

AHSP Telescope Observing Award



Compiled by Dan L. Ward

- To qualify for the TOA pin, you must see 15 of the following 20 telescope targets. Check off each as you spot them.

Seen	#	Object	Const.	Type*	RA	Dec	Mag	Size	Nickname
	1.	M13	Her	GC	16 41.7	+36 28	5.9	16'	Great Hercules Globular
	2.	M57	Lyr	PN	18 53.6	+33 02	9.7	86"x62"	Ring Nebula
	3.	NGC 6819	Cyg	OC	19 41.3	+40 11	7.3	5'	Fox Head Cluster
	4.	M27	Vul	PN	19 59.6	+22 43	8.1	8'x6'	Dumbbell Nebula
	5.	NGC 7000	Cyg	BN	20 58.8	+44 20	-	120'x100'	North America Nebula
	6.	NGC 7009	Aqr	PN	21 04.2	-11 22	8.3	28"x23"	Saturn Nebula
	7.	M15	Peg	GC	21 30.0	+12 10	7.5	12'	Great Pegasus Cluster
	8.	M2	Aqr	GC	21 33.5	-00 49	6.3	16'	NGC 7089
	9.	M39	Cyg	OC	21 32.2	+48 26	4.6	32'	NGC 7092
	10.	M30	Cap	GC	21 40.4	-23 11	8.4	11'x11'	NGC 7099
	11.	NGC 7331	Peg	Gx	22 37.1	+34 25	10.4	11'x4'	Caldwell 30
	12.	M31	And	Gx	00 42.8	+41 16	4.5	178'	Andromeda Galaxy
	13.	NGC 253	Scl	Gx	00 47.5	-25 18	7.1	25'x7'	Sculptor Galaxy
	14.	NGC 457	Cas	OC	01 19.1	+58 20	6.4	13'	Owl Cluster/ET Cluster
	15.	M74	Psc	Gx	01 36.7	+15 47	10.5	10'x9.5'	The Phantom
	16.	NGC 663	Cas	OC	01 46.0	+61 15	7.1	16'	Caldwell 10
	17.	NGC 752	And	OC	01 57.8	+37 41	5.7	50'	Caldwell 28
	18.	NGC 772	Ari	Gx	01 59.4	+19 00	11.5	8'x5'	Nautilus Galaxy
	19.	NGC 869/884	Per	OCx2	02 19.0	+57 09	5.3	30' & 30'	Double Cluster
	20.	NGC 891	And	Gx	02 22.6	+42 21	11.5	14'x13'	Silver Sliver Galaxy

*Type:

AS:	Asterism	Gx:	Galaxy	PN:	Planetary nebula
BN:	Bright nebula	GC:	Globular cluster	SNR:	Supernova remnant
DN:	Dark nebula	OC:	Open cluster		

This program is to recognize observations made with Telescopes **during** the 2018 Almost Heaven Star Party (AHSP). To receive this observing reward, observe at least 15 objects from this observing list during one or more evenings at AHSP. Some may be easy, but others can be very challenging. Check off which objects you observed on the prior page and provide the following additional information to Alan Goldberg or Dan Ward at AHSP or via email (agoldber3@yahoo.com) or (danlward51@gmail.com) no later September 30, 2018.

Observer's Details

First Name: _____ Last Name: _____

Email Address: _____

Telescope Optical System used: (102mm f/8, 6" f10, etc.): _____

Date(s) of Observation: _____

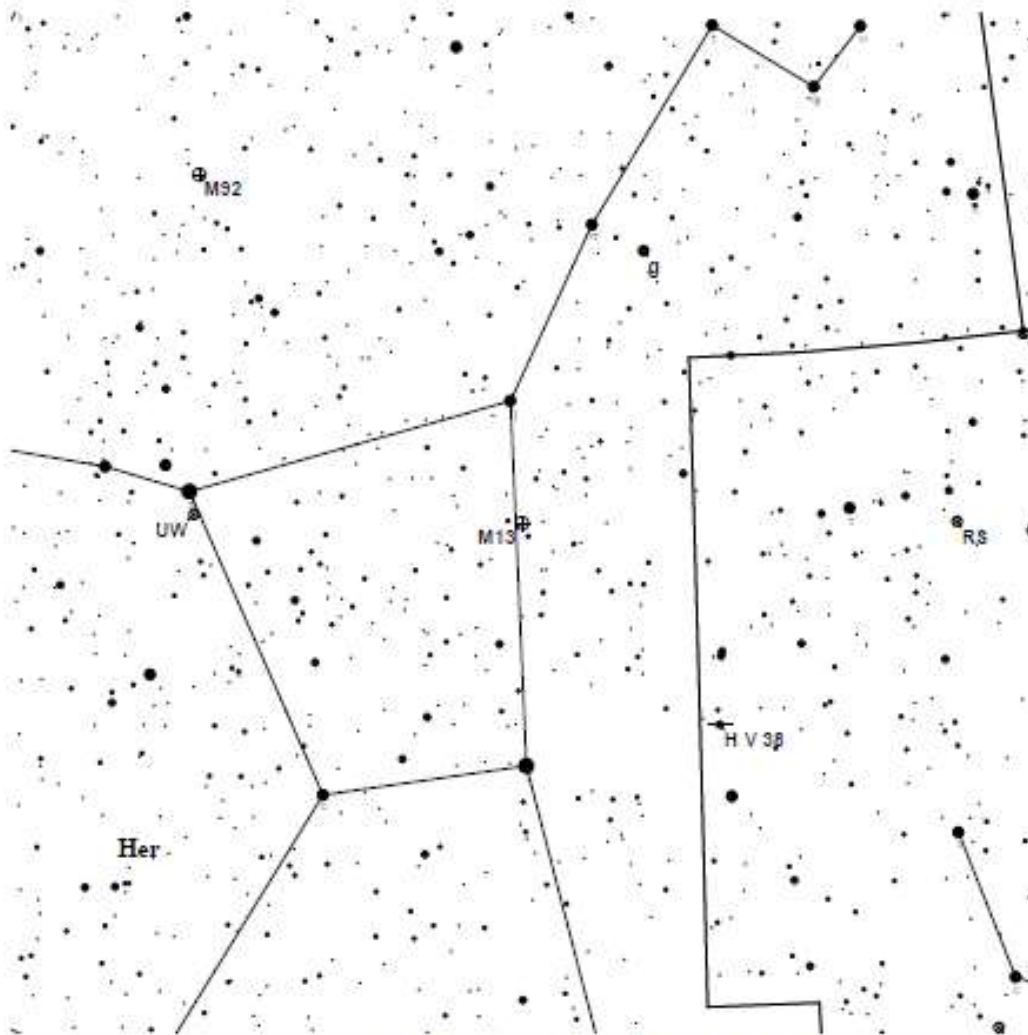
Member of the Northern Virginia Astronomy Club: Yes _____ No _____

How many Almost Heaven Star Parties have you attended, including this one? _____

What is your Astro Observing skill level: Novice _____ Intermediate _____ Advanced _____?

Note: The following charts were adapted by **Dan Ward** using Phil Harrington's *Touring the Universe Through Binoculars* atlas. The scale of the charts varies by object. The center of view, field of view (FOV), and limiting magnitude of each chart are shown in the chart legend.

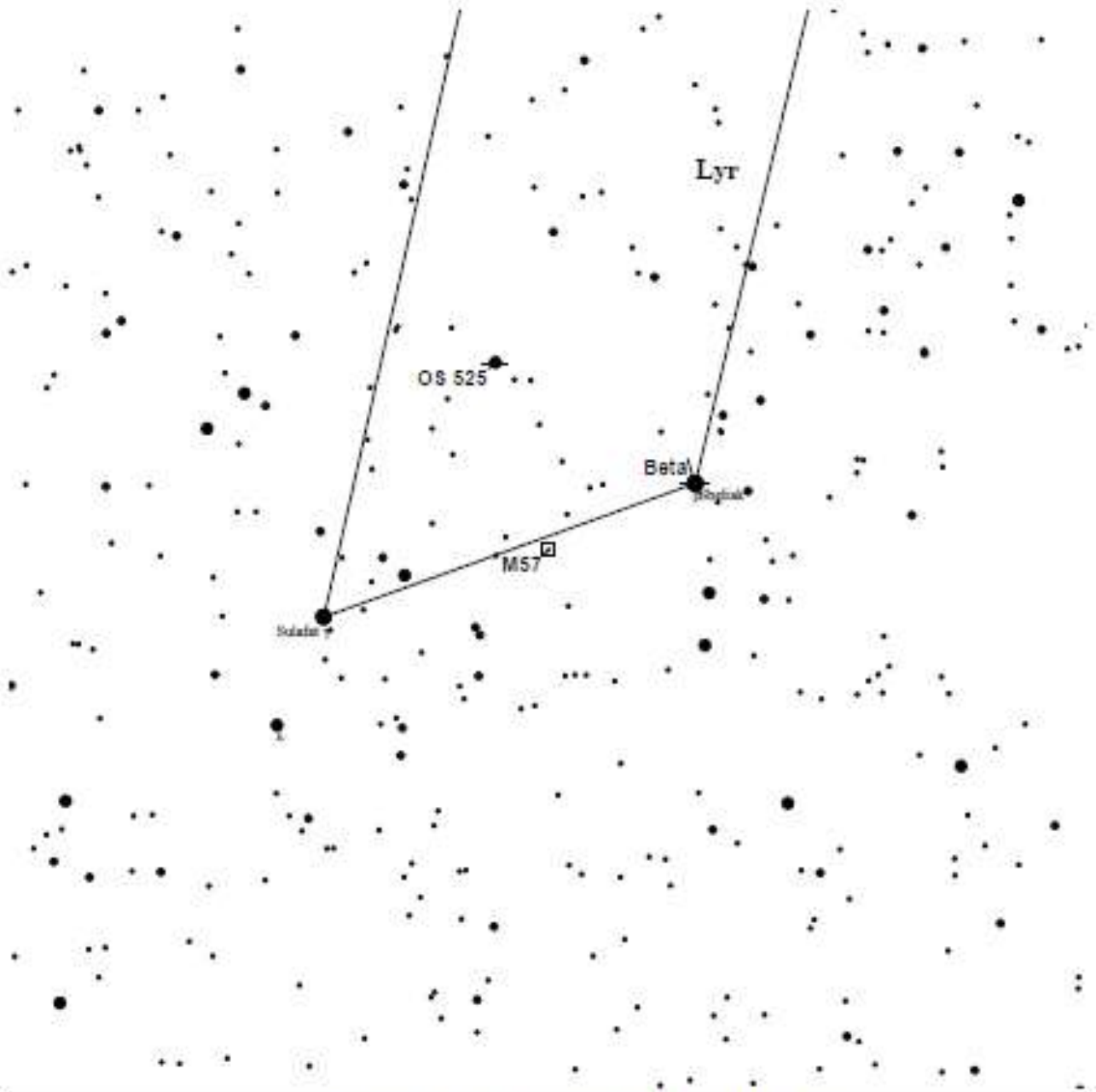
M13 (Great Hercules Globular)



Touring the Universe Through Binoculars Atlas
RA: 16h 41m, Dec: 36d 28m, FOV: 19d, Mag: 7.5

- | | | | |
|-------------------------|--------------------|-----------|------------|
| ● ≤ 1.2 | ☉ Galaxy | ☿ Mercury | ♃ Pluto |
| ● 1.2 - 2.4 | ○ Open Cluster | ♀ Venus | ☼ Sun |
| ● 2.4 - 3.6 | ⊕ Globular Cluster | ♂ Mars | ☾ Moon |
| ● 3.6 - 4.9 | □ Diffuse Nebula | ♃ Jupiter | ♁ Asteroid |
| ● 4.9 - 6.1 | ◻ Planetary Nebula | ♄ Saturn | ☄ Comet |
| ● 6.1 - 7.3 | ⊙ Variable Star | ♅ Uranus | ⊛ Unknown |
| ⋯ > 7.3 | ↔ Double Star | ♆ Neptune | |

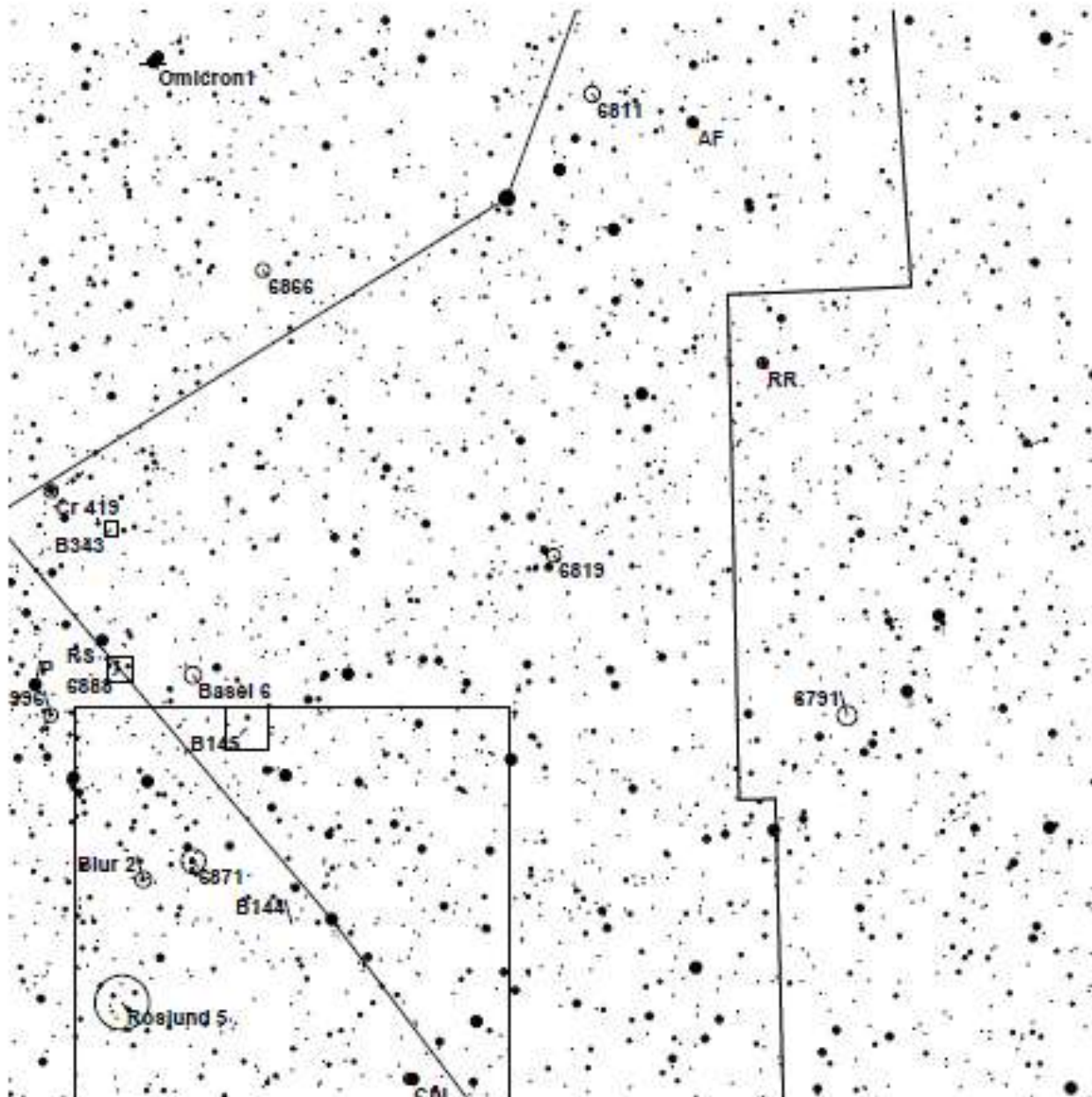
M57 (Ring Nebula)



Touring the Universe Through Binoculars Atlas
RA: 18h 53m, Dec: 33d 1m, FOV: 5d, Mag: 11

● = 1.6	☉ Galaxy	♿ Mercury	♃ Pluto
● 1.6 - 3.1	○ Open Cluster	♀ Venus	☼ Sun
● 3.1 - 4.7	⊕ Globular Cluster	♂ Mars	☾ Moon
● 4.7 - 6.3	□ Diffuse Nebula	♃ Jupiter	♁ Asteroid
● 6.3 - 7.9	◻ Planetary Nebula	♄ Saturn	☄ Comet
● 7.9 - 9.4	⊙ Variable Star	♅ Uranus	⊛ Unknown
● > 9.4	↔ Double Star	♆ Neptune	

NGC 6819 (Fox Head Cluster)



Touring the Universe Through Binoculars Atlas
RA: 19h 41m, Dec: 40d 10m, FOV: 14d, Mag: 8.5

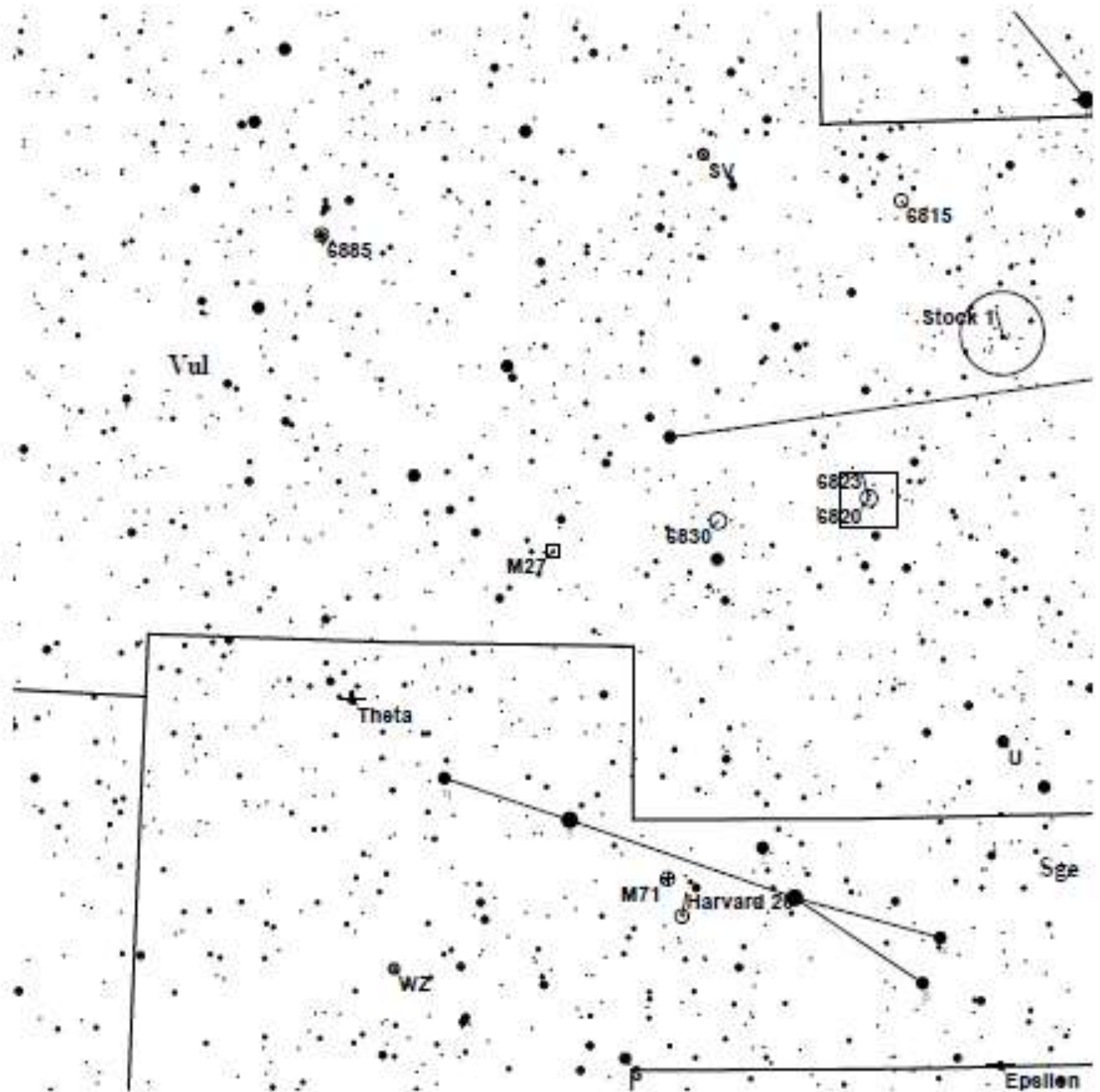
- ≤ 1.3
- 1.3 - 2.6
- 2.6 - 3.9
- 3.9 - 5.1
- 5.1 - 6.4
- 6.4 - 7.7
- > 7.7

- Galaxy
- Open Cluster
- ⊕ Globular Cluster
- Diffuse Nebula
- ⊠ Planetary Nebula
- ⊙ Variable Star
- ↔ Double Star

- ♿ Mercury
- ♀ Venus
- ♂ Mars
- ♃ Jupiter
- ♄ Saturn
- ♅ Uranus
- ♆ Neptune

- ♇ Pluto
- ☼ Sun
- ☾ Moon
- ♁ Asteroid
- ☄ Comet
- ⊙ Unknown

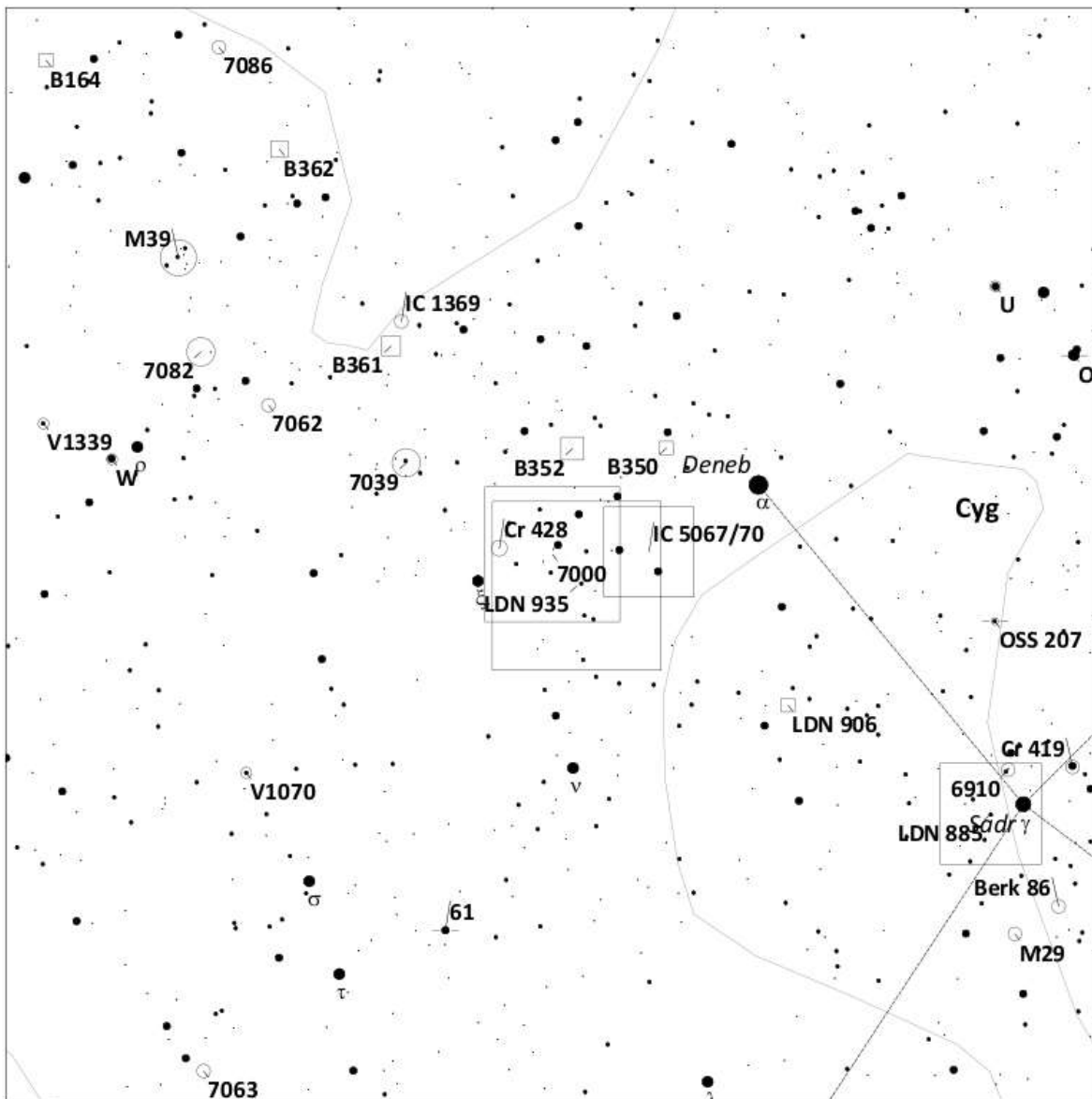
M27 (Dumbbell Nebula)



Touring the Universe Through Binoculars Atlas
RA: 19h 59m, Dec: 22d 42m, FOV: 12d, Mag: 8.5

<ul style="list-style-type: none"> ● ≤ 1.3 ● 1.3 - 2.6 ● 2.6 - 3.9 ● 3.9 - 5.1 ● 5.1 - 6.4 ● 6.4 - 7.7 ● > 7.7 	<ul style="list-style-type: none"> ☐ Galaxy ○ Open Cluster ⊕ Globular Cluster □ Diffuse Nebula ◻ Planetary Nebula ⊙ Variable Star ↔ Double Star 	<ul style="list-style-type: none"> ♿ Mercury ♀ Venus ♂ Mars ♃ Jupiter ♄ Saturn ♅ Uranus ♆ Neptune
		<ul style="list-style-type: none"> ♇ Pluto ☼ Sun ☾ Moon ♁ Asteroid ☄ Comet ⊛ Unknown

NGC 7000 (North American Nebula)



Touring the Universe Through Binoculars Atlas

RA: 20h 58m, Dec: 44d 20m, FOV: 15d, Mag: 8

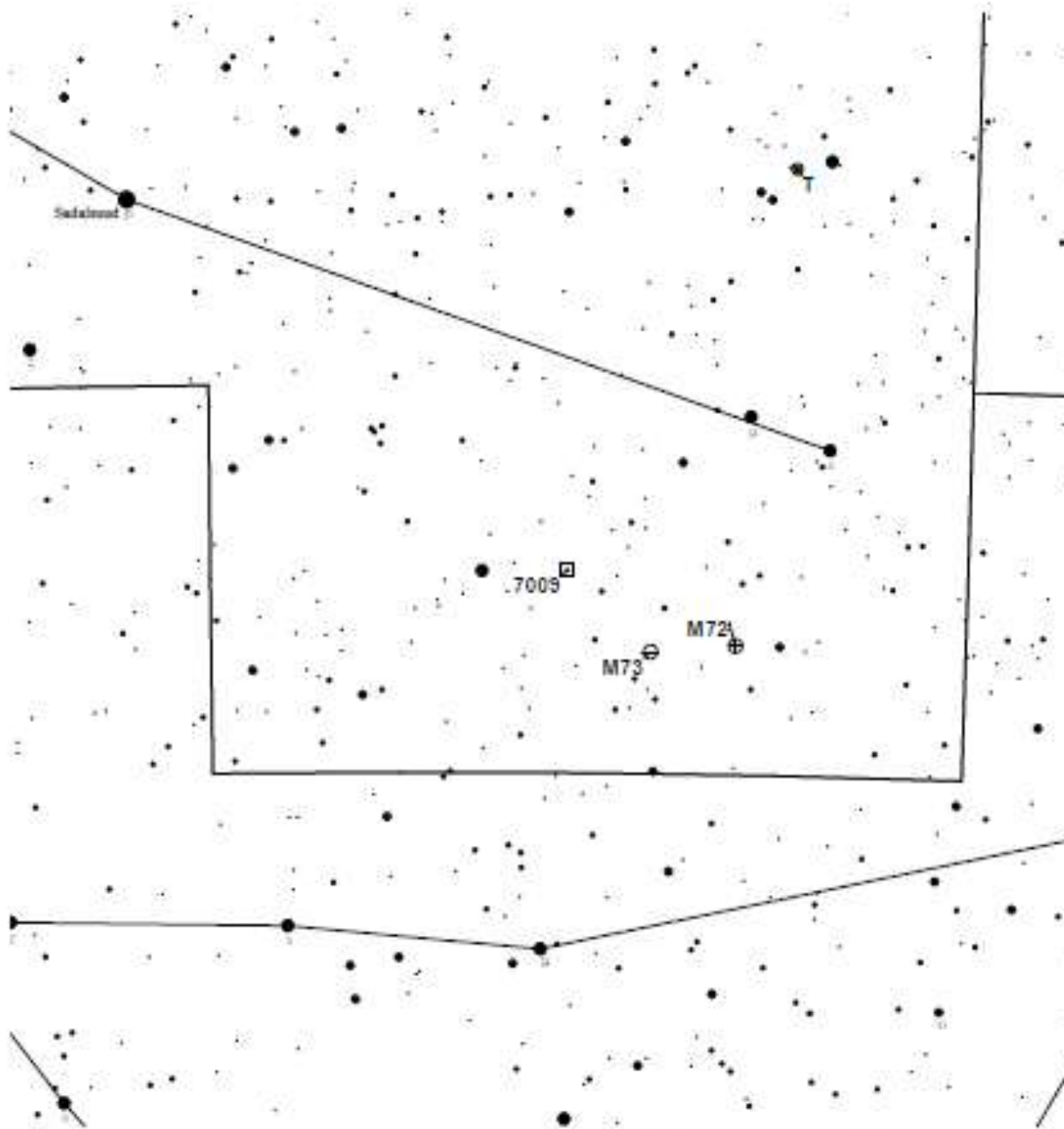
- ≤ 1.1
- 1.1 - 2.3
- 2.3 - 3.4
- 3.4 - 4.6
- 4.6 - 5.7
- 5.7 - 6.9
- > 6.9

- Galaxy
- Open Cluster
- ⊕ Globular Cluster
- Diffuse Nebula
- Planetary Nebula
- ⊙ Variable Star
- Double Star

- ♿ Mercury
- ♀ Venus
- ♂ Mars
- ♃ Jupiter
- ♄ Saturn
- ♅ Uranus
- ♆ Neptune

- ♃ Pluto
- ☉ Sun
- ☾ Moon
- ♁ Asteroid
- ☄ Comet
- Unknown

NGC 7009 (Saturn Nebula)



Touring the Universe Through Binoculars Atlas

RA: 21h 4m, Dec: -11d 22m, FOV: 16d, Mag: 8.5

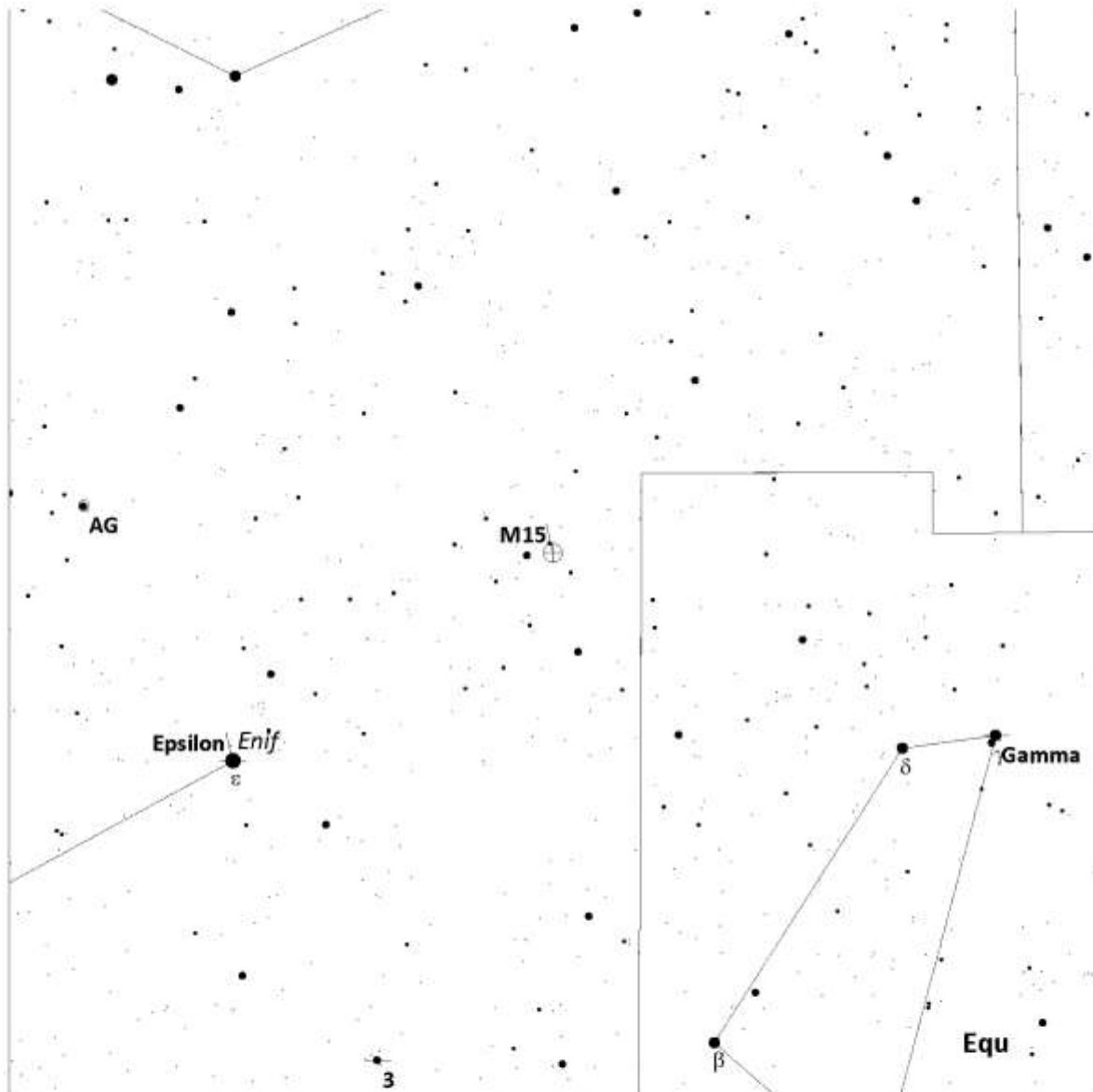
- ≤ 1.2
- 1.2 - 2.4
- 2.4 - 3.6
- 3.6 - 4.9
- 4.9 - 6.1
- 6.1 - 7.3
- > 7.3

- Galaxy
- Open Cluster
- ⊕ Globular Cluster
- Diffuse Nebula
- Planetary Nebula
- ⊙ Variable Star
- ↔ Double Star

- ♿ Mercury
- ♃ Venus
- ♂ Mars
- ♃ Jupiter
- ♄ Saturn
- ♅ Uranus
- ♆ Neptune

- ♃ Pluto
- ☼ Sun
- ☾ Moon
- ♁ Asteroid
- ☄ Comet
- ⊙ Unknown

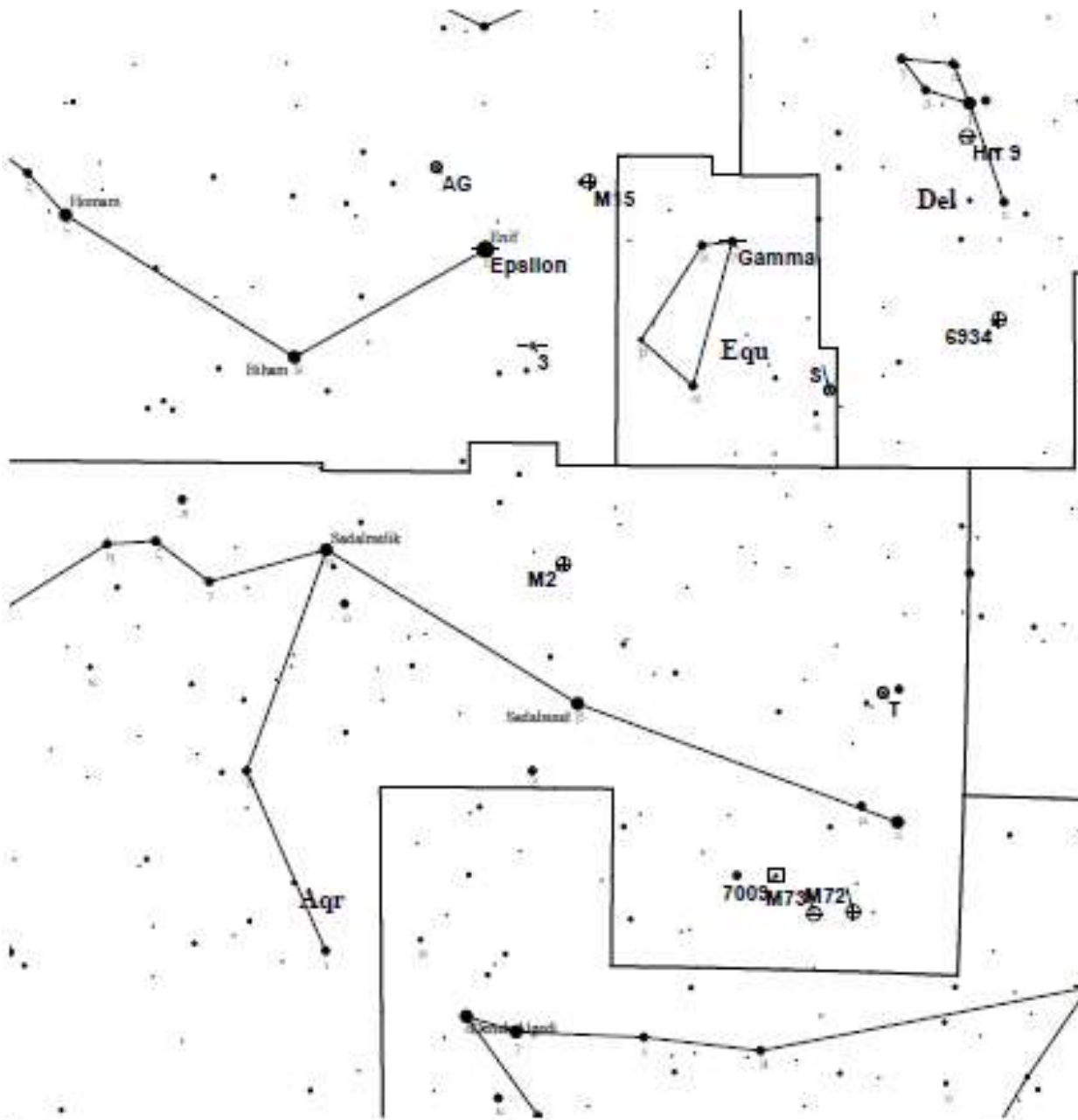
M15 (Great Pegasus Cluster)



Touring the Universe Through Binoculars Atlas
RA: 21h 30m, Dec: 12d 10m, FOV: 11d, Mag: 8.5

- | | | | |
|-------------|--------------------|-----------|------------|
| ● ≤ 1.3 | ☉ Galaxy | ☿ Mercury | ♇ Pluto |
| ● 1.3 - 2.6 | ○ Open Cluster | ♀ Venus | ☼ Sun |
| ● 2.6 - 3.9 | ⊕ Globular Cluster | ♂ Mars | ☾ Moon |
| ● 3.9 - 5.1 | ☄ Diffuse Nebula | ♃ Jupiter | ♁ Asteroid |
| ● 5.1 - 6.4 | ☁ Planetary Nebula | ♄ Saturn | ☄ Comet |
| ● 6.4 - 7.7 | ⊛ Variable Star | ♅ Uranus | ⊛ Unknown |
| ● > 7.7 | ♁ Double Star | ♆ Neptune | |

M2 (NGC 7089)



Touring the Universe Through Binoculars Atlas
RA: 21h 33m, Dec: -0d 48m, FOV: 35d, Mag: 5.5

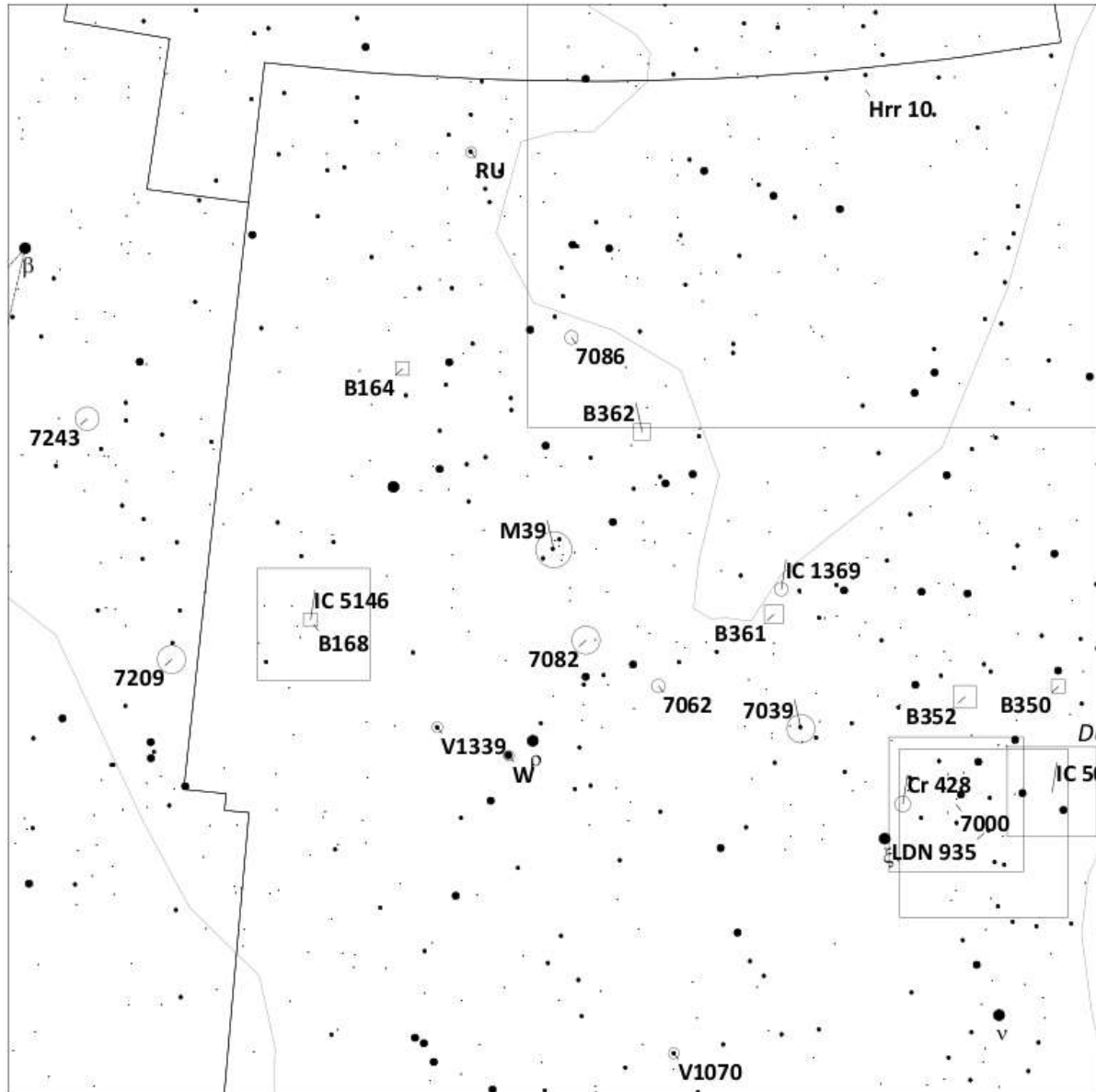
- ≤ 0.9
- 0.9 - 1.9
- 1.9 - 2.8
- 2.8 - 3.7
- 3.7 - 4.6
- 4.6 - 5.6
- > 5.6

- Galaxy
- Open Cluster
- ⊕ Globular Cluster
- Diffuse Nebula
- Planetary Nebula
- ⊙ Variable Star
- ↔ Double Star

- ♿ Mercury
- ♀ Venus
- ♂ Mars
- ♃ Jupiter
- ♄ Saturn
- ♅ Uranus
- ♆ Neptune

- ♇ Pluto
- ☼ Sun
- ☾ Moon
- ♁ Asteroid
- ☄ Comet
- ⊙ Unknown

M39 (NGC 7092)



Touring the Universe Through Binoculars Atlas
RA: 21h 32m, Dec: 48d 25m, FOV: 15d, Mag: 8

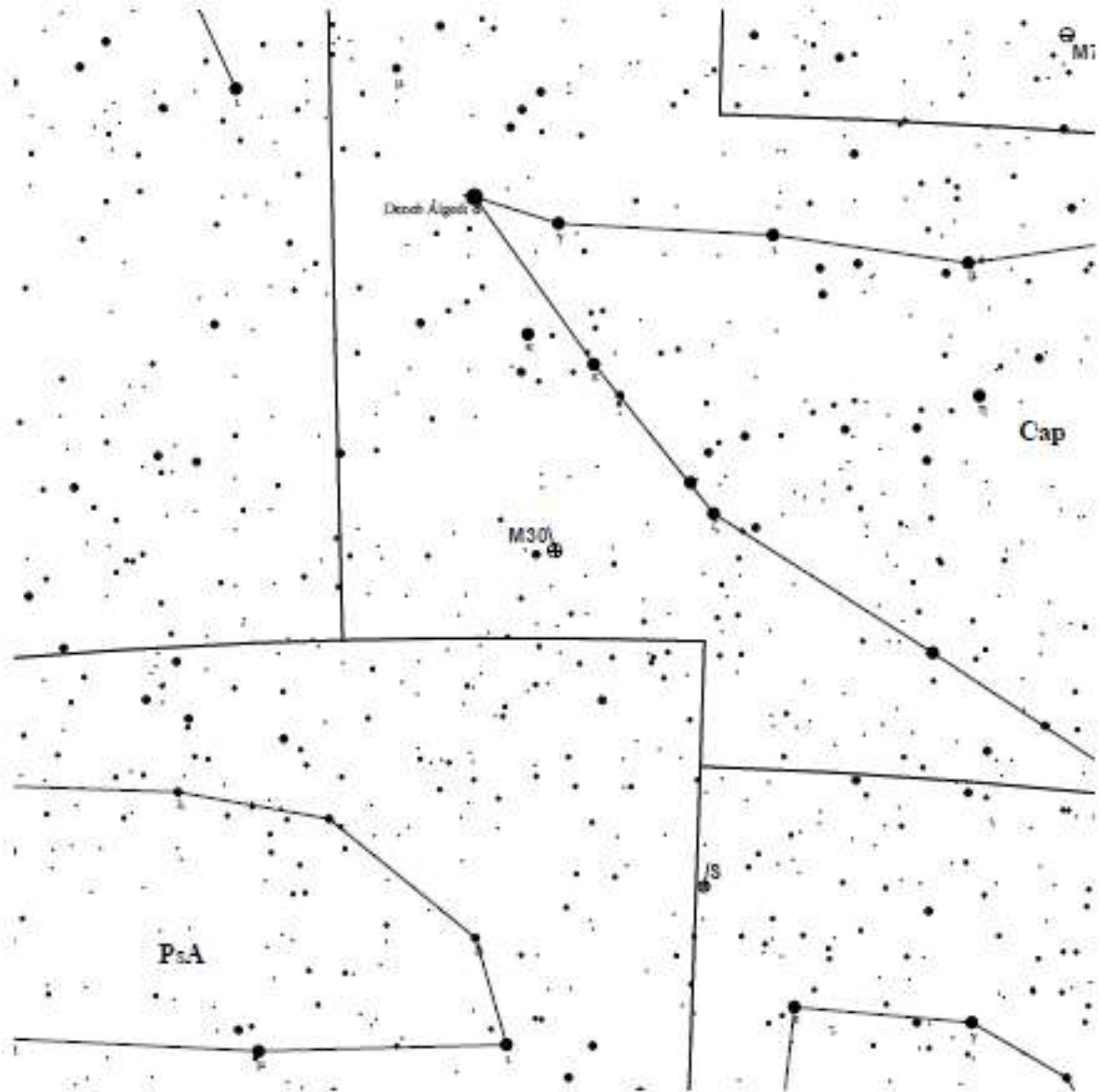
- ≤ 1.1
- 1.1 - 2.3
- 2.3 - 3.4
- 3.4 - 4.6
- 4.6 - 5.7
- 5.7 - 6.9
- > 6.9

- Galaxy
- Open Cluster
- ⊕ Globular Cluster
- Diffuse Nebula
- Planetary Nebula
- ⊙ Variable Star
- ⊖ Double Star

- ♿ Mercury
- ♀ Venus
- ♂ Mars
- ♃ Jupiter
- ♄ Saturn
- ♅ Uranus
- ♆ Neptune

- ♇ Pluto
- ☉ Sun
- ☾ Moon
- ♁ Asteroid
- ☄ Comet
- ⊛ Unknown

M 30 (NGC 7099)



Touring the Universe Through Binoculars Atlas
RA: 21h 40m, Dec: -23d 11m, FOV: 20d, Mag: 7.5

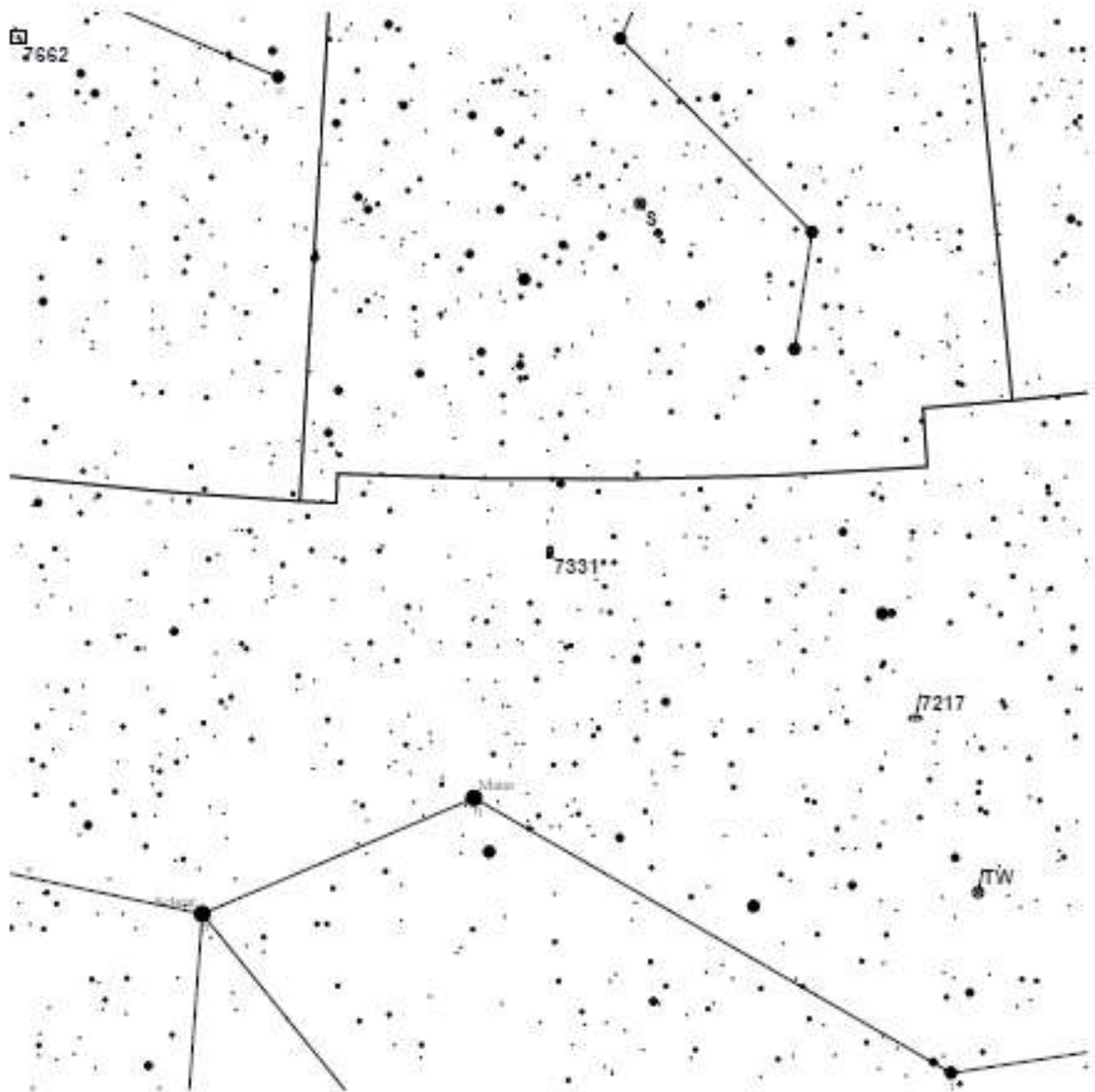
- ≤ 1.1
- 1.2 - 2.4
- 2.4 - 3.6
- 3.6 - 4.9
- + 4.9 - 6.1
- + 6.1 - 7.3
- > 7.3

- ☉ Galaxy
- Open Cluster
- ⊕ Globular Cluster
- Diffuse Nebula
- ▣ Planetary Nebula
- ⊙ Variable Star
- ↔ Double Star

- ♿ Mercury
- ♀ Venus
- ♂ Mars
- ♃ Jupiter
- ♄ Saturn
- ♅ Uranus
- ♆ Neptune

- P Pluto
- ☼ Sun
- ☾ Moon
- ♁ Asteroid
- ☄ Comet
- ⊙ Unknown

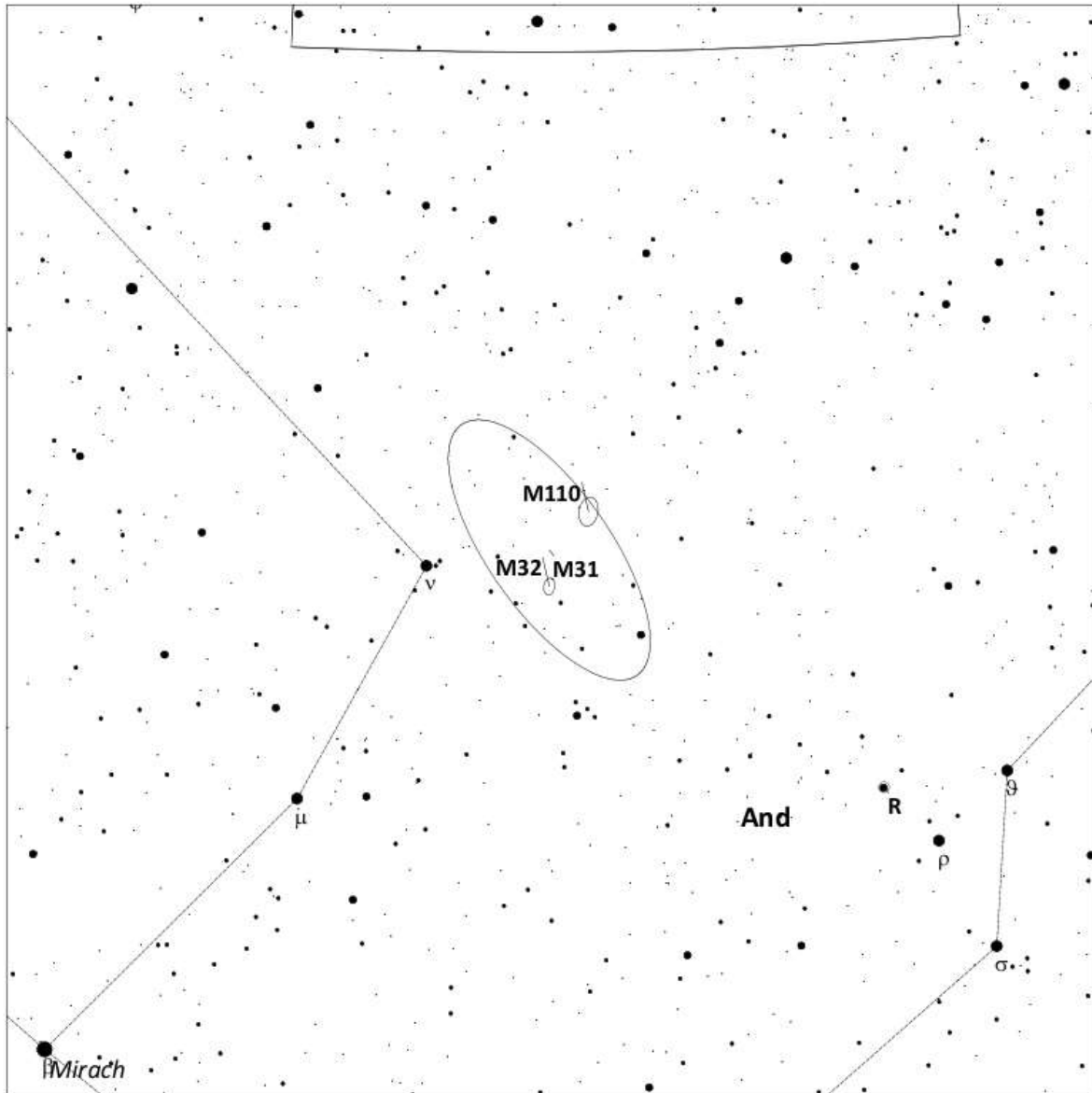
NGC 7331 (Caldwell 30)



Touring the Universe Through Binoculars Atlas
RA: 22h 37m, Dec: 34d 24m, FOV: 17d, Mag: 8.5

● ≤ 1.2	☉ Galaxy	♿ Mercury	♃ Pluto
● 1.2 - 2.4	○ Open Cluster	♀ Venus	☼ Sun
● 2.4 - 3.6	⊕ Globular Cluster	♁ Mars	☾ Moon
● 3.6 - 4.9	☐ Diffuse Nebula	♃ Jupiter	♁ Asteroid
● 4.9 - 6.1	☐ Planetary Nebula	♄ Saturn	☄ Comet
● 6.1 - 7.3	⊙ Variable Star	♅ Uranus	⊙ Unknown
● > 7.3	↔ Double Star	♆ Neptune	

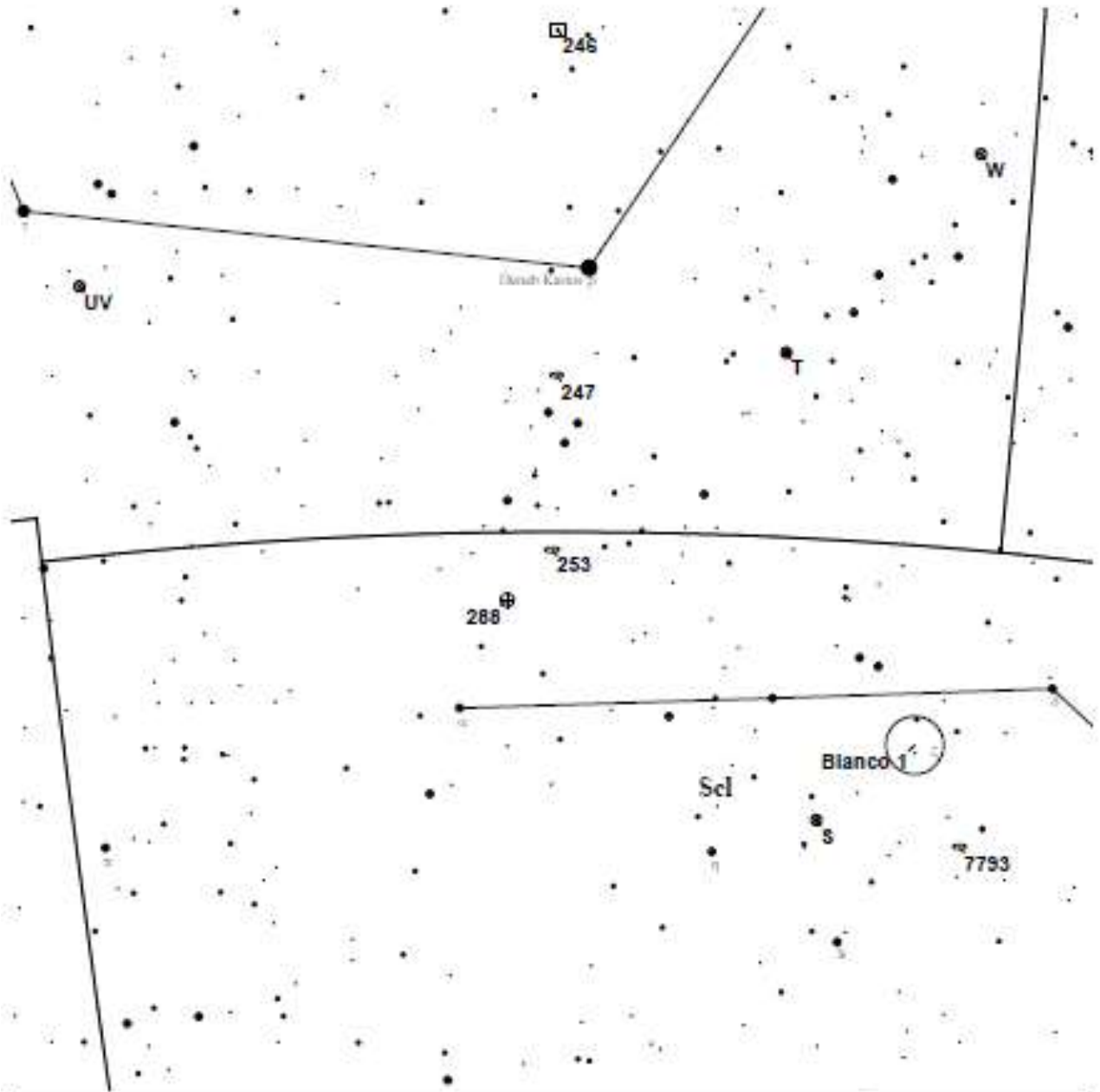
M31 (Andromeda Galaxy)



Touring the Universe Through Binoculars Atlas
RA: 0h 42m, Dec: 41d 16m, FOV: 11d, Mag: 8.5

- | | | | |
|-------------|--------------------|-----------|------------|
| ● ≤ 1.3 | ○ Galaxy | ♿ Mercury | ♇ Pluto |
| ● 1.3 - 2.6 | ○ Open Cluster | ♀ Venus | ☉ Sun |
| ● 2.6 - 3.9 | ⊕ Globular Cluster | ♂ Mars | ☾ Moon |
| ● 3.9 - 5.1 | □ Diffuse Nebula | ♃ Jupiter | ♁ Asteroid |
| ● 5.1 - 6.4 | □ Planetary Nebula | ♄ Saturn | ☄ Comet |
| ● 6.4 - 7.7 | ⊙ Variable Star | ♅ Uranus | ⊛ Unknown |
| ○ > 7.7 | ⊖ Double Star | ♆ Neptune | |

NGC 253 (Sculptor Galaxy)



Touring the Universe Through Binoculars Atlas
RA: 0h 47m, Dec: -25d 17m, FOV: 26d, Mag: 7.5

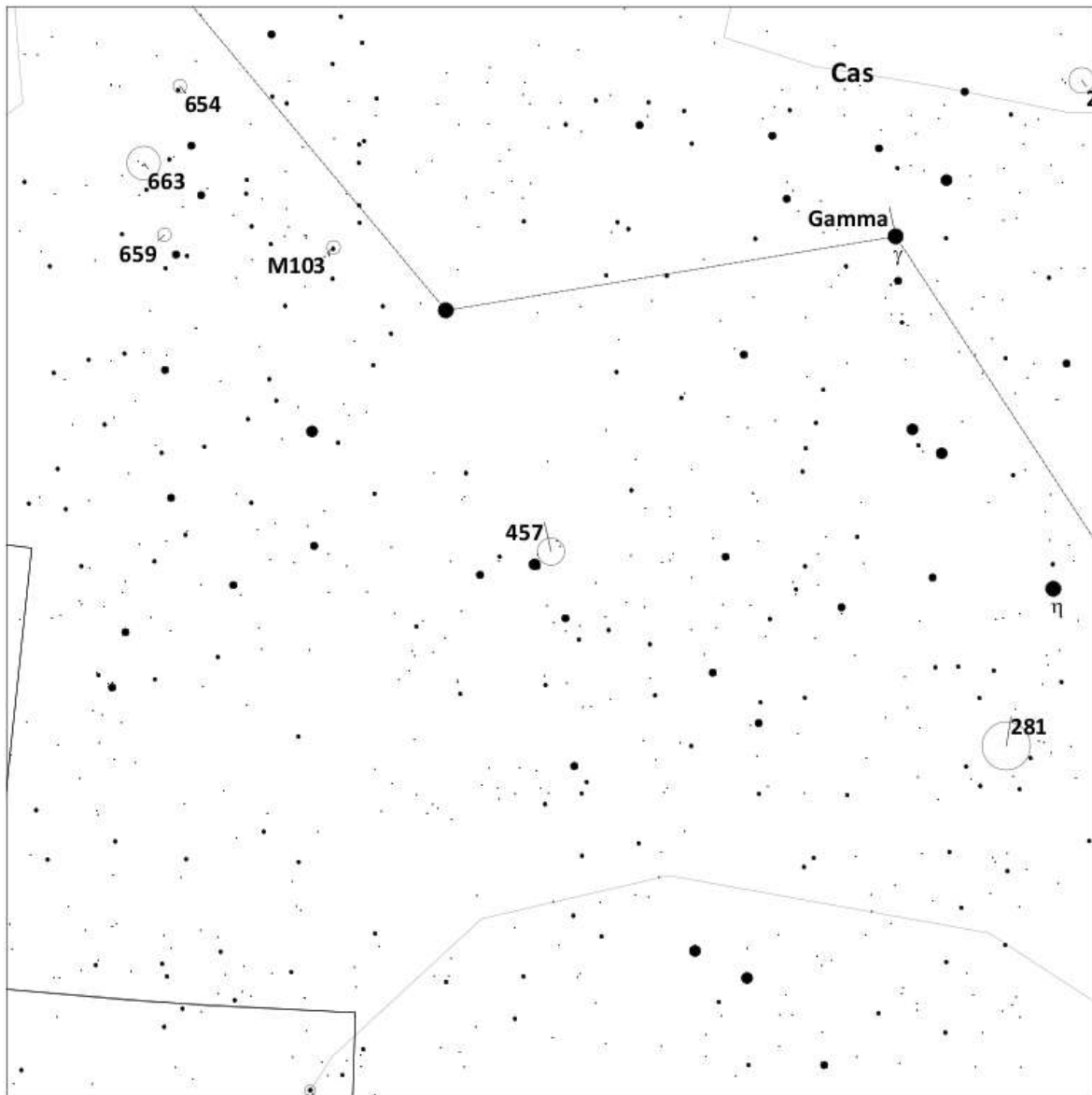
- ≤ 1.1
- 1.1 - 2.1
- 2.1 - 3.2
- 3.2 - 4.3
- 4.3 - 5.4
- 5.4 - 6.4
- > 6.4

- Galaxy
- Open Cluster
- ⊕ Globular Cluster
- Diffuse Nebula
- Planetary Nebula
- ⊙ Variable Star
- ↔ Double Star

- ♿ Mercury
- ♀ Venus
- ♂ Mars
- ♃ Jupiter
- ♄ Saturn
- ♅ Uranus
- ♆ Neptune

- ☾ Pluto
- ☼ Sun
- ☾ Moon
- ♁ Asteroid
- ☄ Comet
- ⊙ Unknown

NGC 457 (Owl Cluster)

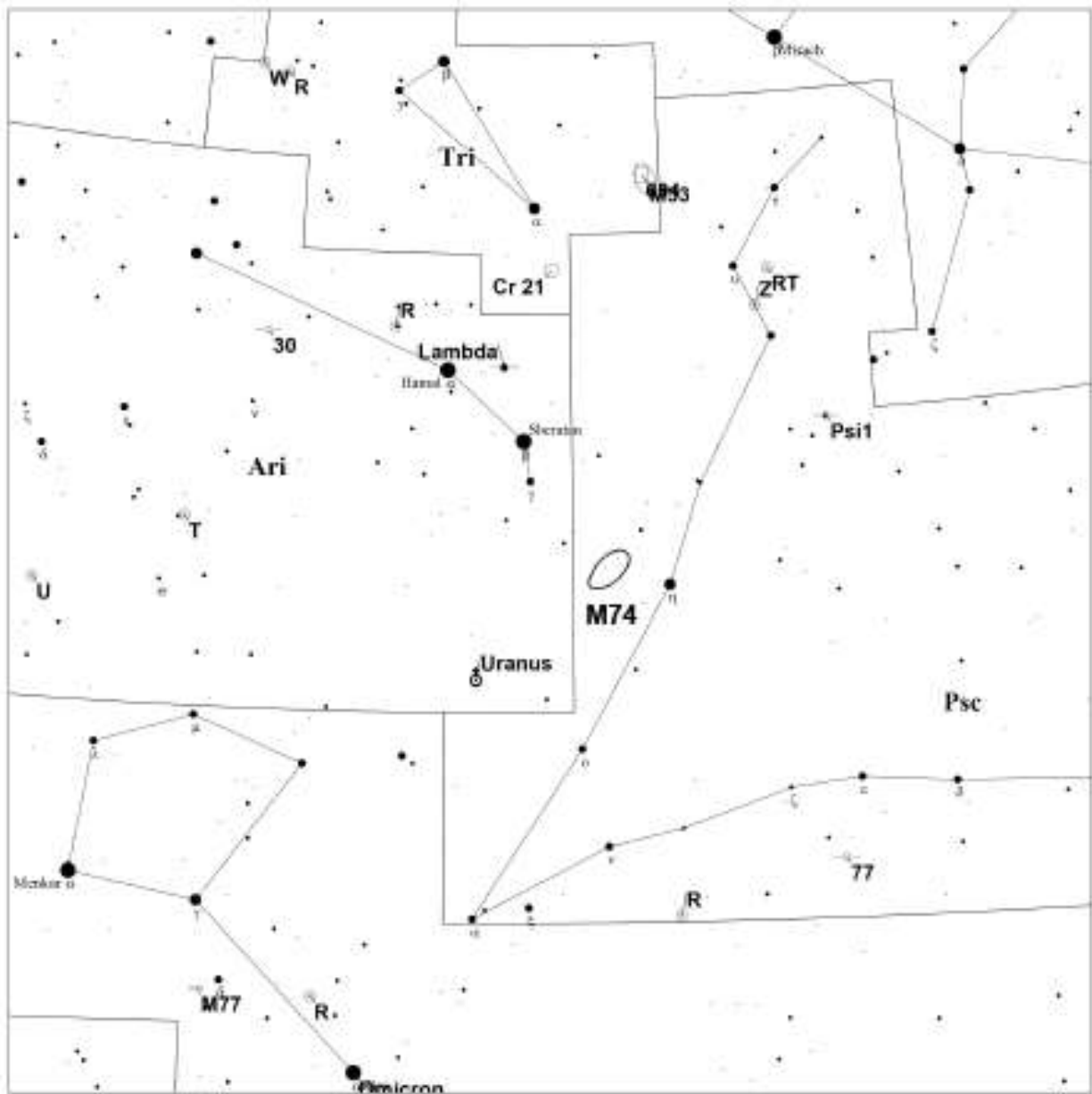


Touring the Universe Through Binoculars Atlas

RA: 1h 19m, Dec: 58d 20m, FOV: 8d, Mag: 9

- | | | | |
|-------------|--------------------|-----------|------------|
| ● ≤ 1.3 | ○ Galaxy | ♿ Mercury | ♇ Pluto |
| ● 1.3 - 2.6 | ○ Open Cluster | ♀ Venus | ☉ Sun |
| ● 2.6 - 3.9 | ⊕ Globular Cluster | ♂ Mars | ☾ Moon |
| ● 3.9 - 5.1 | ⊞ Diffuse Nebula | ♃ Jupiter | ♁ Asteroid |
| ● 5.1 - 6.4 | ⊠ Planetary Nebula | ♄ Saturn | ☄ Comet |
| ● 6.4 - 7.7 | ⊙ Variable Star | ♅ Uranus | ⊛ Unknown |
| ○ > 7.7 | ⊖ Double Star | ♆ Neptune | |

M74 (The Phantom Galaxy)



Touring the Universe Through Binoculars Atlas
RA: 1h 50m, Dec: 16d 39m, FOV: 38d, Mag: 5.5

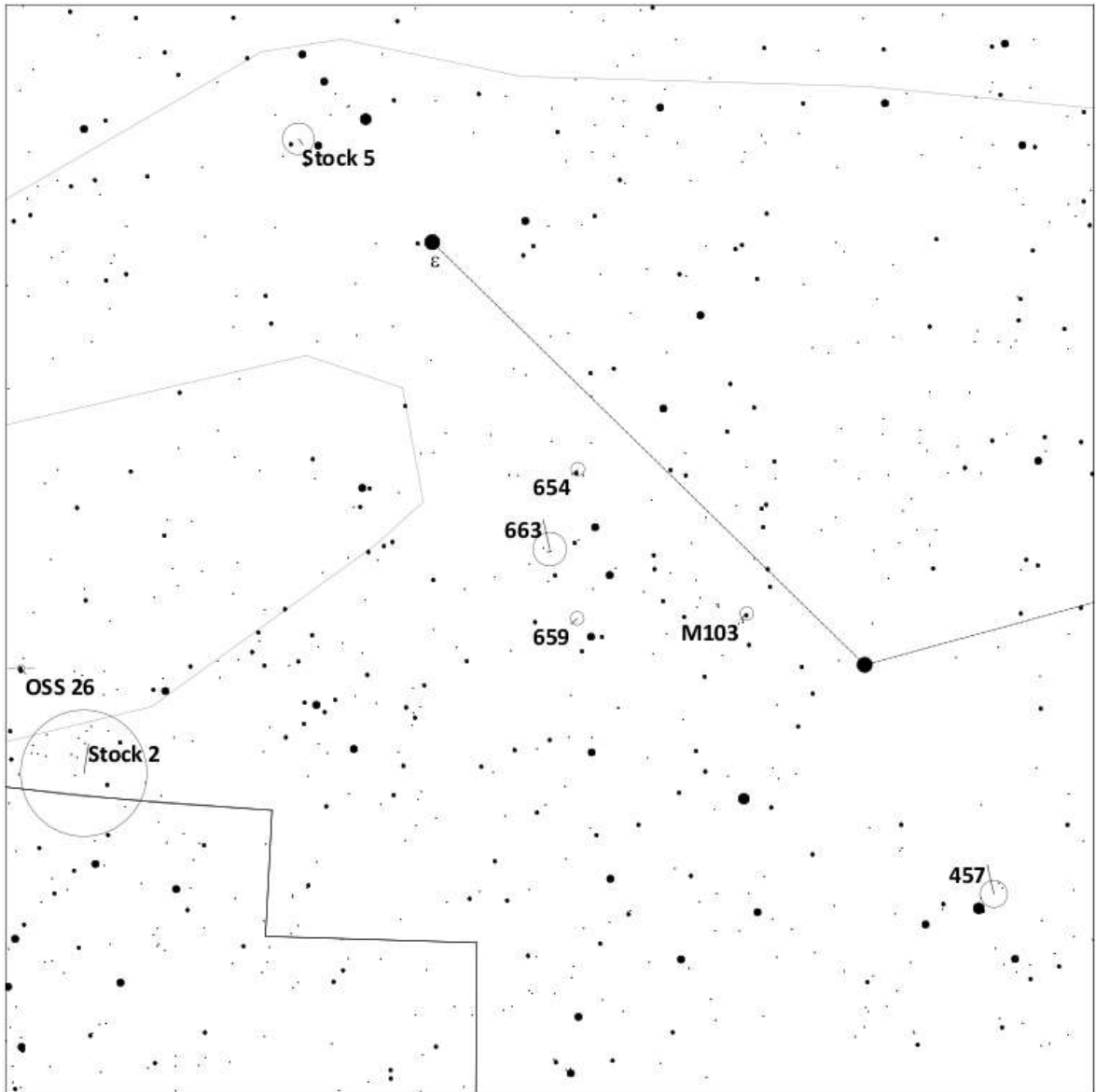
- <= 0.9
- 0.9 - 1.9
- 1.9 - 2.8
- 2.8 - 3.7
- 3.7 - 4.6
- 4.6 - 5.6
- > 5.6

- Galaxy
- Open Cluster
- ⊕ Globular Cluster
- Diffuse Nebula
- Planetary Nebula
- ⊙ Variable Star
- Double Star

- ♿ Mercury
- ♀ Venus
- ♂ Mars
- ♃ Jupiter
- ♄ Saturn
- ♅ Uranus
- ♆ Neptune

- ♇ Pluto
- ☉ Sun
- ☾ Moon
- ♁ Asteroid
- ☄ Comet
- Unknown

NGC 663 (Caldwell 10)



Touring the Universe Through Binoculars Atlas

RA: 1h 45m, Dec: 61d 15m, FOV: 8d, Mag: 9

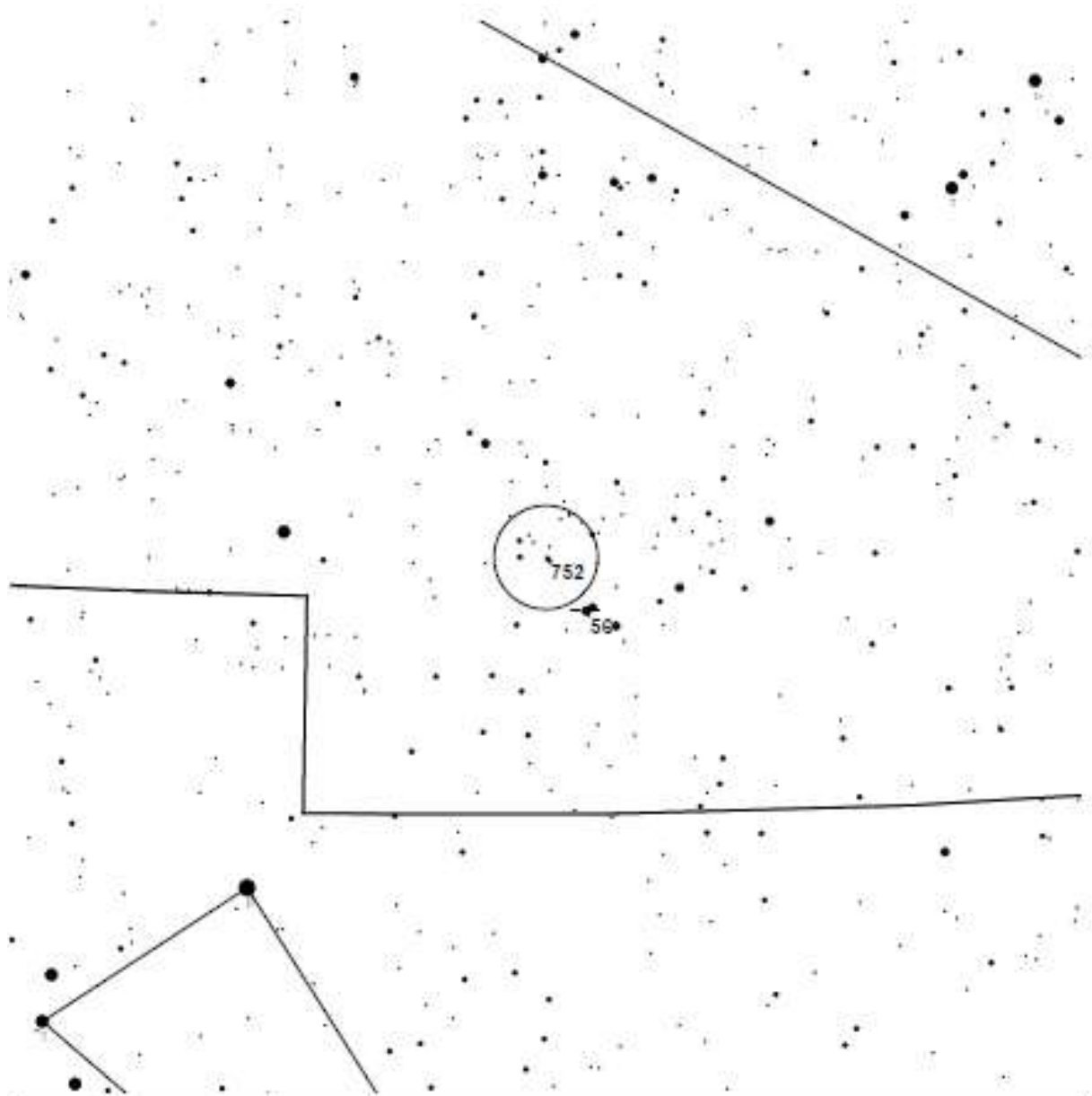
- ≤ 1.3
- 1.3 - 2.6
- 2.6 - 3.9
- 3.9 - 5.1
- 5.1 - 6.4
- 6.4 - 7.7
- > 7.7

- Galaxy
- Open Cluster
- ⊕ Globular Cluster
- Diffuse Nebula
- ⊠ Planetary Nebula
- ⊙ Variable Star
- ⊖ Double Star

- ♿ Mercury
- ♀ Venus
- ♂ Mars
- ♃ Jupiter
- ♄ Saturn
- ♅ Uranus
- ♆ Neptune

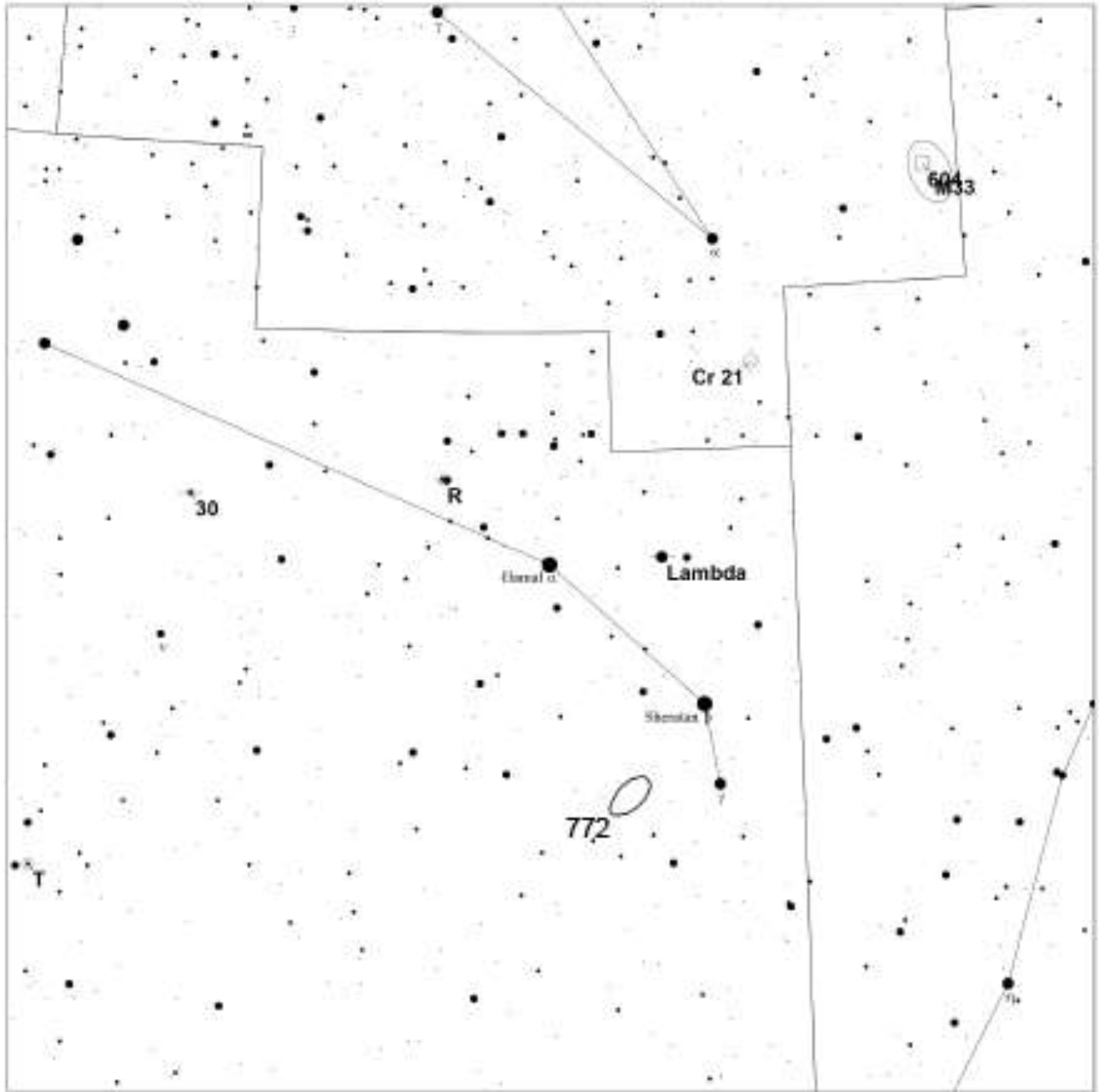
- ♇ Pluto
- ☉ Sun
- ☾ Moon
- ♁ Asteroid
- ☄ Comet
- ⊛ Unknown

NGC 752 (Caldwell 28)



<u>Touring the Universe Through Binoculars Atlas</u>			
<u>RA: 1h 57m, Dec: 37d 40m, FOV: 8d, Mag: 9</u>			
● ≤ 1.3	☉ Galaxy	☿ Mercury	♃ Pluto
● 1.3 - 2.6	○ Open Cluster	♀ Venus	☼ Sun
● 2.6 - 3.9	⊕ Globular Cluster	♁ Mars	☾ Moon
● 3.9 - 5.1	□ Diffuse Nebula	♃ Jupiter	♁ Asteroid
● 5.1 - 6.4	▣ Planetary Nebula	♄ Saturn	☄ Comet
● 6.4 - 7.7	⊙ Variable Star	♅ Uranus	♁ Unknown
● > 7.7	↔ Double Star	♆ Neptune	

NGC 772 (Nautilus Galaxy - Arp 78)



Touring the Universe Through Binoculars Atlas

RA: 2h 7m, Dec: 23d 46m, FOV: 19d, Mag: 7.5

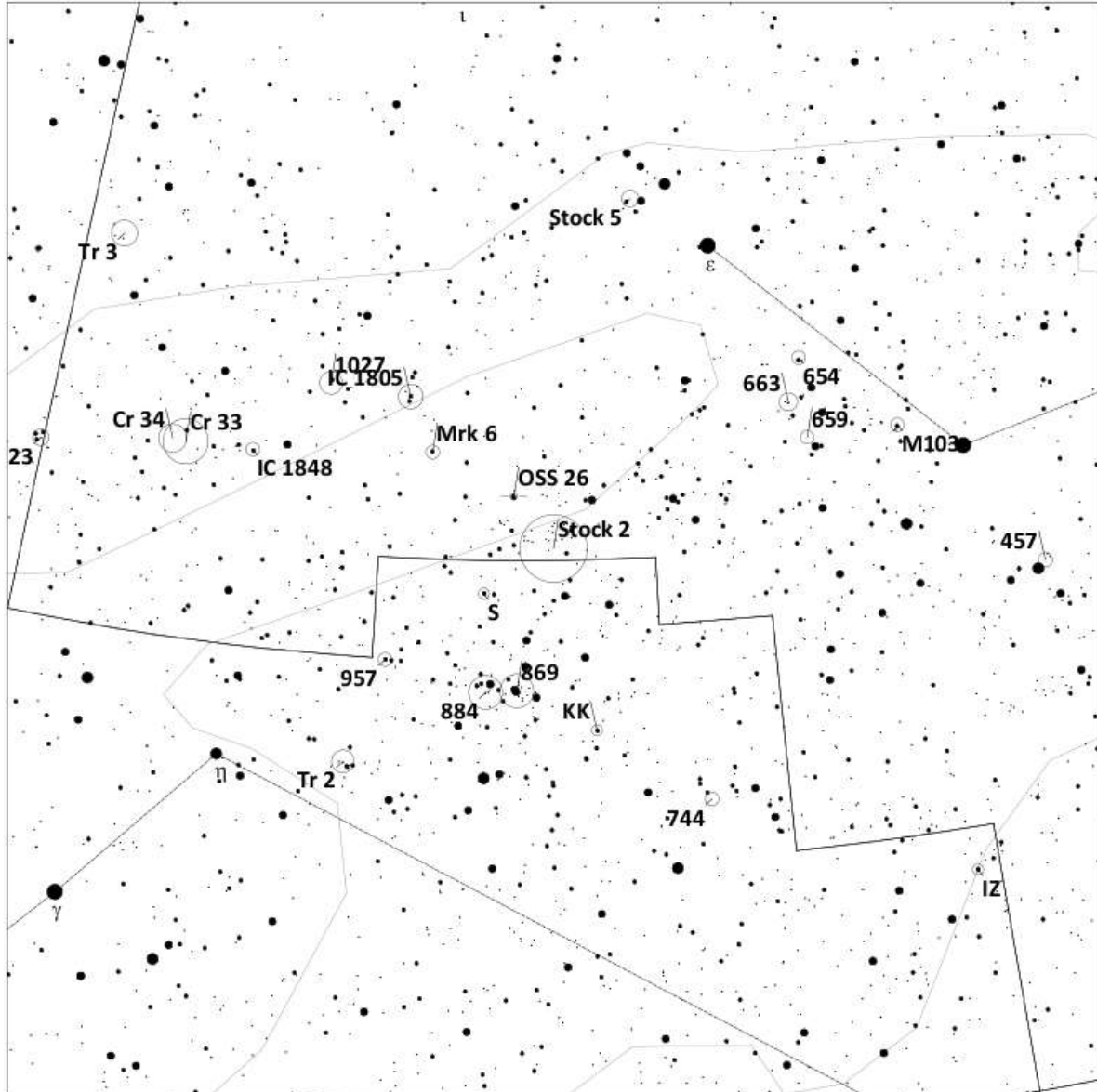
- ≤ 1.2
- 1.2 - 2.4
- 2.4 - 3.6
- 3.6 - 4.9
- 4.9 - 6.1
- 6.1 - 7.3
- > 7.3

- Galaxy
- Open Cluster
- ⊕ Globular Cluster
- Diffuse Nebula
- ⊠ Planetary Nebula
- ⊙ Variable Star
- Double Star

- ♿ Mercury
- ♀ Venus
- ♂ Mars
- ♃ Jupiter
- ♄ Saturn
- ♅ Uranus
- ♆ Neptune

- ♇ Pluto
- ☉ Sun
- ☾ Moon
- ♁ Asteroid
- ☄ Comet
- ⊙ Unknown

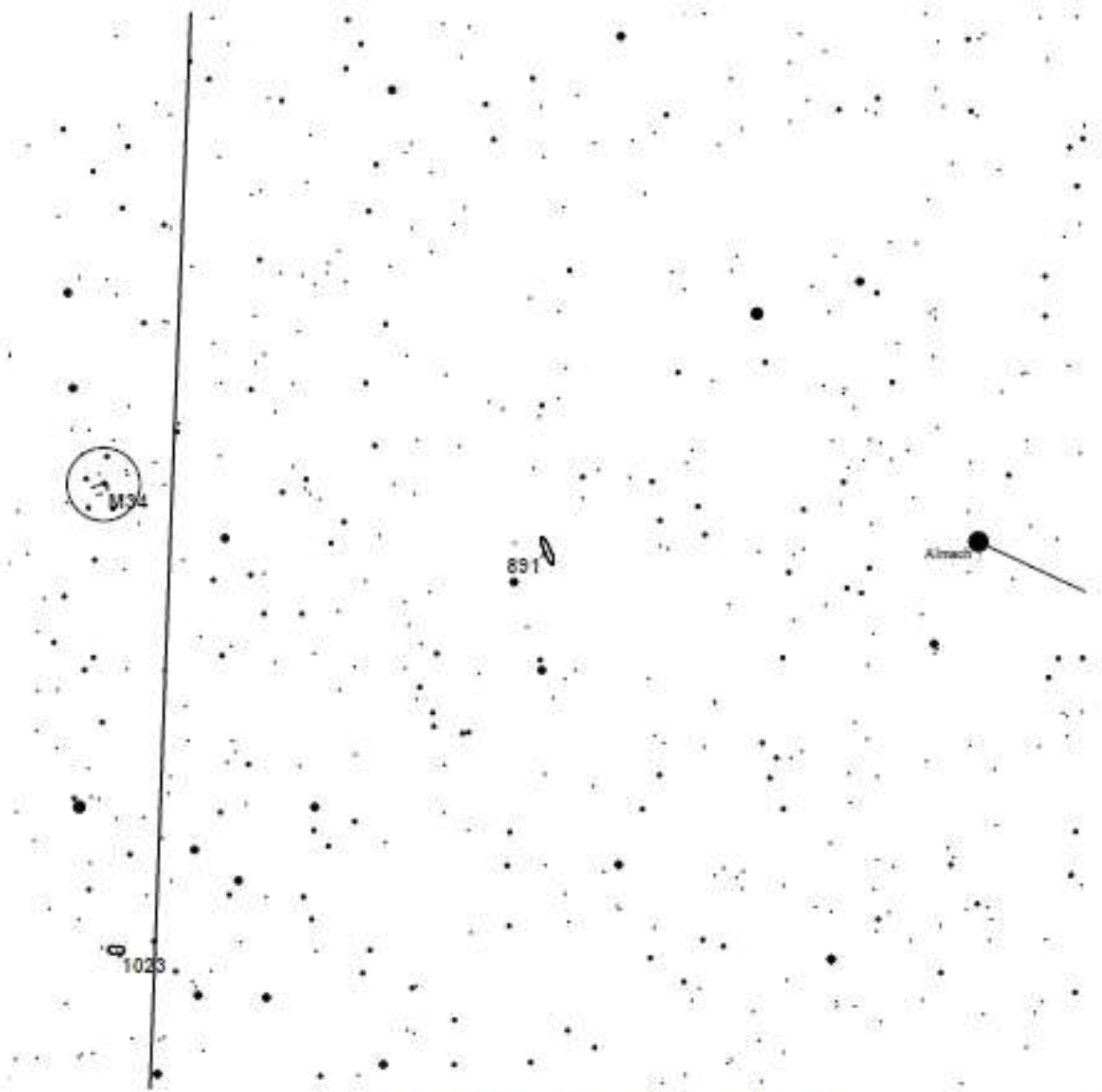
NGC 869/884 (Perseus Double Cluster)



Touring the Universe Through Binoculars Atlas
RA: 2h 15m, Dec: 59d 16m, FOV: 15d, Mag: 9

- | | | | |
|-------------|--------------------|-----------|------------|
| ● ≤ 1.3 | ○ Galaxy | ♿ Mercury | ♃ Pluto |
| ● 1.3 - 2.6 | ○ Open Cluster | ♀ Venus | ☼ Sun |
| ● 2.6 - 3.9 | ⊕ Globular Cluster | ♂ Mars | ☾ Moon |
| ● 3.9 - 5.1 | □ Diffuse Nebula | ♃ Jupiter | ♁ Asteroid |
| ● 5.1 - 6.4 | □ Planetary Nebula | ♄ Saturn | ☄ Comet |
| ● 6.4 - 7.7 | ⊙ Variable Star | ♅ Uranus | ⊛ Unknown |
| ○ > 7.7 | ⊖ Double Star | ♆ Neptune | |

NGC 891 (Silver Sliver Galaxy)



Touring the Universe Through Binoculars Atlas
RA: 2h 22m, Dec: 42d 21m, FOV: 8d, Mag: 9

● ≤ 1.3	○ Galaxy	♿ Mercury	♃ Pluto
● 1.3 - 2.6	○ Open Cluster	♀ Venus	☼ Sun
● 2.6 - 3.9	⊕ Globular Cluster	♂ Mars	☾ Moon
● 3.9 - 5.1	□ Diffuse Nebula	♃ Jupiter	☾ Asteroid
● 5.1 - 6.4	□ Planetary Nebula	♄ Saturn	☾ Comet
● 6.4 - 7.7	⊙ Variable Star	♅ Uranus	⊙ Unknown
● > 7.7	↔ Double Star	♆ Neptune	