

Astronomical League

Double Star Certificate - Observing List

“100 of the finest double and multiple stars in the heavens.”

**The double star list contained in this book was compiled by:
The Astronomical League**

For more information visit
<http://www.astroleague.org/>

**The star charts in this book were generated using
Cartes du Ciel
Sky Charts: Free Astronomy Software**

For more information and to download visit
<http://www.stargazing.net/astropc/>

**This book was put together by
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For the *free* use of the Centre's members**

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Introduction

Welcome to the Astronomical League's Double Star Club. The purpose of the Double Star Club is to introduce observers to 100 of the finest double and multiple stars in the heavens. You don't need a large, expensive apochromatic refractor to view the objects on this list since a small refractor, Newtonian reflector, or Schmidt-Cassegrain will do just fine. All objects on this list were observed with a three inch refractor using between 75X and 150X. Again, this program is meant to allow you to enjoy a different aspect of our wonderful hobby, and not to test your equipment.

Double star observing can be very forgiving. You don't need the darkest skies, the clearest skies, or even a moonless night to observe many of these objects. Some can be observed from your backyard under moderate light pollution, some can be observed under less than transparent skies, and some can even be observed with the moon up. However, as usual in astronomy, the best results can be obtained under optimum conditions. The point is, always try for the best conditions, but if you don't have them, don't worry about it. You can still enjoy this program.

Rules and Regulations

To qualify for the AL's Double Star Certificate and pin, you need only be a member of the Astronomical League, either through an affiliated club or as a Member-at-Large, and observe the 100 selected objects on the included list. Any telescope may be used, but one with an objective 60mm in diameter or larger is recommended. To record your observations, you may use the log sheet provided, or one with similar information. If you use your own log sheets, they should include: object, date, time, power, seeing, instrument, and a drawing of the double or multiple system. Yes, I said a drawing of the double star. Now, before you panic, how hard is it to draw two dots in the box provided, with the size of the dot indicating magnitude, and the distance between the dots representing separation? I have given you a line for a description, but this is optional and not required. I have included this so that if you are inspired by any one double star, you can write your thoughts or feelings down for later reference.

You must be a member of the Astronomical League to receive this certificate. If you are not a member now, click here to view information on membership in our organization.

To receive your Double Star Certificate and pin, simply send your observations along with your name, address, phone number, and society affiliation, either to your society's Awards Co-ordinator for verification, or to:

Mike Benson
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Upon verification of your observations, your certificate and pin will be forwarded either to you or your society's Awards Co-ordinator, whomever you choose.

For information on which double stars to observe, read the Double Star Observing list and record your observations on the log sheet.

*This page was reproduced from the Astronomical League website.
<http://www.astroleague.org/al/obsclubs/dblstar/dblstar1.html>*

Notes on Observing Double Stars:

By Brian Battersby

Separation:

One arcminute (') = $1/60^{\text{th}}$ of a degree
One arcsecond (") = $1/60^{\text{th}}$ of an arcminute

Examples:

Alcor and Mizar (Zeta Ursa Majoris) are separated by 12'
Mizar A & B (Zeta Ursa Majoris) are separated by 14.4"
Alberio (Beta Cygni) is separated by 34.4"

Push Your Telescope To Its Limit:

The diameter of mirror, seeing conditions, quality of optics and experience of the observer all play a role in determining how close a pair you will be able to split. The theoretical separation limit for a given telescope, or Dawes Limit, can be derived using the following formula:

$$S = 4.6 / D \text{ (in inches)} \quad \text{or} \quad S = 11.7 / D \text{ (in centimetres)}$$

S stands for arcseconds (").
D stands for the diameter of your primary mirror.

Examples:

4" telescope will split doubles down to 1.15"
6" telescope will split doubles down to 0.76"
8" telescope will split doubles down to 0.575"

Magnification:

A rule of thumb for determining what magnification is needed to split the double is:

$$X = 240 / S$$

X stands for magnification
S stands for arcseconds (")

Examples:

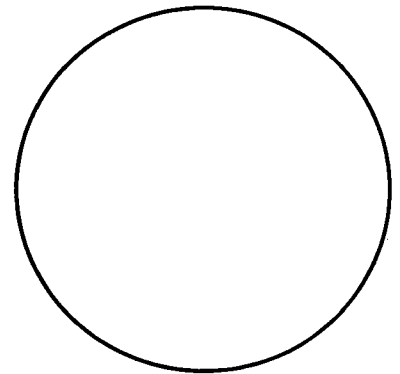
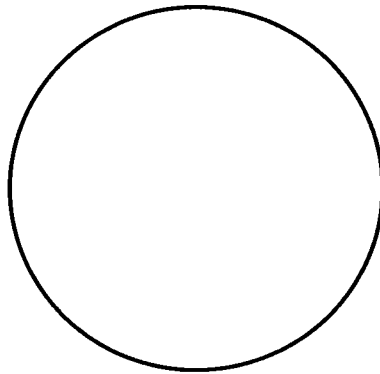
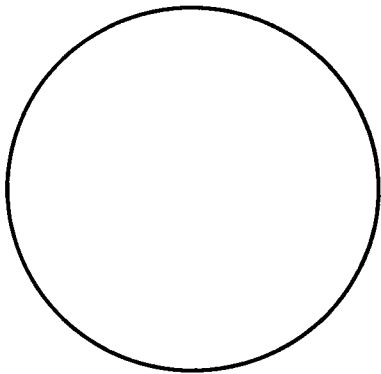
Alcor & Mizar split with 0.33x (notice it is less than 1x therefore it can be split with the naked eye)
Mizar A & B require about 16.6x to split
Alberio splits at 7x.

Position Angle:

The Position Angle (PA) of a pair is determined by the orientation of the dimmer star to the brighter star as measured from north.

0 = North	90 = East
180 = South	270 = West

Don't forget that the view in your telescope may be mirror imaged depending on its configuration. An easy way to determine north is to bump the telescope towards Polaris and watch in the eyepiece to see which way the star moves. To determine which direction is west in the eyepiece simply watch the star drift through the eyepiece without any type of tracking employed. Stars, like the Sun, move from east to west across the sky.

[illegible]

Double Star Observing List (Epoch 2000.0)

	Object	Right Ascension	Declination	Magnitude	Separation	Position Angle
[]	Eta Cassiopeiae	00 ^h 49 ^m .1	+57° 49'	3.4, 7.5	12"	307°
[]	65 Piscium	00 ^h 49 ^m .9	+27° 43'	6.3, 6.3	4.4"	297°
[]	Psi 1 Piscium	01 ^h 05 ^m .6	+21° 28'	5.6, 5.8	30"	159°
[]	Zeta Piscium	01 ^h 13 ^m .7	+07° 35'	5.6, 6.5	23"	63°
[]	Gamma Arietis	01 ^h 53 ^m .5	+19° 18'	4.8, 4.8	7.8"	0°
[]	Lambda Arietis	01 ^h 57 ^m .9	+23° 36'	4.9, 7.7	37"	46°
[]	Alpha Piscium	02 ^h 02 ^m .0	+02° 46'	4.2, 5.1	1.7"	50°
[]	Gamma Andromedae	02 ^h 03 ^m .9	+42° 20'	2.3, 5.5	9.8"	63°
[]	Iota Trianguli	02 ^h 12 ^m .4	+30° 18'	5.3, 6.9	3.9"	71°
[]	Alpha Ursa Minoris	02 ^h 31 ^m .8	+89° 16'	2.0, 9.0	18.4"	218°
[]	Gamma Ceti	02 ^h 43 ^m .3	+03° 14'	3.5, 7.3	2.8"	294°
[]	Eta Persei	02 ^h 50 ^m .7	+55° 54'	3.8, 8.5	28.3"	300°
[]	Struve 331	03 ^h 00 ^m .9	+52° 21'	5.3, 6.7	12.1"	85°
[]	32 Eridani	03 ^h 54 ^m .3	-02° 57'	4.8, 6.1	6.8"	347°
[]	Chi Tauri	04 ^h 22 ^m .6	+25° 38'	5.5, 7.6	19.4"	24°
[]	1 Camelopardalis	04 ^h 32 ^m .0	+53° 55'	5.7, 6.8	10.3"	308°
[]	55 Eridani	04 ^h 43 ^m .6	-08° 48'	6.7, 6.8	9.2"	317°
[]	Beta Orionis	05 ^h 14 ^m .5	-08° 12'	0.1, 6.8	9.5"	202°
[]	118 Tauri	05 ^h 29 ^m .3	+25° 09'	5.8, 6.6	4.8"	204°
[]	Delta Orionis	05 ^h 32 ^m .0	-00° 18'	2.2, 6.3	52.6"	359°
[]	Struve 747	05 ^h 35 ^m .0	-06° 00'	4.8, 5.7	35.7"	223°
[]	Lambda Orionis	05 ^h 35 ^m .1	+09° 56'	3.6, 5.5	4.4"	43°
[]	Theta 1 Orionis	05 ^h 35 ^m .3	-05° 23'	6.7, 7.9, 5.1, 6.7	8.8", 13", 21.5"	31°, 132°, 96°
[]	Iota Orionis	05 ^h 35 ^m .4	-05° 55'	2.8, 6.9	11.3"	141°
[]	Theta 2 Orionis	05 ^h 35 ^m .4	-05° 25'	5.2, 6.5	52"	92°
[]	Sigma Orionis	05 ^h 38 ^m .7	-02° 36'	4.0, 7.5, 6.5	12.9", 43"	84°, 61°

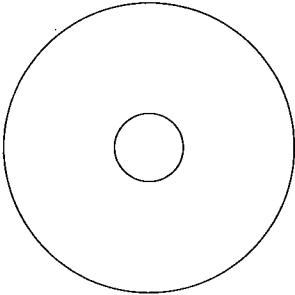
[]	Zeta Orionis	05 ^h 40 ^m .8	-01° 57'	1.9, 4.0, 9.9	2.4", 58"	162°, 10°
[]	Gamma Leporis	05 ^h 44 ^m .5	-22° 27'	3.7, 6.3	96"	350°
[]	Theta Aurigae	05 ^h 59 ^m .7	+37° 13'	2.6, 7.1	3.6"	313°
[]	Epsilon Monocerotis	06 ^h 23 ^m .8	+04° 36'	4.5, 6.5	13.4"	27°
[]	Beta Monocerotis	06 ^h 28 ^m .8	-07° 02'	4.7, 5.2	7.3"	132°
[]	12 Lyncis	06 ^h 46 ^m .2	+59° 27'	5.4, 7.3	8.7"	308°
[]	Epsilon Canis Majoris	06 ^h 58 ^m .6	-28° 58'	1.5, 7.4	7.5"	161°
[]	Delta Geminorum	07 ^h 20 ^m .1	+21° 59'	3.5, 8.2	6.8"	211°
[]	19 Lyncis	07 ^h 22 ^m .9	+55° 17'	5.6, 6.5	14.8"	315°
[]	Alpha Geminorum	07 ^h 34 ^m .6	+31° 53'	1.9, 2.9	2.2"	171°
[]	Kappa Puppis	07 ^h 38 ^m .8	-26° 48'	4.5, 4.7	9.9"	318°
[]	Zeta Cancri	08 ^h 12 ^m .2	+17° 39'	5.6, 6.0	5.9"	89°
[]	Iota Cancri	08 ^h 46 ^m .7	+28° 46'	4.2, 6.6	30"	307°
[]	38 Lyncis	09 ^h 18 ^m .8	+36° 48'	3.9, 6.6	2.7"	229°
[]	Alpha Leonis	10 ^h 08 ^m .4	+11° 58'	1.4, 7.7	177"	307°
[]	Gamma Leonis	10 ^h 20 ^m .0	+19° 51'	2.2, 3.5	4.4"	122
[]	54 Leonis	10 ^h 55 ^m .6	+24° 45'	4.5, 6.3	6.5"	110°
[]	N Hydrae	11 ^h 32 ^m .3	-29° 16'	5.8, 5.9	9.2"	210°
[]	Delta Corvi	12 ^h 29 ^m .9	-16° 31'	3.0, 9.2	24.2"	214°
[]	24 Comae Berenices	12 ^h 35 ^m .1	+18° 23'	5.2, 6.7	20.3"	271°
[]	Gamma Virginis	12 ^h 41 ^m .7	-01° 27'	3.5, 3.5	3.6"	293°
[]	32 Camelopardalis	12 ^h 49 ^m .2	+83° 25'	5.3, 5.8	21.6"	326°
[]	Alpha Canum Venaticorum	12 ^h 56 ^m .0	+38° 19'	2.9, 5.5	19.4"	229°
[]	Zeta Ursa Majoris	13 ^h 23 ^m .9	+54° 56'	2.3, 4.0, 4.0	14.4", 709"	152°, 71°
[]	Kappa Bootis	14 ^h 13 ^m .5	+51° 47'	4.6, 6.6	13.4"	236°
[]	Iota Bootis	14 ^h 16 ^m .2	+51° 22'	4.9, 7.5	38"	33°
[]	Pi Bootis	14 ^h 40 ^m .7	+16° 25'	4.9, 5.8	5.6"	108°
[]	Epsilon Bootis	14 ^h 45 ^m .0	+27° 04'	2.5, 4.9	2.8"	339°
[]	Alpha Librae	14 ^h 50 ^m .9	-16° 02'	2.8, 5.2	231"	314°

[]	Xi Bootis	14 ^h 51 ^m .4	+19° 06'	4.7, 7.0	6.9"	332°
[]	Delta Bootis	15 ^h 15 ^m .5	+33° 19'	3.5, 8.7	105"	79°
[]	Mu Bootis	15 ^h 24 ^m .5	+37° 23'	4.3, 7.0	108"	171°
[]	Delta Serpentis	15 ^h 34 ^m .8	+10° 32'	4.2, 5.2	3.9"	178°
[]	Zeta Corona Borealis	15 ^h 39 ^m .4	+36° 38'	5.1, 6.0	6.3"	305°
[]	Xi Scorpii	16 ^h 04 ^m .4	-11° 22'	4.8, 7.3	7.6"	51°
[]	Struve 1999	16 ^h 04 ^m .4	-11° 27'	7.4, 8.1	11.6"	99°
[]	Beta Scorpii	16 ^h 05 ^m .4	-19° 48'	2.6, 4.9	13.6"	21°
[]	Kappa Herculis	16 ^h 08 ^m .1	+17° 03'	5.3, 6.5	28"	12°
[]	Nu Scorpii	16 ^h 12 ^m .0	-19° 28'	4.3, 6.4	41"	337°
[]	Sigma Corona Borealis	16 ^h 14 ^m .7	+33° 52'	5.6, 6.6	6.2"	233°
[]	16/17 Draconis	16 ^h 36 ^m .2	+52° 55'	5.4, 6.4, 5.5	3.4, 90	108°, 194°
[]	Mu Draconis	17 ^h 05 ^m .3	+54° 28'	5.7, 5.7	2.0"	42°
[]	Alpha Herculis	17 ^h 14 ^m .6	+14° 23'	3.5, 5.4	4.7"	107°
[]	Delta Herculis	17 ^h 15 ^m .0	+24° 50'	3.1, 8.2	8.9"	236°
[]	36 Ophiuchi	17 ^h 15 ^m .3	-26° 36'	5.1, 5.1	4.4"	154°
[]	Omicron Ophiuchi	17 ^h 18 ^m .0	-24° 17'	5.4, 6.9	10.3"	355°
[]	Rho Herculis	17 ^h 23 ^m .7	+37° 09'	4.6, 5.6	4.1"	316°
[]	Nu Draconis	17 ^h 32 ^m .2	+55° 11'	4.9, 4.9	62"	312°
[]	Psi Draconis	17 ^h 41 ^m .9	+72° 09'	4.9, 6.1	30.3"	15°
[]	40/41 Draconis	18 ^h 00 ^m .2	+80° 00'	5.7, 6.1	19.3"	232°
[]	95 Herculis	18 ^h 01 ^m .5	+21° 36'	5.0, 5.1	6.3"	258°
[]	70 Ophiuchi	18 ^h 05 ^m .5	+02° 30'	4.2, 6.0	2.8"	72°
[]	Epsilon Lyrae	18 ^h 44 ^m .3	+39° 40'	5.0, 6.1, 5.2, 5.5	208", 2.6", 2.3"	357°, 173°, 94°
[]	Zeta Lyrae	18 ^h 44 ^m .8	+37° 36'	4.3, 5.9	44"	150°
[]	Beta Lyrae	18 ^h 50 ^m .1	+33° 22'	3.4, 8.6	46"	149°
[]	Struve 2404	18 ^h 50 ^m .8	+10° 59'	6.9, 8.1	3.6"	183°
[]	Otto Struve 525	18 ^h 54 ^m .9	+33° 58'	6.0, 7.7	45"	350°
[]	Theta Serpentis	18 ^h 56 ^m .2	+04° 12'	4.5, 5.4	22.3"	104°
[]	Beta Cygni	19 ^h 30 ^m .7	+27° 58'	3.1, 5.1	34.4"	54°

[]	57 Aquilae	19 ^h 54 ^m .6	-08° 14'	5.8, 6.5	36"	170°
[]	31 Cygni	20 ^h 13 ^m .6	+46° 44'	3.8, 6.7, 4.8	107", 337"	173°, 323°
[]	Alpha Capricornus	20 ^h 18 ^m .1	-12° 33'	3.6, 4.2	378"	291°
[]	Beta Capricornus	20 ^h 21 ^m .0	-14° 47'	3.4, 6.2	206"	267°
[]	Gamma Delphinus	20 ^h 46 ^m .7	+16° 07'	4.5, 5.5	9.6"	268°
[]	61 Cygni	21 ^h 06 ^m .9	+38° 45'	5.2, 6.0	28"	146°
[]	Beta Cephei	21 ^h 28 ^m .7	+70° 34'	3.2, 7.9	13.3"	249°
[]	Struve 2816	21 ^h 39 ^m .0	+57° 29'	5.6, 7.7, 7.8	11.7", 20"	121°, 339°
[]	Epsilon Pegasi	21 ^h 44 ^m .2	+09° 52'	2.4, 8.4	142"	320°
[]	Xi Cephei	22 ^h 03 ^m .8	+64° 38'	4.4, 6.5	7.7"	277°
[]	Zeta Aquarii	22 ^h 28 ^m .8	-00° 01'	4.3, 4.5	1.8"	266°
[]	Delta Cephei	22 ^h 29 ^m .2	+58° 25'	3.9, 6.3	41"	192°
[]	8 Lacerta	22 ^h 35 ^m .9	+39° 38'	5.7, 6.5	22.4"	186°
[]	94 Aquarii	23 ^h 19 ^m .1	-13° 28'	5.3, 7.3	12.7"	350°
[]	Sigma Cassiopeiae	23 ^h 59 ^m .0	+55° 45'	5.0, 7.1	3"	326°

Outer Circle = 7 deg

Inner Circle = 1.4 deg



This is a detailed black and white star chart of the constellation Cassiopeia. The chart displays a dense field of stars, with the primary stars of the constellation connected by lines to form its characteristic 'W' shape. The central star, Ruchbah (Ruchbah), is prominently marked. Several deep sky objects are highlighted, including the spiral galaxy M 52 (NGC 457) and the open cluster M 103 (NGC 604). The chart is labeled 'Eta Cassiopeiae' in the bottom left corner.

C









65 Piscium

M 110
M 31

M 33

pm: 0.084 -0.010

Magnitude: 0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet

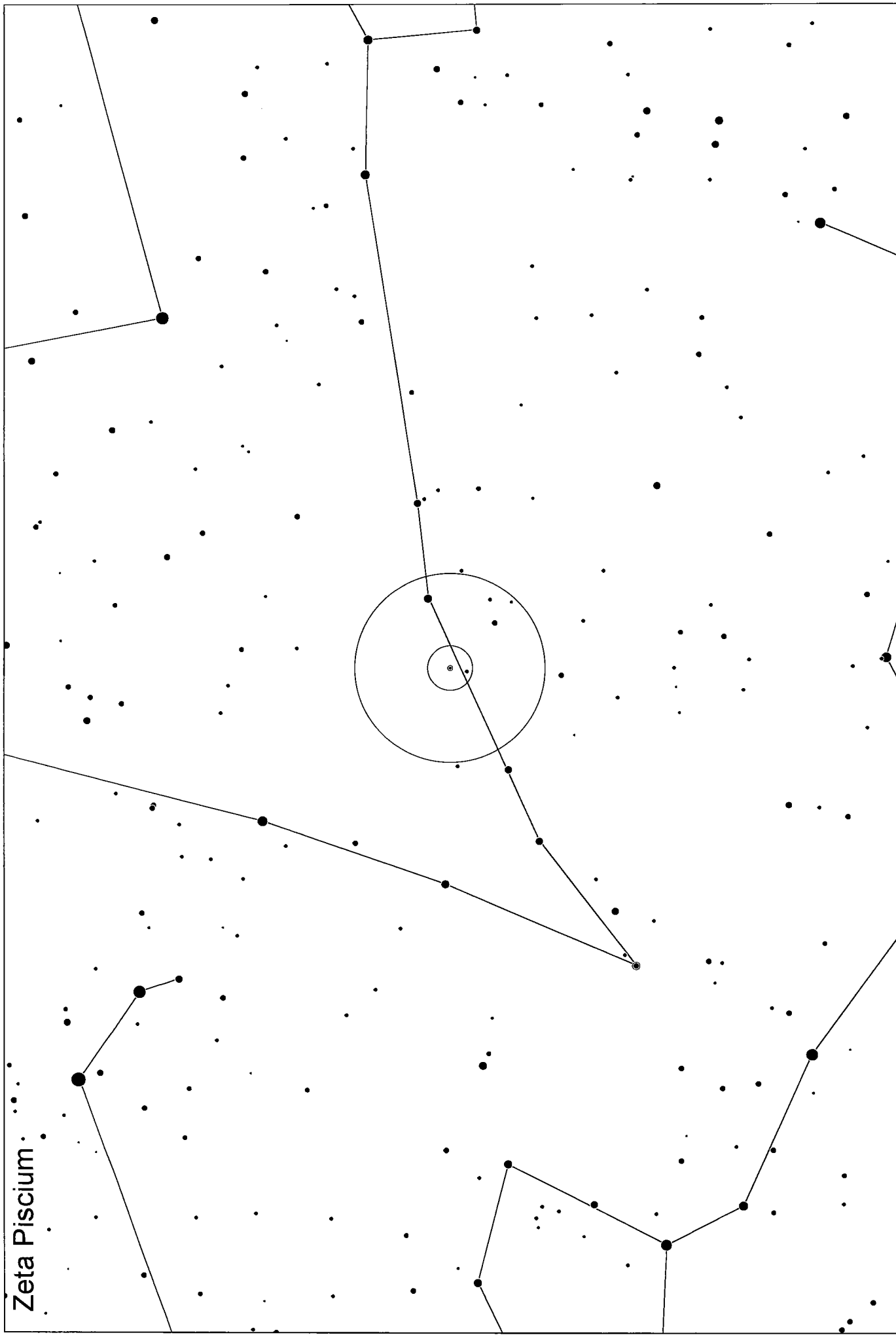
Nebula:        

Psi 1 Piscium

pm: 0.144 -0.056

[illegible]

Zeta Piscium



PGO 2003-10-11 0h14m C: 1h14m +07°36' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC
 1h13m43.90s +07°34'31.0" * HR 361 HD 7344 Fl: 86 Ba: Zet const: Psc mV: 5.24 b-v: 0.32 sp: A7IV
 MAG: 5.6, 6.5 SEP: 23" PA: 63 deg pm: 0.144 -0.056

Magnitude:	0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet
Nebula:	Gx	Oc	Gc	Pl	Neb	N+C	Star	Unk				

Gamma Arietis

OM 33

PGAO 2003-10-11 0h14m +19°19' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC
 1h53m31.80s +19°17'37.0" * HR 546 HD 11502 Fl: 5 Ba: Gam2 const: Ari mV: 4.75 b-v: -0.04 sp: A1pSI
 MAG: 4.8, 4.8 SEP: 7.8" PA: 0 deg

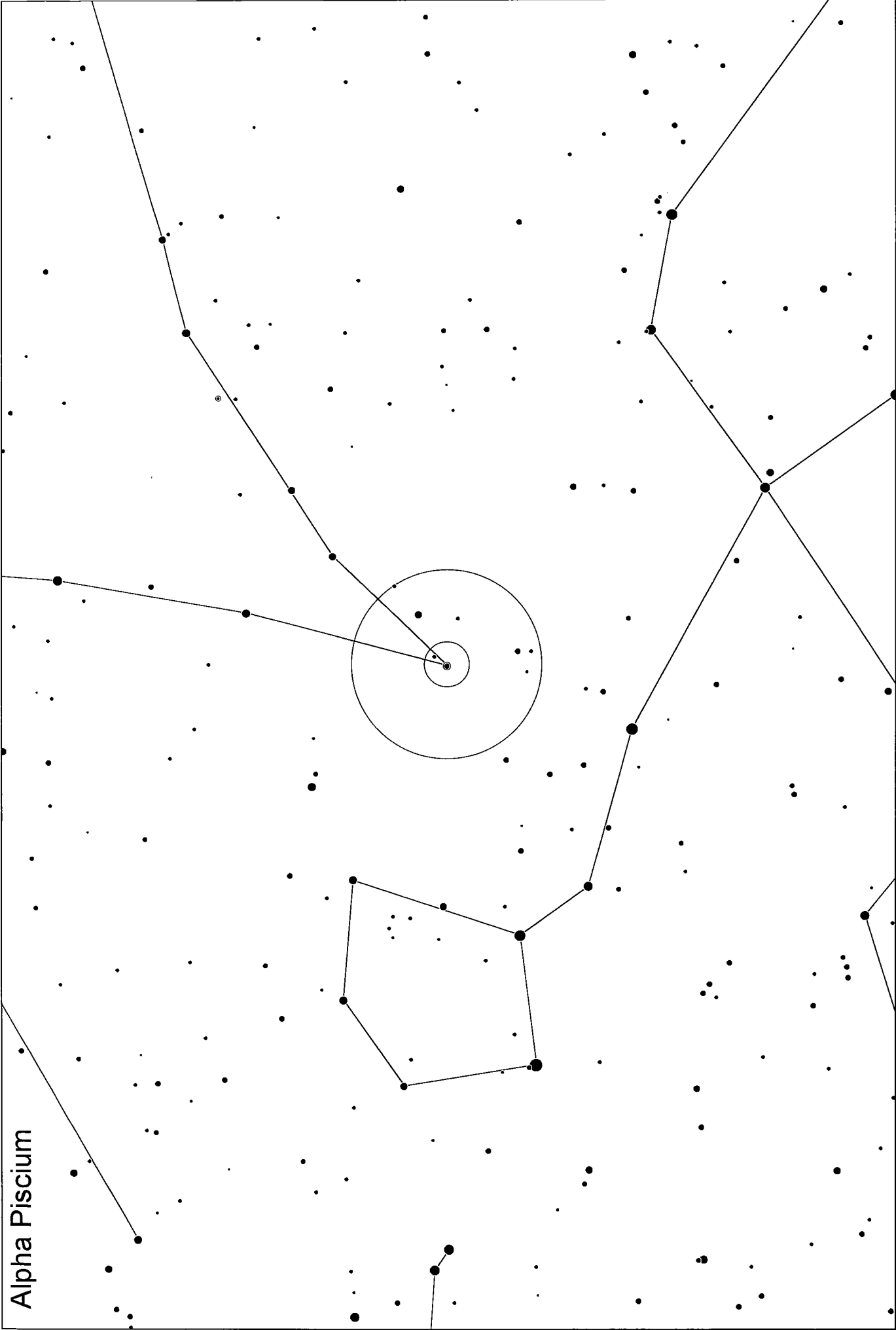
pm: 0.079 -0.104 Mesarthim; Mesartim; First Star in Aries

Magnitude: 0 1 2 3 4 5 6	Variable	Double	Comet	Asteroid	Planet
Gx Oc Gc Pl Neb N+C Star Unk	+	+	+	+	+

QM 33

					.	*	(7)	
Magnitude:	: 0	1	2	3	4	5	6	Variable Double Comet Asteroid Planet
Nebula:	Gx	Oc	Oc	+ x				Gc Pl Neb N+C Star Unk

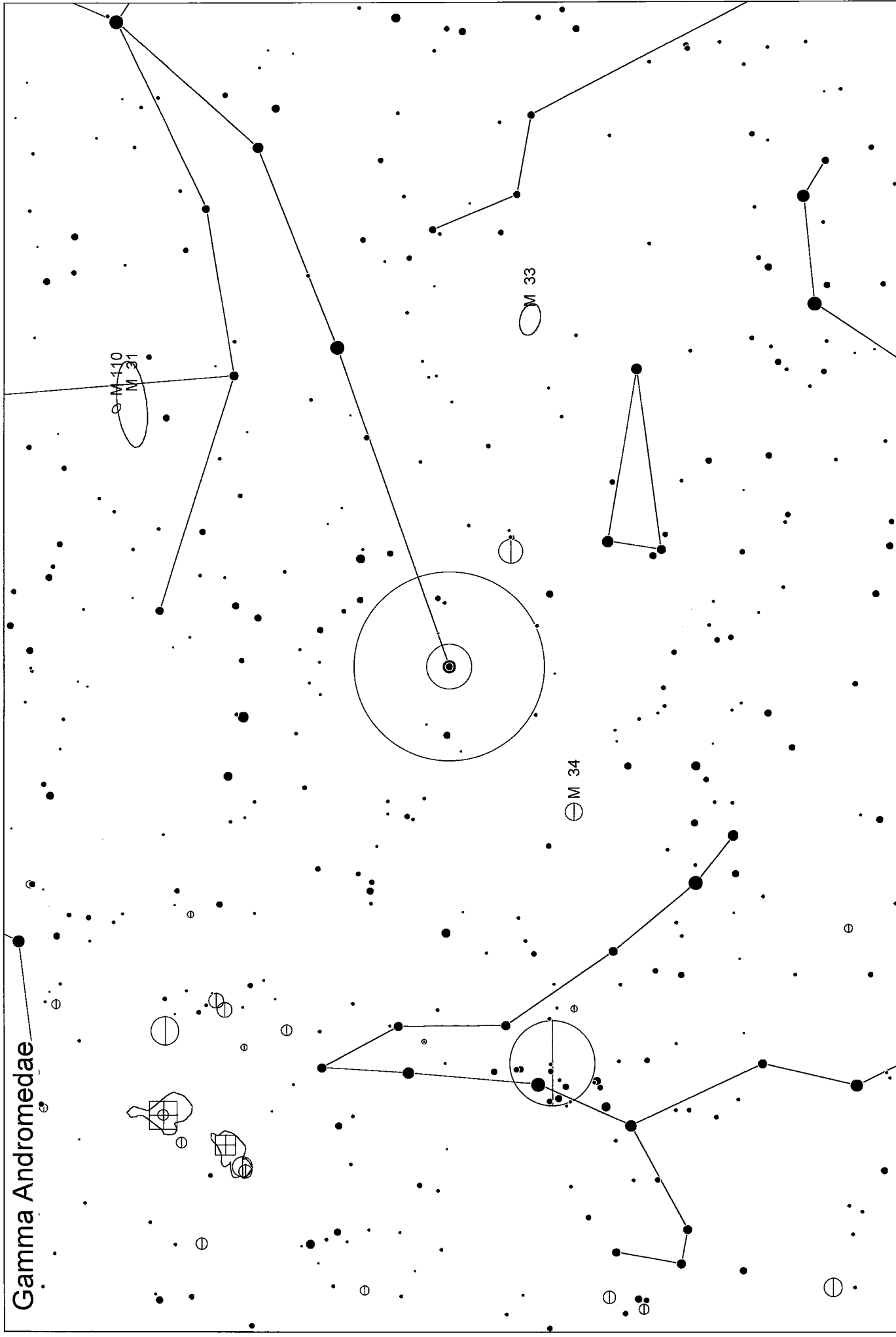
Alpha Piscium



PGAO 2003-10-11 0h14m C: 2h02m +02°46' L:+49°00' O:0° ARC HZ Cat: DSL BSC SAC
 6h48m11.40s -61°56'29.0" * HR 2550 HD 50241 Fl: Ba:Alp const:Pic mV: 3.27 b-v: 0.21 sp: A7IV pm:-0.069 0.269
 MAG: 4.2, 5.1 SEP: 1.7" PA: 50 deg

Magnitude:	0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet
Nebula:	Gx	Oc	Gc	Pl	Neb	N+C	Star	Unk				

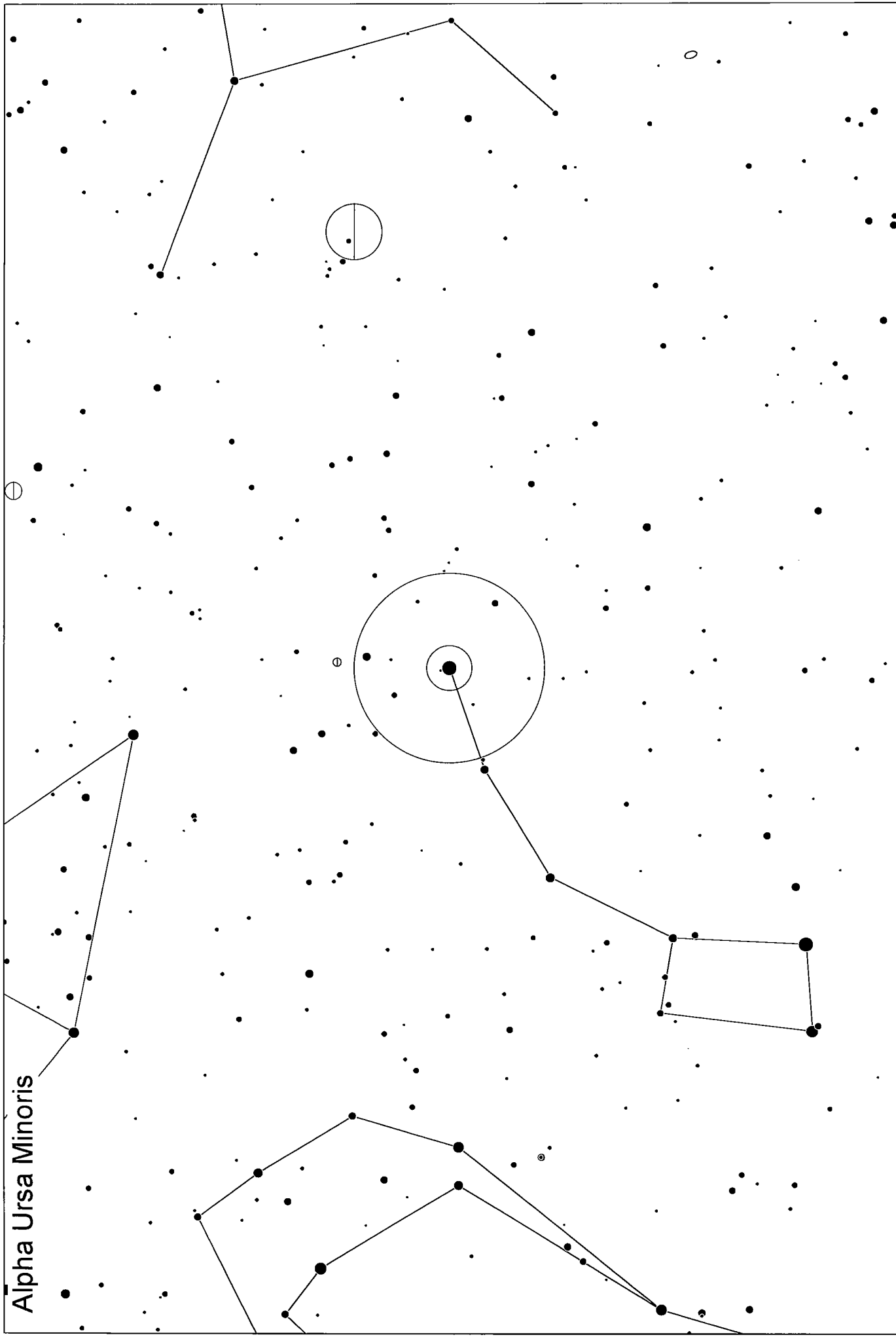
Gamma Andromedae



PGAO 2003-10-11 0h14m C: 2h04m +42°21' L:+49°00' O:0° ARC HZ Cat: DSL BSC SAC
 2h03m54.00s +42°19'47.0" * HR 603 HD 12533 Fl: 57 Ba:Gam1 const:And mV: 2.26 b-v: 1.37 sp: K3-IIb
 MAG: 2.3, 5.5 SEP: 9.8" PA: 63 deg pm: 0.045 -0.052 ;ALMAAK; Almach; Alamak; Almach; Almach; Almach

Magnitude:	0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet
Nebula:	Gx	Oc	Gc	Pl	Neb	N+C	Star	Unk				

Alpha Ursa Minoris



PGAO 2003-10-11 0h14m C: 2h36m +89°17' L:+49°00' O:0° ARC HZ Cat: DSL BSC SAC
 2h31m48.70s +89°15'51.0" * HR 424 HD 8890 Fl: 1 Ba:Alp const:UMI mV: 2.02 b-v: 0.60 sp: F7:Ib-II
 MAG: 2.0, 9.0 SEP: 18.4" PA: 218 deg

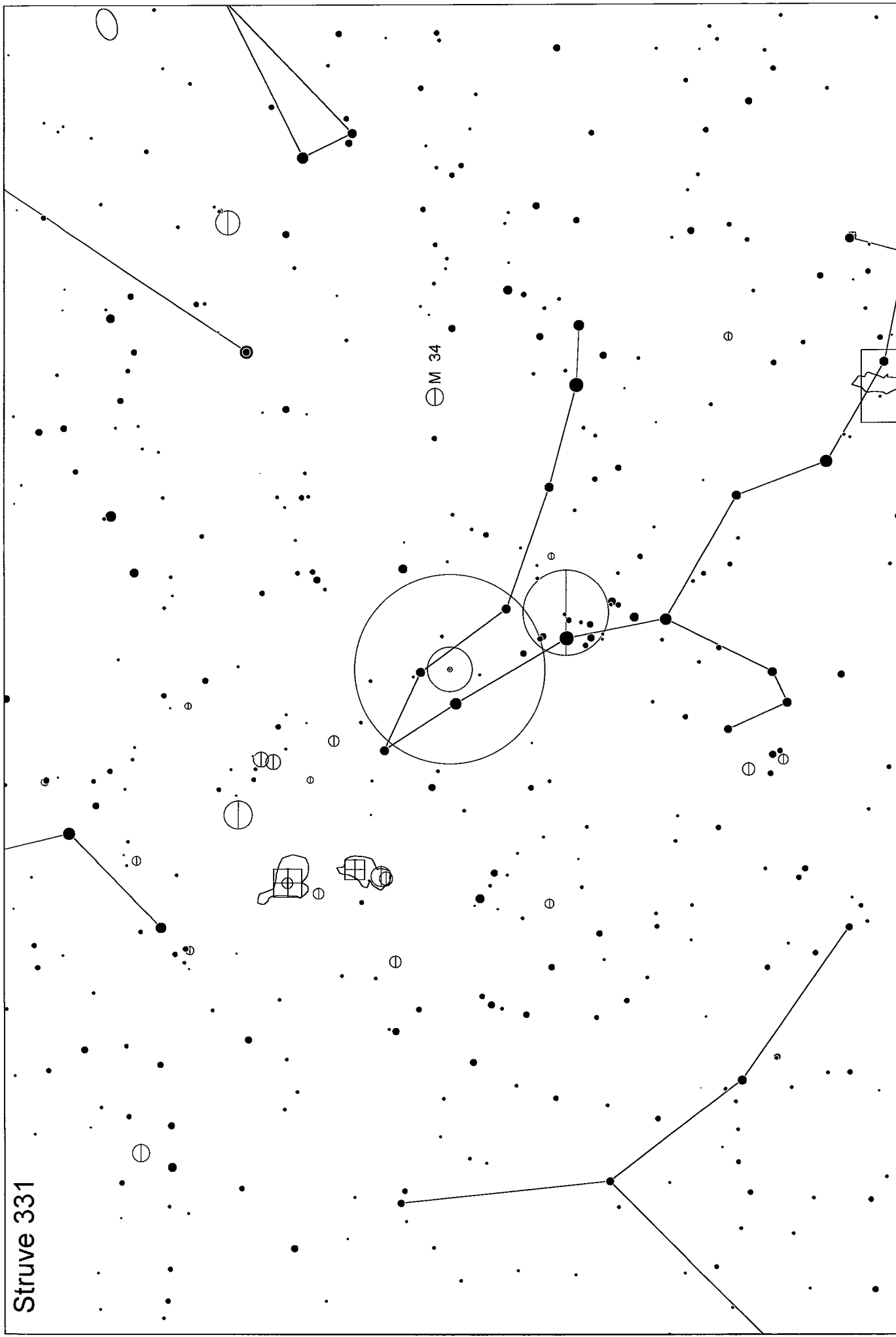
pm: 0.038 -0.015 ;POLARIS; Alruccabah; Cynosura; M 82; Penice; Lodestar; Pole Star; Tramontana; Angel St

Magnitude:	0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet
Nebula:	Gx	Oc	Gc	Pl	Neb	N+C	Star	Unk				

This is a detailed black and white star chart of the constellation Perseus. The chart features numerous stars of varying magnitudes, represented by dots of different sizes. Several stars are circled, and some are labeled with Greek letters or numbers. The constellation's outline is defined by a series of connected lines. The text "Eta Persei" is visible in the bottom left corner.

Magnitude: : 0 1 2 3 4 5 6	Variable	Double	Comet	Asteroid	Planet
○	⊕	⊕	☄	♁	♁
Gx	Gc	Gc	+	+	+
Nebula:	Gx	Gc	Pl	Neb	N+C Star Unk

Struve 331



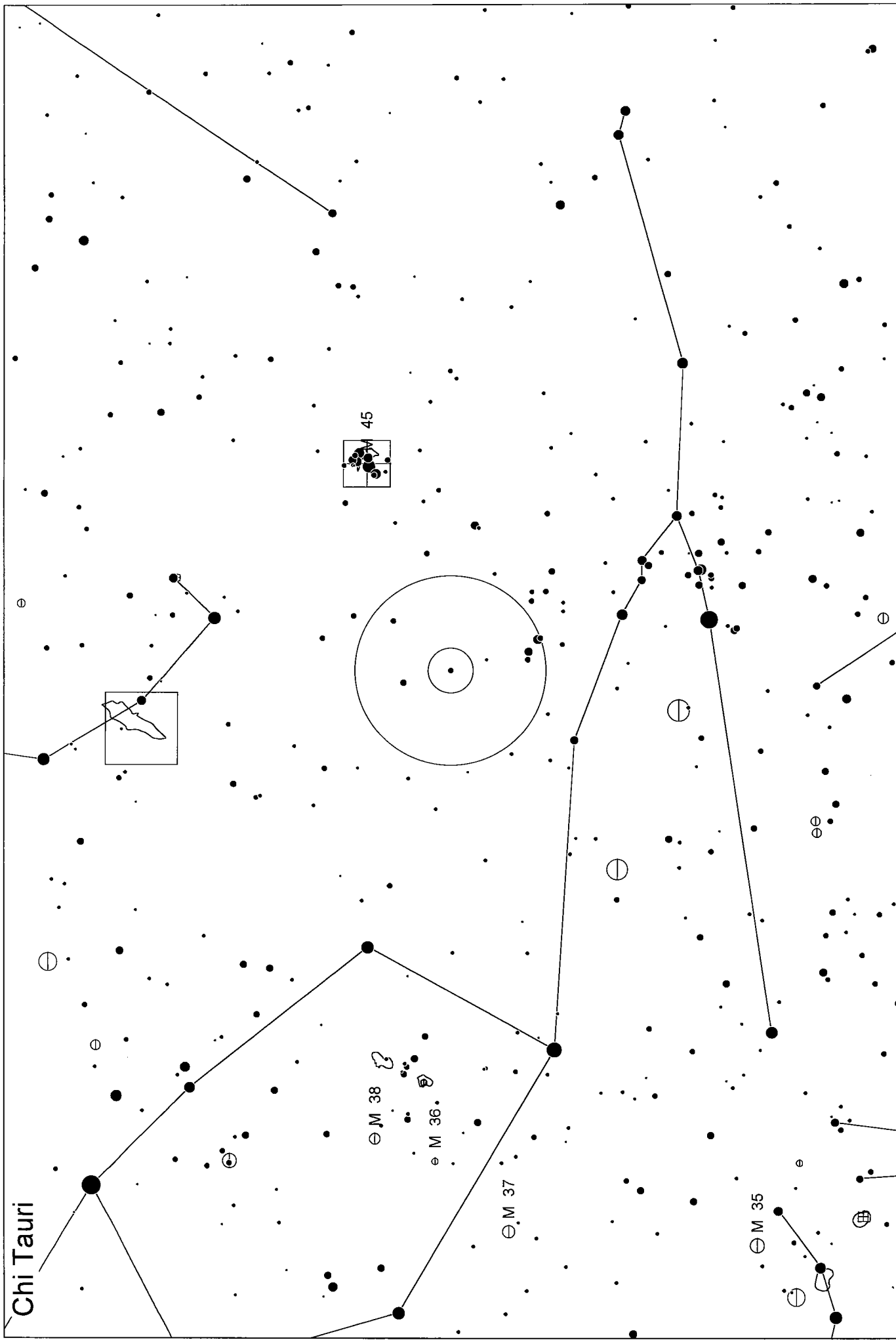
PGAO 2003-10-11 2h14m C: 3h01m +52°22' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC		pm: 0.028 -0.026	
3h00m52.20s +52°21'06.0" * HR 890 HD 18537 Fl: Ba: const: mV: 5.28 b-v: -0.05 sp: B7V			
MAG: 5.6, 6.7 SEP: 12.1" PA: 85 deg			
Magnitude: : 0 1 2 3 4 5 6		Variable Double Comet Asteroid Planet	
Nebula: Gx Oc Gc Pl Neb N+C Star Unk			

pm: 0.029 0.002

(七)

x =

ar U












































PGAO 2003-10-11 2h14m C: 4h23m +25°38' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC





MAG: 5.5, 7.6 SEP: 19.4" PA: 24 deg

Magnitude: : 0 1 2 3 4 5 6

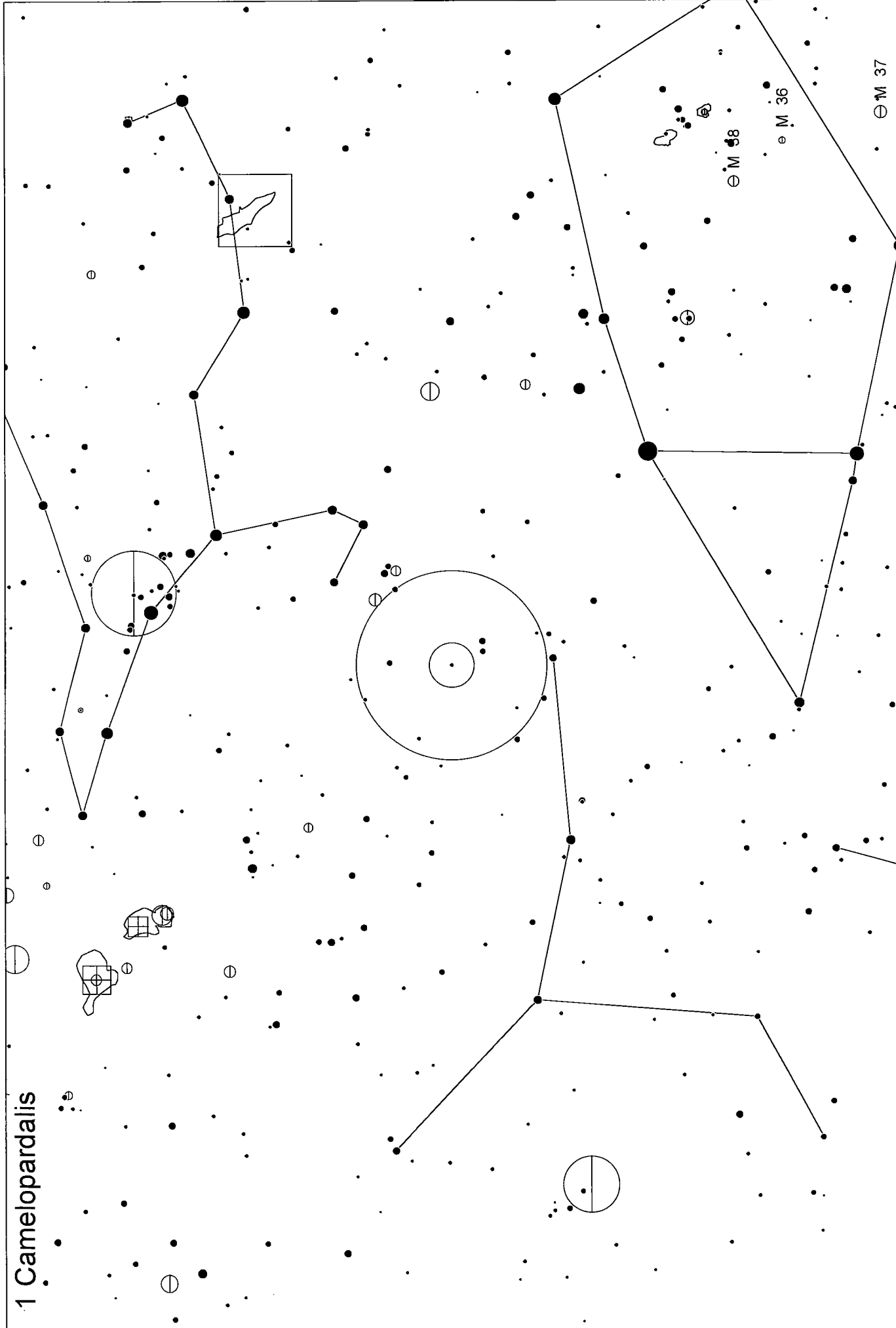
Variable Variable Double Comet Asteroid Planet



					
Nebula:	Gx	Oc	Gc	Pl	Neb
					N+C Star
					Unk

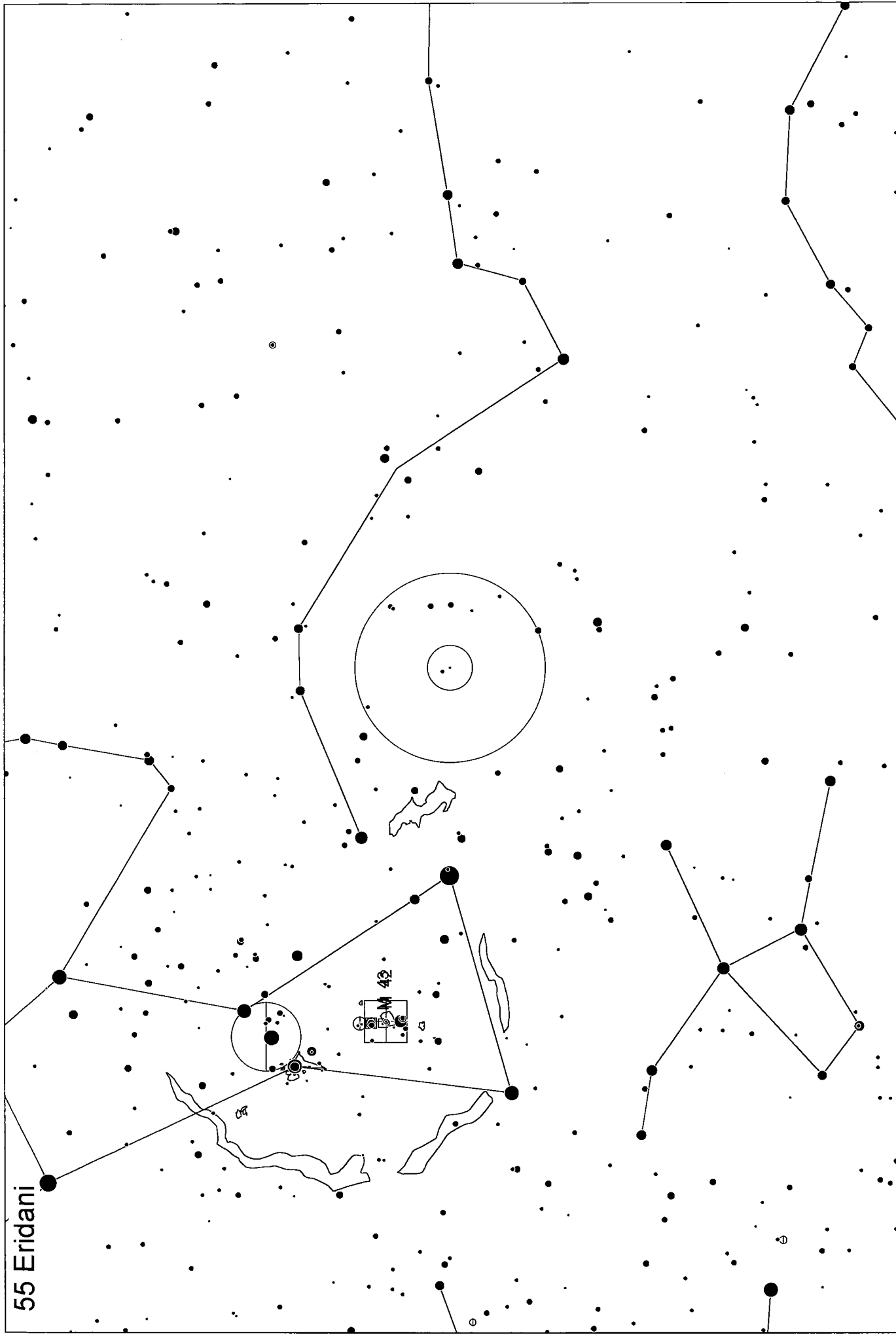
1 Camelopardalis



PGAO 2003-10-11 4h14m C: 4h32m +53°55' L:+49°00' O:0° ARC HZ Cat: DSL BSC SAC
 4h32m01.80s +53°54'39.0" * HR 1417 HD 28446 Fl: 1 Ba: const:Cam mV: 5.77 b-v: 0.18 sp: B0III pm: 0.000 -0.003
 MAG: 5.7, 6.8 SEP: 10.3" PA: 308 deg

Magnitude: 0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet
Gx	Gc	Oc	Gc	Pl	Neb	N+C	Star	Unk			

55 Eridani



PGAO 2003-10-11 4h14m C: 4h44m -08°47' L:+49°00' O:0° ARC HZ Cat: DSL BSC SAC
4h43m35.17s -08°47'46.4" * TYC5321-02147-1 Bt: 7.73 Vt: 6.74 mV: 6.65 b-v: 0.84 pm: 0.031 -0.029
MAG: 6.7, 6.8 SEP: 9.2" PA: 317 deg

Magnitude: 0 1 2 3 4 5 6						Variable	Double	Comet	Asteroid	Planet
☉	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
Gx	Oc	Gc	Pl	Neb	N+C	Star	Unk			

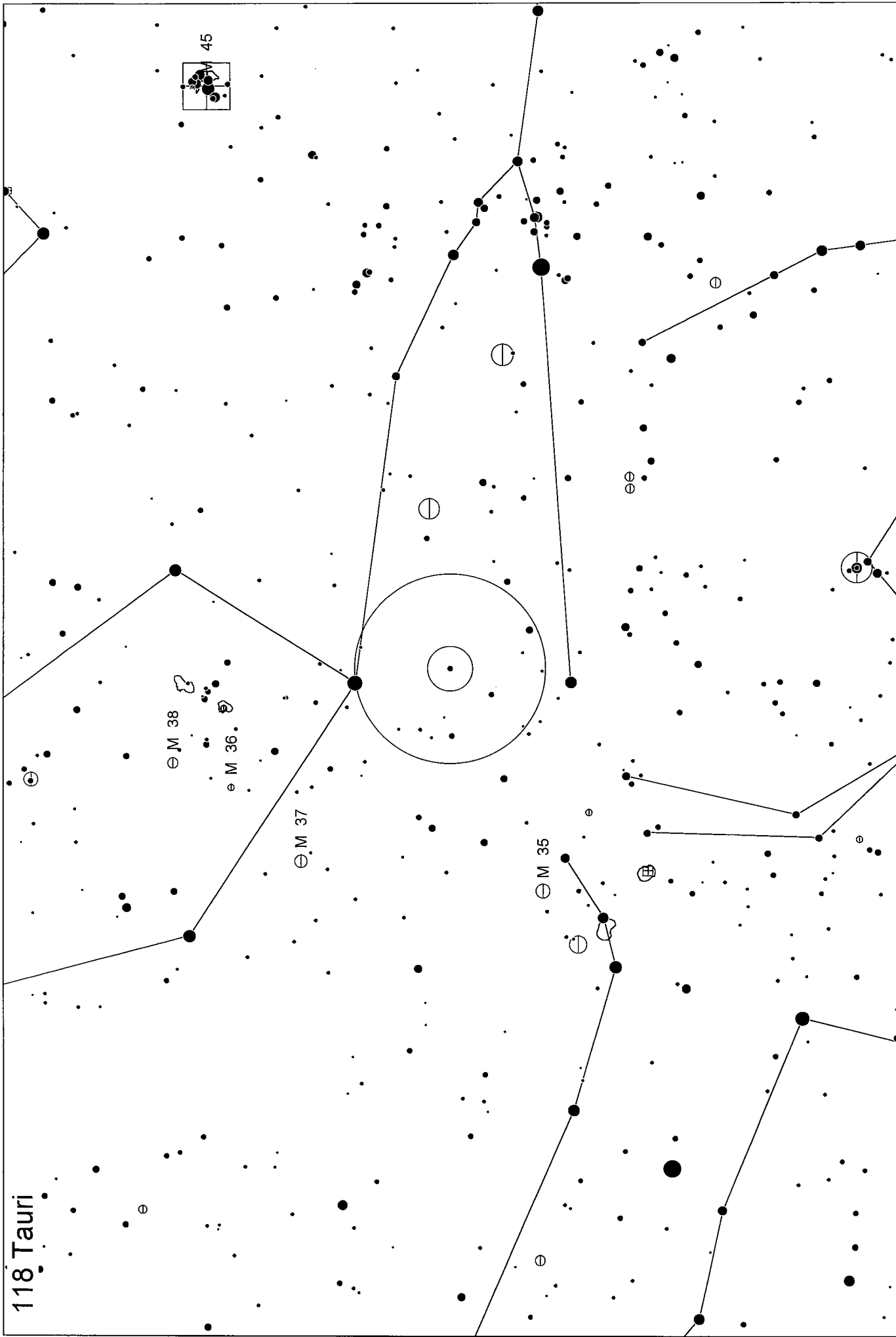
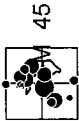
Beta Orionis

5h14m32.30s -08°12'06.0" * HR 1713 HD 34085 Fl: 19 Ba:Bet const:Ori mV: 0.12 b-v:-0.03 sp: B8la:
MAC: 01 68 SEP: 05" PA: 202 deg

MAG. U.1, 0.0 SEP. 9.5 PA. 202 deg

Nebula:	Gx	Oc	Gc	Pl	Neb	N+C	Star	Unk

118 Tauri



PGAO 2003-10-11 4h14m C: 5h30m +25°09' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC
 5h29m16.50s +25°09'02.0" * HR 1821 HD 35943 Fl: 118 Ba: const: Tau mV: 5.47 b-v: 0.04 sp: B8.5V pm: 0.010 -0.032
 MAG: 5.8, 6.6 SEP: 4.8" PA: 204 deg

Magnitude:	0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet
Nebula:	Gx	Oc	Gc	PI	Neb	N+C	Star	Unk				

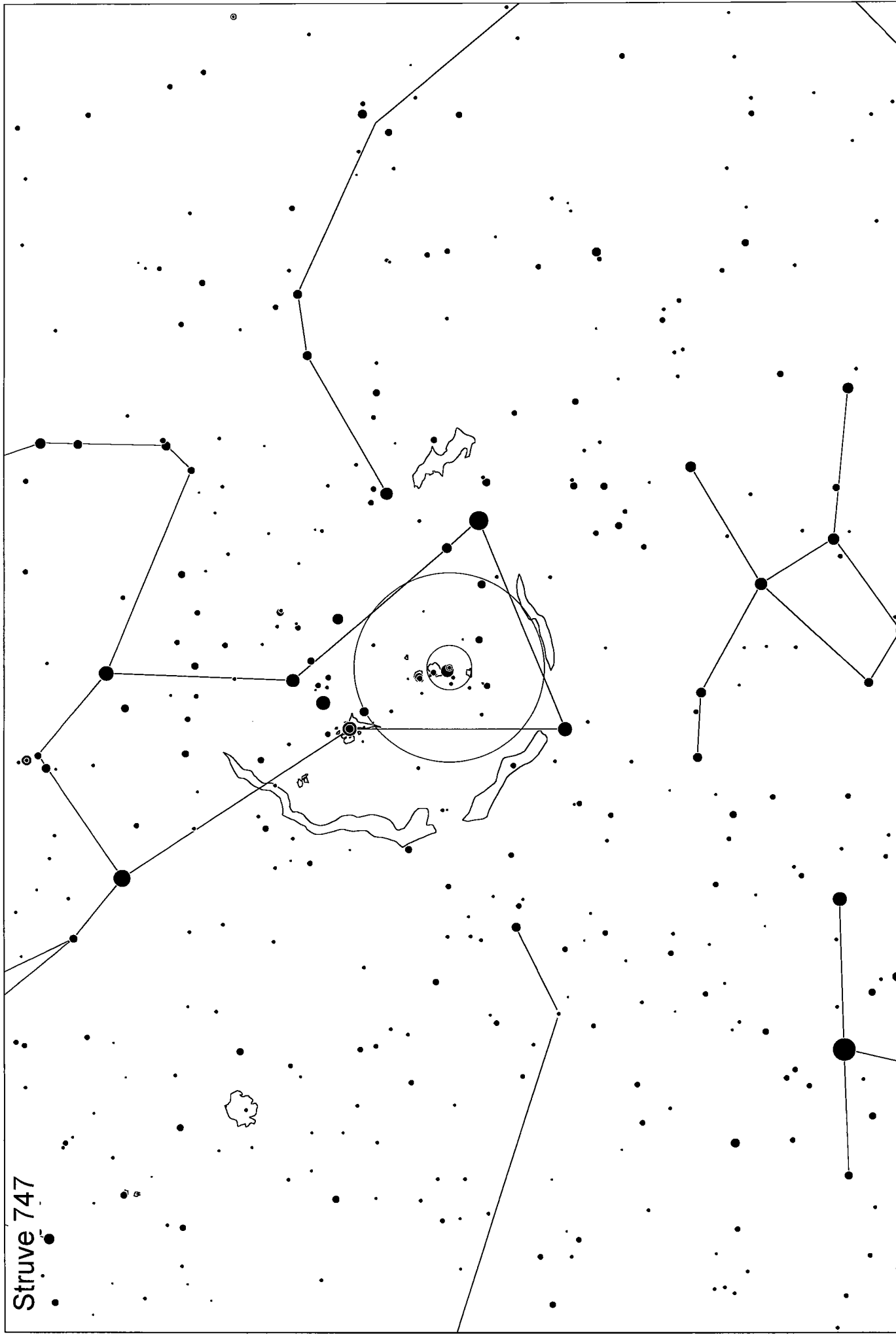
This is a detailed astronomical chart of the constellation Orion. The constellation is outlined by a series of lines connecting its primary stars, which are represented by black dots of varying sizes. The most prominent feature is the 'belt' of Orion, a horizontal row of three bright stars. Below the belt is the 'sword', a vertical line of stars and nebulae. The chart includes numerous smaller stars, some of which are labeled with letters. A large circle is drawn around the central part of the sword, highlighting a specific region of interest. The background is filled with a dense field of stars, representing the surrounding sky. The overall style is that of a traditional astronomical map, with clear lines and labels for identification.

5h32m00.40s -00°17'57.0" * HR 1852 HD 36486 Fl: 34 Ba:Del const:Ori mV: 2.23 b-v:-0.22 sp: O9.5II

MAG: 2.2, 6.3 SEP: 52.6 PA: 359 deg

Nebula:	Gx	Oc	Gc	Pl	Neb	N+C	Star	Unk

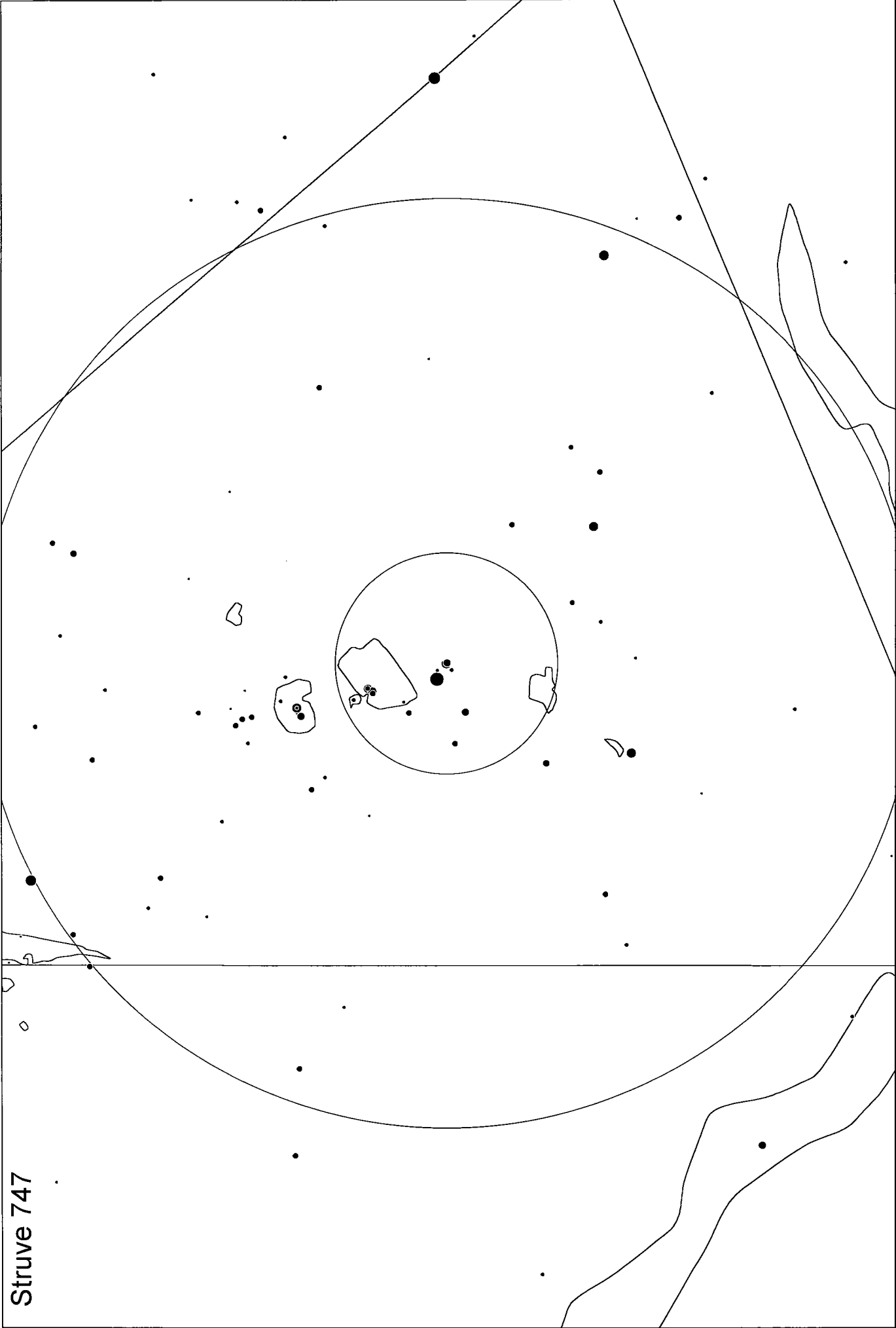
Struve 747



PGAO 2003-10-11 4h14m C: 5h35m -06°00' L:+49°00' O:0° ARC HZ Cat: DSL BSC
 5h35m01.01s -06°00'33.4" * TYC4778-01404-1 Bt: 5.28 Vt: 5.51 mV: 5.53 b-v: 0.20 pm: 0.002 0.001
 MAG: 4.8, 5.7 SEP: 35.7" PA: 223 deg

Magnitude:	0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet
Nebula:	Gx	Oc	Gc	Pi	Neb	N+C	Star	Unk				

Struve 747



PGAO 2003-10-11 4h14m C: 5h35m -06°00' L:+10°00' O:0° ARC HZ Cat: DSL TY2
5h35m01.01s -06°00'33.4" * TYC4778-01404-1 Bt: 5.28 Vt: 5.51 mV: 5.53 b-v: 0.20 pm: 0.002 0.001

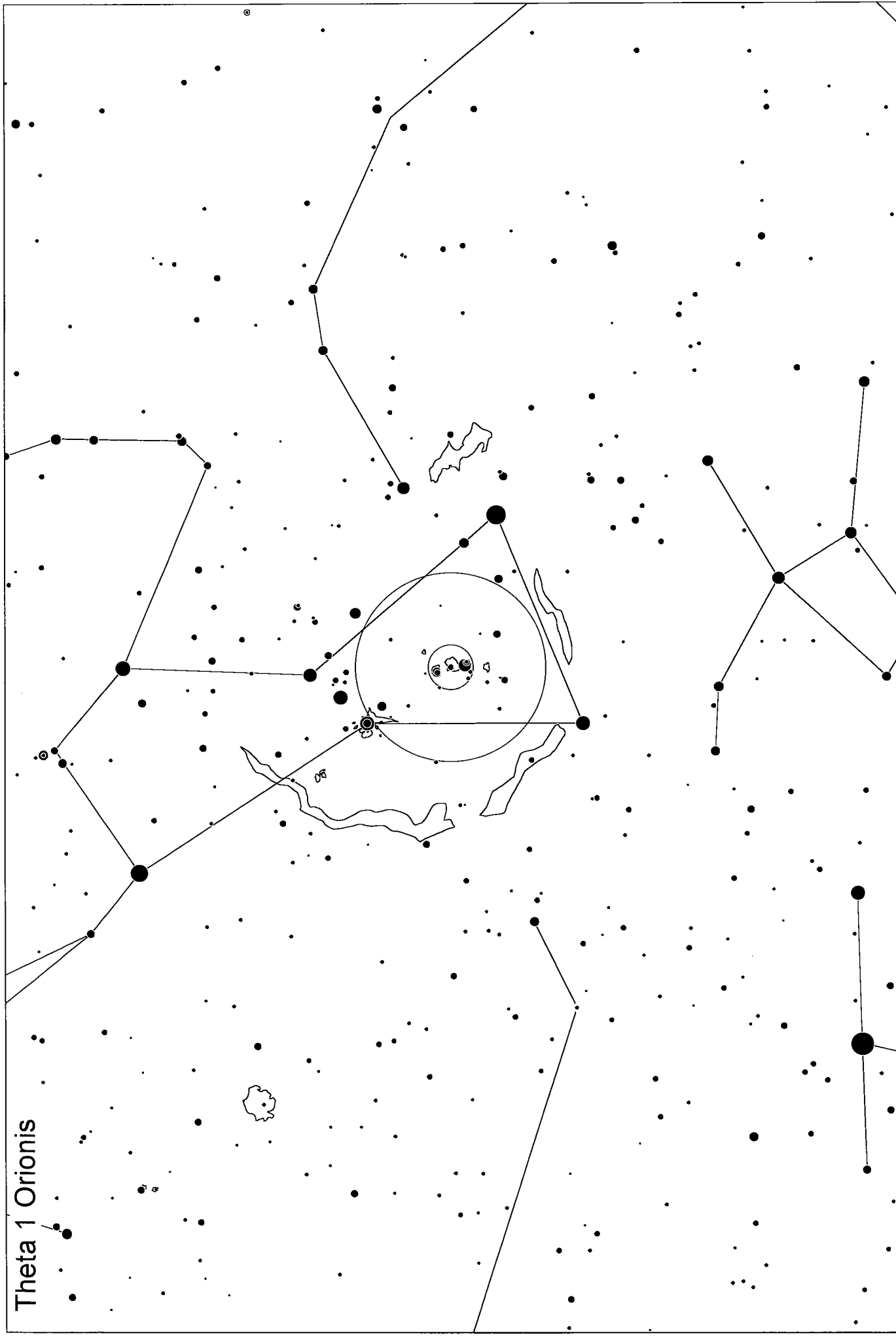
Magnitude: 0 1 2 3 4 5 6 7 8										Variable	Double	Comet	Asteroid	Planet
●	●	●	●	●	●	●	●	●	●	⊙	●	☄	◆	♃
○	⊖	⊕	⊗	⊘	⊙	⊚	⊛	⊜	⊝	+	x			
Nebula: Gx Oc Gc Pl Neb N+C Star Unk														

PGAO 2003-10-11 4h14m C: 5h35m +09°56' L: +49°00' O:0° ARC HZ Cat: DSL BSC
5h35m08.30s +09°56'03.0" * HR 1879 HD 38861 Fl: 39 Ba: Lam const: Ori mV: 3.54 b-v: -0.18 sp: O8III((f))
MAG: 3.6, 5.5 SEP: 4.4" PA: 43 deg pm: 0.000 -0.006 ,Meissa, Heka

Magnitude: :	0	1	2	3	4	5	6		
									
									Variable
									Double
									Comet
									Asteroid
									Planet

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Nebula:	Gx	Oc	Gc	Pi	Neb	N+C	Star Unk

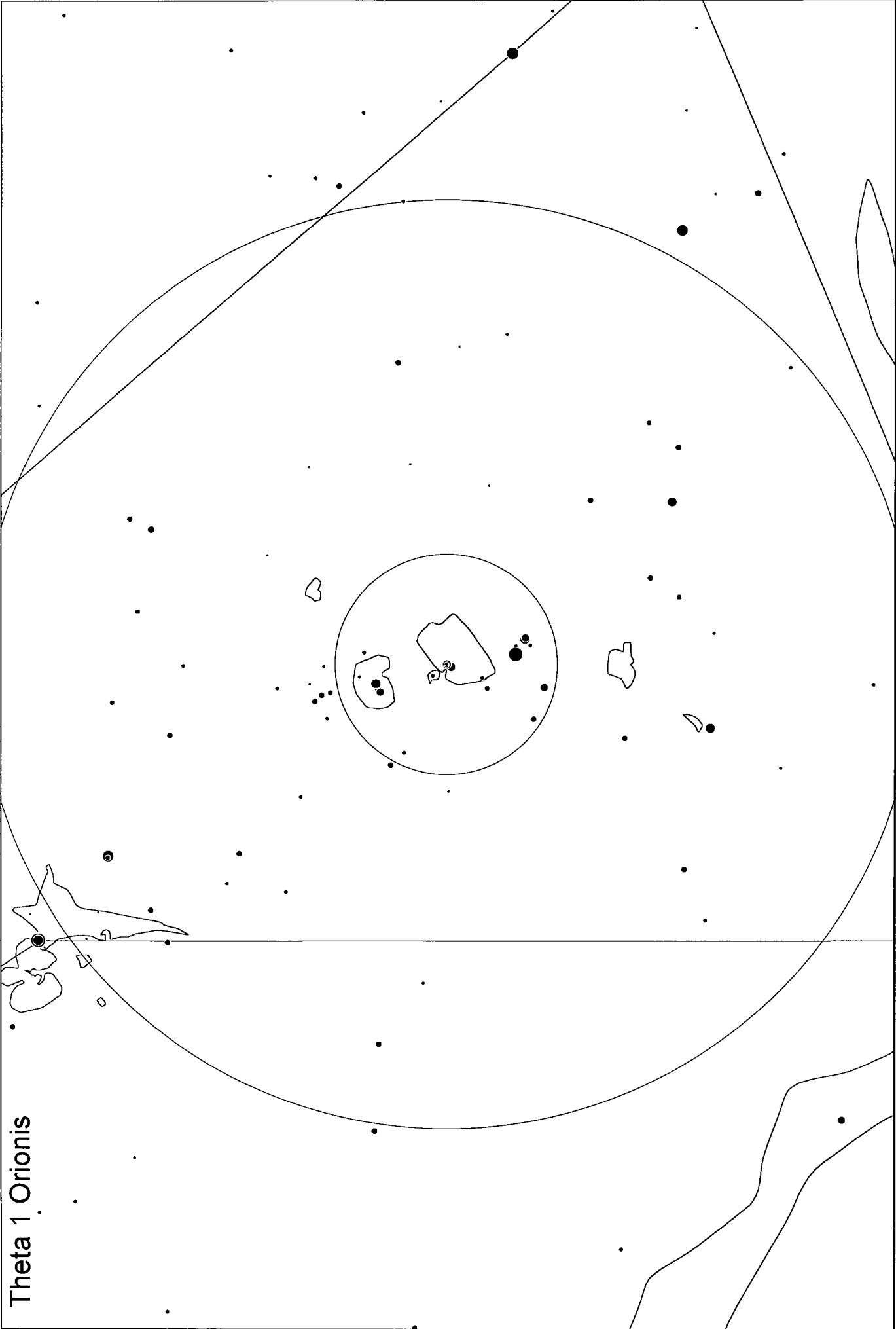
Theta 1 Orionis



PGAO 2003-10-11 4h14m C: 5h35m -05°23' L:+49°00' O:0° ARC HZ Cat: DSL BSC
 5h35m11.01s -05°55'36.9" * TYC4778-01370-1 Bt: 7.28 Vt: 7.42 mV: 7.43 b-v: 0.12 pm: -0.001 -0.001

Magnitude:	0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet
Nebula:	Gx	Oc	Gc	Pl	Neb	N+C	Star	Unk				

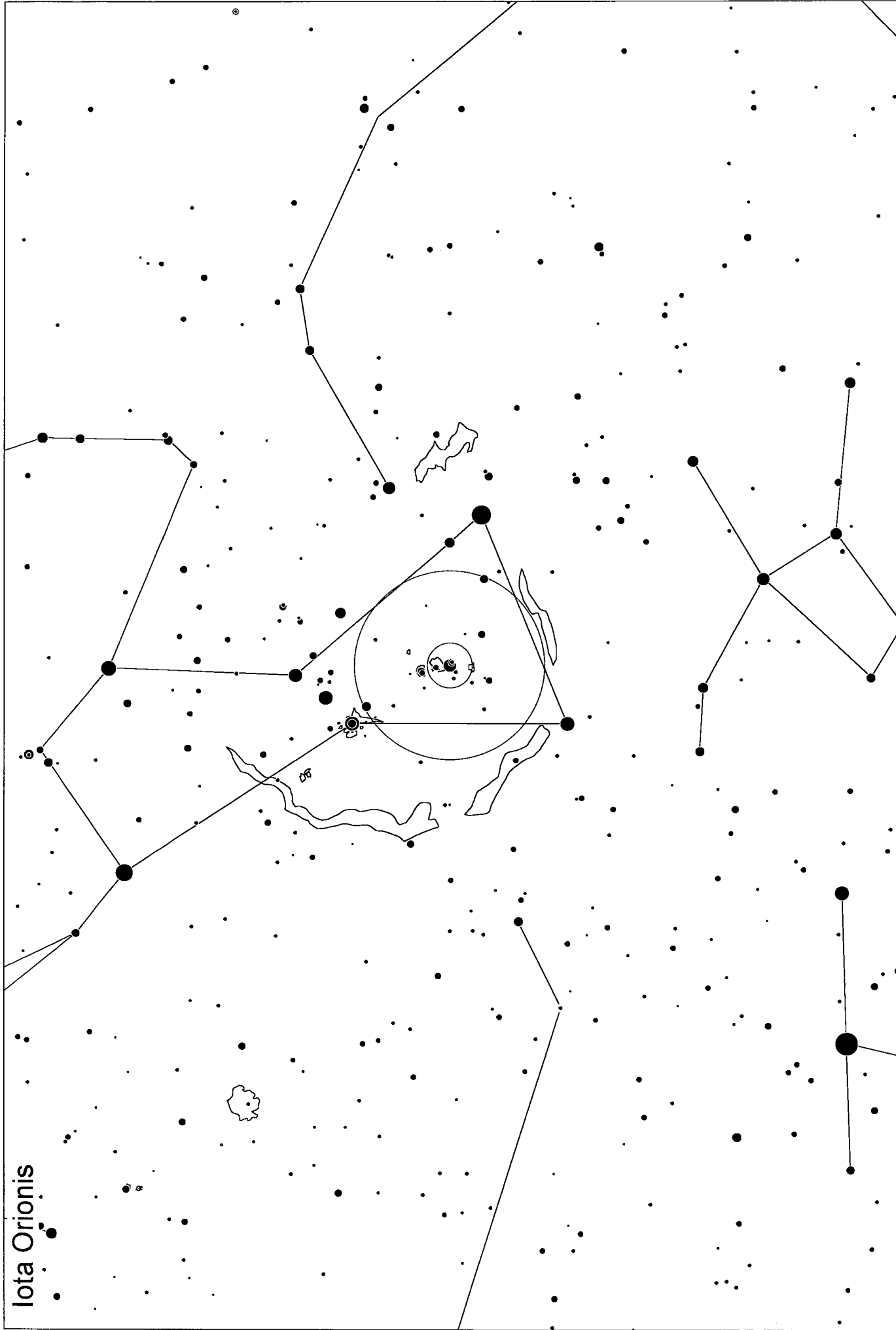
Theta 1 Orionis



PGAO 2003-10-11 4h14m C: 5h35m -05°23' L:+10°00' O:0° ARC HZ Cat: DSL BSC SKY TY2
5h35m11.01s -05°55'36.9" * TYC4778-01370-1 Bt: 7.28 Vt: 7.42 mV: 7.43 b-v:-0.12 pm:-0.001-0.001

Magnitude: 0 1 2 3 4 5 6 7 8										Variable	Double	Comet	Asteroid	Planet
Gx Oc Gc Pi Neb N+C Star Unk										+	x			

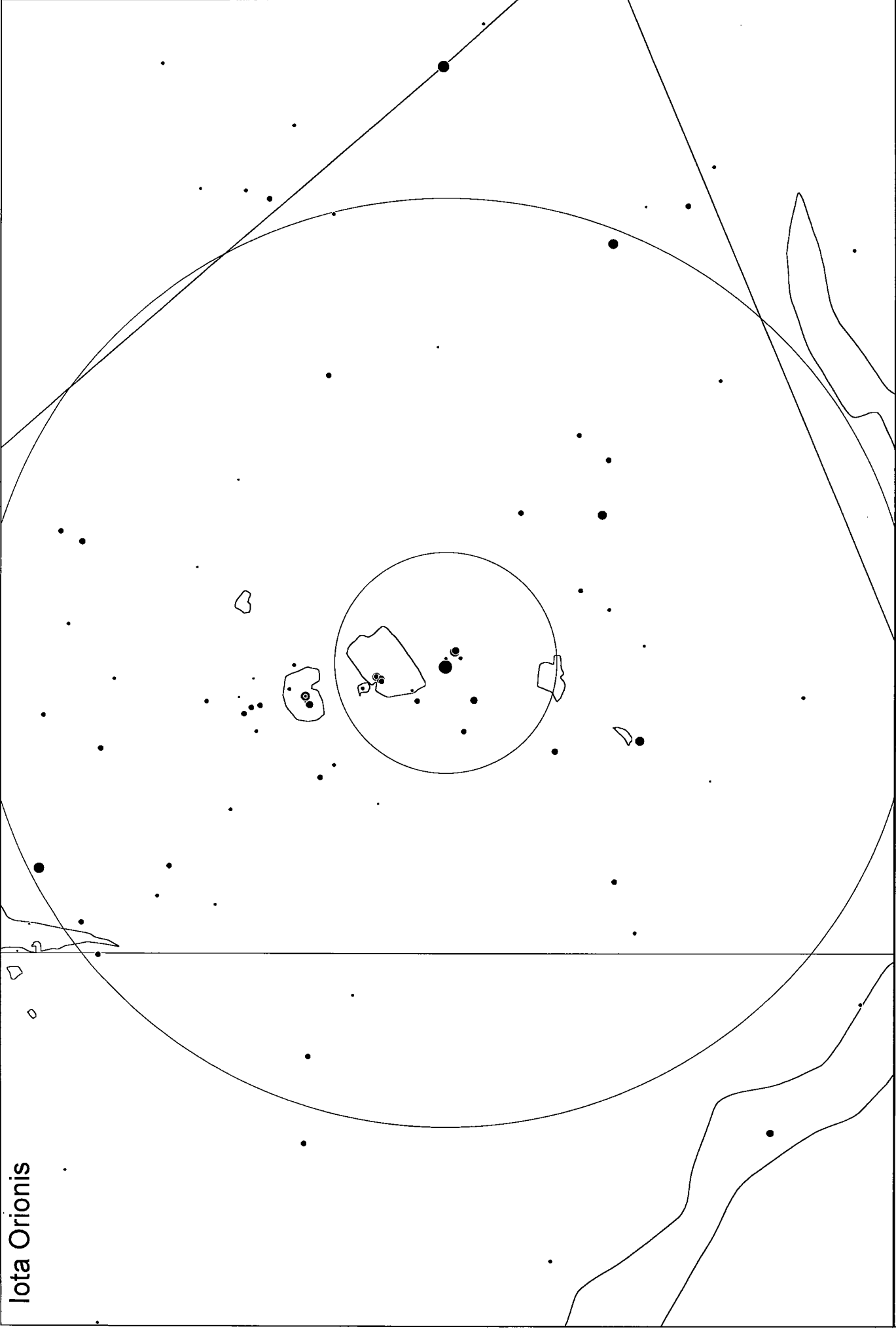
Iota Orionis



PGAO 2003-10-11 4h14m C: 5h36m -05°54' L: +49°00' O:0° ARC HZ Cat: DSL BSC
 5h35m26.45s -05°54'44.5" * mV: 7.73 B-V: sp: Dbl: 11.40"/ 4.10m pm:-0.016 -0.001

Magnitude: 0 1 2 3 4 5 6	Variable	Double	Comet	Asteroid	Planet
Gx Oc Gc Pl Neb N+C Star Unk	+	+	+	+	+








Iota Orionis



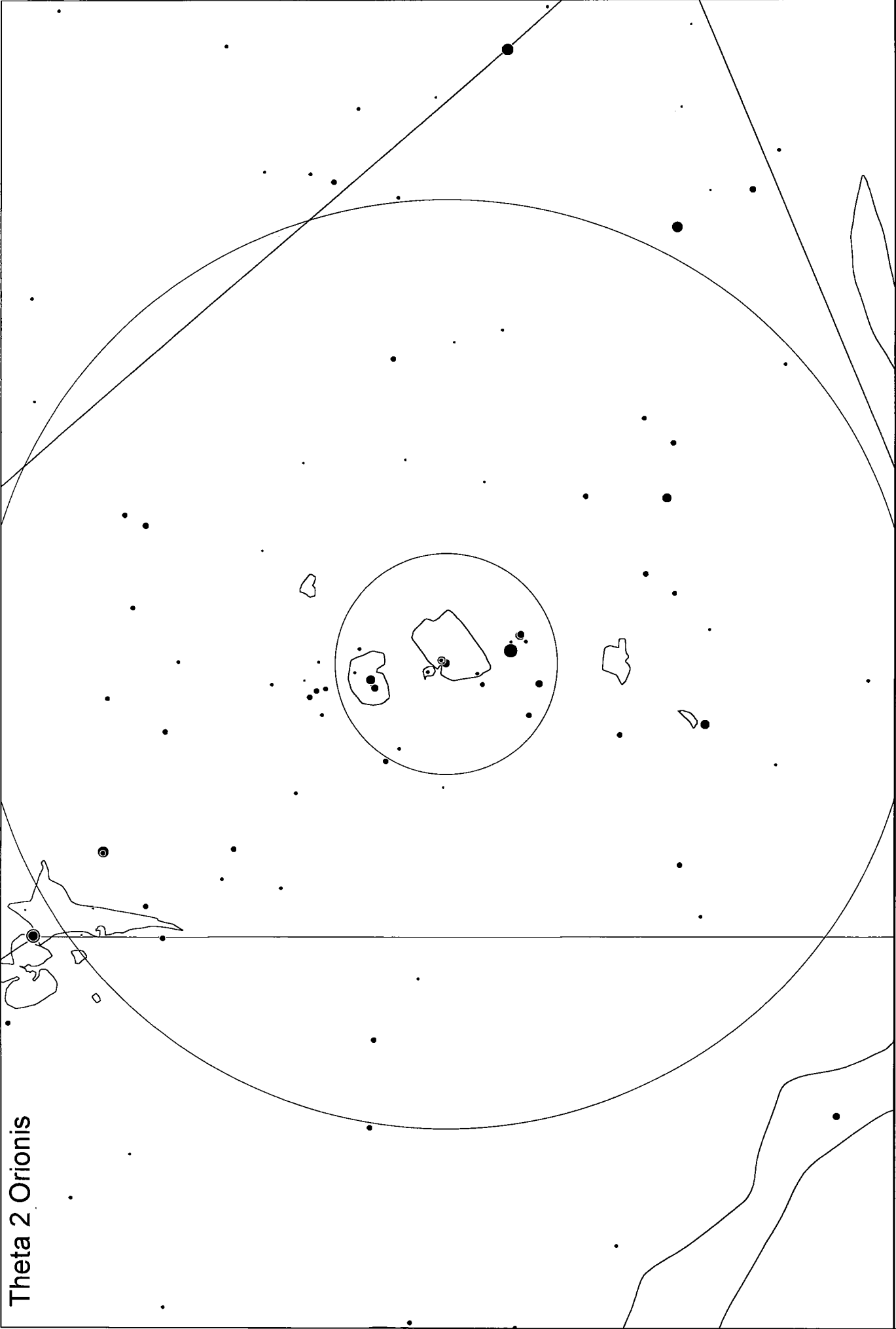
PGAO 2003-10-11 4h14m C: 5h35m -05°55' L:+10°00' O:0° ARC HZ Cat: DSL TY2
5h35m11.01s -05°55'36.9" * TYC4778-01370-1 Bt: 7.28 Vt: 7.42 mV: 7.43 b-v:-0.12 pm:-0.001 -0.001

Magnitude: 0 1 2 3 4 5 6 7 8										Variable	Double	Comet	Asteroid	Planet
Gx Oc Gc Pl Neb N+C Star Unk										+	x			
Nebula: Gx Oc Gc Pl Neb N+C Star Unk														

Theta 2 Orionis

									
Magnitude: :	0	1	2	3	4	5	6	Variable	Planet
Nebula:									

Theta 2 Orionis



PGAO 2003-10-11 4h14m C: 5h36m -05°25' L:+10°00' O:0° ARC HZ Cat: DSL BSC SKY TY2
5h35m22.90s -05°24'57.8" * TYC4774-00933-1 Bt: 4.91 Vt: 5.03 mV: 5.04 b-v:-0.10 pm: 0.004 0.004

Magnitude:	0	1	2	3	4	5	6	7	8	Variable	Double	Comet	Asteroid	Planet
Nebula:	Gx	Oc	Gc	Pi	Neb	N+C	Star	Unk						

This is a detailed astronomical chart of the constellation Orion. The constellation is outlined with a thick black line, showing its characteristic shape. The three stars of the Belt (Rigel, Saiph, and Bellatrix) are connected by a line. The sword is also clearly visible, with the stars of the handle (Mintaka, Alnilam, and Saiph) connected by a line. The chart includes numerous stars of varying sizes, representing different magnitudes. Several nebulae are depicted with irregular, cloud-like outlines, including the Orion Nebula (M42) and the Flame Nebula (M2). The background is filled with a dense field of stars, representing the surrounding sky. The chart is oriented with North at the top.

5h38m44.80s -02°36'00.0" * HR 1931 HD 37468 Fl: 48 Ba:Sig const:Ori mV: 3.81 b-v:0.24 sp: 09.5V

Magnitude:	0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet
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Nebula:	Gx	Oc	Gc	PI	Neb	N+C	Star	Unk
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This is a detailed astronomical chart of the constellation Orion. The constellation is outlined with lines connecting its major stars. A large circle is centered on the belt stars, and a smaller circle is centered on the sword. The constellation is surrounded by other stars and constellations. The label 'Zeta Orionis' is at the bottom left.

5h40m45.50s -01°56'34.0" * HR 1948 HD 37742 Fl: 50 Ba:Zet const:Ori mV: 2.05 b-v
MAG: 19.40.0.0 SED: 2.4" 58" PA: 163.40 deg

Magnitude: 0 1 2 3 4 5 6

Nebula:	Gx	Oc	Gc	Pl	Neb	N+C	Star	Unk
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pm: 0.003 -0.002 ;ALNITAK; Alnitah

Downloaded from <http://ajphaphysocpharm.sagepub.com/> at 11:51 11 November 2014

A detailed black and white star chart of the constellation Gamma Leporis. The chart shows numerous stars of varying magnitudes, with the primary stars connected by lines to form the constellation's shape. A large circle is drawn around the central star, and a smaller circle is drawn around the star labeled 'M 41'. The constellation is labeled 'Gamma Leporis' in the bottom left corner. Other labels include 'M 50' and 'M 41' near specific stars, and 'e' near several other stars.

[illegible]

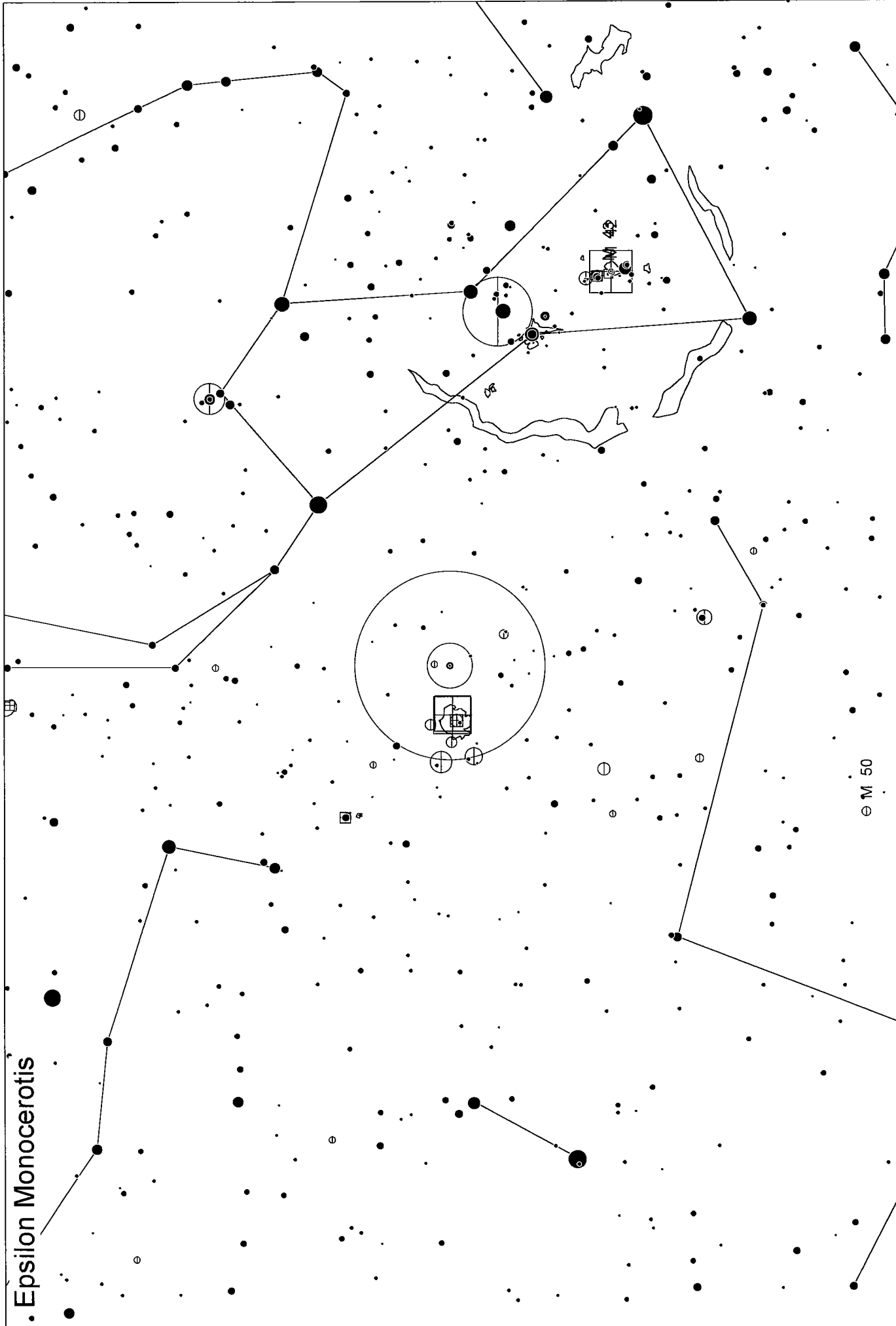
This is a detailed black and white star chart of the constellation Theta Aurigae. The chart features numerous stars of varying magnitudes, represented by dots of different sizes. Several key stars are connected by lines to form the constellation's outline. A large circle highlights a central star, and a smaller circle is centered on it. Labels include 'Theta Aurigae' at the bottom left, 'M 35', 'M 36', 'M 37', and 'M 38' near the center, and 'M 39' at the top right. A small inset map in the top left corner shows the constellation's location within the larger sky.

PGAO 2003-10-5 5h07m C: 6h00m +37°13' L+49°00' O:0° ARC HZ Cat: DSL BSC SAC
5h59m43.30s +37°12'45.0" * HR 2095 HD 40312 Fl: 37 Ba:The const:Aur mV: 2.62 b-v-0.08 sp: A0pSiS
MAG: 2.6, 7.1 SEP: 3.6" PA: 313 deg

[illegible]

Nebula:	Gx	Oc	Gc	Pl	Neb	N+C	Star	x	Unk

Epsilon Monocerotis



PGAO 2003-10-5 5h07m C: 6h24m +04°35' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC
6h23m 46.10s +04°35'34.0" * HR 2298 HD 44769 Fl: 8 Ba: Eps const: Mon mV: 4.44 b-v: 0.18 sp: A5IV
MAC J4586.5 SEP: 13.4" PA: 27 deg

pm: 0.018 0.011







Magnitude: : 0 1 2 3 4 5 6 Variable Double Comet Asteroid Planet

Nebula: Gx Oc Gc Pl Neb N+C Star Unk

																																																																																																																								
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12 Lyncis

6h46m14.10s +59°26'30.0" * HR 2470 HD 48230 P: 12 Ba: const:Lyn mV: 4.87 b-v: 0.08 sp: A3V

										
Nebula:	Gx	Oc	Oc	Gc	Gc	Pl	Neb	N+C	Star	Unk

Magnitude: 0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet
●	●	●	●	●	●	●	⊙	●	☄	◆	♃
○	○	⊕	⊕	○	□	⊕	⊕	+	×		
Nebula:	GX	Oc	Gc	Pi	Neb	N+C	Star	Unk			

This is a detailed astronomical chart of the constellation Delta Geminorum. The chart features a dense field of stars, with the primary stars of the constellation connected by lines to form its characteristic shape. A large circle is centered on the primary star, and a smaller circle is centered on the star labeled 'M 35'. The text 'Delta Geminorum' is written in the bottom left corner. The chart is a black and white line drawing, typical of astronomical atlases.

PGAO 2003-10-5 6h07m C: 7h20m ~~7h20m~~ +21°59' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC
7h20m07.40s +21°58'56.0" * HR 2777 HD 56986 Fl: 55 Ba: Del const: Gem mV: 3.53 b-v: 0.34 sp: F2IV
MAG: 3.5, 8.2 SEP: 6.8" PA: 211 deg pm: -0.026 -0.012 ; Wasat; Wesat

Magnitude: 0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet
○	⊖	⊕	⊙	●	●	●	⊙	●	☄	◆	♁
Nebula: Gx	Gc	Oc	Pl	Gc	Pl	Neb	N+C	Star	Unk		

This is a detailed astronomical chart of the constellation Lynx. The chart features numerous stars of varying sizes, representing different magnitudes. Several stars are connected by lines to form the constellation's outline. Key features include:

- Star 19 Lynx:** Located in the lower-left corner, marked with a large circle and a horizontal line through its center.
- Star sigma M81:** Located in the lower-right corner, labeled with the text σM^{82}_{81} .
- Central Star:** A prominent star in the center, surrounded by a large circle, with a smaller circle and a central dot indicating a specific feature or measurement.
- Other Labels:** The letters "O" and "P" are visible near the center, and "M" is visible near the bottom right.

PGAO 2003-10-5 6h07m C: 7h23m +55°16' L+49°00' O:0° ARC HZ Cat: DSL BSC SAC
7h22m52.10s +55°16'53.0" * HR 2784 HD 57103 Fl: 19 Ba: const:Lyn mV: 5.45 b-v: sp: B8V
MAG: 5.6, 6.5 SEP: 14.8" PA: 315 deg pm:-0.003 -0.029

[illegible]

	GX	Oc	Gc	Pt	Neb	N+C	Star	Unk
Nebula:	○	⊖	⊕	○	□	⊞	+	x

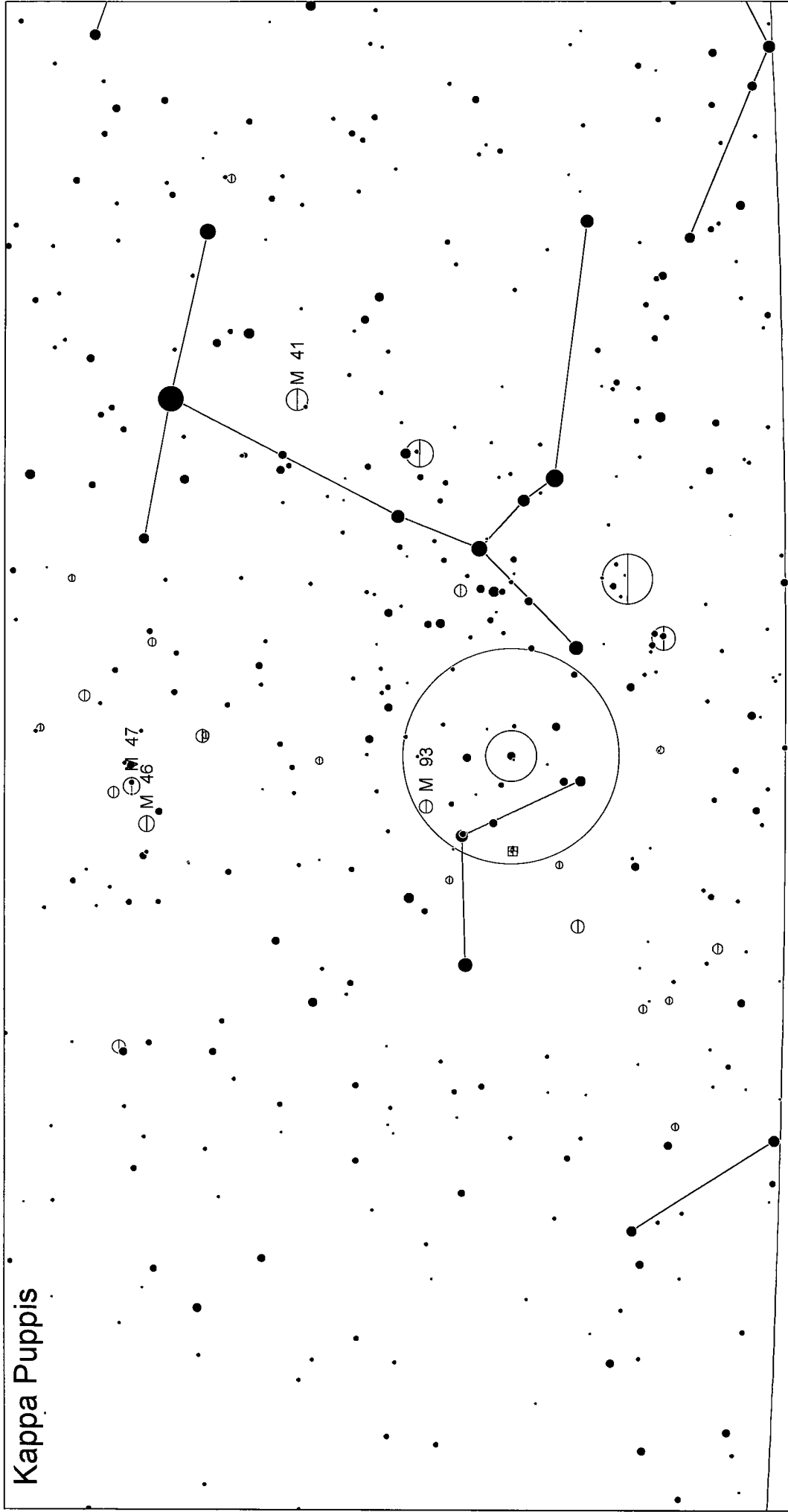
A detailed black and white star chart of the constellation Alpha Geminorum. The chart shows numerous stars of varying sizes, with the primary stars connected by lines to form the constellation's outline. A large circle is drawn around the central star, and a smaller circle is drawn around the star labeled 'M 25'. The text 'Alpha Geminorum' is written vertically on the left side of the chart.

7h34m36.00s +31°53'18.0" * HR 2891 HD 60179 FI: 66 Ba:Alp const:Gem m_V: 1.98 b-v: 0.03 sp: A1V
MAG: 19.29 SEP: 2.2" PA: 171 deg

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{4}
planet
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1

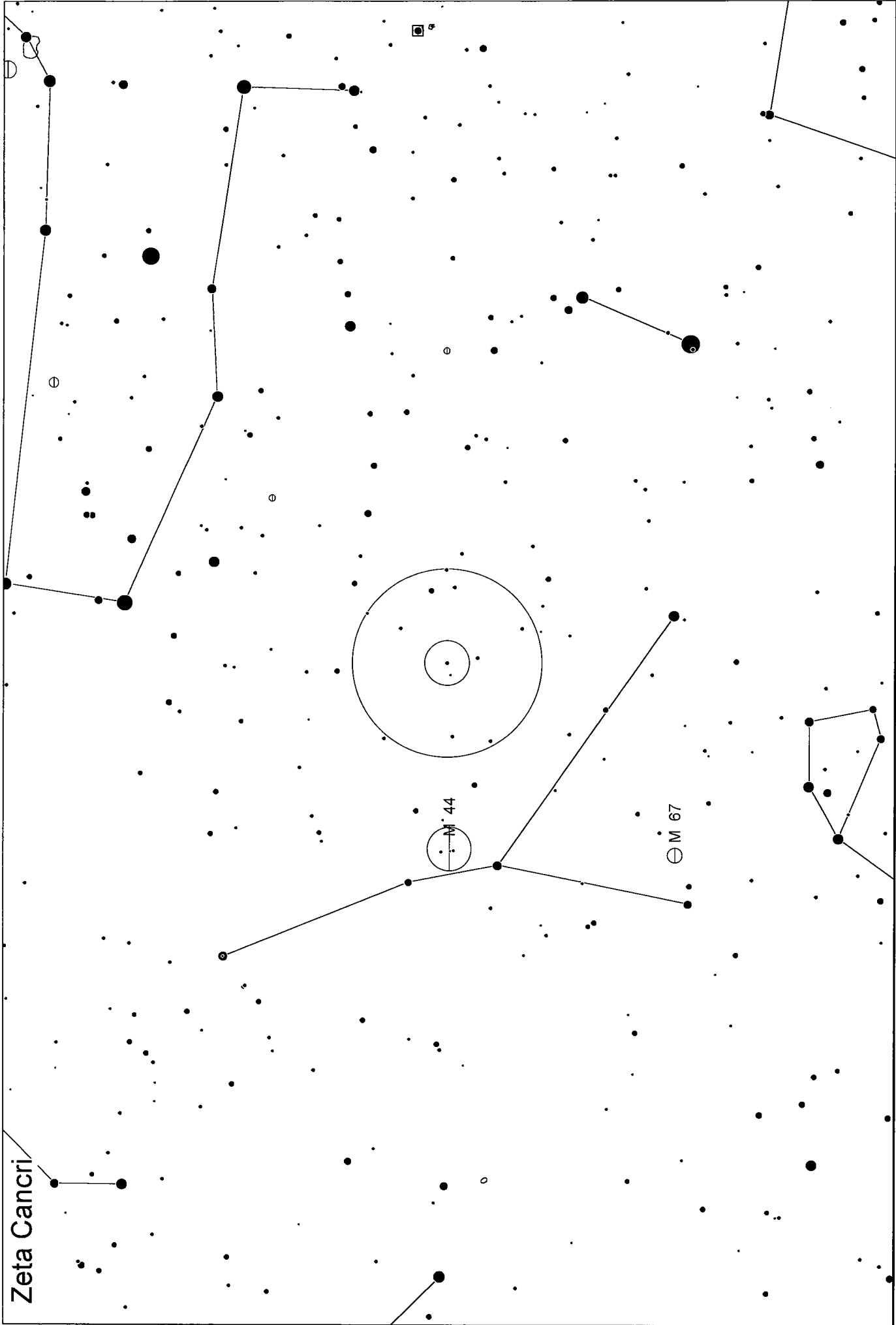
Kappa Puppis



PGAO 2003-10-5 7h07m C: 7h39m -26°49' L:+49°00' O:0° ARC HZ Cat: DSL BSC SAC
 7h38m49.38s -26°48'06.5" * HD 61556 SAO174199 CD-26 4707 mV: 4.66 B-V:-0.11 sp:B3 Dbl: 9.90"/ 0.25m pm:-0.014 0.016
 MAG: 4.5, 4.7 SEP: 9.9" PA: 318 deg

Magnitude:	0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet
Nebula:	Gx	Oc	Gc	Pl	Neb	N+C	Star	Unk				

Zeta Cancri



PGAO 2003-10-5 7h07m C: 8h12m +17°38' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC
8h12m 12.70s +17°38'52.0" * HR 3208 HD 68257 Fl: 16 Ba: Zet1 const: Cnc mV: 5.63 b-v: 0.54 sp: F8V
MAG: 5.6, 6.0 SEP: 5.9" PA: 89 deg pm: 0.066 -0.135 ; Tegmine

Magnitude: 0 1 2 3 4 5 6										Variable	Double	Comet	Asteroid	Planet
●	●	●	●	●	●	●	●	●	●	⊙	●	☄	◆	♃
○	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕
Nebula:										Gx	Oc	Gc	Pl	Neb
Nebula:										N+C	Star	Unk		

This is a detailed black and white star chart of the constellation Iota Cancri. The chart features a dense field of stars, with several stars of varying sizes connected by lines to form the constellation's outline. A large circle is centered on a star, and a smaller circle is centered on a star labeled 'M 44'. Other labels include 'Iota Cancri' at the bottom left, 'M 67' at the top right, and 'M 44' near the center. The chart is set against a background of a grid of stars.

8h46m41.80s +28°45'36.0" * HR 3475 HD 74739 Fl: 48 Ba:lot const:Cnc mV: 4.02 b-v: 1.01 sp: G7.5IIaBa0.1 pm:-0.025 -0.042

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— 2 —

38 Lynx

M 44

⊖ M 67

9h18m50.70s +36°48'09.0" * HR 3690 HD 80081 Fl: 38 Ba: const:Lyn mV: 3.82 b-v: 0.06 sp: A3V
MAC: 2066 SEP: 27" PA: 220 deg

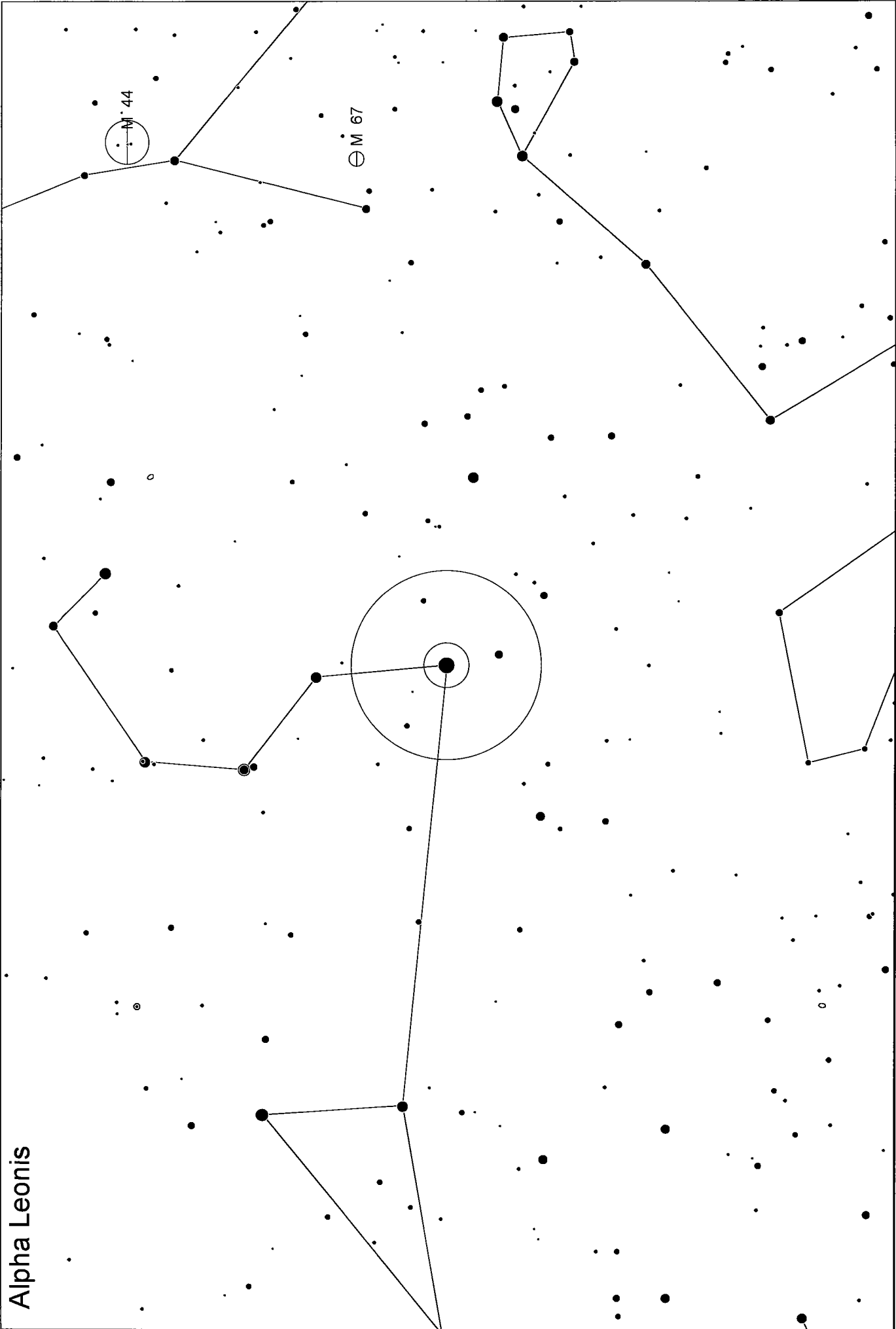
pm:-0.030 -0.122

⑦

X

X

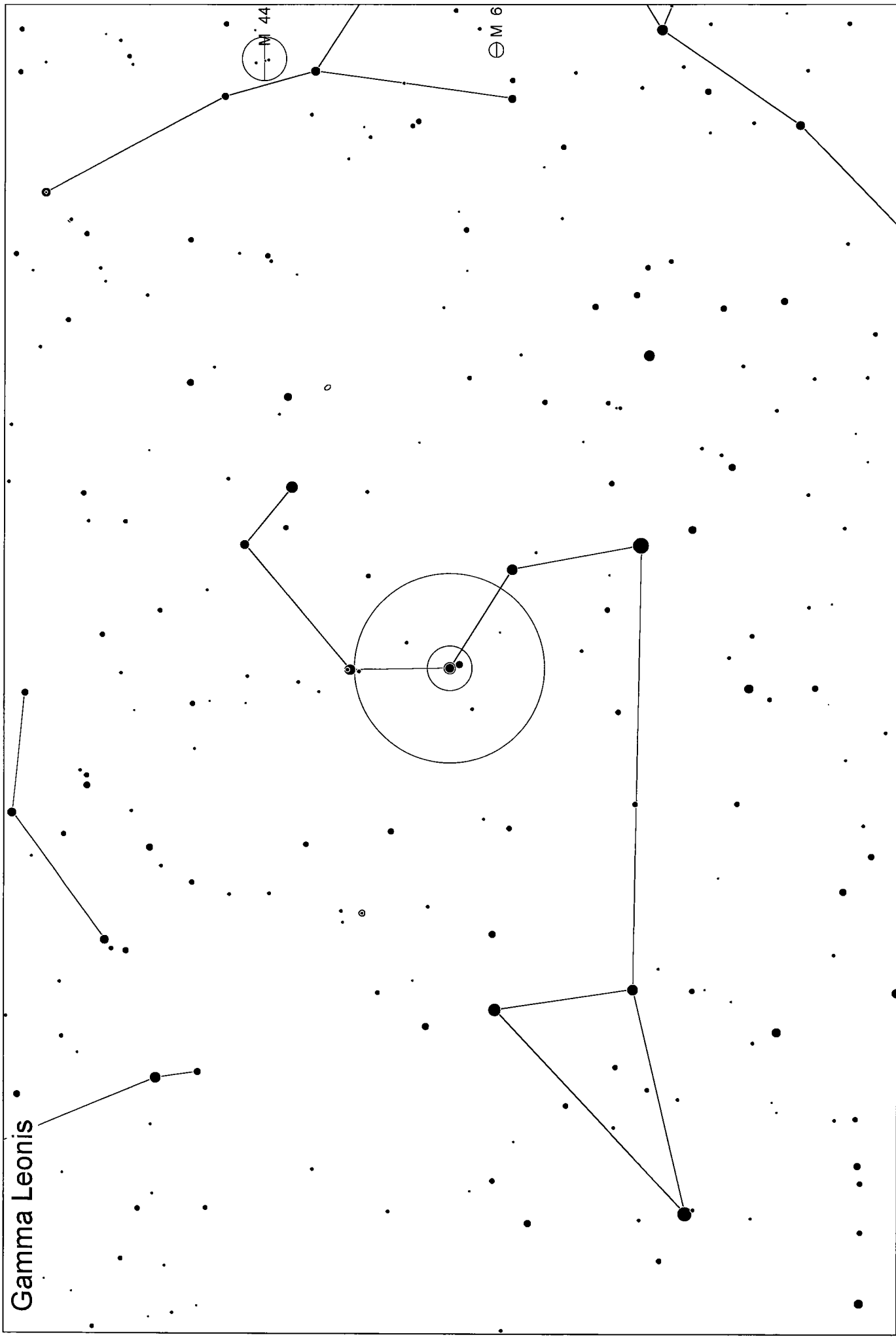
Alpha Leonis



PGAO 2003-10-11 9h22m C: 10h09m +11°57' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC
10h08m22.30s +11°58'02.0" * HR 3982 HD 87901 Fl: 32 Ba: Alp const: Leo mV: 1.35 b-v: -0.11 sp: B7V
MAG: 1.4, 7.7 SEP: 1.4, 7.7 PA: 307 deg pm: -0.248 0.006 ; REGULUS; Cor Leonis; Rex; Al Kalb al Asad; Kabeleced

Magnitude: 0 1 2 3 4 5 6	Variable	Double	Comet	Asteroid	Planet
Gx Oc Gc Pl Neb N+C Star Unk	+	+	+	+	+

Gamma Leonis



PGAO 2003-10-11 9h22m C: 10h20m +19°49' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC
 10h19m58.30s +19°50'30.0" * HR 4057 HD 89484 Fl: 41 Ba: Gam1 const: Leo mV: 2.61 b-v: 1.15 sp: K1-IIIbFe-0.5 pm: 0.306 -0.147 ,AL GIEBA; Algieba; Algieba
 MAG: 2.2, 3.5 SEP: 4.4" PA: 122 deg

Magnitude: : 0 1 2 3 4 5 6	Variable	Double	Comet	Asteroid	Planet
○	⊕	⊙	☄	◆	♃
Gx	Gc	Gc	PI	Neb	N+C Star Unk

55 Leonis

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									(7)
Magnitude:	: 0	1	2	3	4	5	6		
Nebula:	Gx	Oc	Oc	Pt	Gc	Pt	Neb	N+C	Star Unk

N Hydrae

10h49m37.50s -16°11'37.0" * HR 4232 HD 93813 Fl: Ba:Nu const:Hya mV: 3.11 b-v: 1.25 sp: K2III pm: 0.094 0.200

MAG: 5.8, 5.9 SEP: 9.2" PA: 210 deg

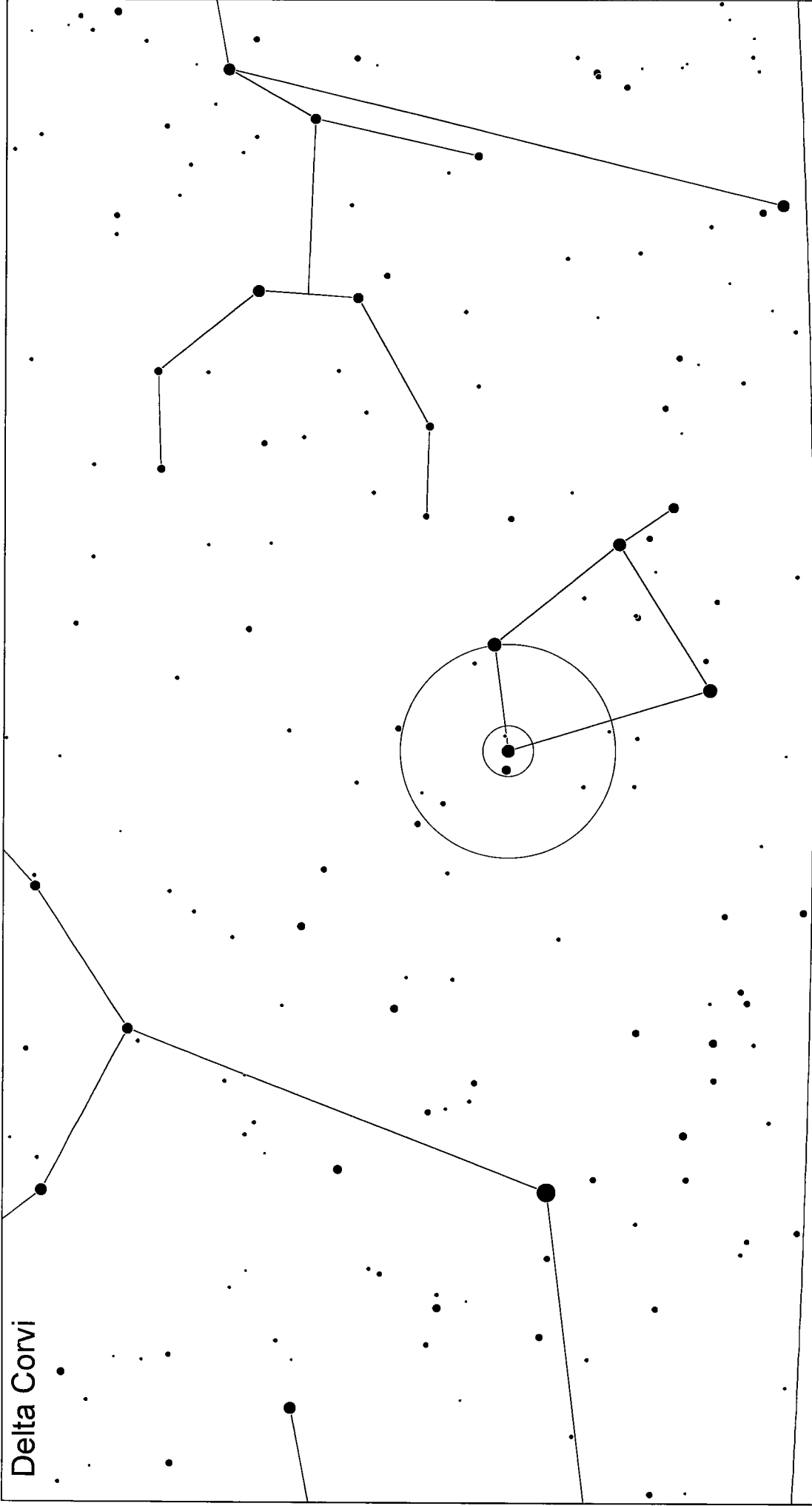
Magnitude: : 0 1 2 3 4 5 6

Variable Variable Double Comet Asteroid Planet Planet

7

Nebula: Gx Oc Gc Pl Neb N+C Star Unk

Delta Corvi



PGAO 2003-10-11 9h22m C: 12h30m -16°32' L:+49°00' O:0° ARC HZ Cat: DSL BSC SAC
 12h29m51.90s -16°30'56.0" * HR 4757 HD108767 Fl: 7 Ba:Del const:Crv mV: 2.95 b-v:-0.05 sp: B9.5V
 MAG: 3.0, 9.2 SEP: 24.2" PA: 214 deg pm:-0.210 -0.138 ;Algorab; Algores; Algorai; Algorel

Magnitude: 0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet
☉	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
Gx	Oc	Gc	Pl	Neb	N+C	Star	Unk				

This is a detailed star chart of the constellation Comae Berenices. The chart displays a wide field of stars, with the constellation's primary stars connected by lines to form its characteristic shape. A prominent feature is the large circle labeled 'M 64', representing the Bode Galaxy, located near the center of the chart. Another significant feature is the smaller circle labeled 'M 53', representing the Coma Cluster, located towards the bottom right. The constellation is labeled 'Comae Berenices' in the bottom left corner. The chart includes various star patterns and lines connecting them, providing a comprehensive view of the constellation's structure and its surrounding celestial objects.

PGAO 2003-10-11 9h22m C: 12h35m +18°21' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC
12h35m07.80s +18°22'37.0" * HR 4792 HD109511 Fl: 24 Ba: const: Com mV: 5.02 b-v: 1.15 sp: K2III
MAG: 5.2, 6.7 SEP: 20.3" PA: 271 deg

Magnitude.: 0 1 2 3 4 5 6

Variable Variable Double Comet Asteroid Planet

Planet

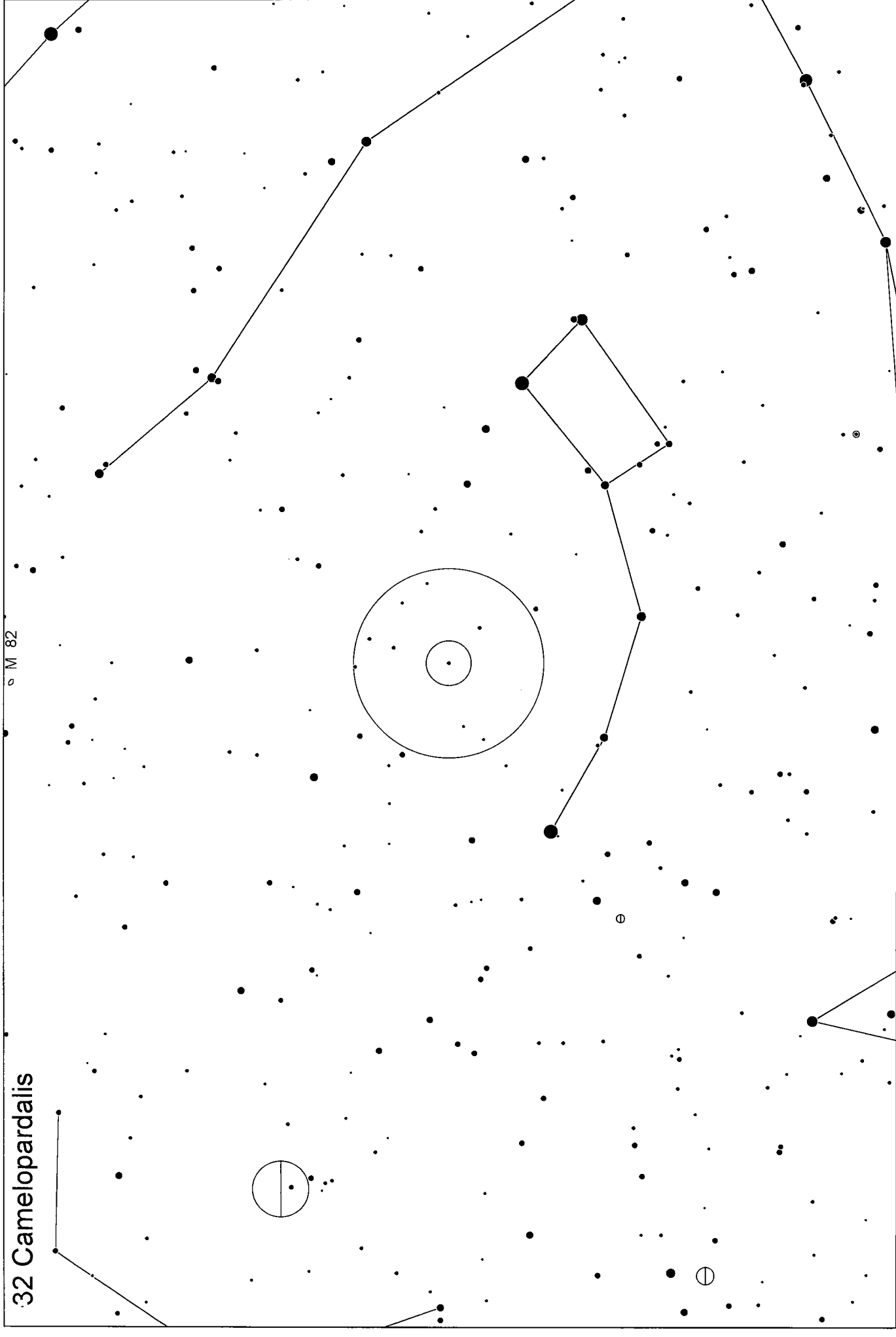
Nebula:	Gx	Oc	Gc	Pl	Neb	N+C	Star	Unk
	○	⊖	⊕	○	□	⊞	+	x

A detailed star chart of the constellation Gamma Virginis. The chart shows numerous stars of varying magnitudes, with the primary star, Gamma Virginis, highlighted by a large circle. Other stars are connected by lines to form the constellation's shape. A label 'Gamma Virginis' is positioned at the bottom left, with a line pointing to the primary star. A small circle is also visible near the center of the constellation.

This is a detailed star chart of the constellation Gamma Virginis. The chart features a large number of stars, with the primary star, Gamma Virginis, prominently marked by a large circle. Other stars are connected by lines to form the constellation's outline. A label 'Gamma Virginis' is placed near the primary star, and a small circle is labeled 'M. 53'.

32 Camelopardalis

8 M 82



PGO 2003-10-6 9h47m C: 12h49m +83°24' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC
 12h49m06.69s +83°25'04.2" * TYC4633-01784-1 Bt: 5.74 Vt: 5.74 mV: 5.74 b-v: 0.00 pm:-0.020 0.015
 MAG: 5.3, 5.8 SEP: 21.6° PA: 326 deg

Magnitude:	0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet
	●	●	●	●	●	●	●	○	●	☄	◆	♃
Nebula:	○	○	○	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕
	Gx	Oc	Gc	Pl	Neb	N+C	Star	Unk				

Alpha Canum Venaticorum

α M 106

α M 101

α M 51

α M 63

α M 94

α M 64

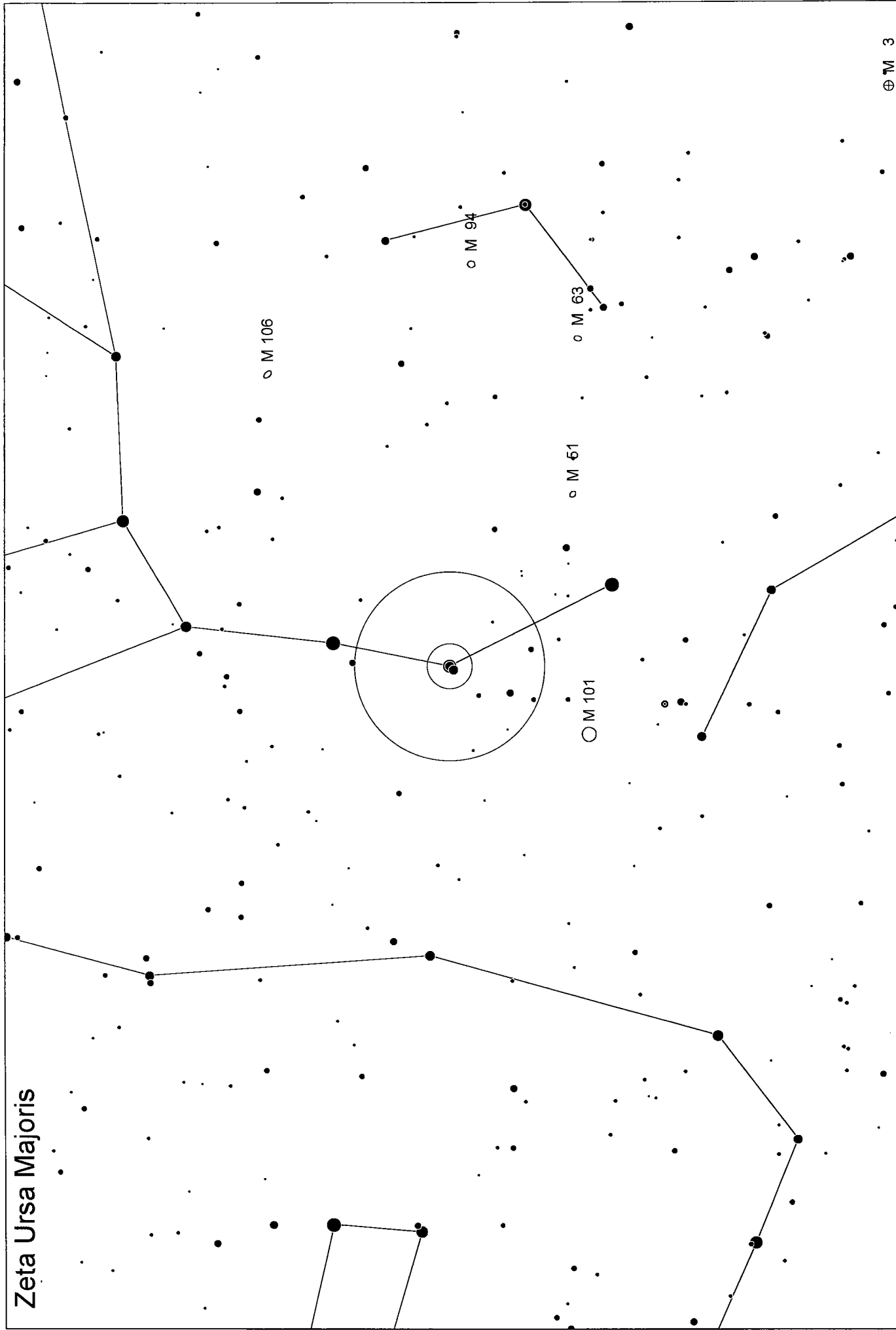
α M 3

PGAO 2003-10-7 8h54m C: 12h56m +38°18' L:+49°00' O:0° ARC HZ Cat: DSL BSC SAC
12h56m07.70s +38°19'06.0" * HR 4915 HD112413 Fl: 12 Ba:Alp2 const:CvN mV: 2.90 b-v:-0.12 sp: A0pSIEuHg
MAG: 2.9, 5.5 SEP: 19.4" PA: 229 deg pm:-0.234 0.056 ,COR CAROLI

Magnitude: 0	1	2	3	4	5	6		
								Variable
								Variable
								Variable
								Variable
								Variable
								Variable
								Variable
								Variable
								Variable
								Variable
								Variable
								Variable
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								Variable

[illegible]

Zeta Ursa Majoris



⊕ M 3

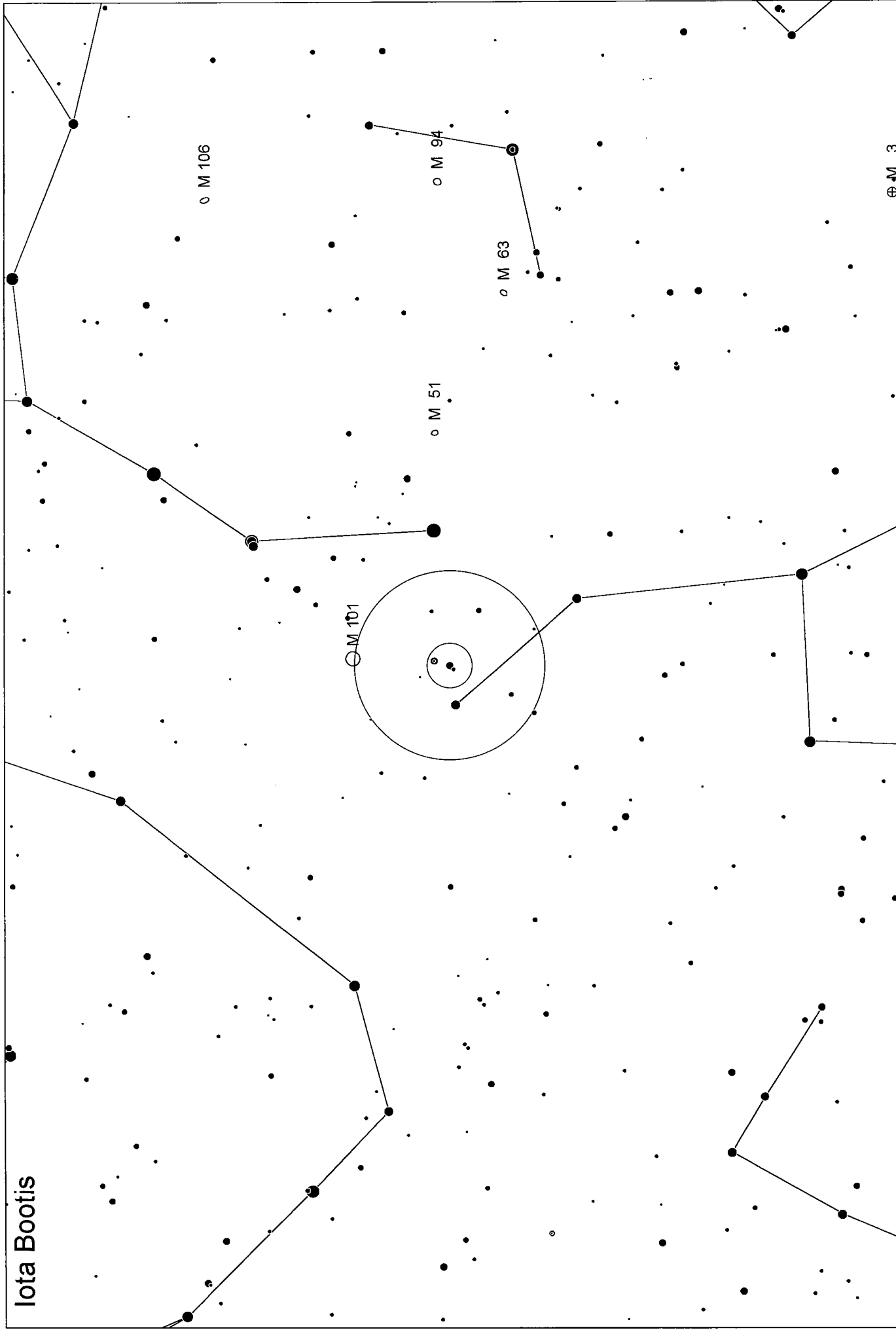
PGAO 2003-10-7 8h54m C: 13h24m +54°54' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC
13h23m55.50s +54°55'31.0" * HR 5054 HD116656 Fl: 79 BaZet const:UMa mV: 2.27 b-v: 0.02 sp: A1VpSrSi prn: 0.122 -0.020 ,MIZAR; Mizat; Mirza
MAG: 2.3, 4.0, 4.0 SEP: 14.4", 709" PA: 152, 71

Magnitude: : 0 1 2 3 4 5 6							Variable	Double	Comet	Asteroid	Planet
Gx Oc Gc Pl Neb N+C Star Unk							+	+	+	+	+

A detailed star chart of the constellation Kappa Bootis. The chart shows numerous stars of varying magnitudes, with the primary stars connected by lines to form the constellation's outline. Key features include the circled star M 101, and other labeled objects like M 94, M 63, M 51, M 106, and M 3. The constellation is labeled 'Kappa Bootis' in the bottom left corner.

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Iota Bootis



PGAO 2003-10-7 5h35m C: 14h16m +51°21' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC
14h16m09.90s +51°22'02.0" * HR 5350 HD125161 Fl: 21 Ba: ldt const: Boo mV: 4.75 b-v: 0.20 sp: A9V
MAG: 4.9, 7.5 SEP: 38" PA: 33 deg

pm: -0.150 0.092 Asellus Secundus

Magnitude: 0 1 2 3 4 5 6 Variable Double Comet Asteroid Planet

Nebula: Gx Oc Gc Pl Neb N+C Star Unk

This is a black and white star chart of the constellation Pi Bootis. The chart displays a field of stars, with the primary stars of the constellation connected by lines. A large circle is centered on a star in the upper right, and a smaller circle is centered on a star to its right. Labels include 'Pi Bootis' at the bottom left, 'M 3' at the top left, 'M 53' at the top center, and 'M 5' at the bottom right.

[illegible]

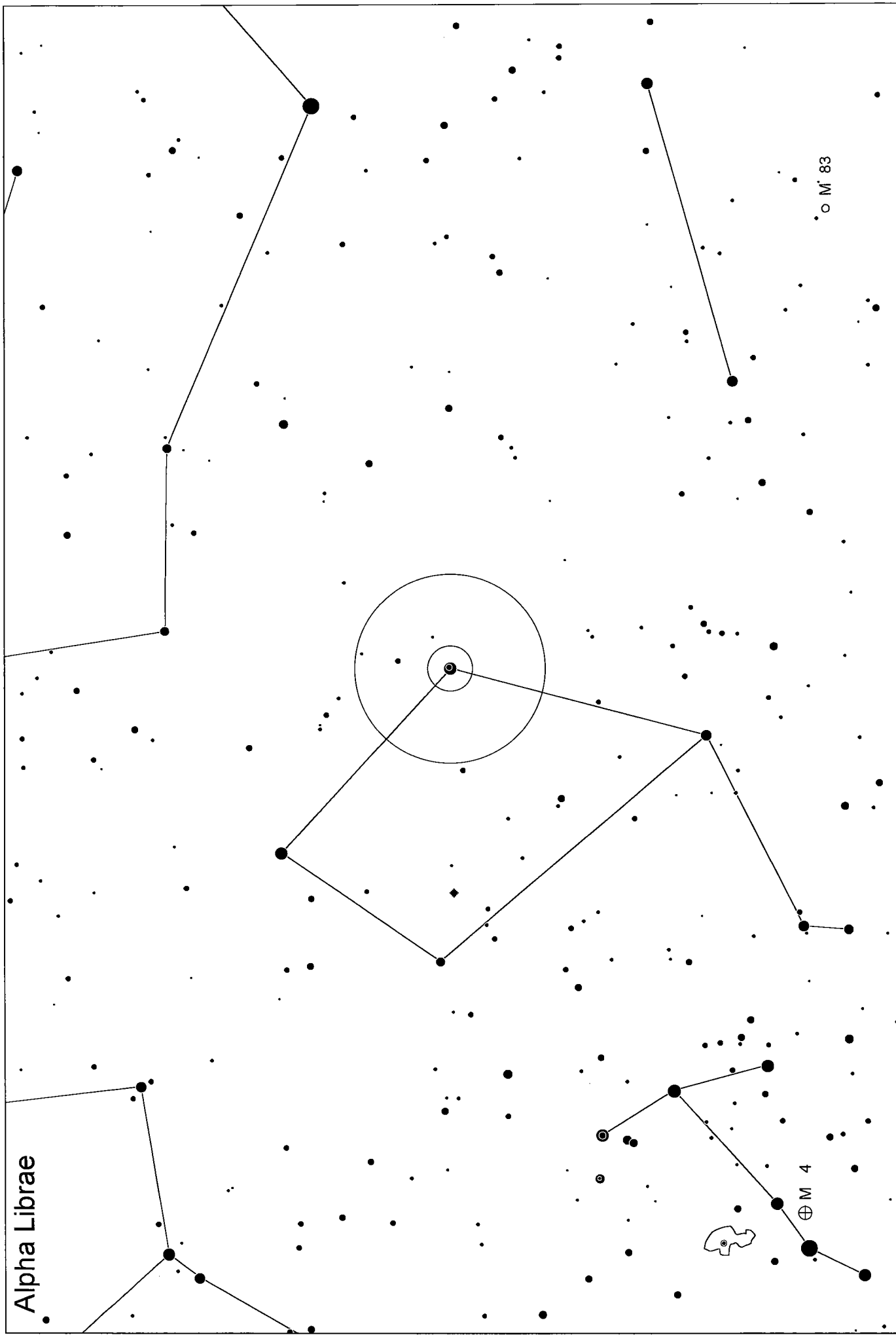
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This is a detailed black and white star chart of the constellation Epsilon Bootis. The chart features numerous stars of varying magnitudes, represented by dots of different sizes. The primary stars are connected by lines to form the constellation's shape. A large circle is drawn around the central star, and a smaller circle is drawn around the star labeled 'Epsilon Bootis'. The chart is labeled 'Epsilon Bootis' in the top left corner and includes several numerical labels: 'M 13' at the bottom left, 'M 3' in the center, and 'M 53' at the top right.

PGAO 2003-10-7 14h48m C: 14h45m +27°04' L: +49°00' O:0° ARC HZ Cat: DSL BSC SAC
14h44m59.20s +27°04'27.0" * HR 5506 HD129989 Fl: 36 Ba: Eps const: Boo mV: 2.70 b-v: 0.97 sp: K0-II-III
MAG: 2.5, 4.9 SEP: 2.8" PA: 339 deg pm:-0.049 0.021 iZAR; Mirac; Mirak; Miraz; Mizar; Pulchertima

Magnitude: 0	1	2	3	4	5	6	•	⊙	●	✶	◆	☄	♁			
Variable													Double	Comet	Asteroid	Planet
Nebula: Gx Oc Gc Pl Neb N+C Star Unk																

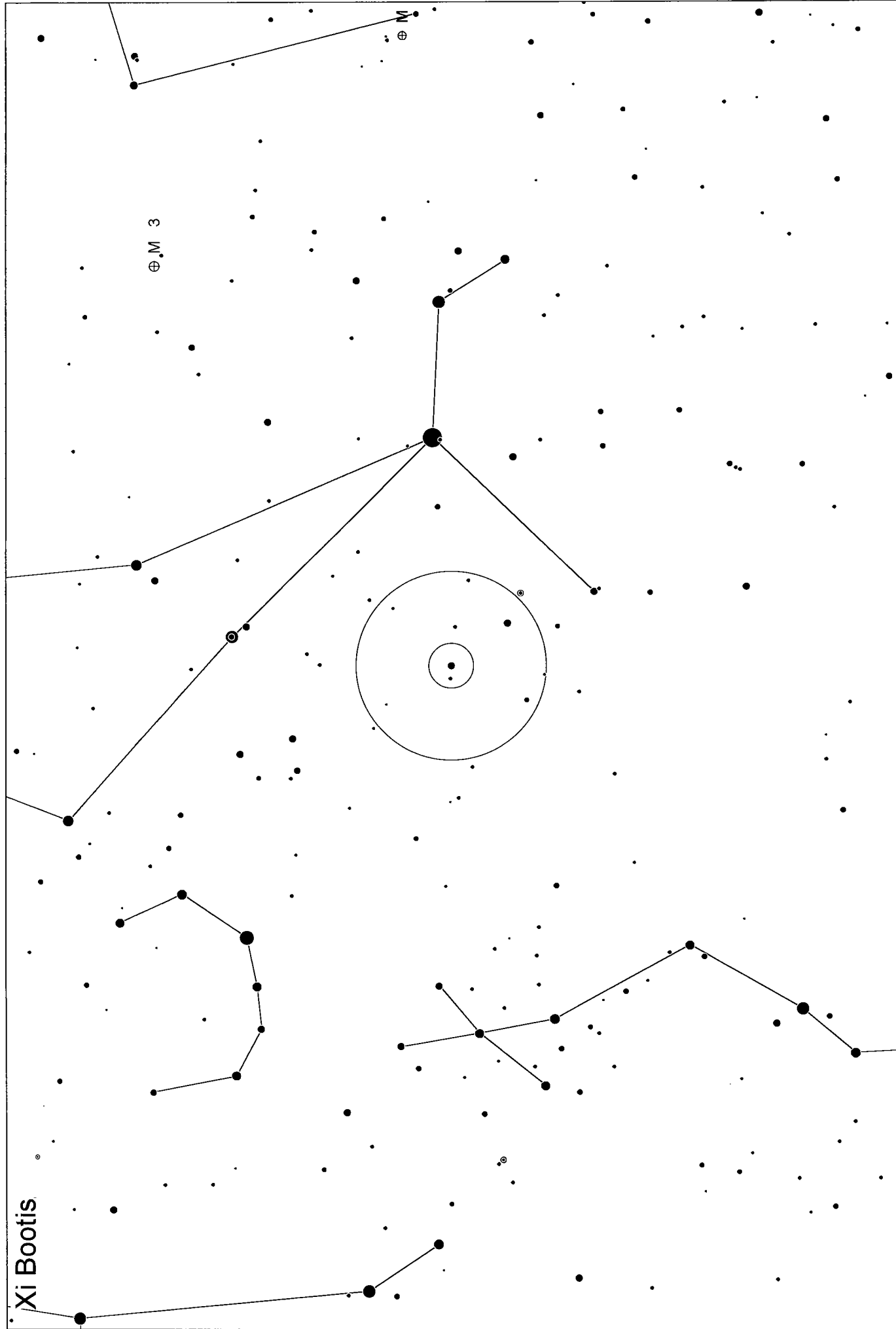
Alpha Librae



PGAO 2003-10-11 14h22m C: 14h51m -16°03' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC
14h50m52.70s -16°02'30.0" * HR 5531 HD130841 Fl: 9 Ba: Alp2 const: Lib mV: 2.75 b-v: 0.15 sp: A3IV
MAG: 2.8, 5.2 SEP: 231" PA: 314 deg pm: -0.106 -0.067 ; Zuben Elgenubi; Zubenelgenubi; Kiffa Australis; Elkhiffa Australis

Magnitude:	0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet
Nebula:	Gx	Oc	Gc	Pl	Neb	N+C	Star	Unk				

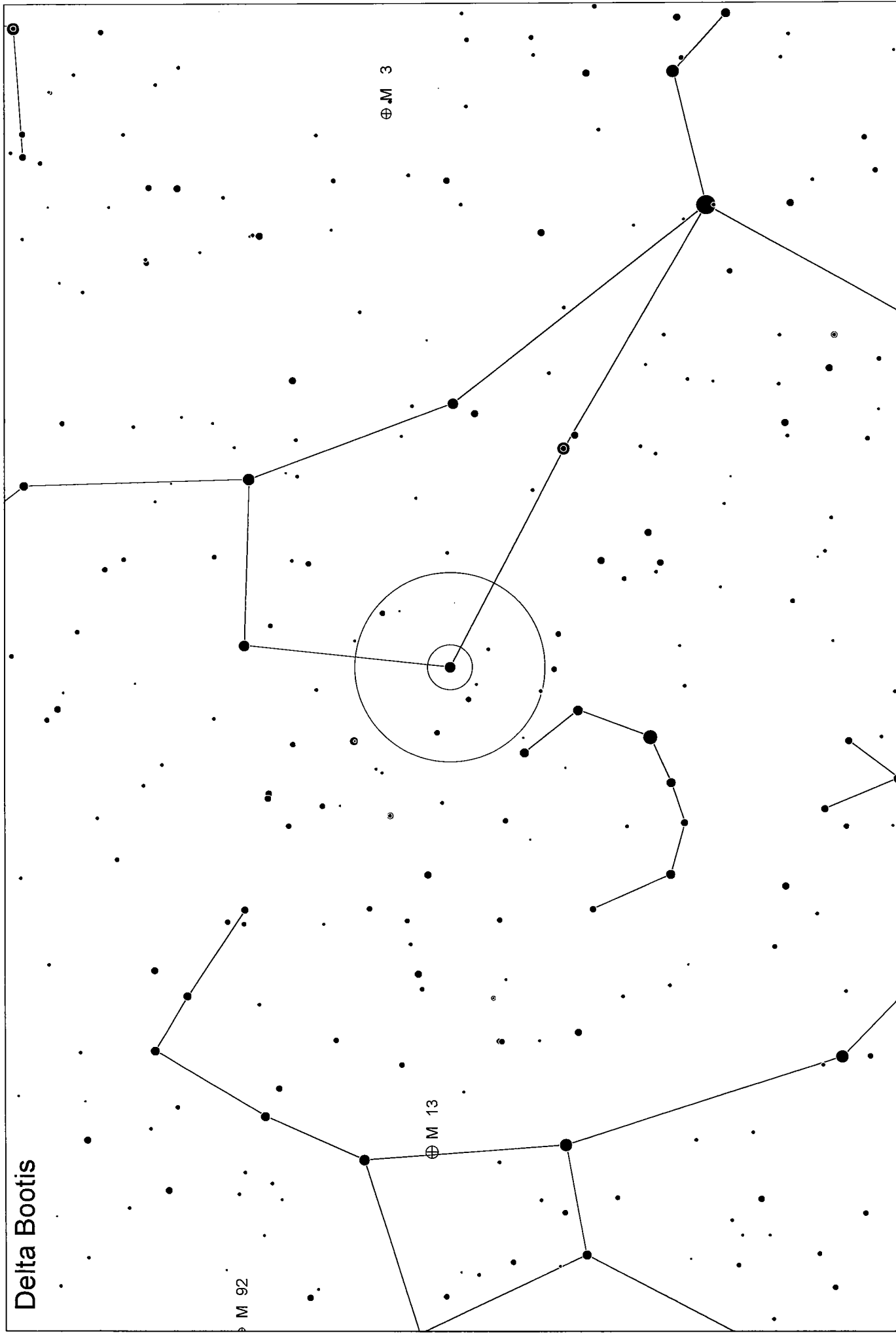
Xi Bootis



PGAO 2003-10-7 14h48m C: 14h52m +19°05' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC
 14h51m23.30s +19°06'04.0" * HR 5544 HD131156 Fl: 37 Ba:Xi const:Boo mV: 4.55 B-v: 0.76 sp: G8Ve+K4Ve pm: 0.137 -0.098
 MAG: 4.7, 7.0 SEP: 6.9" PA: 332 deg

Magnitude:	0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet
Nebula:	Gx	Oc	Gc	Pl	Neb	N+C	Star	Unk				

Delta Bootis



PGAO 2003-10-7 14h48m C: 15h16m +33°18' L:+49°00' O:0° ARC HZ Cat: DSL BSC SAC
15h15m30.20s +33°18'53.0" * HR 5681 HD135722 Fl: 49 Ba:Del const:Boo mV: 3.47 b-v: 0.95 sp: G8IIFe-1
MAG: 3.5, 8.7 SEP: 105" PA: 79 deg

pm: 0.086 -0.112



Magnitude: 0 1 2 3 4 5 6 Variable Double Comet Asteroid Planet

Nebula: Gx Oc Gc Pl Neb N+C Star Unk

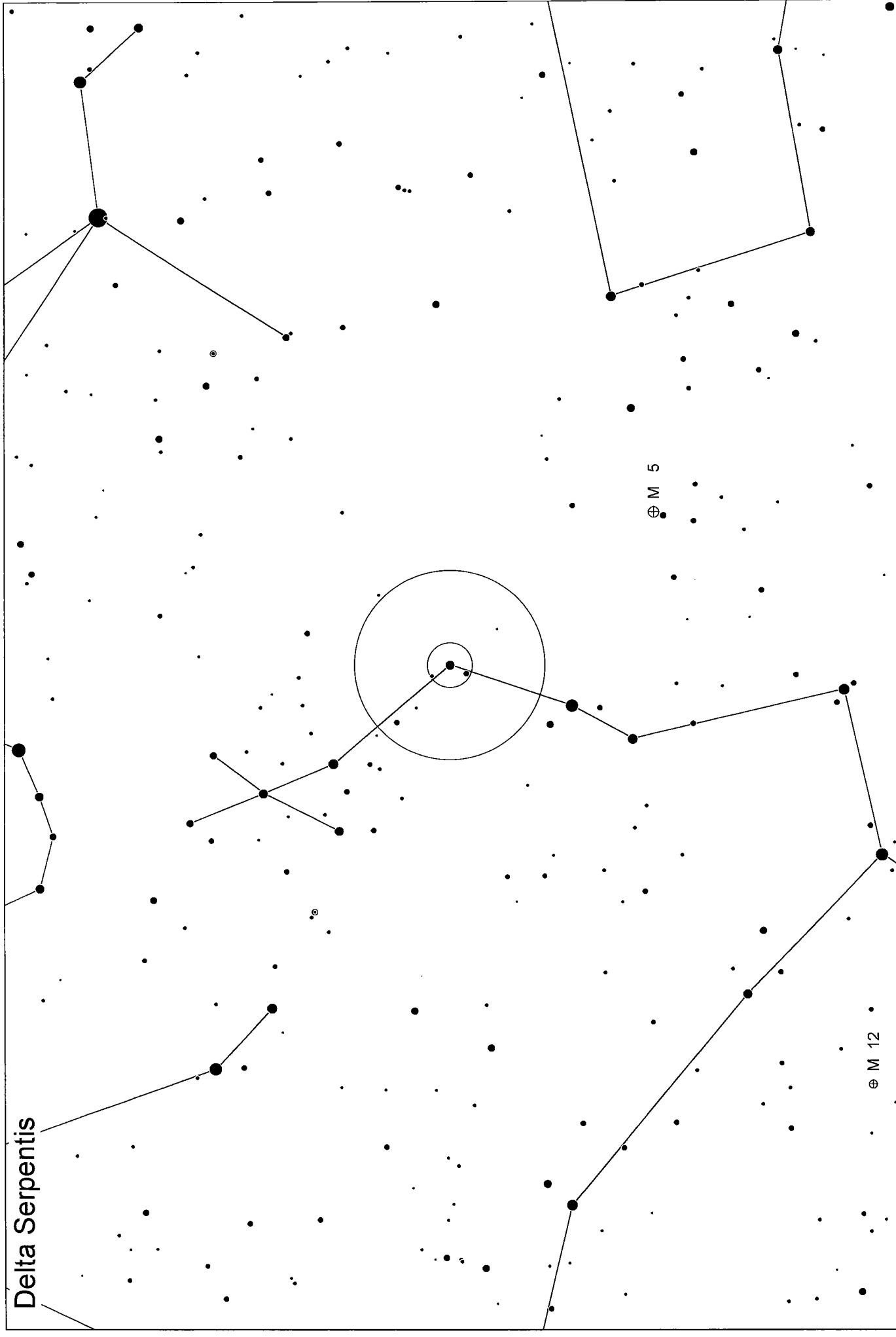
This is a detailed star chart of the constellation Mu Bootis. The chart features a dense field of stars, with the primary stars connected by lines to form the constellation's outline. A large circle is drawn around the central star, and a smaller circle is drawn around the star labeled 'M 13'. The text 'Mu Bootis' is written vertically on the left side, and 'M 13' is written near the central star.

pm:-0.146 0.087 0.087 Clava; Venabulum

Magnitude	0	1	2	3	4	5	6
Planet							
Asteroid							
Comet							
Double							
Variable							

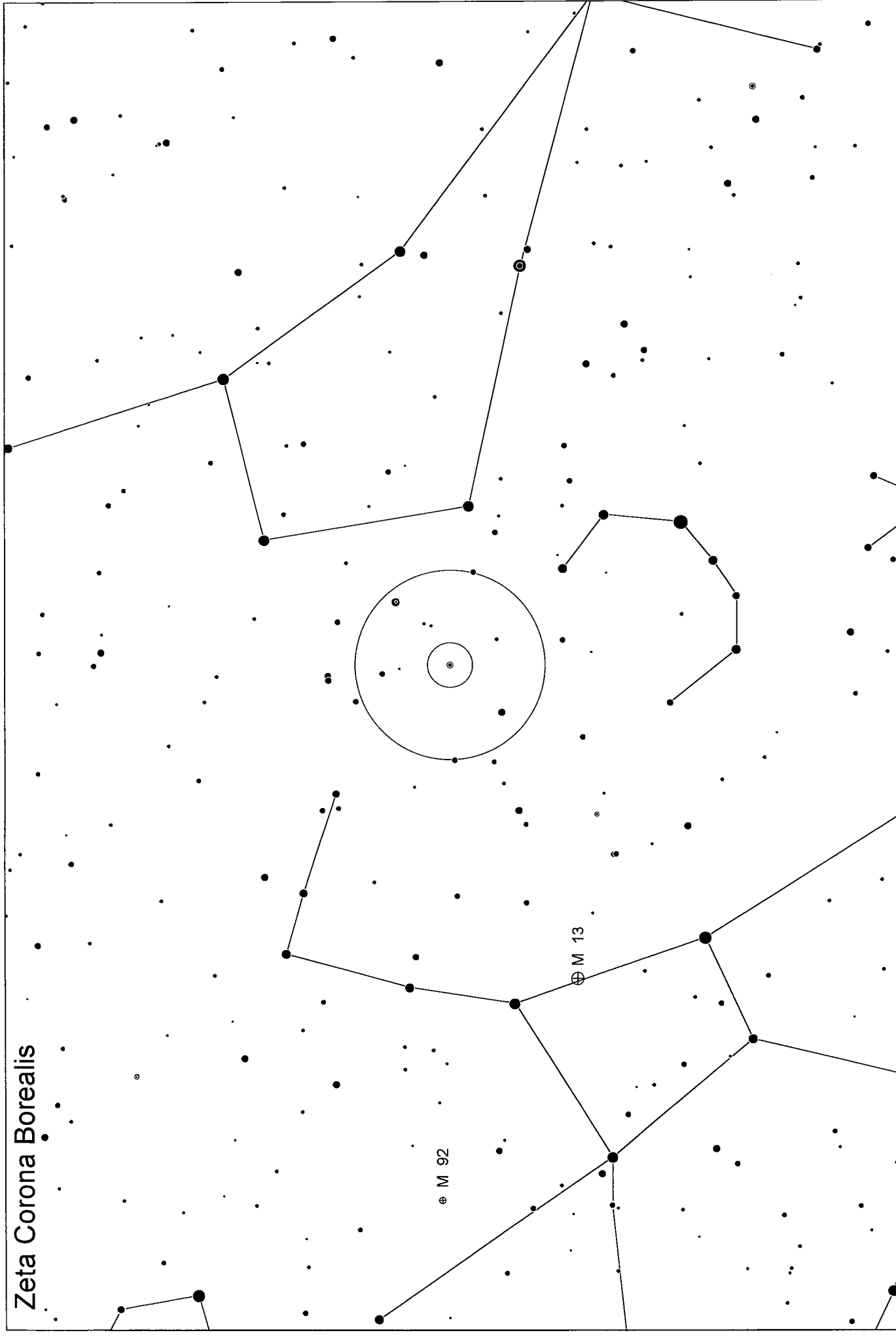
								
Nebula:	Gx	Oc	Gc	Pl	Neb	N+C	Star	Unk

Delta Serpentis



PGAO 2003-10-7 14h48m C: 15h35m +10°32' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC		15h34m48.10s +10°32'21.0" * HR 5789 HD138918 Fl: 13 Ba:Del const: Ser mV: 3.80 b-v: 0.26 sp: F0IV		pm: -0.074 0.012	
MAG: 4.2, 5.2 SEP: 3.9" PA: 170 deg					
Magnitude: 0 1 2 3 4 5 6		Variable Double Comet Asteroid Planet			
Nebula: Gx Oc Gc Pl Neb N+C Star Unk					

Zeta Corona Borealis



PGAO 2003-10-7 14h48m C: 15h40m +36°37' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC
15h39m22.70s +36°38'09.0" * HR 5834 HD139892 Fl: 7 Ba:Zet2 const:CrB mV: 5.07 b-v: 0.12 sp: B7V
MAG: 5.1, 6.0 SEP: 6.3" PA: 305 deg

pmi: -0.013 -0.006

Magnitude: : 0 1 2 3 4 5 6 Variable Double Comet Asteroid Planet

Nebula: Gx Oc Gc Pl Neb N+C Star Unk

This is a detailed astronomical chart of the constellation Xi Scorpis. The chart displays a field of stars, with several stars connected by lines to form the constellation's outline. Key features include:

- Xi Scorpis:** The constellation's name is written in the top left corner.
- M 5:** A label for a specific star or object, located in the upper right quadrant.
- M 12:** A label for a specific star or object, located in the lower left quadrant.
- M 10:** A label for a specific star or object, located in the lower left quadrant.
- M 4:** A label for a specific star or object, located in the lower right quadrant.
- M 62:** A label for a specific star or object, located in the lower right quadrant.
- Nebula:** A large, faint, irregularly shaped nebula is depicted in the upper right quadrant.
- Central Object:** A large, faint, circular object is located in the center of the chart.
- Other Objects:** A small, bright, circular object is located in the lower left quadrant, and a small, bright, irregularly shaped object is located in the lower right quadrant.

PGA0 2003-10-8 19h02m C: 16h05m -11°23' L:49°00' O:0° ARC HZ Cat: DSL BSC SAC
16h04m22.10s -11°22'23.0" * HR 5978 HD144070 Fl: Ba:Xi const:Sco mV: 4.77 b-v: 0.47 sp: F5IV
MAG: 4.8, 7.3 SEP: 7.6" PA: 51 deg

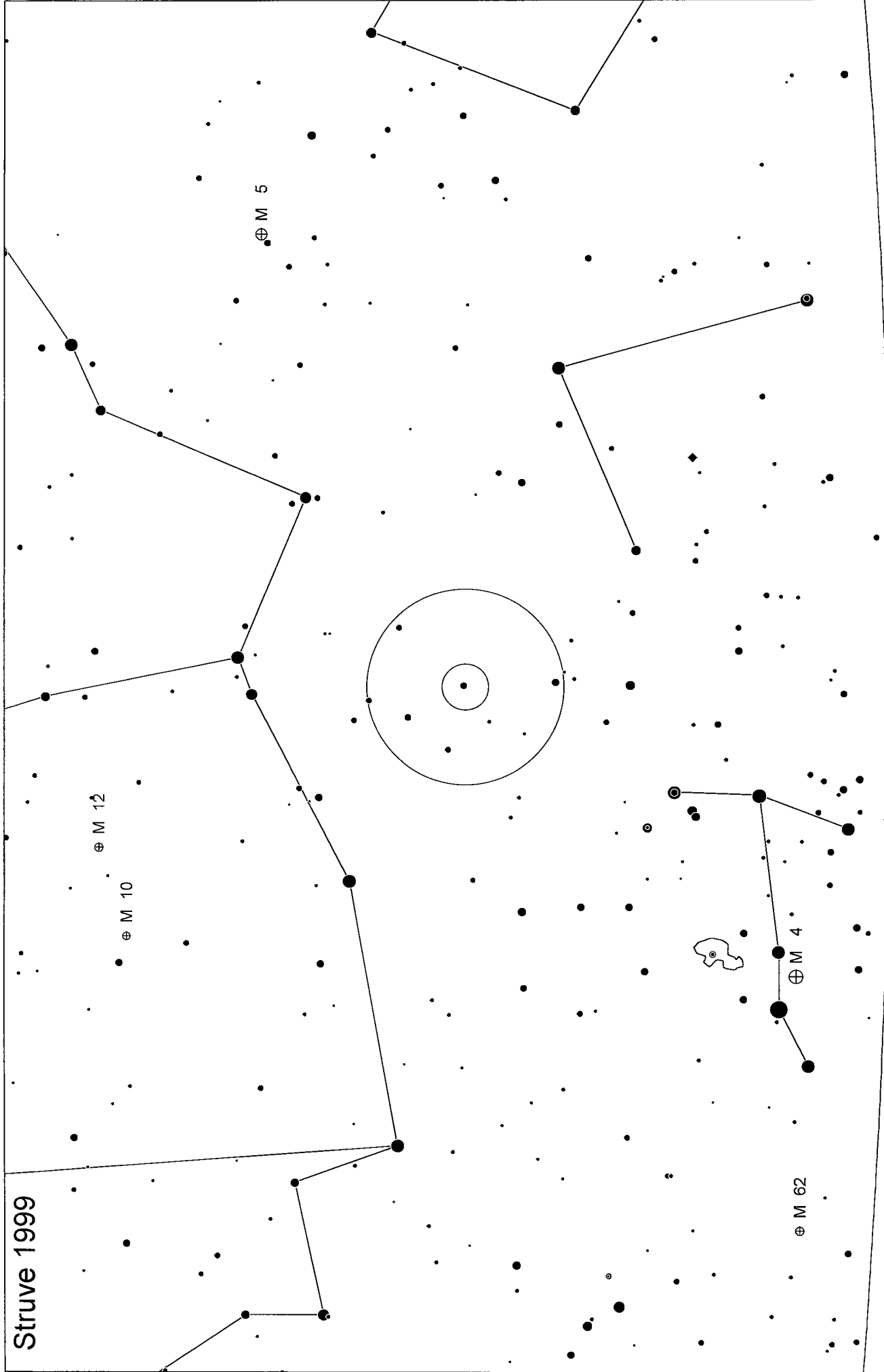
Magnitude: 0 1 2 3 4 5 6

Variable Double Comet Asteroid Planet

7

	\odot	\ominus	\oplus	\bigcirc	\square	\boxplus	$+$	\times
Nebula:	Gx	Oc	Gc	Pl	Neb	N+C	Star	Unk

Struve 1999



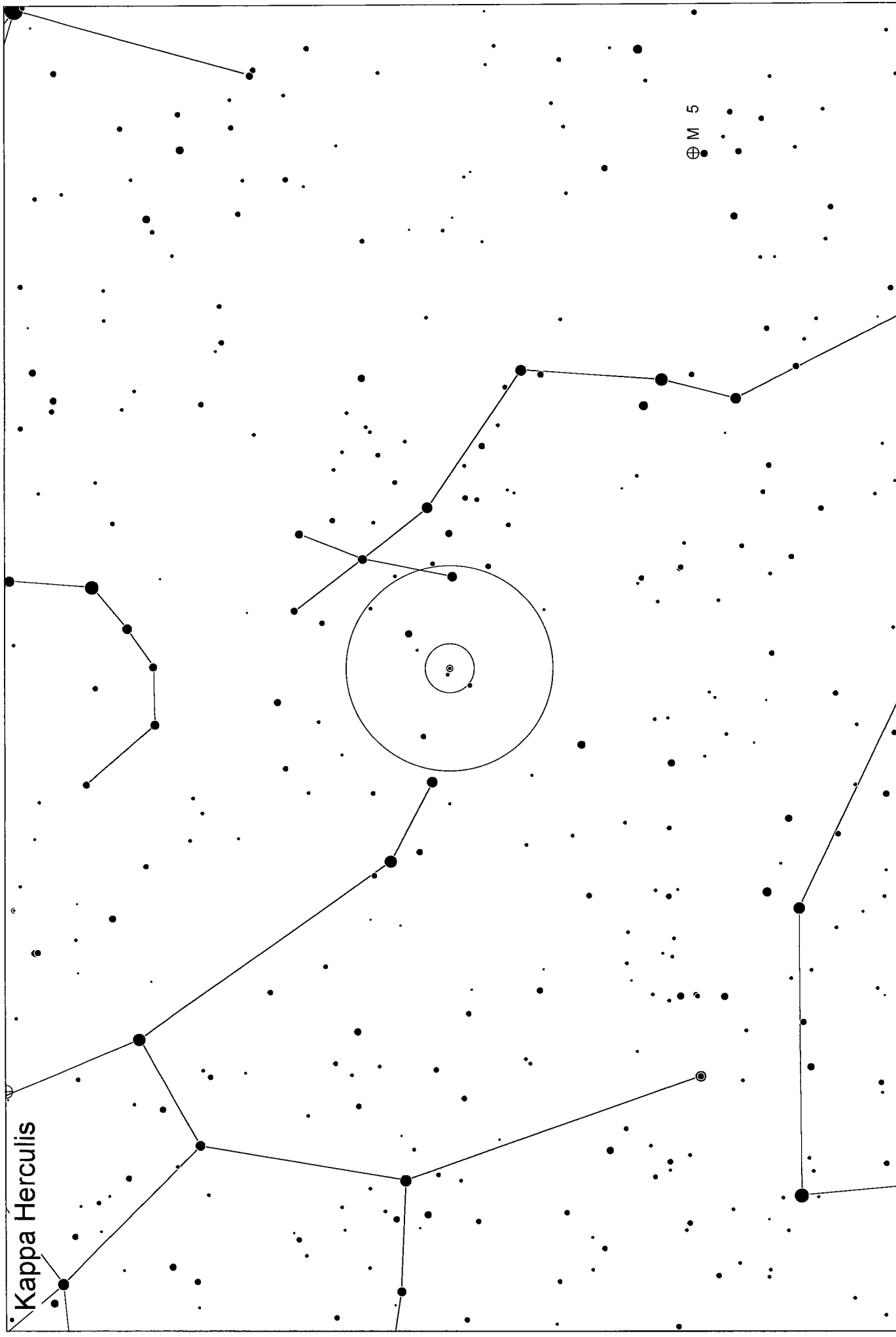
PGAO 2003-10-8 19h02m C: 16h05m -11°28' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC
16h04m25.92s -11°26'57.8" * HD144087 SAO159668 SD-11 4057 mV: 7.43 B-V: 0.74 sp:K0 Dbl: 11.70' 0.57m pm:-0.069 -0.021
MAG: 7.4, 8.1 SEP: 11.6" PA: 99 deg

Magnitude: 0 1 2 3 4 5 6										Variable	Double	Comet	Asteroid	Planet
Gx Oc Gc Pl Neb N+C Star Unk										+	x			

$\oplus M 10$

Magnitude:	0	1	2	3	4	5	6	7	Variable	Double	Comet	Asteroid	Planet
Nebula:	Gx	Oc	Oc	Pi	Gc	Pi	Neb	N+C	Star	Unk			

Kappa Herculis



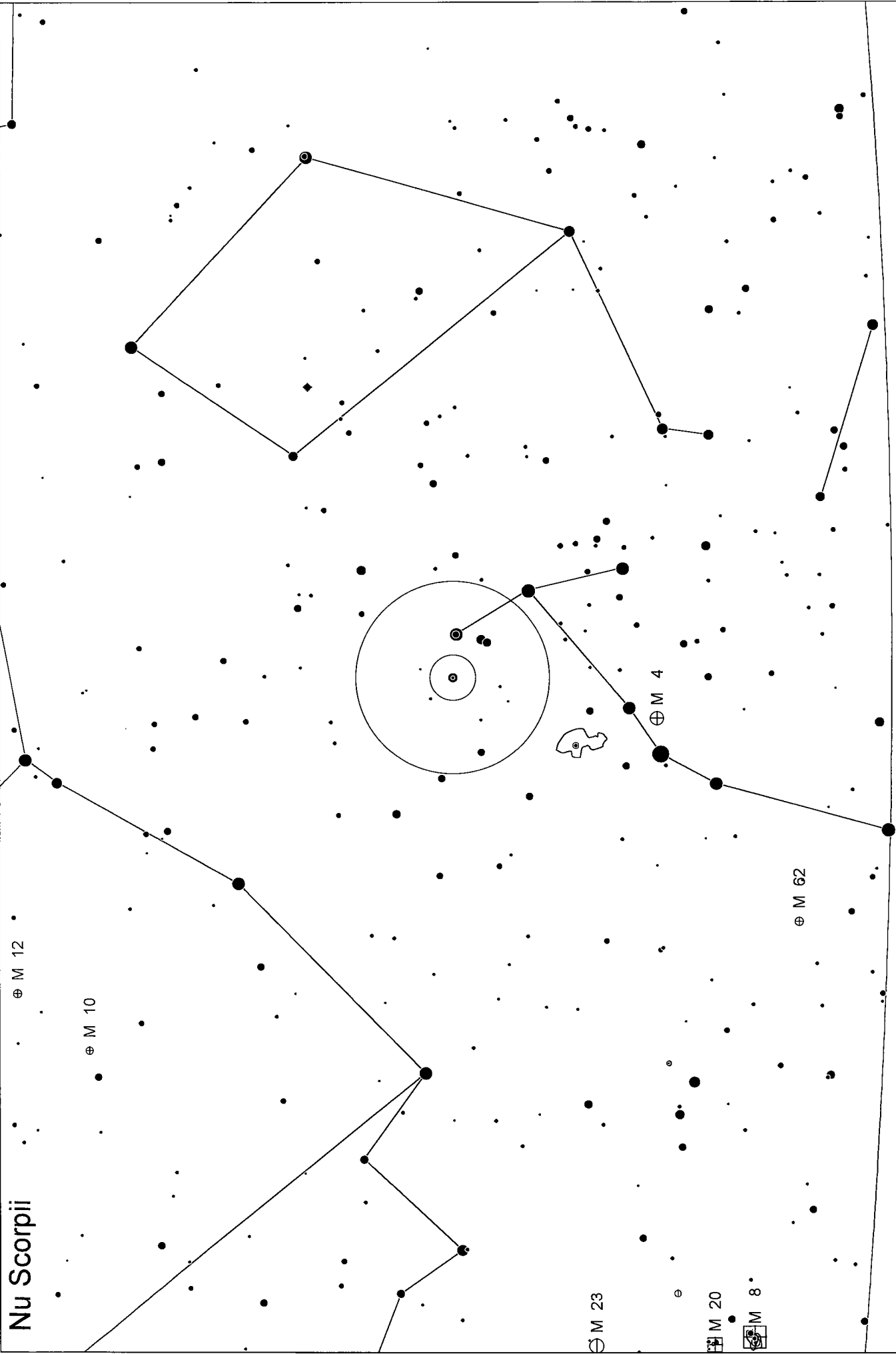
⊕ M 5

PGAO 2003-10-11 14h06m C: 16h08m +17°02' L:+45°00' O:0° ARC HZ Cat: DSL BSC SKY SAC
 16h08m04.50s +17°02'49.0" * HR 6008 HD145001 Fl: 7 Ba:Kap const:Her mV: 5.00 b-v: 0.95 sp: G8III
 MAG: 5.3, 6.5 SEP: 28" PA: 12 deg

pm:-0.032 -0.007 ;Marfik; Marsik; Mirfak; Marfak

Magnitude:	0	1	2	3	4	5	6	7	Variable	Double	Comet	Asteroid	Planet
	●	●	●	●	●	●	●	●	○	●	☄	◆	♃
Nebula:	○	⊖	⊕	⊖	⊕	⊖	⊕	⊖	+	×	☄	☄	☄
	Gx	Oc	Gc	Pl	Neb	N+C	Star	Unk					

Nu Scorpj



PGAO 2003-10-11 15h05m C: 16h12m -19°28' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC

MAG: 4.3, 6.4 SEP: 41" PA: 337 deg

Magnitude: : 0 1 2 3 4 5 6 Variable Double Comet Asteroid Planet

Nebula: Gx Oc Gc Pl Neb N+C Star Unk

This is a detailed star chart of the constellation Sigma Corona Borealis. The chart features a dense field of stars, with the primary stars connected by lines to form the constellation's outline. A large circle is drawn around a central star, and a smaller circle is drawn around a star labeled 'M 13'. The text 'Sigma Corona Borealis' is written vertically on the left side, and 'M 92' is written near the bottom center.

MAG: 5.6, 6.6 SEP: 6.2" PA: 233 deg

Nebula: \bigcirc Gx \bigcirc Oc \oplus Gc \bigcirc Pl \square Neb \boxplus N+C Star \times Unk

16 / 17 Draconis

M 13

M 92

pm:-0.009 0.027

Magnitude: 0 1 2 3 4 5 6
 Nebula: Gx Oc Gc Pl Neb N+C Star Unk
 Variable Double Comet Asteroid Planet
 (T)

This is a detailed star map of the constellation Mu Draconis. The map features a large number of stars, with the most prominent ones connected by lines to delineate the constellation's boundaries. Two specific deep-sky objects are highlighted with concentric circles: M 13, a globular cluster, and M 92, another globular cluster. The constellation is labeled 'Mu Draconis' in the bottom left corner.

MAG: 5.7, 5.7 SEP: 2.0" PA: 42 deg

	\times	$+$	\times
Nebula:	☐	☐	☒
	Gx	Oc	N+C Star Unk
	○	⊕	
	○	⊗	
	○	○	

This is a detailed black and white star chart of the constellation Alpha Herculis. The chart features a dense field of stars, with the primary star, Alpha Herculis, prominently marked by a large circle. Other stars are connected by lines to form the constellation's outline. Labels include 'Alpha Herculis' at the bottom left, 'M 12' and 'M 10' in the upper right, and several circled symbols (⊖) on the right side.

FGAC 2003-10-11 14113311 14 23 50 0.0 AKC HZ Cat. D3LB3C SAC
17h14m38.90s +14°23'25.0" * HR 6406 HD156014 Fl: 64 Ba:Alp1 const:Her mV: 3.48 b-v: 1.44 sp: M51b-II
pm:-0.006 0.036 ,RASALGETHI, Ras Algethi, Rasalegti

MAG: 3.5, 5.4 SEP: 4.7" PA: 107 deg

Magnitude: 0 1 2 3 4 5 6
 Variable
 Double
 Comet
 Asteroid
 Planet

Nebula:	Gx	Oc	Gc	PI	Neb	N+C	Star	Unk
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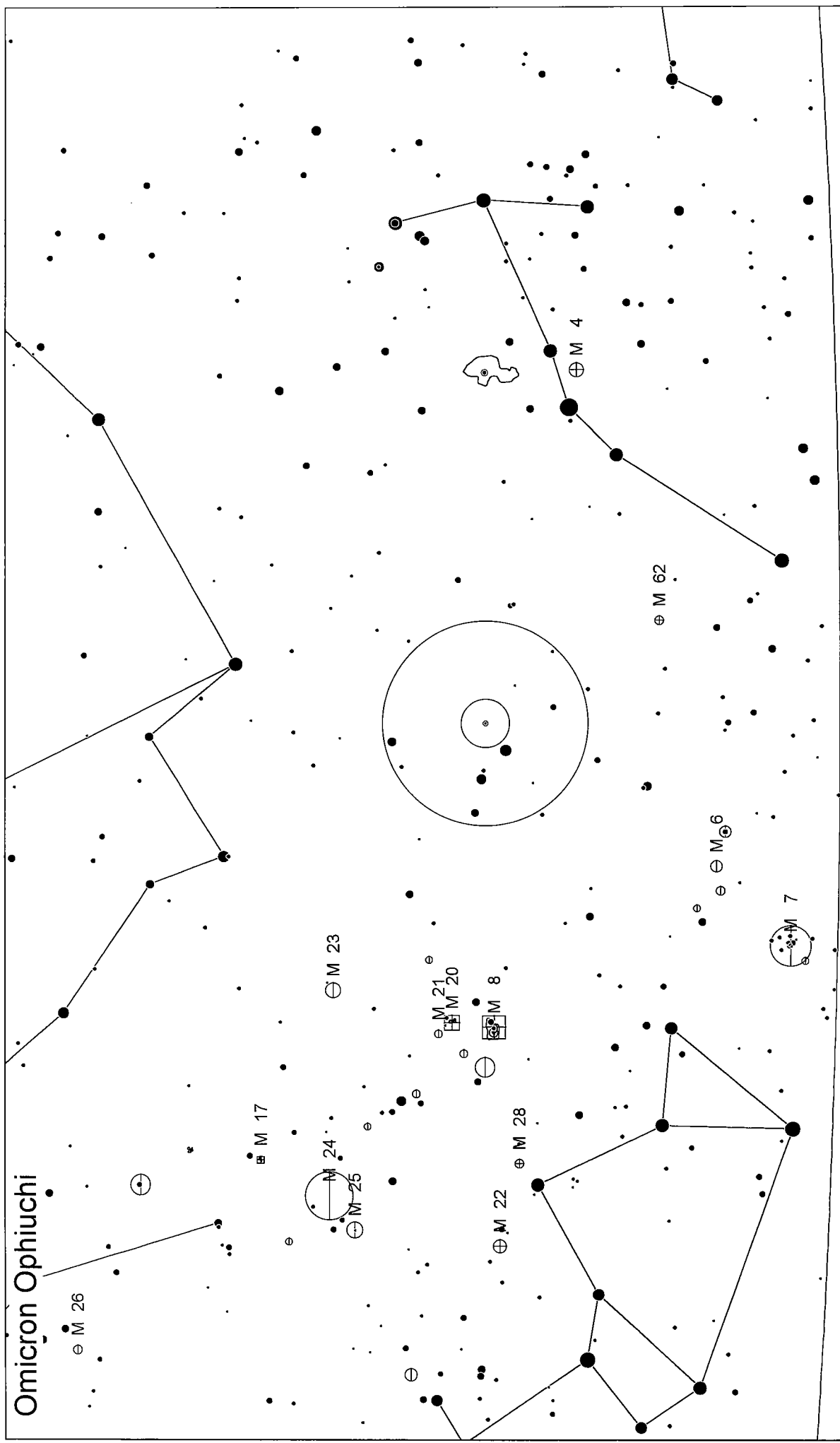
This is a detailed black and white star chart of the constellation Delta Herculis. The chart features numerous stars of varying magnitudes, represented by dots of different sizes. The primary stars are connected by lines to form the constellation's outline. A large circle is drawn around the central star, and a smaller circle is centered on it. Labels include 'M 13' and 'M 92' near specific stars, and 'Delta Herculis' at the bottom left.

17h15m01.90s +24°50'21.0" * HR 6410 HD156164 Fl: 65 Ba:Del const:Her mV: 3.14 b-v: 0.08 sp: A3IV
MA: 2.4 8.0 SED: 8.0 PA: 236 deg

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{+}
planet
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M 10

Omicron Ophiuchi



PGAO 2003-10-11 17h17m C: 17h18m -24°17' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC
 17h18m00.70s -24°17'13.0" * HR 6424 HD156349 FI: 39 Ba:Omi const:Oph mV: 5.20 b-v: 1.10 sp: K0II-III pm:-0.054 -0.008
 MAG: 5.4, 6.9 SEP: 10.3" PA: 355 deg

Magnitude:	0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet
Nebula:	Gx	Oc	Gc	Pi	Neb	N+C	Star	Unk				

This is a detailed star chart of the constellation Rho Herculis. The chart features a dense field of stars, with the primary stars connected by lines to form the constellation's outline. Two specific deep-sky objects are highlighted: M 92, a globular cluster, and M 13, a globular cluster. The constellation is labeled 'Rho Herculis' in the bottom left corner.

								(7)				
Magnitude:	0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet
Nebula:	Gx	Oc	Oc	Pi	Gc	Pi	Neb	N+C	Star	Unk		

Nu Draconis

⊕ M 92

PGAO 2003-10-11 17h17m C: 17h32m +55°10' L:+49°00' O:0° ARC HZ Cat: DSL BSC SAC
17h32m16.00s +55°10'23.0" * HR 6555 HD159560 Fl: 25 Ba:Nu 2 const:Dra mV: 4.87 b-v: 0.28 sp: A4m
MAG: 4.9, 4.9 SEP: 62" PA: 312 deg pm: 0.148 0.056 ;Kuma

Magnitude: : 0 1 2 3 4 5 6 Variable Double Comet Asteroid Planet

Nebula: Gx Oc Gc Pl Neb N+C Star Unk

This is a detailed star chart of the constellation Psi Draconis. The chart features a dense field of stars, with the primary stars of the constellation connected by lines to form its characteristic shape. A central star is highlighted with concentric circles, indicating its significance. The constellation is labeled 'Psi Draconis' in the bottom left corner.

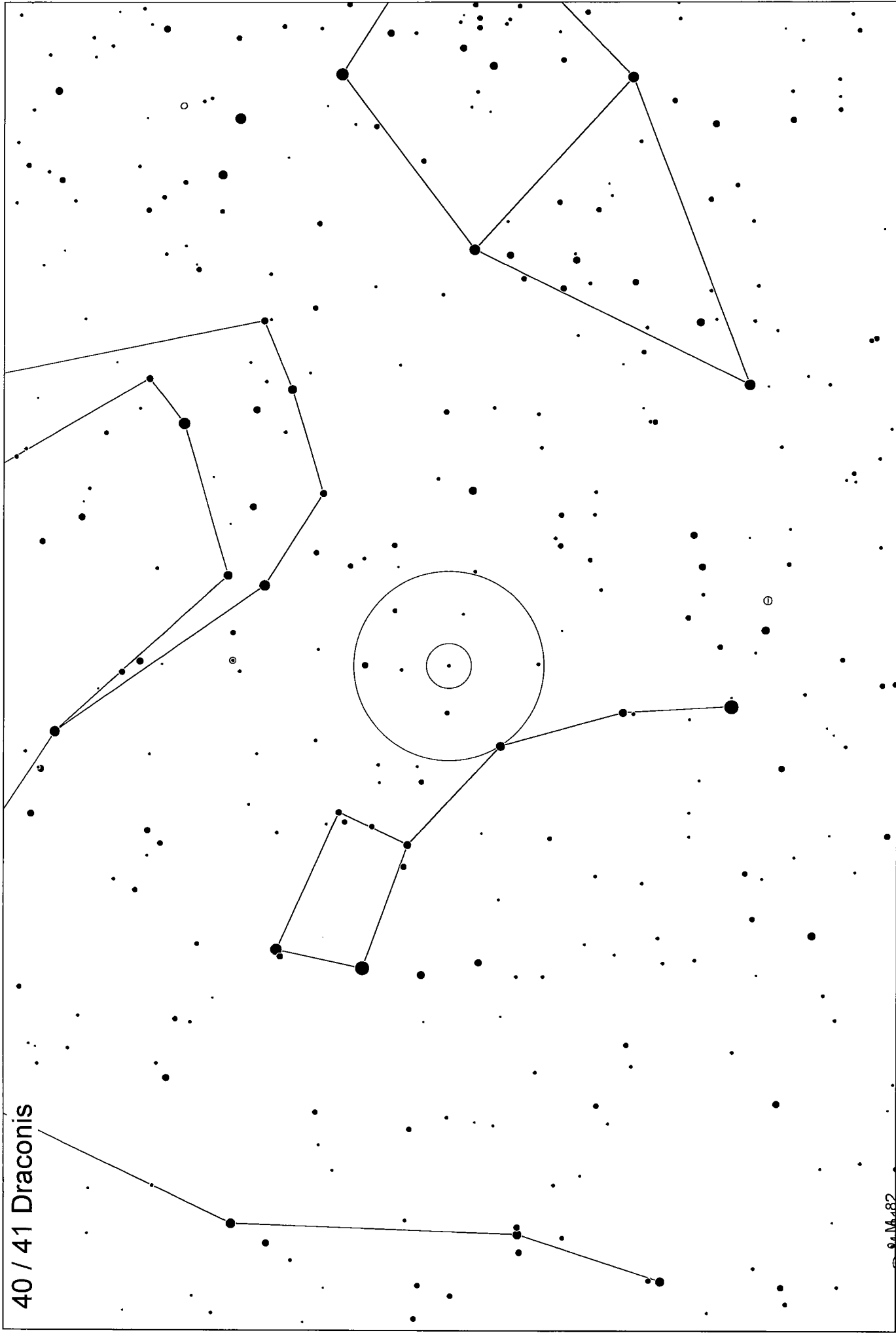
pm: 0.025 -0.267 ;Dsiban; Dziban

MAG: 4.9, 6.1 SEP: 30.3" PA: 15 deg

6

1500

11



40 / 41 Draconis

M 10.82

PGAO 2003-10-11 17h17m C: 18h00m +80°00' L:+49°00' O:0° ARC HZ Cat: DSL BSC SAC
 18h00m09.20s +80°00'15.0" * HR 6810 HD166866 Fl: 41 Ba: const:Dra mV: 5.68 b-v: 0.50 sp: F7 pm: 0.042 0.122
 MAG: 5.7, 6.1 SEP: 19.3" PA: 232 deg

Magnitude:	0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet
	●	●	●	●	●	●	●	⊙	●	☄	◆	♃
Nebula:	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉	☉
	Gx	Oc	Gc	Pl	Neb	N+C	Star	Unk				





95 Hercules

PGAO 2003-10-11 17h17m C: 18h02m +21°36' L:+49°00' O:0° ARC HZ Cat: DSL BSC SAC
18h01m30.40s +21°35'44.0" * HR 6730 HD164669 Fl: 95 Ba: const:Her mV: 4.96 b-v: 0.12 sp: A5IIIn
MAG: 5.0, 5.1 SEP: 6.3" PA: 258 deg

Magnitude: : 0 1 2 3 4 5 6

Variable Variable Double Comet Asteroid Planet

(7)

							
Nebula:	Gx	Oc	Gc	Pl	Neb	N+C Star	Unk

M 1

[illegible]

A detailed black and white star chart of the constellation Epsilon Lyrae. The chart shows numerous stars of varying sizes, with several prominent stars connected by lines to form the constellation's outline. A central star is circled, and a small inset shows a zoomed-in view of this star and its immediate surroundings. The text "Epsilon Lyrae" is written vertically on the left side. The chart is labeled with "M 13" and "M 92" in the upper left corner.

pm: 0.017 0.059

Magnitude: 0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet
Gx	Oc	Gc	Pi	Pi	Neb	N+C	Star	Unk			

• Zeta Lyrae

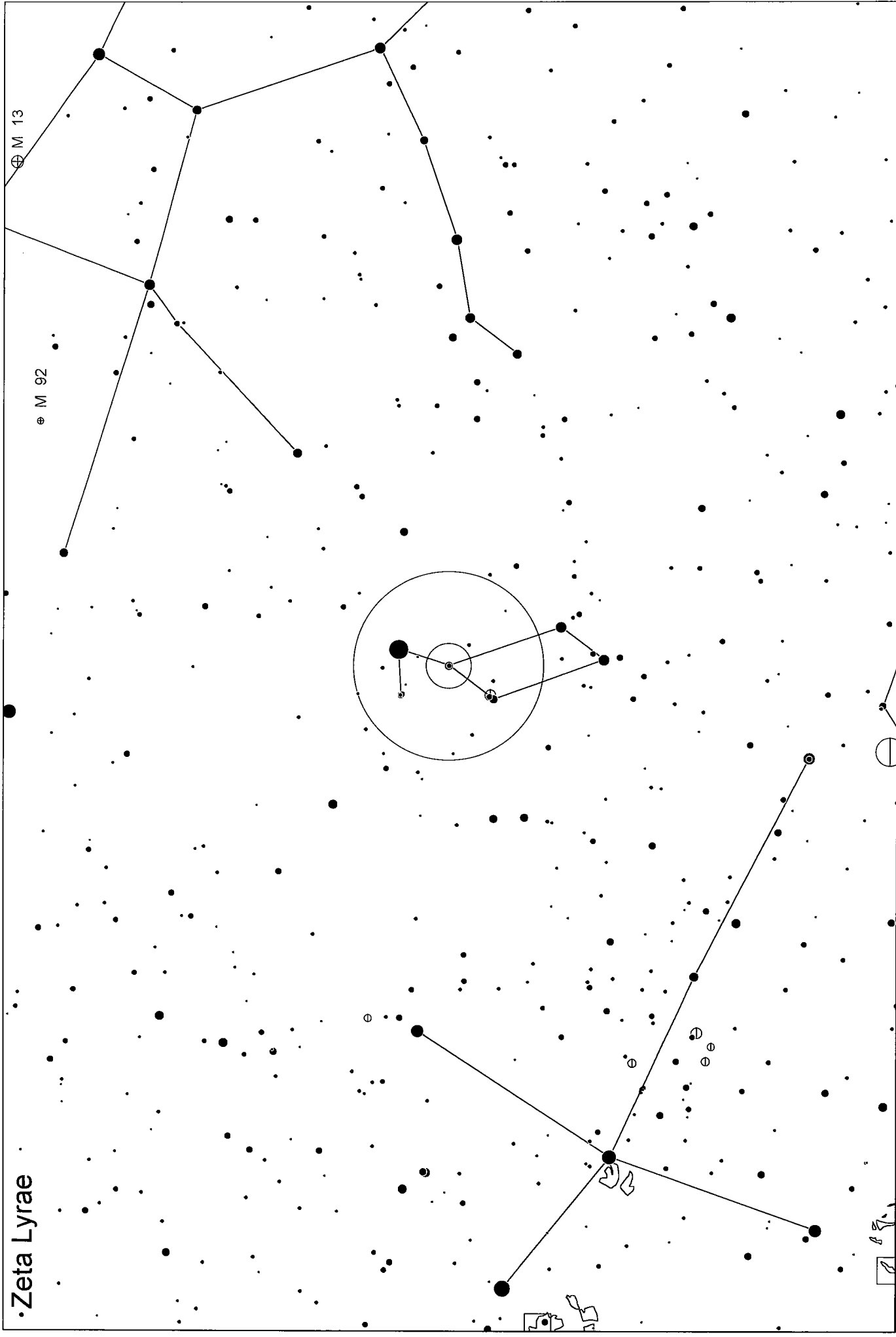
⊕ M 13

☾ M 92



PGAO 2003-10-11 17h17m C: 18h45m +37°37' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC
 18h44m46.40s +37°36'18.0" * HR 7056 HD173648 Fl: 6 Ba: Zet1 const: Lyr mV: 4.36 b-v: 0.19 sp: A4m pm: 0.028 0.024
 MAG: 4.3, 5.9 SEP: 44" PA: 150 deg




Magnitude:	0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet
	●	●	●	●	●	●	●	⊙	●	☄	◆	♃
Nebula:	○	⊖	⊕	⊗	⊘	⊙	⊚	⊛	⊜	⊝	⊞	⊟
	Gx	Oc	Gc	Pi	Neb	N+C	Star	Unk				



Beta Lyrae

18h50m04.80s +33°21'46.0" * HR 7106 HD174638 Fl: 10 Ba:Bet const:Lyr mV: 3.45 b-v: 0.00 sp: B8IIpe
 MAG: 3.1 8.6 SED: 46" PA: 140 deg

MAG. 3.4, 8.0 SEP. 40 FA. 143 deg

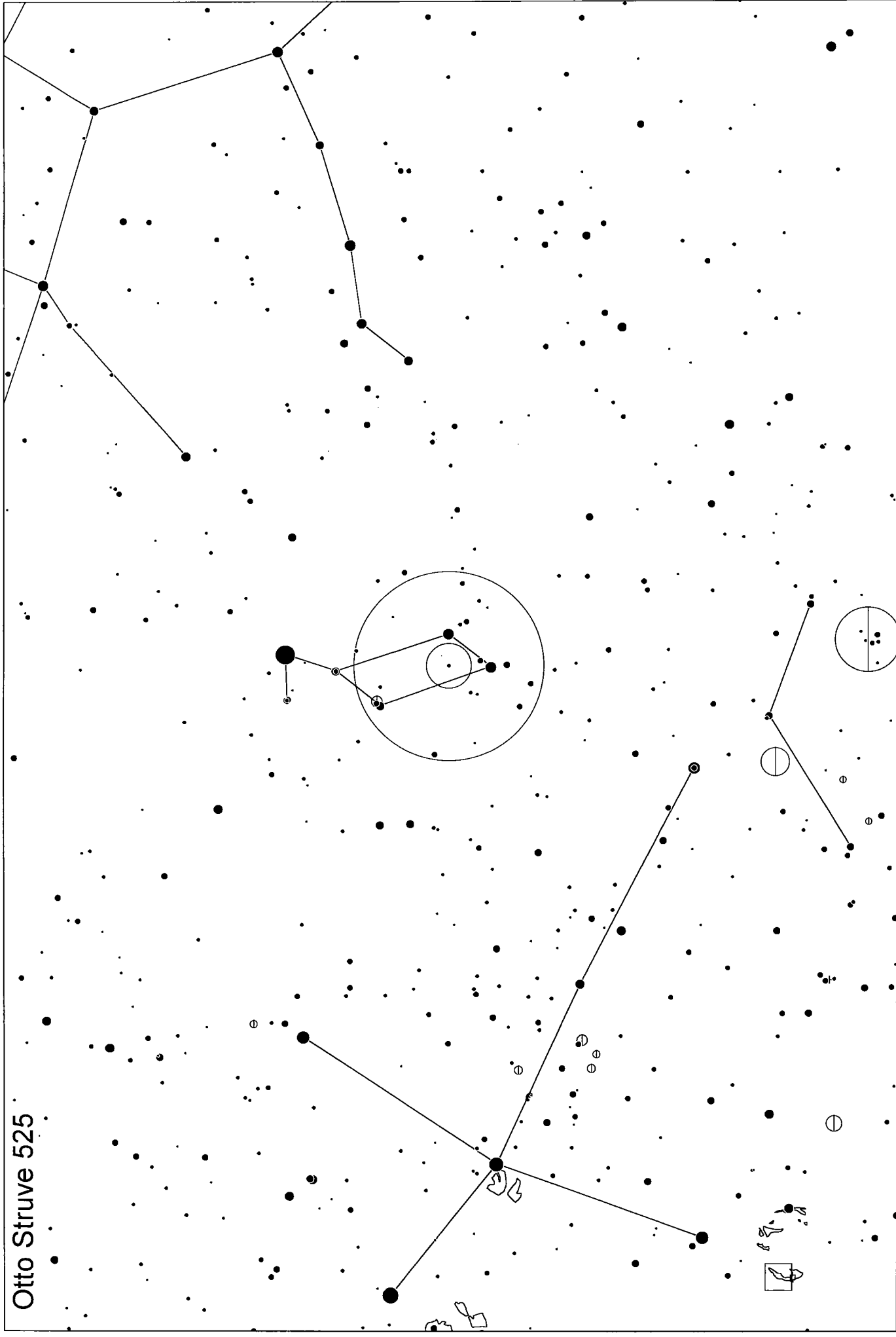
										
Nebula:	Gx	Oc	Gc	Pl	Neb	N+C	Star	Unk		

[illegible]

PGAO 2003-10-11 17h17m C: 18h51m +10°57' L: 49°00' O: 0° ARC HZ Cat: DSL BSC SAC
18h50m 45.60s +10°58'35.0" * HR 7099 HD174569 FI: Ba: const: mV: 6.55 b-v: sp: K5III+K3III pm: 0.023 0.009
MAG: 6.9, 8.1 SEP: 3.6" PA: 183 deg

Magnitude: 0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet	
												M 26
Nebula: Gx	Oc	Gc	Pl	Neb	N+C	Star	Unk					

Otto Struve 525



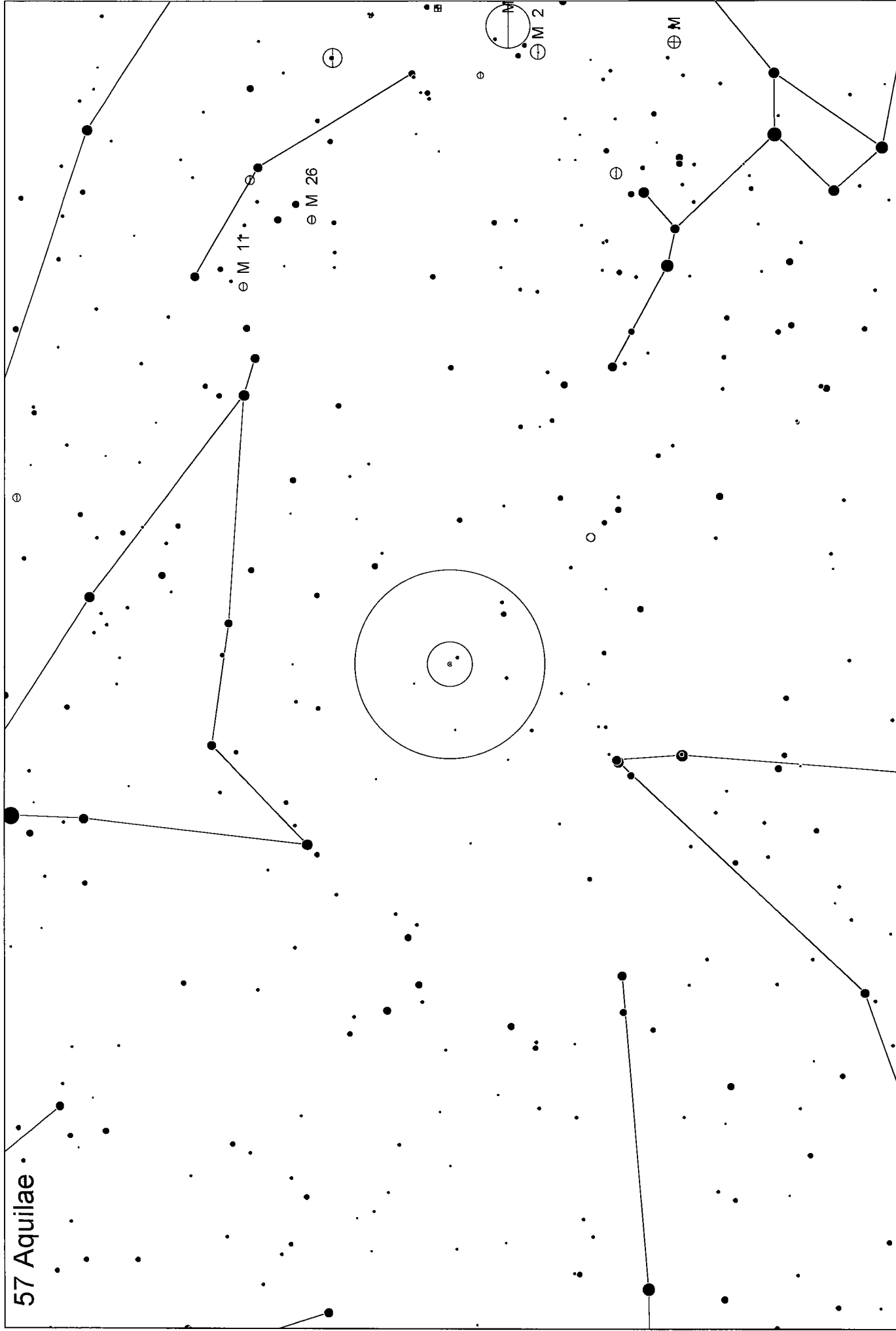
PGAO 2003-10-11 17h17m C: 18h55m +33°59' L:+49°00' O:0° ARC HZ Cat: DSL BSC SAC 18h54m52.50s +33°58'07.0" * HR 7140 HD175635 Fl: Ba: const: mV: 6.02 b-v: 0.91 sp: G8III+A2 pm:-0.008 0.003 MAG: 6.0, 7.7 SEP: 45° PA: 350 deg											
<div>Magnitude: : 0 1 2 3 4 5 6 Variable Double Comet Asteroid Planet</div> <div><div><div>●</div><div>●</div><div>●</div><div>●</div><div>●</div><div>●</div><div>●</div><div>⊙</div><div>●</div><div>☛</div><div>◆</div><div>♁</div></div></div>											
<div>Nebula: Gx Oc Gc Pl Neb N+C Star Unk</div> <div><div>○</div><div>⊖</div><div>⊕</div><div>○</div><div>□</div><div>⊞</div><div>+</div><div>×</div></div>											

PGAO 2003-10-11 17h17m C: 19h31m +27°58' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC
19h30m43.30s +27°57'35.0" * HR 7417 HD183912 Fl: 6 Ba: Bet1 const: Cyg mV: 3.08 b-v: 1.13 sp: K3II+B9.5V
MAG: 3.1, 5.1 SEP: 34.4" PA: 54 deg pm: 0.002 -0.002 ,ALBIREO

Magnitude:	0	1	2	3	4	5	6
	Variable	Double	Comet	Asteroid	Planet		

[illegible]

57 Aquilae



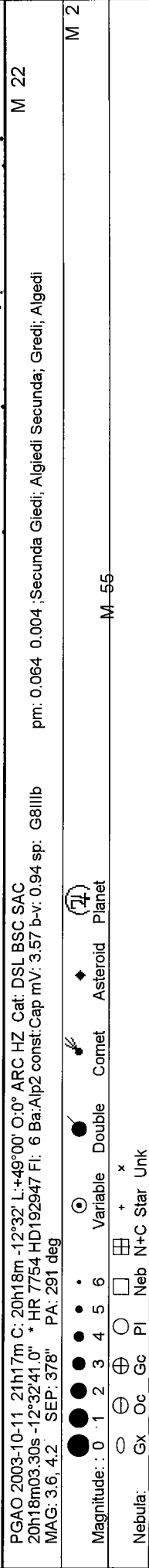
PGAO 2003-10-11 17h17m C: 19h55m -08°13' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC
 19h54m37.60s -08°13'38.0" * HR 7593 HD188293 Fl: 57 Ba: const:Aql mV: 5.71 b-v: -0.08 sp: B7Vn pm: 0.010 -0.025
 MAG: 5.8, 6.5 SEP: 36" PA: 170 deg

Magnitude: 0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet
Nebula: Gx	Oc	Gc	Pl	Neb	N+C	Star	Unk				

This is a detailed star chart of the constellation Cygnus. The chart features numerous stars of varying sizes, representing different magnitudes. Key stars are connected by lines to form the constellation's shape. Several deep sky objects are highlighted with specific symbols: a large circle with a central dot for the Great Dumbbell (M 31), a smaller circle with a central dot for the Little Dumbbell (M 30), and a circle with a cross for M 39. The text '31 Cygni' is located in the bottom left corner. The chart is set against a background of a grid of stars, with some stars marked with circled crosses or other symbols. The overall layout is a rectangular field of view, typical of a star map.

PGAO 2003-10-11 17h17m C: 20h14m +46°45' L:+49°00' O:0° ARC HZ Cat: DSL BSC SAC
20h13m37.90s +46°44'29.0" * HR 7735 HD192577 Fl: 31 Ba: const:Cyg mV: 3.79 b-v: 1.28 sp: K2II+B3V
MAG: 3.8, 6.7, 4.8 SEP: 107", 337" PA: 173, 323 deg pm: 0.004 0.003

[illegible]

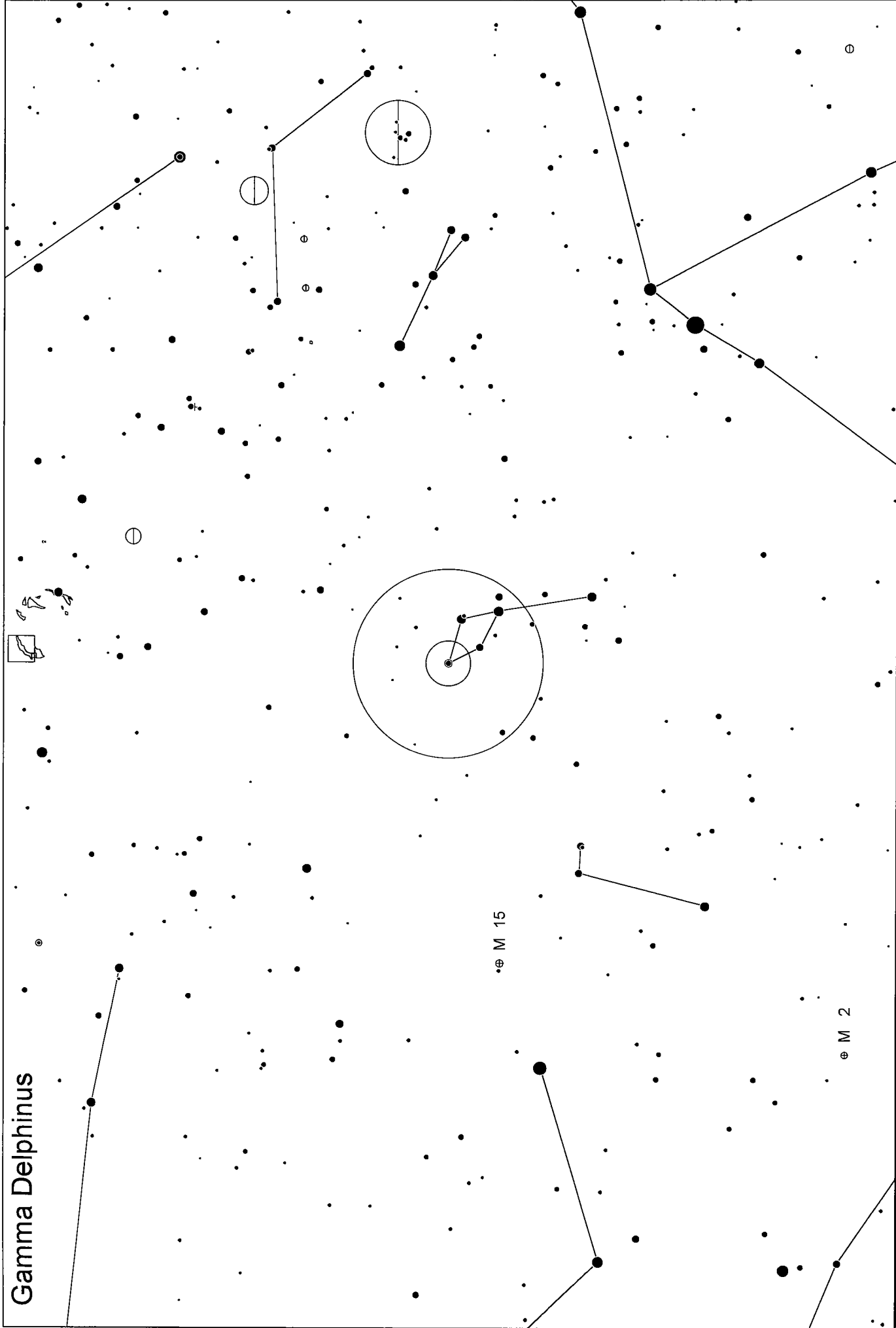
$\oplus M_2$ 

This is a detailed star chart of the constellation Beta Capricornus. The chart features a dense field of stars, with the primary stars of the constellation connected by lines to form its characteristic shape. A central star is highlighted with a circle. The label 'Beta Capricornus' is positioned in the bottom left corner. The chart is oriented with the constellation's main axis running diagonally from the top left to the bottom right.

2021m00.70s -14°46'53.0" * HR 7776 HD193495 Fl: 9 Ba:Bet const.Cap mV: 3.08 b-v: 0.79 sp: F8V+A0
MACJ 2460 SED: 2061 DA: 267 deg pm: 0.042 0.002 0.002 DabihBeta1 = Dabih Major; Beta2 = Dabih Minor

\times	\times
$+$	$+$
$\frac{\square}{\square}$	$\frac{\square}{\square}$
$\frac{\square}{\square}$	$\frac{\square}{\square}$
\bigcirc	\bigcirc
\oplus	\oplus
\ominus	\ominus
0	0

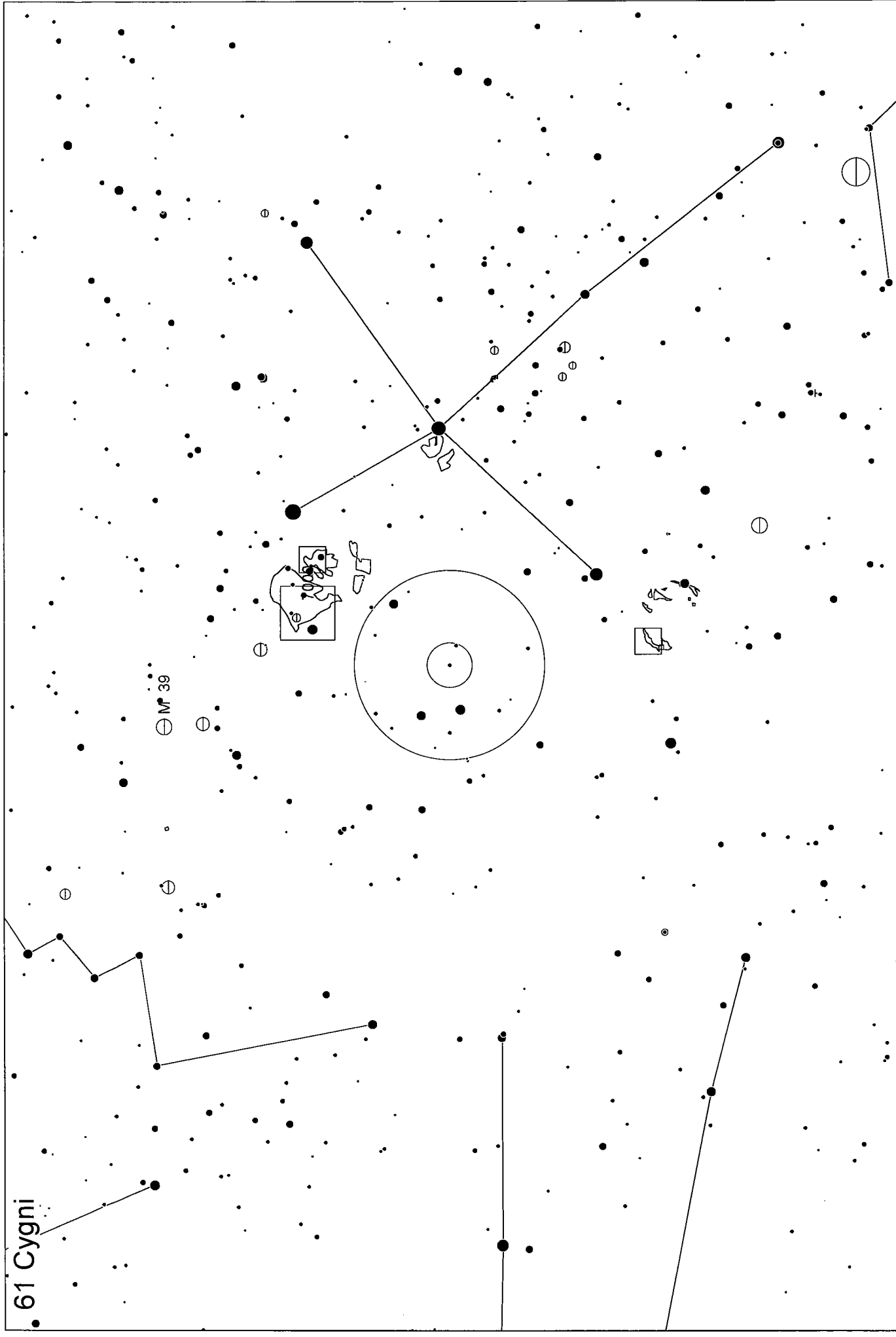
Gamma Delphinus



PGAO 2003-10-11 21h17m C: 20h47m +16°08' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC
20h46m39.50s +16°07'27.0" * HR 7948 HD197964 Fl: 12 Ba: Gam2 const: Del mV: 4.27 b-v: 1.04 sp: K1IV pm: -0.032 -0.197
MAG: 4.5, 5.5 SEP: 9.6" PA: 268 deg

Magnitude: 0 1 2 3 4 5 6										Variable	Double	Comet	Asteroid	Planet
●	●	●	●	●	●	●	●	●	●	○	●	☄	◆	♃
○	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	⊕	+	+	+	+	+
Nebula: Gx Oc Gc Pl Neb N+C Star Unk														

61 Cygni



PGAO 2003-10-11 21h17m C: 21h07m +38°46' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC		pm: 4.136 3.203	
21h06m54.60s +38°44'45.0" * HR 8085 HD201091 Fl: 61 Ba: const: Cyg mV: 5.21 b-v: 1.18 sp: K5V			
MAG: 5.2, 6.0 SEP: 28" PA: 146 deg			
Magnitude: 0 1 2 3 4 5 6		Variable Double Comet Asteroid Planet	
Nebula: Gx Oc Gc Pl Neb N+C Star Unk			

Beta Cephei

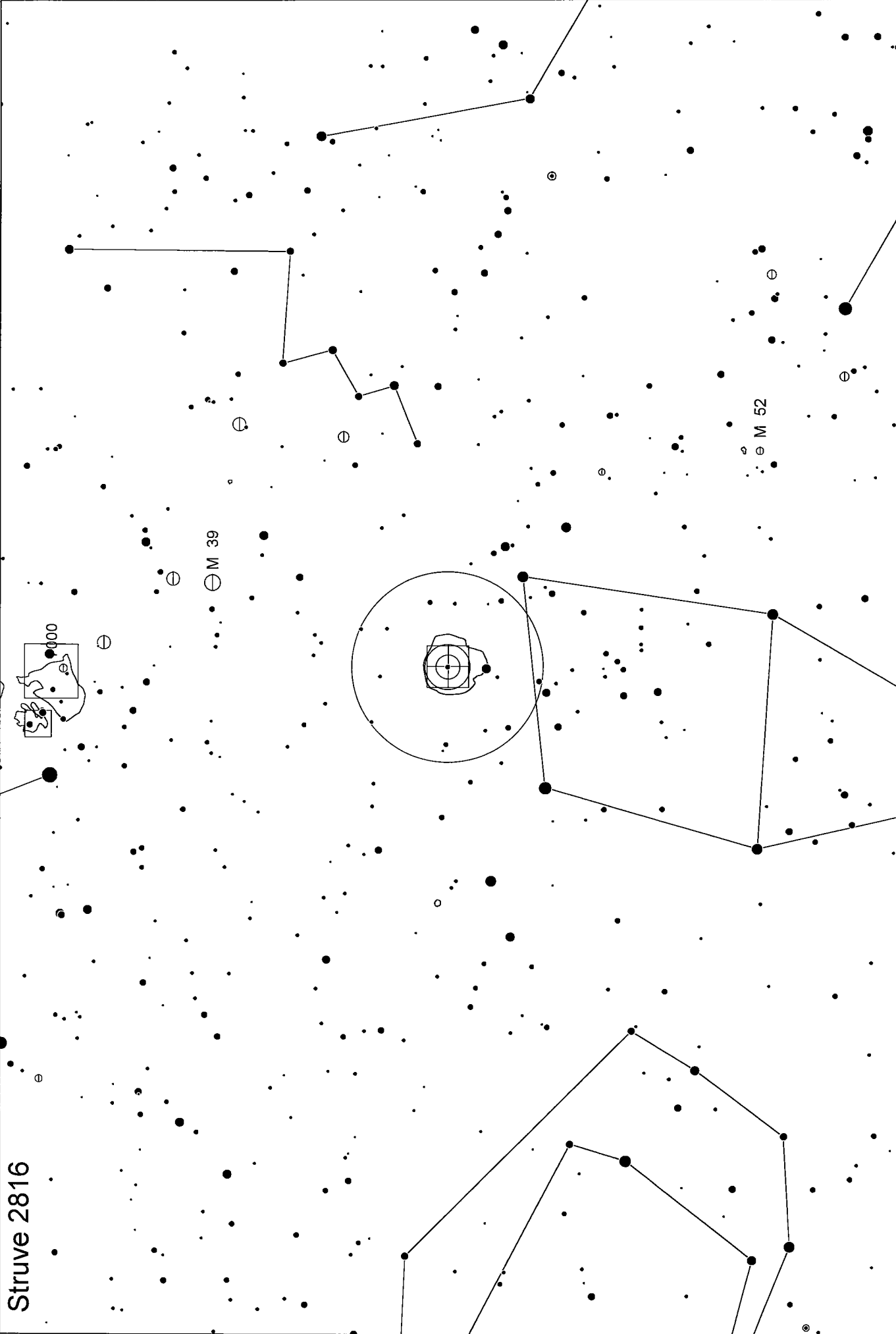
ε M 52

21h28m39.60s +70°33'39.0" * HR 8238 HD205021 Fl: 8 Ba:Bet const:Cep mV: 3.23 b-v:-0.22 sp: B1IV
MAC: 2 2 7 0 SED: 13 2" PA: 240 deg

MAG. 3.2, 1.9 SEP. 13.3 P.A. 249 deg

	○	⊖	⊕	◯	◻	\boxplus	+ x
Nebula:	Gx	Oc	Gc	PI	Neb.	N+C Star	Unk

Struve 2816



PGA0 2003-10-11 21h17m C: 21h39m +57°30' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC

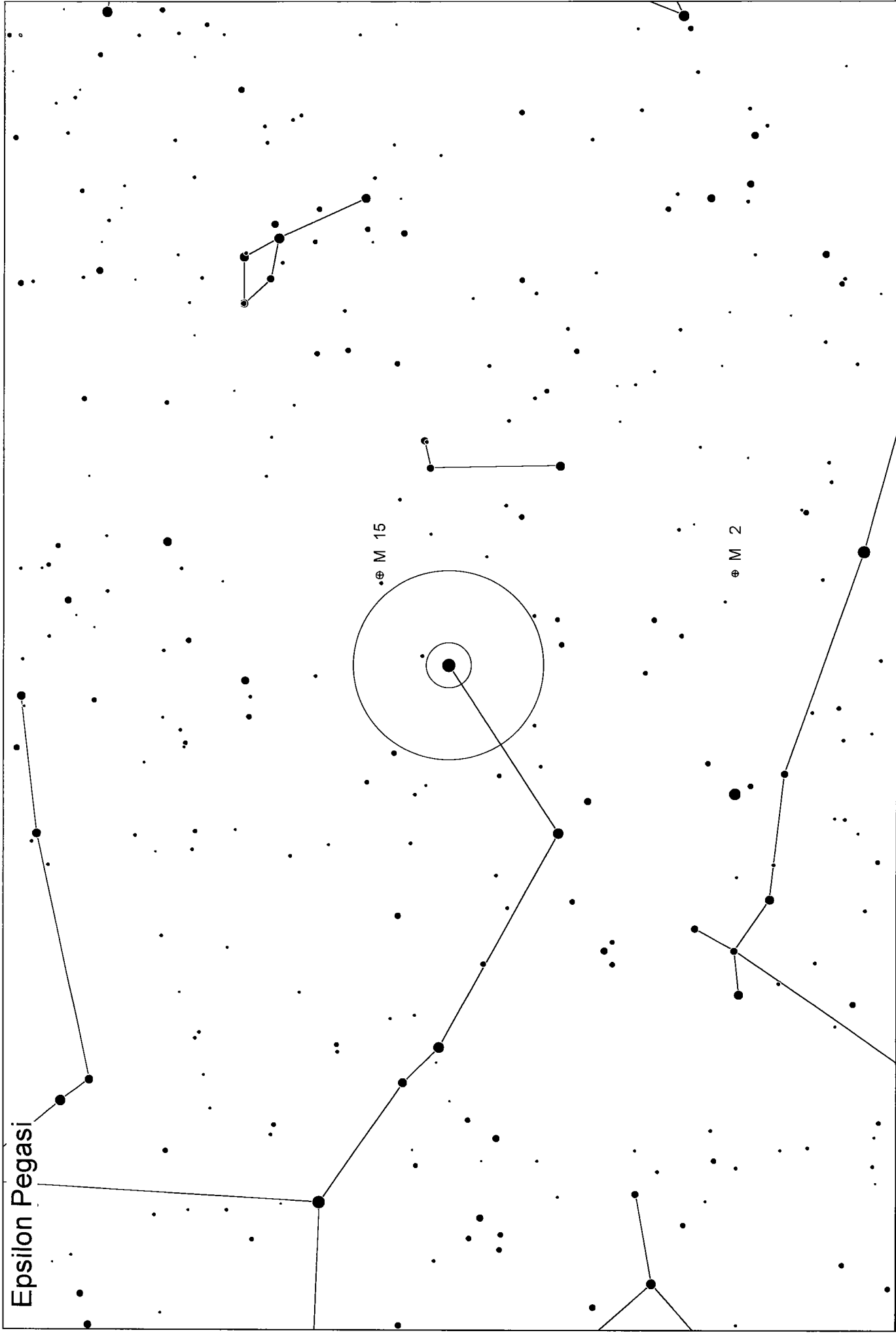
21h28m39.60s +70°33'39.0" * HR 8238 HD205021 Fl: 8 Ba:Bet const:Cep mV: 3.23 b-v:-0.22 sp: B1IV
MAG: 5.6 7.7 7.8 SEP: 11 7" 20" PA: 121 339 deg

WHAO: 0.0, 1.7, 1.0, 0.1 : 11.7 , 20.1 A. 12.1, 0.09 deg

pm: 0.010 0.007 ; Alfirk; Alphirk

Magnitude: 0 1 2 3 4 5 6 Variable Double Comet Asteroid Planet

Nebula: Gx Oc Gc Pl Neb N+C Star Unk

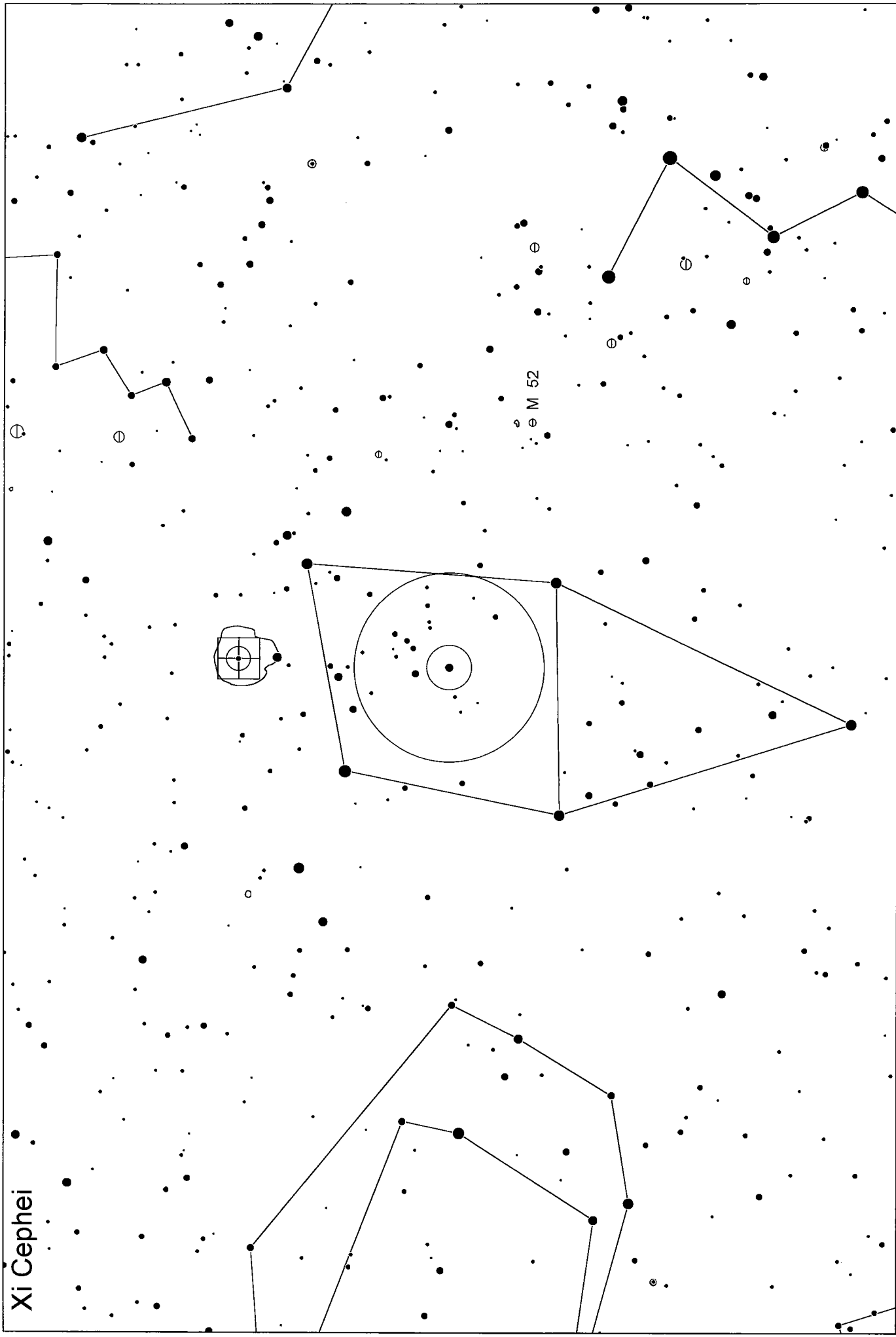


Epsilon Pegasi

PGAO 2003-10-11 21h17m C: 21h44m +09°54' L:+49°00' O:0° ARC HZ Cat: DSL BSC SAC
 21h44m11.20s +09°52'30.0" * HR 8308 HD206778 Fl: 8 Ba:Eps const:Peg mV: 2.39 b-v: 1.53 sp: K2Ib
 MAG: 2.4, 8.4 SEP: 142" PA: 320 deg pm: 0.031 -0.001 ;ENIF; Enf; AI Anf; Os Pegasi; Forn

Magnitude:	0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet
	●	●	●	●	●	●	●	⊙	●	☄	◆	(4)
Nebula:	Gx	Oc	Gc	Pi	Neb	N+C	Star	Unk				
	○	⊖	⊕	⊗	⊞	⊠	+	x				

Xi Cephei



PGAO 2003-10-11 21h17m C: 22h04m +64°39' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC

22h03m47.40s +64°37'40.0" * HR 8417 HD209790 Fl: 17 Ba:Xi const:Cep mV: 4.29 b-v: 0.34 sp: A3/6Vm

MAG: 4.4, 6.5 SEP: 7.7" PA: 277 deg

pm: 0.209 0.085 ;Alkurhah; Al Kirdah; Kurhah

Magnitude:	0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet
	●	●	●	●	●	●	●	○	●	☄	◆	♃

Nebula:	Gx	Oc	Gc	Pl	Neb	N+C	Star	Unk
	○	⊖	⊕	⊗	⊞	+	x	

This is a detailed star chart of the constellation Zeta Aquarii. The chart features a dense field of stars, with the primary stars of the constellation connected by lines to form its characteristic shape. Two specific deep-sky objects are highlighted with circles and labels: M 2, a globular cluster, and M 15, another globular cluster. The constellation is labeled 'Zeta Aquarii' in the bottom left corner. The chart is oriented with North at the top.

22h21m39.40s -01°23'14.0" * HR 8518 HD212061 Fl: 48 Ba:Gam const:Aqr mV: 3.84 b-v:-0.05 sp: A0V
MAC: 12.45 SED: 1.8" PA: 266 deg

MAG. 4.3, 4.3 SEP. 1.0 PA. 200 deg

	Gx	Oc	Gc	Pl	Neb	N+C	Star	Unk
Nebula:								

This is a detailed astronomical chart of the constellation Delta Cephei. The chart displays a dense field of stars, with several stars connected by lines to form the constellation's outline. Key features include a large circle around a central star, a smaller circle around a star labeled 'e M 39', and a small square with a crosshair around a star labeled 'e M 52'. The text 'Delta Cephei' is written vertically on the left side.

PGAO 2003-10-11 21h17m C: 22h29m +58°26' L: +49°00' O: 0° ARC HZ Cat: DSL BSC SAC
22h29m 10.30s +58°24'55.0" * HR 8571 HD213306 Fl: 27 Ba: Del const: Cep mV: 3.75 b-v: 0.60 sp: F5Ib-G2Ib
MAG: 3.9, 6.3 SEP: 41" PA: 192 deg pm: 0.015 0.001

[illegible][illegible][illegible]

A detailed black and white star chart of the constellation Laceria. The chart shows numerous stars of varying magnitudes, with several stars connected by lines to form the constellation's outline. Key features include a large circle around a central star, a smaller circle around a star labeled 'M 39', and a line connecting stars labeled 'M 40' and 'M 31'. The constellation is labeled 'Laceria' in the bottom left corner.

PGAO 2003-10-11	21h17m	C: 22h36m	+39°39'	L: +49°00'	O: 0°	ARC HZ	Cat: DSL BSC SAC
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22h35m52.30s +39°38'03.0" * HR 8603 HD214168 Fl: 8 Ba: pm: 0.005 -0.006
 22h35m52.30s +39°38'03.0" * HR 8603 HD214168 Fl: 8 Ba: const:lac mV: 5.73 b-v:-0.15 sp: B2Ve

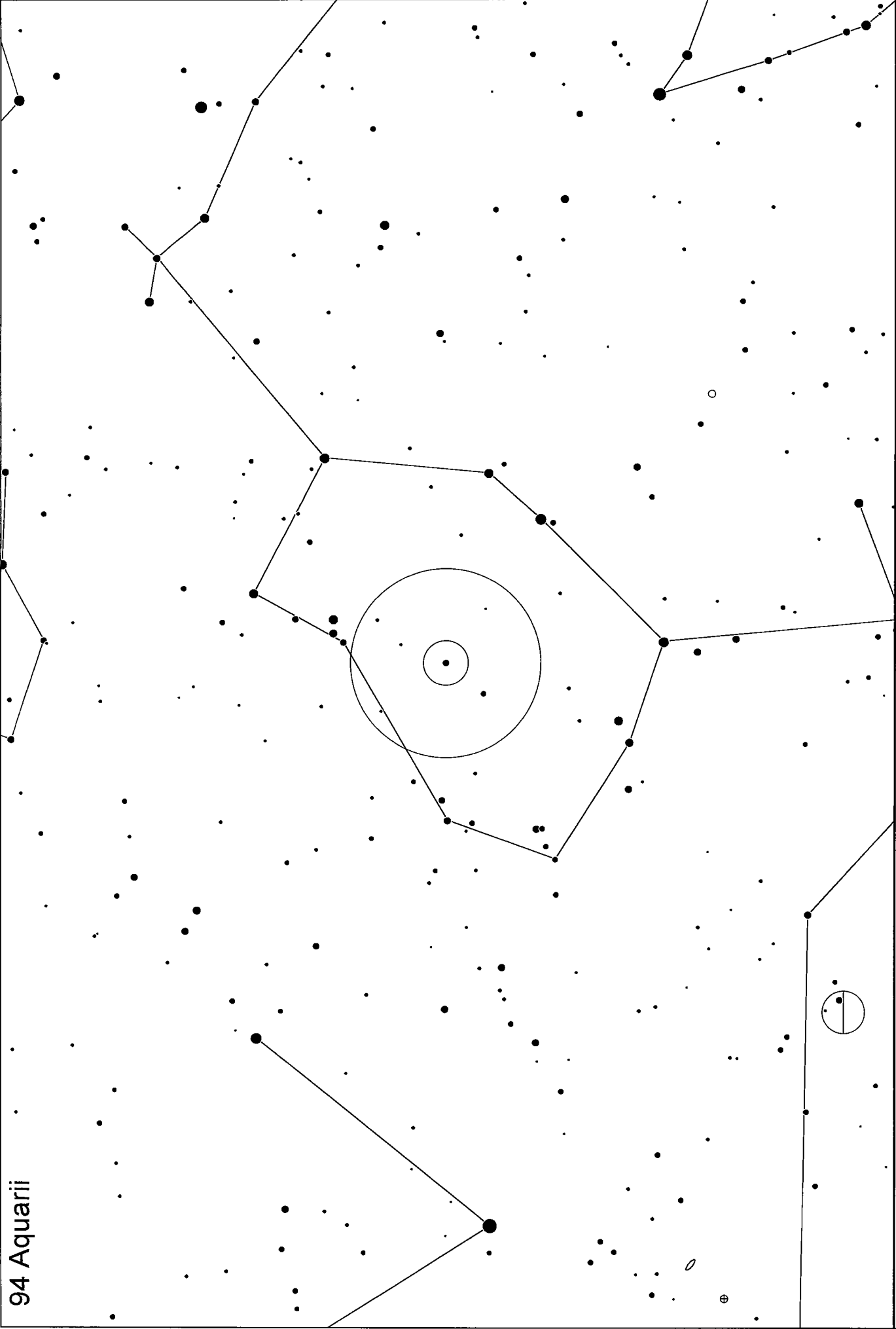
MAG: 5.7, 6.5 SEP: 22.4" PA: 166 deg

pm: 0.005 -0.006

Magnitude: : 0	1	2	3	4	5	6		
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								
								

Nebula: Gx Oo Oo Pl Neb N+C Star Unk

94 Aquarii

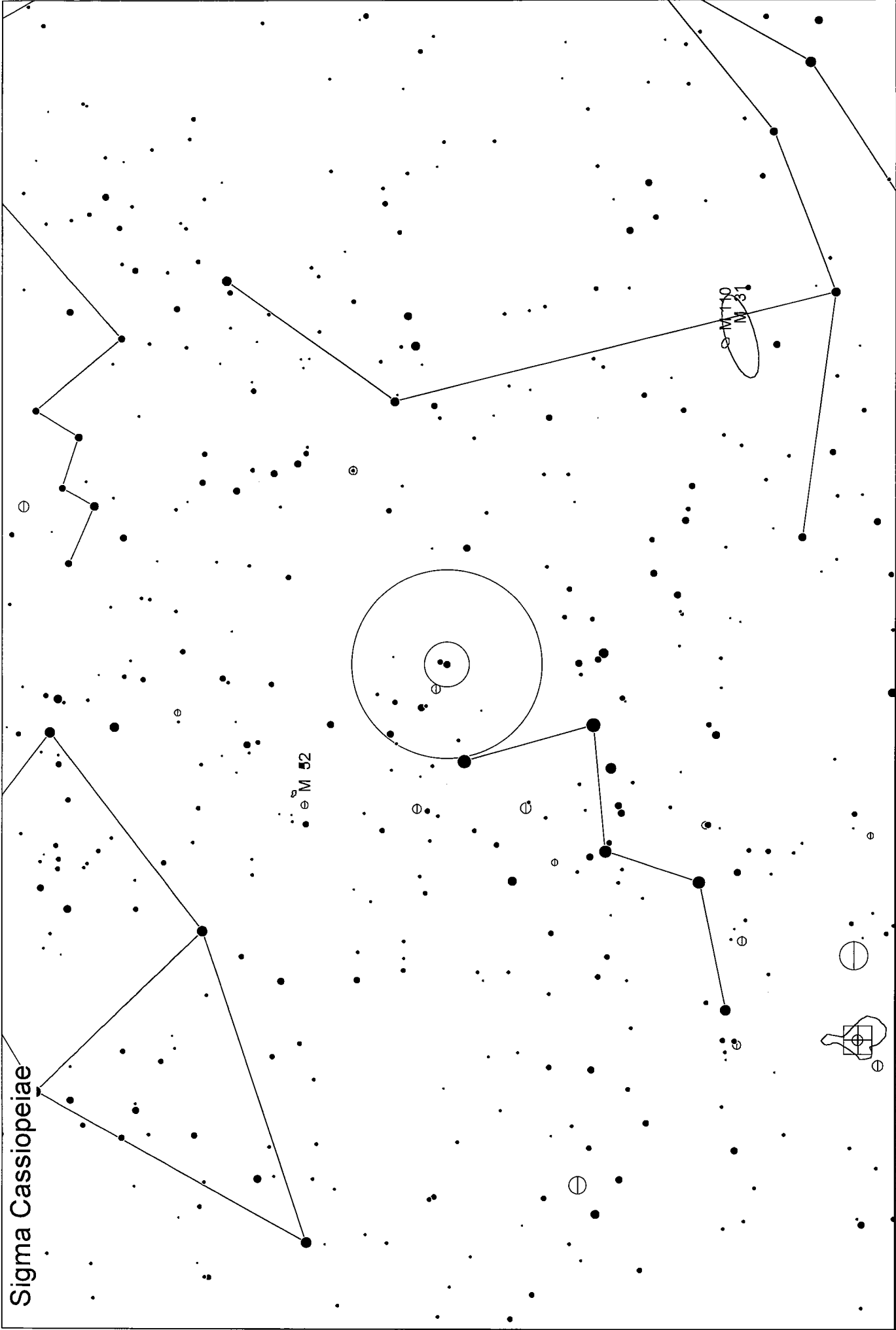


PGAO 2003-10-11 0h22m C: 23h19m -13°26' L:+49°00' O:0° ARC HZ Cat: DSL BSC SAC
23h19m06.70s -13°27'32.0" * HR 8866 HD219834 Fl: 94 Ba: const:Aqr mV: 5.08 b-v: 0.80 sp: G5IV
MAG: 5.3, 7.3 SEP: 12.7" PA: 350 deg

pm: 0.298 -0.101

Magnitude: 0 1 2 3 4 5 6										Variable	Double	Comet	Asteroid	Planet
Gx Oc Gc Pl Neb N+C Star Unk										+	x			

Sigma Cassiopeiae



PGAO 2003-10-11 21h17m C: 23h59m +55°47' L:+49°00' O:0° ARC HZ Cat: DSL BSC SAC
 23h59m00.50s +55°45'18.0" * HR 9071 HD224572 Fl: 8 Ba:Sig const:Cas mV: 4.88 b-v:-0.07 sp: B1V
 MAG: 5.0, 7.1 SEP: 3" PA: 326 deg

pm: 0.009 -0.004

Magnitude:	0	1	2	3	4	5	6	Variable	Double	Comet	Asteroid	Planet
Nebula:	Gx	Oc	Gc	Pl	Neb	N+C	Star	Unk				