ 3945 - 145 CMa	BS	CMa	4.8/5.8	26"	Orange/bluish pair (K3/F0).	
M41	OC	CMa	4.5 (naked eye)	38'	Large ~ 80 stars.	
NGC 2362 - C64	OC	CMa	3.8	8'	Tau Cma. Compact ~ 80 stars.	
NGC 1851 - C73	GC	Col	7.1	12' - Class 2	Compact. Dense centre.	
NGC 2070 - C103	NB	Dor	5	40' x 25'	Tarantula Nebula in LMC.	
theta Eri - Acamar	BS	Eri	3.2/4.1	8.6"	Striking white pair (A3/A1).	
omicron 2 Eridani	MS	Eri	4.5//10/11.5	82", 8.2"	B=white dwarf, C=red dwarf.	
p Eridani - DUN 5	BS	Eri	5.8/5.9	11.4"	Striking twin pair (K2/K2).	
NGC 1535	PN	Eri	9.4	45"	Cleopatra's Eye. Blue-green.	
alpha Geminorum	MS	Gem	1.9/3	5.2"	Castor. White pair (A1/A2).	
delta Gem - Wasat	BS	Gem	3.5/8.2	5.5"	Mag contrast (F2/K6).	
20 Geminorum	BS	Gem	6.3/6.9	20"	Similar yellowish pair (F7/F5).	
M35	OC	Gem	5.1	40'	Large, bright > 120 stars.	
NGC 2158	OC	Gem	8.6	5'	Near M35. Looks like a glob.	
NGC 2392 - C39	PN	Gem	9.2 (star 10.5)	40"	Eskimo Nebula.	
gamma Leporis	BS	Lep	3.6/6.3	95"	Binocular pair (F6/K2).	
R Leporis	CS	Lep	5.2 - 12	C7,6	Hind's Crimson Star. B-V = 3.5	
M79	GC	Lep	7.7	10' - Class 5	Just 36' from binary HJ 3752.	
beta Monocerotis	MS	Mon	4.6/5/5.4	AB~7", BC~3"	Triple - all B3 type stars.	
M50	OC	Mon	5.9	15'	> 80 stars.	
NGC 2244 - C50	OC+NB	Mon	4.8	15'	OC in Rosette Nebula.	
NGC 2264	OC	Mon	4.1	55' (Tree 26')	Christmas Tree Cluster.	
NGC 2261 - C46	NB	Mon	9.2	4' x 2' fan shape	Hubble's Variable Nebula.	
beta Orionis	BS	Ori	0.2/6.8	9.5"	Rigel. Mag contrast (B8/B9).	
delta Orionis	BS?	Ori	2.4/6.8	53"	Mintaka in the belt (O9.5/B2).	
zeta Orionis	BS	Ori	1.9/3.7	2.4"	Alnitak in the belt (O9.7/B0).	
theta 1 Orionis	OC	Ori	6.6/7.5/5.1/6.4	A to D is 21"	Trapezium. Visual order ACDB.	
lambda Orionis	BS	Ori	3.5/5.5	4.5"	Meissa (O8/B0.5).	
sigma Orionis	MS	Ori	3.8/8.8/6.6/6.3	12", 13", 42"	Visual order ED(AB)C. AB = 3.8	
RT Orionis	CS	Ori	7 - 9.4	C6,4	B-V = 3	
W Orionis	CS	Ori	5 - 8.4	C5,4	B-V = 3.6	
M42	NB+OC	Ori	4 (naked eye)	90' x 60'	Orion Nebula with Trapezium.	
M43 - part of M42	NB	Ori	9	10' x 7'	Around mag 6.9 star NU Ori.	
M78	NB	Ori	8.3	8' x 6'	Small reflection nebula.	
NGC 2169	OC	Ori	5.9	5'	Celestial "37". Close to eta & xi.	
beta Persei - Algol	BS	Per	2.1 - 3.4	Period 2.9 days	Eclipsing binary.	
M34	OC	Per	5.2	35'	Low altitude ~ 100 stars.	
NGC 1313	GX	Ret	9.2	9' x 7'	Topsy Turvy Galaxy.	
M1	NB	Tau	8.4	6' x 4'	Crab Neb. Supernova remnant.	
M45 - Pleiades	OC	Tau	1.5 (naked eye)	120'	Seven sisters. Naked eye.	
Hyades - C41	OC	Tau	0.5 (naked eye)	330'	Large OC around theta 2,1 Tau.	

Con=Constellation, Vmag=Visual Magnitude, Size mostly in arcminutes, Sep=Separation in arcseconds.

Type: Aster=Asterism, BS=Binary Star, CS=Carbon Star, DS=Double Star, GC=Globular Cluster, GX=Galaxy, MS=Multiple Star, NB=Diffuse Nebula, OC=Open Cluster, PN=Planetary Nebula, VS=Variable Star.

Compiled by Rob Horvat for WSAAG

FEBRUARY		Observing targets by constellation.				
Object	Type	Con	Vmag	Size, Sep, Class	Comments	
omega Aurigae	BS	Aur	5/8.2	4.8"	4 Aurigae (A1/F9).	
M38	OC	Aur	6.4	20'	Starfish Cluster ~ 100 stars.	
M36	OC	Aur	6	12'	Pinwheel Cluster ~ 60 stars.	
M37	OC	Aur	5.6	24'	Richest of the trio > 150 stars.	
iota Cancri	BS	Cnc	4.1/6	30"	Yellow/blue pair (G8/A3).	
phi 2 Cancri	BS	Cnc	6.2/6.2	5.3"	Almost twin pair (A3/A6).	
X Cnc	CS	Cnc	5.5 - 7.9	C5,4	B-V = 3.3	
M44 (Bee Hive)	OC	Cnc	3.1 (naked eye)	1.5 degrees	Very large > 200 stars.	
M67	OC	Cnc	6.9	30'	Fairly rich ~ 100 stars.	
NGC 2775 - C48	GX	Cnc	10.2	4.3' x 3.4'	Large smooth bulge. Faint halo	
HJ 3945 - 145 CMa	BS	CMa	4.8/5.8	26"	Orange/bluish pair (K3/F0).	
M41	OC	CMa	4.5 (naked eye)	38'	Large ~ 80 stars.	
NGC 2362 - C64	OC	CMa	3.8	8'	Tau Cma. Compact ~ 80 stars.	
NGC 1851 - C73	GC	Col	7.1	12' - Class 2	Compact. Dense centre.	
NGC 2070 - C103	NB	Dor	5	40' x 25'	Tarantula Nebula in LMC.	
alpha Geminorum	MS	Gem	1.9/3	5.2"	Castor. White pair (A1/A2).	
delta Gem - Wasat	BS	Gem	3.5/8.2	5.5"	Mag contrast (F2/K6).	
M35	OC	Gem	5.1	40'	Large, bright > 120 stars.	
NGC 2392 - C39	PN	Gem	9.2 (star 10.5)	40"	Eskimo Nebula.	
gamma Leporis	BS	Lep	3.6/6.3	95"	Binocular pair (F6/K2).	
R Leporis	CS	Lep	5.2 - 12	C7,6	Hind's Crimson Star. B-V = 3.5	
M79	GC	Lep	7.7	10' - Class 5	Just 36' from binary HJ 3752.	
beta Monocerotis	MS	Mon	4.6/5/5.4	AB~7", BC~3"	Triple - all B3 type stars.	
M50	OC	Mon	5.9	15'	> 80 stars.	
NGC 2244 - C50	OC+NB	Mon	4.8	15'	OC in Rosette Nebula.	
NGC 2264	OC	Mon	4.1	55' (Tree 26')	Christmas Tree Cluster.	
NGC 2261 - C46	NB	Mon	9.2	4' x 2' fan shape	Hubble's Variable Nebula.	
beta Orionis	BS	Ori	0.2/6.8	9.5"	Rigel. Mag contrast (B8/B9).	
theta 1 Orionis	OC	Ori	6.6/7.5/5.1/6.4	A to D is 21"	Trapezium. Visual order ACDB.	
sigma Orionis	MS	Ori	3.8/8.8/6.6/6.3	12", 13", 42"	Visual order ED(AB)C. AB = 3.8	
M42	NB+OC	Ori	4 (naked eye)	90' x 60'	Orion Nebula with Trapezium.	
M43 - part of M42	NB	Ori	9	10' x 7'	Around mag 6.9 star NU Ori.	
Zeta Puppis - Naos	Star	Pup	2.2	O5 Supergiant	2 nd brightest O class star in sky	
k Pup - HIP 37229	BS	Pup	4.4/4.6	10.2"	Almost twins (B6/B5).	
n Pup - HIP 36817	BS	Pup	5.8/5.8	9.7"	Almost twins (F5/F6).	
2 Pup	BS	Pup	6.1/6.7	17"	Similar pair (A2/F0).	
DUN 31 - HR 2462	BS	Pup	5.1/7.4	13.5"	Yellow/bluish pair (G8/F0).	
M46 + NGC 2437	OC	Pup	6.1	20'	Rich > 150 stars. Plus PN.	
M47	OC	Pup	4.4 (naked eye)	30'	Large, scattered ~ 50 stars.	
M93	OC	Pup	6.2	10'	Rich ~ 80 stars. Wedge-shape.	
NGC 2451 + c Pup	OC	Pup	2.8 (c Pup = 3.8)	50'	Large, scattered ~ 40 stars.	
NGC 2477	OC	Pup	5.8	15' (glob-like)	Rich > 200 stars. Near b Pup.	
gamma 2,1 Vol	BS	Vol	3.9/5.4	14.4"	Fine pair (K0/F2).	
epsilon Vol	BS	Vol	4.4/7.3	6"	Contrasting pair (B6,?)	
NGC 2442	GX	Vol	10.6	6' x 5'	Meathook Galaxy.	

Con=Constellation, Vmag=Visual Magnitude, Size mostly in arcminutes, Sep=Separation in arcseconds.

Type: Aster=Asterism, BS=Binary Star, CS=Carbon Star, DS=Double Star, GC=Globular Cluster, GX=Galaxy, MS=Multiple Star, NB=Diffuse Nebula, OC=Open Cluster, PN=Planetary Nebula, VS=Variable Star.

Compiled by Rob Horvat for WSAAG

MARCH		Observing targets by constellation.				
Object	Type	Con	Vmag	Size, Sep, Class	Comments	
iota Cancri	BS	Cnc	4.1/6	30"	Yellow/blue pair (G8/A3).	
M44 (Bee Hive)	OC	Cnc	3.1 (naked eye)	1.5 degrees	Very large > 200 stars.	
M67	OC	Cnc	6.9	30'	Fairly rich ~ 100 stars.	
HJ 3945 - 145 CMa	BS	CMa	4.8/5.8	26"	Orange/bluish pair (K3/F0).	
M41	OC	CMa	4.5 (naked eye)	38'	Large ~ 80 stars.	
NGC 2362 - C64	OC	CMa	3.8	8'	Tau Cma. Compact ~ 80 stars.	
NGC 2516 - C96	OC	Car	3.8 (naked eye)	30'	Southern Beehive ~100 stars.	
NGC 2808	GC	Car	6.2	14' - Class 1	Massive & highly condensed.	
NGC 3293	OC	Car	4.7	6' - compact	Gem Cluster > 50 stars.	
NGC 3372 - C92	NB	Car	1	2 x 2 degs	eta Carinae Nebula.	
NGC 3532 - C91	OC	Car	3 (naked eye)	50'	Wishing Well Clust. >150 stars.	
IC 2602 + the Car	OC	Car	1.9 (naked eye)	100'	Southern Pleiades ~ 60 stars.	
alpha Geminorum	MS	Gem	1.9/3	5.2"	Castor. White pair (A1/A2).	
M35	OC	Gem	5.1	40'	Large, bright > 120 stars.	
NGC 2392 - C39	PN	Gem	9.2 (star 10.5)	40"	Eskimo Nebula.	
17 Crt - HR 4444	BS	Hya	5.6/5.7	9.4"	Twin yellowish pair (F8/F8).	
U Hydrae	CS	Hya	4.5 - 6.3	C5,4	B-V = 2.7	
Y Hydrae	CS	Hya	6 - 8	C5,5	B-V = 3.8	
M48	OC	Hya	5.8	40'	Large ~ 80 stars.	
M68	GC	Hya	7.8	12' - Class 10	3.5° from beta Corvi.	
M83	GX	Hya	7.2	13.5' x 13.2'	Southern Pinwheel Galaxy.	
NGC 3242 - C59	PN	Hya	7.3 (star 12.1)	40"	Ghost of Jupiter. Blue-green.	
gam Leo - Algieba	BS	Leo	2.4/3.6	4.7"	Striking yellow pair (K1/G7).	
Leo Triplet	GX	Leo	9.3/9/9.8	10' x 3', 9' x 4'	M65 & M66 - 20' apart.	
				15' x 3'	NGC 3628 - 36' to M65 & M66.	
M96 Group	GX	Leo	9.8/9.2/9.3/9.7	7.4' x 5', 8' x 5'	M95 & M96 - 42' apart.	
				5.4' x 5', 5 x 2.4'	M105 & NGC 3384 - 7' apart.	
NGC 2903	GX	Leo	8.9	12.6' x 6'	Spiral galaxy.	
NGC 2419 - C25	GC	Lyn	10.4	4.6'	Intergalactic Wanderer. Low.	
beta Monocerotis	MS	Mon	4.6/5/5.4	AB~7", BC~3"	Triple - all B3 type stars.	
M50	OC	Mon	5.9	15'	> 80 stars.	
NGC 2264	OC	Mon	4.1	55' (Tree 26')	Christmas Tree Cluster.	
M46 + NGC 2437	OC	Pup	6.1	20'	Rich > 150 stars. Plus PN.	
M47	OC	Pup	4.4 (naked eye)	30'	Large, scattered ~ 50 stars.	
M93	OC	Pup	6.2	10'	Rich ~ 80 stars. Wedge-shape.	
NGC 3115 - C53	GX	Sex	8.6	8' x 3'	Spindle Galaxy. Lenticular (S0)	
gamma Velorum	MS	Vel	1.8/4.1/7.3/9.4	40", 62", 94"	Y shape. A= Wolf-Rayet (WC8).	
x Vel (HR 4180)	BS	Vel	4.4/6	52"	DUN 95. Yellow/blue (G2/B8).	
DUN 70 - HR 3359	BS	Vel	5.2/7	4.3"	Blue-white pair (B3/B2.5).	
IC 2391 - C85	OC	Vel	2.6 (naked eye)	1 degree	Omicron Velorum Cl ~ 50 stars	
NGC 2547	OC	Vel	4.7	25'	Open cluster ~ 80 stars.	
NGC 3132 - C74	PN	Vel	9.2	60" x 45"	Eight-Burst Nebula. Oval shape	
NGC 3201 - C79	GC	Vel	6.8	20' - Class 10	Large, round, loose.	
gamma 2,1 Vol	BS	Vol	3.9/5.4	14.4"	Fine pair (K0/F2).	
NGC 2442	GX	Vol	10.6	6' x 5'	Meathook Galaxy.	

Con=Constellation, Vmag=Visual Magnitude, Size mostly in arcminutes, Sep=Separation in arcseconds.

Type: Aster=Asterism, BS=Binary Star, CS=Carbon Star, DS=Double Star, GC=Globular Cluster, GX=Galaxy, MS=Multiple Star, NB=Diffuse Nebula, OC=Open Cluster, PN=Planetary Nebula, VS=Variable Star.

Compiled by Rob Horvat for WSAAG

APRIL		Observing targets by constellation.			
Object	Type	Con	Vmag	Size, Sep, Class	Comments
iota Cancri	BS	Cnc	4.1/6	30"	Yellow/blue pair (G8/A3).
M44 (Bee Hive)	OC	Cnc	3.1 (naked eye)	1.5 degrees	Very large > 200 stars.
Cor Caroli	BS	CVn	2.9/5.5	19"	alp CVn. Contrasting (A0/F2).
Y CVn: La Superba	CS	CVn	4.8 – 6.4	C5,5	B-V = 3.24. Very low.
M3	GC	CVn	6.2	18' – Class 6	Bright. 500,000 stars.
M51	GX	CVn	8	14' x 12'	Whirlpool Galaxy. Very Low.
M63	GX	CVn	8.6	12' x 7'	Sunflower Galaxy. Low.
M94	GX	CVn	8	11' x 9'	Spiral galaxy. Low
M106	GX	CVn	8.4	17' x 7'	Spiral galaxy. Very low.
NGC 2516 – C96	OC	Car	3.8 (naked eye)	30'	Southern Beehive ~100 stars.
NGC 2808	GC	Car	6.2	14' – Class 1	Massive & highly condensed.
NGC 3372 – C92	NB	Car	1	2 x 2 degs	eta Carinae Nebula.
NGC 3532 – C91	OC	Car	3 (naked eye)	50'	Wishing Well Clust. >150 stars.
M53	GC	Com	7.6	13' – Class 5	About 1 degree from alp Com.
M64	GX	Com	8.5	11' x 5.4'	Black Eye Galaxy. Spiral galaxy.
M85	GX	Com	9.1	7' x 5.4'	Lenticular galaxy (S0).
M88/M91	GX	Com	9.5/10.1	9' x 4', 6' x 5'	M88 spiral. M91 barred spiral.
M98/M99/M100	GX	Com	10/9.8/9.3	11' x 3', 5' x 4.7'	Spirals. M99 = Coma Pinwheel.
				6.2' x 5.6'	M100. Face on.
NGC 4565 – C38	GX	Com	9.2	16'x2'	Needle Galaxy. Edge-on.
del Crv – Algorab	BS	Crv	3/8.5	25"	Contrasting pair (A0/B9).
NGC 4038/4039	GX	Crv	10.2/11	5' x 3', 3' x 2'	Antennae Galaxies. Interacting.
alp Cru – Acrux	BS	Cru	1.3/1.6	3.9"	Bright bluish pair (B0.5/B1).
NGC 4755 – C94	OC	Cru	4.2	10'	Jewel Box. Compact ~100 stars
M68	GC	Hya	7.8	12' – Class 10	3.5° from beta Corvi.
M83	GX	Hya	7.2	13.5' x 13.2'	Southern Pinwheel Galaxy.
NGC 3242 – C59	PN	Hya	7.3 (star 12.1)	40"	Ghost of Jupiter. Blue-green.
Leo Triplet	GX	Leo	9.3/9/9.8	10' x 3', 9' x 4'	M65 & M66 – 20' apart.
				15' x 3'	NGC 3628 – 36' to M65 & M66.
M96 Group	GX	Leo	9.8/9.2/9.3/9.7	7.4' x 5', 8' x 5'	M95 & M96 – 42' apart.
				5.4' x 5', 5 x 2.4'	M105 & NGC 3384 – 7' apart.
beta Muscae	BS	Mus	3.5/4	1"	Very tight bluish pair (B2/B3).
NGC 4833 – C105	GC	Mus	6.9	14'	About 42' from delta Muscae.
NGC 3115 – C53	GX	Sex	8.6	8' x 3'	Spindle Galaxy. Lenticular (S0)
gamma Velorum	MS	Vel	1.8/4.1/7.3/9.4	40", 62", 94"	Y shape. A= Wolf-Rayet (WC8).
NGC 3132 – C74	PN	Vel	9.2	60" x 45"	Eight-Burst Nebula. Oval shape
NGC 3201 – C79	GC	Vel	6.8	20' – Class 10	Large, round, loose.
M49	GX	Vir	8.3	10' x 8.3'	Giant elliptical galaxy.
M58	GX	Vir	9.7	5' x 4'	Barred spiral galaxy.
M59/M60	GX	Vir	9.6/8.9	5' x 3', 7' x 5.4'	Ellipticals. About 25' apart.
M61	GX	Vir	9.6	6.5' x 6'	Face-on spiral galaxy.
M84/M86	GX	Vir	9.4/9	7' x 6', 9' x 6'	Ellipticals. Markarian's Chain.
M87	GX	Vir	8.6	8' x 6.6'	Virgo A. Giant elliptical galaxy.
M89/M90	GX	Vir	9.7, 9.4	5' x 4.7', 9' x 4'	Elliptical + spiral. 40' apart.
M104	GX	Vir	8	8.5' x 3.5'	Sombrero Galaxy. Spiral.

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MAY		Observing targets by constellation.				
Object	Type	Con	Vmag	Size, Sep, Class	Comments	
pi Bootis	BS	Boo	4.9/5.8	5.4"	Striking white pair (B9/A6).	
xi Bootis	BS	Boo	4.7/7	5.6"	Contrasting pair (G7/K5).	
Cor Caroli	BS	CVn	2.9/5.5	19"	alp CVn. Contrasting (A0/F2).	
M3	GC	CVn	6.2	18' - Class 6	Bright. 500,000 stars.	
NGC 2516 - C96	OC	Car	3.8 (naked eye)	30'	Southern Beehive ~100 stars.	
NGC 2808	GC	Car	6.2	14' - Class 1	Massive & highly condensed.	
NGC 3372 - C92	NB	Car	1	2 x 2 degs	eta Carinae Nebula.	
NGC 3532 - C91	OC	Car	3 (naked eye)	50'	Wishing Well Clust. >150 stars.	
omega Centauri	GC	Cen	3.7 (naked eye)	36' - Class 8	C80. Largest & brightest glob.	
NGC 3766 - C97	OC	Cen	5.3	12'	Pearl Cluster > 100 stars.	
NGC 3918	PN	Cen	8.2 (star mag 16)	12"	Blue Planetary.	
NGC 4945 - C83	GX	Cen	9.3	20' x 4'	Edge-on. 19' from xi 1 Centauri	
NGC 5128 - C77	GX	Cen	6.8	26' x 20'	Centaurus A. Huge dust lane.	
M53	GC	Com	7.6	13' - Class 5	About 1° from alp Com.	
M64	GX	Com	8.5	11' x 5.4'	Black Eye Galaxy. Spiral galaxy.	
M85	GX	Com	9.1	7' x 5.4'	Lenticular galaxy (S0).	
M88/M91	GX	Com	9.5/10.1	9' x 4', 6' x 5'	M88 spiral. M91 barred spiral.	
M98/M99/M100	GX	Com	10/9.8/9.3	11' x 3', 5' x 4.7'	Spirals. M99 = Coma Pinwheel.	
				6.2' x 5.6'	M100. Face on.	
NGC 4565 - C38	GX	Com	9.2	16'x2'	Needle Galaxy. Edge-on.	
del Crv - Algorab	BS	Crv	3/8.5	25"	Contrasting pair (A0/B9).	
NGC 4038/4039	GX	Crv	10.2/11	5' x 3', 3' x 2'	Antennae Galaxies. Interacting.	
alp Cru - Acrux	BS	Cru	1.3/1.6	3.9"	Bright bluish pair (B0.5/B1).	
NGC 4755 - C94	OC	Cru	4.2	10'	Jewel Box. Compact ~100 stars	
M68	GC	Hya	7.8	12' - Class 10	3.5° from beta Corvi.	
M83	GX	Hya	7.2	13.5' x 13.2'	Southern Pinwheel Galaxy.	
NGC 3242 - C59	PN	Hya	7.3 (star 12.1)	40"	Ghost of Jupiter. Blue-green.	
Leo Triplet	GX	Leo	9.3/9/9.8	10' x 3', 9' x 4'	M65 & M66 - 20' apart.	
				15' x 3'	NGC 3628 - 36' to M65 & M66.	
M96 Group	GX	Leo	9.8/9.2/9.3/9.7	7.4' x 5', 8' x 5'	M95 & M96 - 42' apart.	
				5.4' x 5', 5 x 2.4'	M105 & NGC 3384 - 7' apart.	
beta Muscae	BS	Mus	3.5/4	1"	Very tight bluish pair (B2/B3).	
NGC 4833 - C105	GC	Mus	6.9	14'	About 42' from delta Muscae.	
NGC 3115 - C53	GX	Sex	8.6	8' x 3'	Spindle Galaxy. Lenticular (S0)	
gamma Velorum	MS	Vel	1.8/4.1/7.3/9.4	40", 62", 94"	Y shape. A= Wolf-Rayet (WC8).	
NGC 3132 - C74	PN	Vel	9.2	60" x 45"	Eight-Burst Nebula. Oval shape	
NGC 3201 - C79	GC	Vel	6.8	20' - Class 10	Large, round, loose.	
M49	GX	Vir	8.3	10' x 8.3'	Giant elliptical galaxy.	
M58	GX	Vir	9.7	5' x 4'	Barred spiral galaxy.	
M59/M60	GX	Vir	9.6/8.9	5' x 3', 7' x 5.4'	Ellipticals. About 25' apart.	
M61	GX	Vir	9.6	6.5' x 6'	Face-on spiral galaxy.	
M84/M86	GX	Vir	9.4/9	7' x 6', 9' x 6'	Ellipticals. Markarian's Chain.	
M87	GX	Vir	8.6	8' x 6.6'	Virgo A. Giant elliptical galaxy.	
M89/M90	GX	Vir	9.7, 9.4	5' x 4.7', 9' x 4'	Elliptical + spiral. 40' apart.	
M104	GX	Vir	8	8.5' x 3.5'	Sombrero Galaxy. Spiral.	

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JUNE		Observing targets by constellation.				
Object	Type	Con	Vmag	Size, Sep, Class	Comments	
pi Bootis	BS	Boo	4.9/5.8	5.4"	Striking white pair (B9/A6).	
Cor Caroli	BS	CVn	2.9/5.5	19"	alp CVn. Contrasting (A0/F2).	
M3	GC	CVn	6.2	18' - Class 6	Bright. 500,000 stars.	
alpha Centauri	BS	Cen	0/1.3	4.3"	Brilliant yellow pair (G2/K1).	
omega Centauri	GC	Cen	3.7 (naked eye)	36' - Class 8	C80. Largest & brightest glob.	
NGC 3766 - C97	OC	Cen	5.3	12'	Pearl Cluster > 100 stars.	
NGC 3918	PN	Cen	8.2 (star mag 16)	12"	Blue Planetary.	
NGC 4945 - C83	GX	Cen	9.3	20' x 4'	Edge-on. 19' from xi 1 Centauri	
NGC 5128 - C77	GX	Cen	6.8	26' x 20'	Centaurus A. Huge dust lane.	
M53	GC	Com	7.6	13' - Class 5	About 1° from alp Com.	
M64	GX	Com	8.5	11' x 5.4'	Black Eye Galaxy. Spiral galaxy.	
M98/M99/M100	GX	Com	10/9.8/9.3	11' x 3', 5' x 4.7'	Spirals. M99 = Coma Pinwheel.	
				6.2' x 5.6'	M100. Face on.	
NGC 4565 - C38	GX	Com	9.2	16'x2'	Needle Galaxy. Edge-on.	
del Crv - Algorab	BS	Crv	3/8.5	25"	Contrasting pair (A0/B9).	
NGC 4038/4039	GX	Crv	10.2/11	5' x 3', 3' x 2'	Antennae Galaxies. Interacting.	
alp Cru - Acrux	BS	Cru	1.3/1.6	3.9"	Bright bluish pair (B0.5/B1).	
NGC 4755 - C94	OC	Cru	4.2	10'	Jewel Box. Compact ~100 stars	
alp Her-Rasalgethi	BS	Her	3.5/5.4	4.9"	Contrasting (M5/(G5+F2)).	
M13	GC	Her	5.8	20' - Class 5	Great Hercules Cluster.	
M92	GC	Her	6.4	14' - Class 4	Low altitude.	
alpha Librae	BS	Lib	2.8/5.2	231" -bino pair	Zubenelgenubi. Wide (A3/F4).	
NGC 5986	GC	Lup	7.5	10' - Class 7	About 3° from eta Lupi.	
beta Muscae	BS	Mus	3.5/4	1"	Very tight bluish pair (B2/B3).	
NGC 4833 - C105	GC	Mus	6.9	14'	About 42' from delta Muscae.	
NGC 6067	OC	Nor	5.6	14'	Rich in stars. 25' from kap Nor.	
36 Ophiuchi	BS	Oph	5.1/5.1	5"	Gold twins (K2/K1).	
rho Ophiuchi	MS	Oph	5.1/5.7, 7.3, 6.8	3", 149", 156"	2 close, 2 wide → "delta wing".	
M10	GC	Oph	6.6	15' - Class 7	About 3.3° from M12.	
M12	GC	Oph	6.7	15' - Class 9	Looser than M10.	
M19	GC	Oph	6.8	14' - Class 8	About 3° from 36 Oph.	
M62	GC	Oph	6.4	14' - Class 4	About 4° from M19.	
nu Scorpii	MS	Sco	4.4/5.3//6.6/7.2	1.3", 41", 2.4"	Double-double.	
M4	GC	Sco	5.9	26' - Class 9	Closest glob. Easily resolved.	
M6	OC	Sco	4.2	35'	Butterfly Cluster ~ 80 stars.	
M7	OC	Sco	3.3 (naked eye)	80'	Ptolemy's Cluster ~ 80 stars.	
NGC 6124 - C75	OC	Sco	5.8	40'	Rich ~ 6° from mu & zeta pairs	
NGC 6231 - C76	OC	Sco	2.6	15'	Rich. ½ deg from zeta Sco pair.	
M5	GC	Ser1	5.7	23' - Class 5	Just 22' from 5 Serpentis.	
X TrA	CS	TrA	5.1 - 7.3	C5,5	Bright. B-V = 3.6	
M49	GX	Vir	8.3	10' x 8.3'	Giant elliptical galaxy.	
M61	GX	Vir	9.6	6.5' x 6'	Face-on spiral galaxy.	
M84/M86	GX	Vir	9.4/9	7' x 6', 9' x 6'	Ellipticals. Markarian's Chain.	
M87	GX	Vir	8.6	8' x 6.6'	Virgo A. Giant elliptical galaxy.	
M104	GX	Vir	8	8.5' x 3.5'	Sombrero Galaxy. Spiral.	

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JULY		Observing targets by constellation.				
Object	Type	Con	Vmag	Size, Sep, Class	Comments	
NGC 6397 – C86	GC	Ara	5.7	26' – Class 9	Bright. 2 nd closest glob.	
pi Bootis	BS	Boo	4.9/5.8	5.4"	Striking white pair (B9/A6).	
NGC 5248 – C45	GX	Boo	10	4' x 2.4'	Compact barred spiral.	
alpha Centauri	BS	Cen	0/1.3	4.3"	Brilliant yellow pair (G2/K1).	
omega Centauri	GC	Cen	3.7 (naked eye)	36' – Class 8	C80. Largest & brightest glob.	
NGC 3766 – C97	OC	Cen	5.3	12'	Pearl Cluster > 100 stars.	
NGC 3918	PN	Cen	8.2 (star mag 16)	12"	Blue Planetary.	
NGC 4945 – C83	GX	Cen	9.3	20' x 4'	Edge-on. 19' from xi 1 Centauri	
NGC 5128 – C77	GX	Cen	6.8	26' x 20'	Centaurus A. Huge dust lane.	
NGC 5286 – C84	GC	Cen	7.3	9' – Class 5	Just 4' from mag 4.6 M Cen.	
NGC 6541 – C78	GC	CrA	6.3	13' – Class 3	Compact. 22' from HJ 5014.	
alp Her-Rasalgethi	BS	Her	3.5/5.4	4.9"	Contrasting (M5/(G5+F2)).	
M13	GC	Her	5.8	20' – Class 5	Great Hercules Cluster.	
M92	GC	Her	6.4	14' – Class 4	Low altitude.	
alpha Librae	BS	Lib	2.8/5.2	231" –bino pair	Zubenelgenubi. Wide (A3/F4).	
NGC 5986	GC	Lup	7.5	10' – Class 7	About 3° from eta Lupi.	
epsilon Lyrae	MS	Lyr	5.2/6.1//5.3/5.4	2.4", 208", 2.4"	Famous "Double Double".	
M56	GC	Lyr	8.3	9' – Class 10	Between gam Lyr & Albireo.	
M57	PN	Lyr	8.8 (star mag 16)	84" x 60"	Ring Nebula.	
NGC 6067	OC	Nor	5.6	14'	Rich in stars. 25' from kap Nor.	
36 Ophiuchi	BS	Oph	5.1/5.1	5"	Gold twins (K2/K1).	
rho Ophiuchi	MS	Oph	5.1/5.7, 7.3, 6.8	3", 149", 156"	2 close, 2 wide → "delta wing".	
M10	GC	Oph	6.6	15' – Class 7	About 3.3° from M12.	
M12	GC	Oph	6.7	15' – Class 9	Looser than M10.	
M19	GC	Oph	6.8	14' – Class 8	About 3° from 36 Oph.	
M62	GC	Oph	6.4	14' – Class 4	About 4° from M19.	
M8	NB/OC	Sgr	6? (naked eye)	90' x 40'	Lagoon Nebula.	
M17	NB	Sgr	6	46' x 37'	Swan Nebula. Swan 10' x 5'.	
M20	NB/OC	Sgr	6.3	29' x 27'	Triffid Nebula.	
M22	GC	Sgr	5.1	24' – Class 7	Third brightest in the sky.	
M28	GC	Sgr	6.8	14' – Class 4	More compressed than M22.	
M55	GC	Sgr	6.3	19' – Class 11	About 8° from tau Sgr.	
NGC 6723	GC	Sgr	7	13' – Class 7	30' from eps CrA and BSO 14.	
nu Scorpii	MS	Sco	4.4/5.3//6.6/7.2	1.3", 41", 2.4"	Double-double.	
M4	GC	Sco	5.9	26' – Class 9	Closest glob. Easily resolved.	
M6	OC	Sco	4.2	35'	Butterfly Cluster ~ 80 stars.	
M7	OC	Sco	3.3 (naked eye)	80'	Ptolemy's Cluster ~ 80 stars.	
M80	GC	Sco	7.3	9' – Class 2	Highly concentrated.	
NGC 6231 – C76	OC	Sco	2.6	15'	Rich. ½ deg from zeta Sco pair.	
NGC 6302 – C69	PN	Sco	9.7	84" x 24"	Bug Nebula. Bipolar – 2 lobes.	
NGC 6441	GC	Sco	7.2	8' – Class 3	Only 4' from mag 3.2 G Scorpii.	
M11	OC	Sct	5.8	14'	Wild Duck Cluster. Rich.	
M5	GC	Ser1	5.7	23' – Class 5	Just 22' from 5 Serpentes.	
M16 + NGC 6611	NB/OC	Ser2	6.4	35' x 28'	Eagle Nebula and star cluster.	
X TrA	CS	TrA	5.1 – 7.3	C5,5	Bright. B-V = 3.6	

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AUGUST		Observing targets by constellation.				
Object	Type	Con	Vmag	Size, Sep, Class	Comments	
V Aquilae	CS	Aql	6.6 – 8.4	C6,4	B-V = 3.9. 40' from 12 Aql.	
NGC 6397 – C86	GC	Ara	5.7	26' – Class 9	Bright. 2 nd closest glob.	
beta Capricorni	BS	Cap	3.2/6.1	205"	Binocular target (G9/A0).	
M30	GC	Cap	7.2	12' – Class 5	Just 23' from mag 5.2 41 Cap.	
NGC 6541 – C78	GC	CrA	6.3	13' – Class 3	Compact. 22' from HJ 5014.	
bet Cyg – Albireo	BS	Cyg	3.2/5.1	34"	Orange/blue pair (K3/B8).	
gamma Delphini	BS	Del	4.3/5	8.9"	Striking pair (K1/F7).	
alp Her-Rasalgethi	BS	Her	3.5/5.4	4.9"	Contrasting (M5/(G5+F2)).	
M13	GC	Her	5.8	20' – Class 5	Great Hercules Cluster.	
M92	GC	Her	6.4	14' – Class 4	Low altitude.	
epsilon Lyrae	MS	Lyr	5.2/6.1//5.3/5.4	2.4", 208", 2.4"	Famous "Double Double".	
M56	GC	Lyr	8.3	9' – Class 10	Between gam Lyr & Albireo.	
M57	PN	Lyr	8.8 (star mag 16)	84" x 60"	Ring Nebula.	
M9	GC	Oph	7.7	9' – Class 8	About 3.5° from Sabik (eta).	
M10	GC	Oph	6.6	15' – Class 7	About 3.3° from M12.	
M12	GC	Oph	6.7	15' – Class 9	Looser than M10.	
M14	GC	Oph	7.6	12' – Class 8	About 8° from bet Oph.	
M19	GC	Oph	6.8	14' – Class 8	About 3° from 36 Oph.	
M62	GC	Oph	6.4	14' – Class 4	About 4° from M19.	
M107	GC	Oph	7.9	10' – Class 10	About 2.7° from zet Oph.	
NGC 6752 – C93	GC	Pav	5.4	20' – Class 6	Fourth brightest in the sky.	
M71	GC	Sge	8.2	7' – Class 11	Loose – weakly concentrated.	
M8	NB/OC	Sgr	6? (naked eye)	90' x 40'	Lagoon Nebula.	
M17	NB	Sgr	6	46' x 37'	Swan Nebula. Swan 10' x5'.	
M20	NB/OC	Sgr	6.3	29' x 27'	Triffid Nebula.	
M22	GC	Sgr	5.1	24' – Class 7	Third brightest in the sky.	
M28	GC	Sgr	6.8	14' – Class 4	More compressed than M22.	
M54	GC	Sgr	7.6	9' – Class 3	Very distant. Mass ~ 47 Tuc.	
M55	GC	Sgr	6.3	19' – Class 11	About 8° from tau Sgr.	
M69	GC	Sgr	7.6	7' – Class 5	Similar distance to M70.	
M70	GC	Sgr	7.8	8' – Class 5	Similar size/luminosity to M69	
M75	GC	Sgr	8.5	6' – Class 1	Densely concentrated. Remote.	
NGC 6723	GC	Sgr	7	13' – Class 7	30' from eps CrA and BSO 14.	
NGC 6818	PN	Sgr	9.4	22' x 15'	Little Gem Nebula. Blue-green.	
nu Scorpii	MS	Sco	4.4/5.3//6.6/7.2	1.3", 41", 2.4"	Double-double.	
M4	GC	Sco	5.9	26' – Class 9	Closest glob. Easily resolved.	
M6	OC	Sco	4.2	35'	Butterfly Cluster ~ 80 stars.	
M7	OC	Sco	3.3 (naked eye)	80'	Ptolemy's Cluster ~ 80 stars.	
M80	GC	Sco	7.3	9' – Class 2	Highly concentrated.	
NGC 6231 – C76	OC	Sco	2.6	15'	Rich. ½ deg from zeta Sco pair.	
NGC 6441	GC	Sco	7.2	8' – Class 3	Only 4' from mag 3.2 G Scorpii.	
M11	OC	Sct	5.8	14'	Wild Duck Cluster. Rich.	
M16 + NGC 6611	NB/OC	Ser2	6.4	35' x 28'	Eagle Nebula and star cluster.	
Brocchi's Cluster	Aster	Vul	3.6 – bino target	1.5 degs	10 stars form the Coathanger.	
M27	PN	Vul	7.4 (star 13.5)	8' x 5.7'	Dumbbell Nebula.	

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SEPTEMBER		Observing targets by constellation.			
Object	Type	Con	Vmag	Size, Sep, Class	Comments
M2	GC	Aqr	6.5	16' – Class 2	Compact. Large in size.
M72	GC	Aqr	9.3	6' – Class 9	About 3.4 degs from eps Aqr
NGC 7009 – C55	PN	Aqr	8 (star mag 11.5)	30" x 24"	Saturn Nebula. Blue-green.
NGC 7293 – C63	PN	Aqr	7.3 (star mag 13)	15'x12'	Helix Nebula. Large, diffuse.
V Aquilae	CS	Aql	6.6 – 8.4	C6,4	40' from 12 Aql. B-V = 3.9.
NGC 6760	GC	Aql	8.9	7' – Class 9	4 degrees from delta Aquilae.
beta Capricorni	BS	Cap	3.2/6.1	205"	Binocular target (G9/A0).
omi Cap	DS	Cap	5.9/6.7	22"	White optical pair (A3/A7).
rho Capricorni	BS	Cap	5/6.9	1.6"	Tight pair.
M30	GC	Cap	7.2	12' – Class 5	Just 23' from mag 5.2 41 Cap.
NGC 6541 – C78	GC	CrA	6.3	13' – Class 3	Compact. 22' from HJ 5014.
bet Cyg – Albireo	BS	Cyg	3.2/5.1	34"	Orange/blue pair (K3/B8).
61 Cygni	BS	Cyg	5.2/6	31"	Pair of orange dwarfs (K5/K7).
Eastern Veil Neb.	NB	Cyg	5 – NGC 6992/5	60' x 8'	C33. Needs OIII or UHC filter.
gamma Delphini	BS	Del	4.3/5	8.9"	Striking pair (K1/F7).
NGC 6934 – C47	GC	Del	8.9	7' – Class 8	About 3° from kappa Delphini.
NGC 7006	GC	Del	10.6	4' – Class 1	Compact. 8 x dist of Ome Cen.
NGC 7213	GX	Gru	10.1	5' x 4'	Just 16' from Alnair (alp Gru).
NGC 7410	GX	Gru	10.3	6' x 2'	Elongated spiral galaxy.
Grus Quartet	GX	Gru	10.6, 11.5, 11.6	{7' x 3', 3 x 1.2',	NGC 7582/90/99 < 13' apart.
			10.5	5'x1.6'} - 4'x3.5'	NGC 7552 – 28' from trio.
epsilon Lyrae	MS	Lyr	5.2/6.1//5.3/5.4	2.4", 208", 2.4"	Famous "Double Double".
M56	GC	Lyr	8.3	9' – Class 10	Between gam Lyr & Albireo.
M57	PN	Lyr	8.8 (star mag 16)	84" x 60"	Ring Nebula.
V Pavonis	CS	Pav	6 – 8.1	C6,4	3.3° to bet & del Arae. B-V =3.5
NGC 6752 – C93	GC	Pav	5.4	20' – Class 6	Fourth brightest in the sky.
M15	GC	Peg	6.2	12' – Class 4	Dense. 4° from Enif.
NGC 7331 – C30	GX	Peg	9.5	11' x 3.7'	Elongated spiral galaxy.
M71	GC	Sge	8.2	7' – Class 11	Loose – weakly concentrated.
M8	NB/OC	Sgr	6? (naked eye)	90' x 40'	Lagoon Nebula.
M17	NB	Sgr	6	46' x 37'	Swan Nebula. Swan 10' x5'.
M20	NB/OC	Sgr	6.3	29' x 27'	Triffid Nebula.
M22	GC	Sgr	5.1	24' – Class 7	Third brightest in the sky.
M28	GC	Sgr	6.8	14' – Class 4	More compressed than M22.
M54	GC	Sgr	7.6	9' – Class 3	Very distant. Mass ~ 47 Tuc.
M55	GC	Sgr	6.3	19' – Class 11	About 8° from tau Sgr.
M69	GC	Sgr	7.6	7' – Class 5	Similar distance to M70.
M70	GC	Sgr	7.8	8' – Class 5	Similar size/luminosity to M69
M75	GC	Sgr	8.5	6' – Class 1	Densely concentrated. Remote.
NGC 6723	GC	Sgr	7	13' – Class 7	30' from eps CrA and BSO 14.
NGC 6818	PN	Sgr	9.4	22' x 15'	Little Gem Nebula. Blue-green.
M11	OC	Sct	5.8	14'	Wild Duck Cluster. Rich.
NGC 6712	GC	Sct	8.1	10' – Class 9	About 2.5° from M11.
Brocchi's Cluster	Aster	Vul	3.6	1.5 degs	Coathanger.
M27	PN	Vul	7.4	8'x5.7'	Dumbbell Nebula.

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OCTOBER		Observing targets by constellation.			
Object	Type	Con	Vmag	Size, Sep, Class	Comments
gam And - Almach	BS	And	2.2/5	9.8"	Orange/blue pair (K3/B8).
pi Andromedae	BS	And	4.3/7.1	36"	Contrasting pair (B5/A6).
AQ Andromedae	CS	And	7.5 - 9.5	C5,4	B-V = 3.5. Between pi & sigma.
M31/M32/M110	GX	And	3.4, 7.9, 8	190' x 60'	Andromeda Galaxy + Satellites.
NGC 7662 - C22	PN	And	8.3 (star 12 - 16)	30"	Blue Snowball. Blue-green.
Zeta 2,1 Aquarii	BS	Aqr	4.3/4.5	2.1"	Twin white pair (F2/F2).
41 Aquarii	BS	Aqr	5.6/6.7	5.2"	(K0/F2) 3.6° from Helix Neb.
M2	GC	Aqr	6.5	16' - Class 2	Compact. Large in size.
M72	GC	Aqr	9.3	6' - Class 9	About 3.4° from eps Aqr.
NGC 7009 - C55	PN	Aqr	8 (star mag 11.5)	30" x 24"	Saturn Nebula. Blue-green.
NGC 7293 - C63	PN	Aqr	7.3 (star mag 13)	15'x12'	Helix Nebula. Large, diffuse.
beta Capricorni	BS	Cap	3.2/6.1	205"	Binocular target (G9/A0).
omi Cap	DS	Cap	5.9/6.7	22"	White optical pair (A3/A7).
rho Capricorni	BS	Cap	5/6.9	1.6"	Tight pair. 3.5° from bet Cap.
M30	GC	Cap	7.2	12' - Class 5	Just 23' from mag 5.2 41 Cap.
bet Cyg - Albireo	BS	Cyg	3.2/5.1	34"	Orange/blue pair (K3/B8).
61 Cygni	BS	Cyg	5.2/6	31"	Pair of orange dwarfs (K5/K7).
Eastern Veil Neb.	NB	Cyg	5 - NGC 6992/5	60' x 8'	C33. Needs OIII or UHC filter.
gamma Delphini	BS	Del	4.3/5	8.9"	Striking pair (K1/F7).
NGC 6934 - C47	GC	Del	8.9	7' - Class 8	3° from kappa Delphini.
NGC 7006	GC	Del	10.6	4' - Class 1	Compact. 8 x dist of Ome Cen.
NGC 7213	GX	Gru	10.1	5' x 4'	Just 16' from Alnair (alp Gru).
NGC 7410	GX	Gru	10.3	6' x 2'	Elongated spiral galaxy.
Grus Quartet	GX	Gru	10.6, 11.5, 11.6	{7' x 3', 3 x 1.2',	NGC 7582/90/99 < 13' apart.
			10.5	5'x1.6'} - 4'x3.5'	NGC 7552 - 28' from trio.
Eps Peg - Enif	DS	Peg	2.5/8.7	145"	Wide contrasting pair (K2/F8).
M15	GC	Peg	6.2	12' - Class 4	Dense. About 4° from Enif.
NGC 7331 - C30	GX	Peg	9.5	11' x 3.7'	Elongated spiral galaxy.
psi1 Piscium	BS	Psc	5.3/5.5	30"	Similar white stars (A1/A0).
65 Piscium	BS	Psc	6.3/6.3	4.2"	Yellowish twins (F5/F4).
TX (19) Piscium	CS	Psc	4.5 - 6.4	C7,2	Bright. B-V = 2.7.
M74	GX	Psc	9.1	10' x 9.3'	Face-on spiral. Very diffuse.
gam PsA	BS	PsA	4.5/8.2	4"	Contrasting. 48' from del PsA.
del PsA	BS	PsA	4.2/9.2	4.5"	About 3° from Fomalhaut.
HCG 90: NGC 7172	GX	PsA	11.9 (6' to 7173)	2.5' x 1.4'	Brightest HCG. Four galaxies.
NGC 7173/76 +74			11.4, 11.4, 13.3	Ellipticals 1'x1'	Two ellipticals + twisted spiral
NGC 55 - C72	GX	Scl	7.8	30' x 6'	Similar visual size to NGC 253.
NGC 253 - C65	GX	Scl	7.1	28' x 7'	Can be seen with binoculars.
NGC 288	GC	Scl	8.1	14' - Class 10	1.8° from NGC 253.
beta 1,2,3 Tuc	BS	Tuc	4.3/4.5//5.1	27", 549"	Striking trio (B9/A2/A0).
47 Tuc - C106	GC	Tuc	4	30' - Class 3	Massive. 2nd only to ome Cen.
NGC 362 - C104	GC	Tuc	6.6	13' - Class 3	Just north of the SMC.
SMC (NGC 292)	GX	Tuc	2.3	5 x 3 degrees	Small Magellanic Cloud.
Brocchi's Cluster	Aster	Vul	3.6 - bino target	1.5 degs	10 stars form the Coathanger.
M27	PN	Vul	7.4 (star 13.5)	8' x 5.7'	Dumbbell Nebula.

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NOVEMBER	Observing targets by constellation.				
Object	Type	Con	Vmag	Size, Sep, Class	Comments
gam And - Almach	BS	And	2.2/5	9.8"	Orange/blue pair (K3/B8).
pi Andromedae	BS	And	4.3/7.1	36"	Contrasting pair (B5/A6).
59 Andromedae	BS	And	6.1/6.1	16.6"	Similar stars (B9/A1).
AQ Andromedae	CS	And	7.5 - 9.5	C5,4	B-V = 3.5. Between pi & sigma.
M31/M32/M110	GX	And	3.4, 7.9, 8	190' x 60'	Andromeda Galaxy + Satellites.
NGC 752 - C28	OC	And	5.7	50'	Large > 60 stars.
NGC 7662 - C22	PN	And	8.3 (star 12 - 16)	30"	Blue Snowball. Blue-green.
gamma Arietis	BS	Ari	4.5/4.6	7.4"	Striking white pair (A2/B9).
epsilon Arietis	BS	Ari	5.2/5.5	1.3"	Tight white twins (A2/A2).
lambda Arietis	BS	Ari	4.8/6.7	37"	Contrasting pair (F0/G0).
gamma Ceti	BS	Cet	3.5/6.2	2.3"	Contrasting/tight (A3/F3).
37 Ceti	BS	Cet	5.2/7.9	49"	Contrasting pair (F5/K1).
omi Cet - Mira	VS	Cet	2 to 10	M5.5 - M9	Variable. Pulsating red giant.
M77 - Cetus A	GX	Cet	9	7' x 6'	Bright core ~ 0.9° from del Cet.
NGC 246 - C56	PN	Cet	10.4 (star = 12)	4' x 3.5'	Skull Nebula.
alpha Fornacis	BS	For	4/7.2	5.4"	Contrasting pair (F6/G7).
omega Fornacis	BS	For	5/7.7	11"	Contrasting pair (B9/A3).
NGC 1097 + 1097A	GX	For	9.4, 13.1	9.3' x 6.3'	Barred spiral + satellite galaxy.
NGC 1316 + 1317	GX	For	8.5, 11 (6' apart)	12' x 8.5'	Fornax A. Giant S0 peculiar.
NGC 1365	GX	For	9.6	11' x 6'	Beaut Z-like barred spiral.
NGC 1398	GX	For	9.8	7' x 5'	Bright core - diffuse disk.
NGC 1399/1404	GX	For	9.5/9.9	7' x 6.5', 3.3' x 3'	Ellipticals only 10' apart.
NGC 1360	PN	For	9.6 (star mag 11)	8' x 5'	Similar in size to Dumbbell PN
HJ 3568 (BN Hyi)	BS	Hyi	5.7/7.7	15.4'	Contrasting pair.
zeta Phoenicis	BS	Phe	4/8.2	6.8"	Contrasting pair (B6/F7).
psi1 Piscium	BS	Psc	5.3/5.5	30"	Similar white stars (A1/A0).
65 Piscium	BS	Psc	6.3/6.3	4.2"	Yellowish twins (F5/F4).
TX (19) Piscium	CS	Psc	4.5 - 6.4	C7,2	Bright. B-V = 2.7.
M74	GX	Psc	9.1	10' x 9.3'	Face-on spiral. Very diffuse.
epsilon Sculptoris	BS	Scl	5.3/8.5	5.1"	Contrasting pair (F1/K1).
kap 1 Sculptoris	BS	Scl	6.1/6.2	1.5"	Tight pair. 32' to orange kap 2.
AL Sculptoris	BS	Scl	6.1/6.8	134"	Binocular double (B6/B8).
NGC 55 - C72	GX	Scl	7.8	30' x 6'	Similar visual size to NGC 253.
NGC 134	GX	Scl	10.3	8.3' x 2'	Edge-on. Just 34' from eta Scl.
NGC 253 - C65	GX	Scl	7.1	28' x 7'	Can be seen with binoculars.
NGC 288	GC	Scl	8.1	14' - Class 10	1.8° from NGC 253.
NGC 300 - C70	GX	Scl	8.2	20' x 13'	Very low surface brightness.
NGC 7793	GX	Scl	9.2	10' x 6'	52' from wide double AL Scl.
iota (6) Trianguli	BS	Tri	5.3/6.7	3.9"	Striking pair (G5/F5).
M33	GX	Tri	5.7	62' x 36'	Triangulum Galaxy. Diffuse.
beta 1,2,3 Tuc	BS	Tuc	4.3/4.5//5.1	27", 549"	Striking trio (B9/A2/A0).
kappa Tucanae	BS	Tuc	4.9/7.6	4.6"	Contrasting pair (F6/K1).
47 Tuc - C106	GC	Tuc	4	30' - Class 3	Massive. 2nd only to ome Cen.
NGC 362 - C104	GC	Tuc	6.6	13' - Class 3	Just north of the SMC.
SMC (NGC 292)	GX	Tuc	2.3	5 x 3 degrees	Small Magellanic Cloud.

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DECEMBER	Observing targets by constellation.				
Object	Type	Con	Vmag	Size, Sep, Class	Comments
gamma Arietis	BS	Ari	4.5/4.6	7.4"	Striking white pair (A2/B9).
epsilon Arietis	BS	Ari	5.2/5.5	1.3"	Tight white twins (A2/A2).
lambda Arietis	BS	Ari	4.8/6.7	37"	Contrasting pair (F0/G0).
gamma Ceti	BS	Cet	3.5/6.2	2.3"	Contrasting/tight (A3/F3).
nu Ceti	BS	Cet	4.9/9	8.4"	Contrasting pair.
37 Ceti	BS	Cet	5.2/7.9	49"	Contrasting pair (F5/K1).
omi Cet – Mira	VS	Cet	2 to 10	M5.5 – M9	Variable. Pulsating red giant.
M77 – Cetus A	GX	Cet	9	7' x 6'	Bright core ~ 0.9° from del Cet.
NGC 246 – C56	PN	Cet	10.4 (star = 12)	4' x 3.5'	Skull Nebula.
theta Eri – Acamar	BS	Eri	3.2/4.1	8.6"	Striking white pair (A3/A1).
omicron 2 Eridani	MS	Eri	4.5//10/11.5	82", 8.2"	B=white dwarf, C=red dwarf.
p Eridani – DUN 5	BS	Eri	5.8/5.9	11.4"	Twins (K2/K2). 1° to Achernar
f Eridani – DUN 16	BS	Eri	4.7/5.3	8.4"	Alike (B9/A1) ~1.2° from h Eri
39 Eridani	BS	Eri	5/8.5	6.3"	Contrasting pair (K2/G2).
NGC 1084	GX	Eri	11.1	3' x 2'	About 3° from eta Eridani.
NGC 1232	GX	Eri	10.1	7' x 6'	Bright core, faint disk.
NGC 1291	GX	Eri	8/6	10' x 8'	Bright core, faint disk.
NGC 1300	GX	Eri	10.5	6' x 4'	Diffuse. 2.4° from tau 4 Eri.
NGC 1535	PN	Eri	9.4	45"	Cleopatra's Eye. Blue-green.
alpha Fornacis	BS	For	4/7.2	5.4"	Contrasting pair (F6/G7).
omega Fornacis	BS	For	5/7.7	11"	Contrasting pair (B9/A3).
NGC 1097 +1097A	GX	For	9.4, 13.1	9.3' x 6.3'	Barred spiral + satellite galaxy.
NGC 1316 + 1317	GX	For	8.5, 11 (6' apart)	12' x 8.5'	Fornax A. Giant S0 peculiar.
NGC 1365	GX	For	9.6	11'x6'	Beaut Z-like barred spiral.
NGC 1398	GX	For	9.8	7' x 5'	Bright core – diffuse disk.
NGC 1399/1404	GX	For	9.5/9.9	7' x 6.5', 3.3'x 3'	Ellipticals only 10' apart.
NGC 1360	PN	For	9.6 (star mag 11)	8' x 5'	Similar in size to Dumbbell PN
HJ 3568 (BN Hyi)	BS	Hyi	5.7/7.7	15.4'	Contrasting pair.
beta Persei – Algol	BS	Per	2.1 – 3.4	Period 2.9 days	Eclipsing binary.
zeta Persei	BS	Per	2.9/9.2	12.9"	Top star. Like Rigel.
M34	OC	Per	5.2	35'	Low altitude ~ 100 stars.
NGC 1023	GX	Per	9.4	8' x 3'	Elongated (S0) galaxy.
zeta 2,1 Reticuli	BS	Ret	5.3/5.6	309" - bino pair	Sun-like stars (G1/G2) at 39 ly.
theta Reticuli	BS	Ret	6.1/7.7	3.9"	Similar pair 52' from alp Ret.
NGC 1313	GX	Ret	9.2	9' x 7'	Topsy Turvy Galaxy.
NGC 1559	GX	Ret	10.7	4' x 2'	About 28' from alpha & theta.
theta 2,1 Tauri	DS	Tau	3.4/3.8	338" naked-eye	A7/G9. Near centre of Hyades.
tau Tauri	BS	Tau	4.3/7	64"	Contrasting mag. (B3/A2).
phi Tauri	BS	Tau	5/7.5	51"	Contrasting (K1/F8).
M1	NB	Tau	8.4	6' x 4'	Crab Neb. Supernova remnant.
M45 - Pleiades	OC	Tau	1.5 (naked eye)	120'	Seven sisters. Naked eye.
Hyades – C41	OC	Tau	0.5 (naked eye)	330'	Large OC around theta 2,1 Tau.
iota (6) Trianguli	BS	Tri	5.3/6.7	3.9"	Striking pair (G5/F5).
15 Trianguli	BS	Tri	5.4/6.8	142"	Colour contrast (M3/A5).
M33	GX	Tri	5.7	62' x 36'	Triangulum Galaxy. Diffuse.

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