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Double stars for northern, light-polluted skies

Discovering Northern Double Stars

Double stars for northern, light-polluted skies (Version 2022-1)

Agnes Clarke

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For Wurzel

Contents

Using This Book

I wrote this book to help myself find the brighter and better double stars visible from my urban location in the Netherlands. The charts and contents of the book have been designed accordingly. I observe with smaller telescopes, the largest being a 150mm Schmidt-Cassegrain, and the smallest being my 50mm finderscope. Being a northern observer, the doubles in this book do not include those in the southern hemisphere, and come only from equatorial and northern regions of the sky.

I locate targets using a 50mm finderscope and a red dot finder (RDF). The RDF helps me to point the telescope within a few degrees of the target by simply moving the projected red dot in the sight to the right place in the sky, and then the finderscope takes over as it shows about 5-7 degrees of sky with about 8-10 times magnification (it varies because my finderscope accepts different eyepieces).

This book has two types of diagrams to help with these two phases. Firstly, large diagrams show brighter stars visible from an urban location with the positions of the doubles indicated as 5 degree finderscope circles. This diagram helps with the rough pointing of the telescope via the red dot finder. Stars down to magnitude 5 are included in these overview charts, which is somewhat fainter than I can normally see from my back garden, unless it is a good clear night and it's past midnight! If there is any haze in the sky, it reflects glare from the city and the surrounding greenhouses and then I can only see about half the stars in the overview charts.

The second type of diagram shows the faint stars visible in my finderscope, so that I can finally locate the double by matching the pattern to the book. I normally have the finderscope and telescope very precisely aligned, so that I can keep a high magnification eyepiece in the telescope and not have to keep switching between lower and higher magnification in the telescope to center the double in the telescope view. To increase the chance that the double will actually be in the telescope view, I prefer to use wide-angle eyepieces so that I still have a reasonably large field of view despite using hundredfold magnification.

All 300 doubles in this book have been selected for brightness, color, and uniqueness, and all are within a few degrees of a relatively bright star of at least magnitude 4.0.

I have also included the position angles of the doubles in the finderscope diagrams. The position angle indicates the angle from the primary star to the secondary star, and I show this angle as a short line radiating from the double star. In the case the double is actually a triple or quadruple or quintuple the other position angles are shown as progressively shorter radiating lines, in order of increasing separation of the components. So the two components with the closest separation have the longest line.

All the charts show the rough spectral class of the stars as a color: hot blue stars of spectral class O or B are shown as dark blue. White stars like Sirius or Procyon (spectral class A or F) are shown as black. Yellow stars similar to our G-class Sun are shown as dark yellow, while cooler K class stars are dark orange and smouldering M class stars are deep red.

Note that the separation and position angle of double stars can change from year to year. This is one of the many charms of double stars: they offer the chance to see dynamic processes in deep space. However it does mean the data in this book is only valid as of 2021.

Astronomical Abbreviations

Constellations are often referred to in this work by three-letter abbreviations. When the constellation name is used in a star name, the constellation's genitive form is used. For example, Aquarius is abbreviated as Aqr, and one of its stars would be 5 Aquarii.

The following list gives the abbreviation and the full and genitive names.

And - Andromeda (Andromedae)

Ant - Antlia (Antliae)

Aps - Apus (Apodis)

Aqr - Aquarius (Aquarii)

Aql - Aquila (Aquilae)

Ara - Ara (Arae)

Ari - Aries (Arietis)

Aur - Auriga (Aurigae)

Boo - Bootes (Bootis)

Cae - Caelum (Caeli)

Cam - Camelopardalis (Camelopardalis)

Cnc - Cancer (Cancri)

CVn - Canes Venatici (Canum Venaticorum)

CMa - Canis Major (Canis Majoris)

CMi - Canis Minor (Canis Minoris)

Cap - Capricornus (Capricorni)

Car - Carina (Carinae)

Cas - Cassiopeia (Cassiopeiae)

Cen - Centaurus (Centauri)

Cep - Cepheus (Cephei)

Cet - Cetus (Ceti)

Cha - Chamaeleon (Chamaeleontis)

Cir - Circinus (Circini)

Col - Columba (Columbae)

Com - Coma Berenices (Comae Berenices)

CrA - Corona Australis (Coronae Australis)

CrB - Corona Borealis (Coronae Borealis)

Crv - Corvus (Corvi)

Crt - Crater (Crateris)

Cru - Crux (Crucis)

Cyg - Cygnus (Cygni)

Del - Delphinus (Delphini)

Dor - Dorado (Doradus)

Dra - Draco (Draconis)

Equ - Equuleus (Equulei)

Eri - Eridanus (Eridani)

For - Fornax (Fornacis)

Gem - Gemini (Geminorum)

Gru - Grus (Gruis)

Her - Hercules (Herculis)

Hor - Horologium (Horologii)

Hya - Hydra (Hydrae)

Hyi - Hydrus (Hydri)

Ind - Indus (Indi)

Lac - Lacerta (Lacertae)

Leo - Leo (Leonis)

LMi - Leo Minor (Leonis Minoris)

Lep - Lepus (Leporis)

Lib - Libra (Librae)

Lup - Lupus (Lupi)

Lyn - Lynx (Lyncis)

Lyr - Lyra (Lyrae)

Men - Mensa Mensae)

Mic - Microscopium (Microscopii)

Mon - Monoceros (Monocerotis)

Mus - Musca (Muscae)

Nor - Norma (Normae)

Oct - Octans (Octantis)

Oph - Ophiuchus (Ophiuchi)

Ori - Orion (Orionis)

Pav - Pavo (Pavonis)

Peg - Pegasus (Pegasi)

Per - Perseus (Persei)

Phe - Phoenix (Phoenicis)

Pic - Pictor (Pictoris)

Psc - Pisces (Piscium)

PsA - Piscis Austrinus (Piscis Austrini)

Pup - Puppis (Puppis)

Pyx - Pyxis (Pyxidis)

Ret - Reticulum (Reticuli)

Sge - Sagitta (Sagittae)

Sgr - Sagittarius (Sagittarii)

Sco - Scorpius (Scorpii)

Scl - Sculptor (Sculptoris)

Sct - Scutum (Scuti)

Ser - Serpens (Serpentis)

Sex - Sextans (Sextantis)

Tau - Taurus (Tauri)

Tel - Telescopium (Telescopii)

Tri - Triangulum (Trianguli)

TrA - Triangulum Australe (Trianguli Australis)

Tuc - Tucana (Tucanae)

UMa - Ursa Major (Ursae Majoris)

UMi - Ursa Minor (Ursae Minoris)

Vel - Vela (Velorum)

Vir - Virgo (Virginis)

Vol - Volans (Volantis)

Vul - Vulpecula (Vulpeculae)

Greek letters are used in Bayer designations of stars, such as Alpha Canis Majoris (Sirius). Greek letters also have standardised three-letter abbreviations as follows:

α - alf - alpha

β - bet - beta

γ - gam - gamma

δ - del - delta

ε - eps - epsilon

ζ - zet - zeta

η - eta - eta

θ - tet - theta

ι - iot - iota

κ - kap - kappa

λ - lam -lamda, lambda

μ - mu. - mu

ν - nu. - nu

ξ - ksi - xi

ο - omi - omicron

π - pi. - pi

ρ - rho - rho

σ - sig - sigma

τ - tau - tau

υ - ups - upsilon

φ - phi - phi

χ - khi - chi

ψ - psi - psi

ω - ome - omega

Doubles by Constellation

Andromeda

Almach: page 71 — A spectacular pairing of an intense orange primary with a fainter blue secondary.

Observed:

Groombridge 34: page 46 — A little pair of red stars, very widely separated.

Observed:

Pi And: page 47 — A bright blue primary widely separated from a fairly bright secondary.

Observed:

Struve 3050: page 45 — A tightly bound and perfectly balanced pair of bright yellow stars.

Observed:

Aquarius

107 Aqr: page 62 — A bright white primary with a fairly bright yellowish companion close by.

Observed:

12 Aqr: page 242 — A very tight yellow-blue system, with the small blue component sufficiently bright to show some color.

Observed:

4 Aqr: page 239 — An extremely tight pair of fairly balanced yellowish stars.

Observed:

53 Aqr: page 244 — An extremely tight and exactly equal pair of yellow suns.

Observed:

94 Aqr: page 61 — A bright yellowish primary easily separated from a fairly bright companion.

Observed:

Ome2 Aqr: page 64 — A brilliant bluish primary with a faint orange companion close by.

Observed:

Psi1 Aqr: page 64 — A brilliant orange primary distantly separated from a faint orange secondary.

Observed:

STF 2838: page 242 — An easily separated pair of white stars with a bright primary and a faint secondary.

Observed:

STF 2944: page 59 — An extremely tight pair of yellow stars, with a fainter distant third component.

Observed:

STF 3008: page 60 — An equal pair, with an orange primary closely separated from a slightly fainter secondary.

Observed:

Zeta Aqr: page 239 — A balanced, tight pair of white stars.

Observed:

Aquila

11 Aql: page 207 — A wide pair with a white primary and a faint blue companion.

Observed:

15 Aql: page 214 — A very wide pair of yellow stars.

Observed:

28 Aql: page 208 — A bright yellowish primary with a distant much fainter companion.

Observed:

57 Aql: page 240 — A very wide and balanced pair of bright, bluish stars.

Observed:

STF 2434: page 215 — A yellow-yellow pairing, widely separated.

Observed:

Struve 2404: page 208 — Two orange stars with very tight separation.

Observed:

Struve 2426: page 203 — A less common white-orange pair, the two components are easily separated.

Observed:

Struve 2449: page 204 — A close and well balanced yellow-blue pair.

Observed:

Struve 2532: page 235 — A very widely separated orange-blue duo, but the blue component is very faint.

Observed:

Aries

1 Ari: page 83 — A close pair with a brighter yellow primary and blue secondary.

Observed:

14 Ari: page 86 — A very wide triangle of three stars; the bright primary is yellowing and the other two components are significantly fainter.

Observed:

30 Ari: page 86 — Two bright yellow stars, almost equally matched and widely separated.

Observed:

33 Ari: page 81 — A bright yellow primary with a faint blue companion, widely separated.

Observed:

Gamma Ari: page 83 — An equal pair of icy blue stars with close separation.

Observed:

Lambda Ari: page 87 — A bright, wide pair with good colors: the A component is yellow and the B component is blue.

Observed:

Struve 326: page 85 — A faint, close orange-red pair.

Observed:

Struve 394: page 87 — A close white-yellow pairing.

Observed:

Auriga

14 Aur: page 100 — A bright yellow-blue pairing with comfortable separation.

Observed:

26 Aur: page 105 — A bright yellow primary easily separated from a significantly fainter blue companion.

Observed:

Omega Aur: page 103 — A yellow primary with a closely bound faint orange companion.

Observed:

Psi5 Aur: page 98 — A very wide yellow-blue duo. The primary is very bright and strongly colored.

Observed:

STT147: page 103 — A moderately bright yellow primary with two small blue companions, forming a widely separated triangle.

Observed:

Struve 644: page 104 — Struve 644 is a real challenge with the two stars separated by much less than 2". The components are equally bright and contrasting yellow and blue.

Observed:

Struve 698: page 104 — A wide orange-blue pair. The two stars are separated in brightness by almost exactly two magnitudes.

Observed:

Struve 872: page 100 — An easily separated pair of stars. Neither star is particularly bright, perhaps leading to fanciful star colors variously reported as pinkish or lilac.

Observed:

Struve 928: page 99 — A very close pair of white stars.

Observed:

Struve 929: page 99 — A close yellow-blue pair.

Observed:

Bootes

39 Boo: page 167 — A balanced tightly bound pair of yellow stars.

Observed:

Iota Boo: page 167 — A very wide pairing of a bright yellow primary and a blue companion.

Observed:

Izar: page 173 — A fine and very narrowly separated orange-yellow pair. Both components shine brilliantly.

Observed:

Kappa Boo: page 166 — A very bright white primary component nicely separated from a reasonably bright blue secondary.

Observed:

Pi Boo: page 178 — A close and reasonably balanced pair of white stars.

Observed:

SHJ 191: page 166 — A balanced (but somewhat less bright) pair of yellow stars with very wide separation.

Observed:

Struve 1825: page 173 — A very close yellow-orange pairing.

Observed:

Struve 1835: page 179 — A bright white primary close to a yellow secondary.

Observed:

Struve 1910: page 175 — A close pair of perfectly balanced yellow stars.

Observed:

Xi Boo: page 177 — A close yellow-orange duo, with a bright primary and brightish secondary.

Observed:

Camelopardalis

1 Cam: page 98 — A reasonably balanced and separated white-blue pair.

Observed:

11/12 Cam: page 101 — A distantly separated but strongly colored orange-blue pairing, both components being bright. 11 Cam is the blue star and 12 Cam is the orange star.

Observed:

32H. Cam: page 38 — A bright and balanced white-white pair, widely separated.

Observed:

Struve 1122: page 131 — An equal and easily separated pair of white stars.

Observed:

Struve 1625: page 35 — A balanced pair of yellow stars, comfortably separated.

Observed:

Struve 384: page 74 — A very tight pair of relatively faint stars, with a loosely associated dim third component.

Observed:

Struve 385: page 69 — A brilliant blue primary with a moderately faint companion, very tightly separated.

Observed:

Struve 485: page 74 — A widely separated equal pair of white stars.

Observed:

Cancer

Iota Cnc: page 135 — A strongly colored deeply yellow and blue pair. The separation is wide but both components are bright.

Observed:

Phi2 Cnc: page 139 — Two identical bright white stars nearly touching each other.

Observed:

Struve 1245: page 143 — A well matched white-yellow pair, easily separated.

Observed:

Struve 1254: page 143 — A wide yellow-blue pairing, but the small blue component is very faint.

Observed:

Struve 1311: page 142 — A close pair of equal yellowish stars.

Observed:

Zeta Cnc: page 140 — An equal pair of closely bound and bright yellow stars.

Observed:

Canes Venatici

16/17 CVn: page 152 — A distantly separated pair of bright white stars.

Observed:

2 CVn: page 152 — A yellow-blue pairing with easy separation.

Observed:

Cor Caroli: page 153 — A brilliant white primary star with a more orange secondary, easily separated.

Observed:

Struve 1755: page 168 — A fairly equal and very close pairing; the primary is yellow.

Observed:

Canis Major

Beta CMa: page 122 — A fiercely brilliant blue primary with a distant very faint companion.

Observed:

STF 1011: page 127 — A very close pair of white stars.

Observed:

STF 1069: page 121 — An equal pair of white stars, widely separated.

Observed:

STF 1097: page 126 — A fairly bright yellow primary with an easily separated and relatively faint companion.

Observed:

Sirius: page 127 — A ferociously brilliant white primary moderately separated from a relatively dim white dwarf companion.

Observed:

Canis Minor

Struve 1103: page 141 — A close but relatively faint yellow-blue pairing.

Observed:

Capricornus

Alpha1/2 Cap: page 243 — A distantly separated pair of brilliant white stars.

Observed:

Beta Cap: page 243 — A brilliant yellow primary distantly separated from bright white secondary.

Observed:

HJ 1537: page 241 — A yellow primary with a very close, faint companion.

Observed:

Pi Cap: page 241 — A very close pair, with a bright blue primary and fairly faint secondary.

Observed:

STF 2683: page 240 — An equal pair of easily separated yellowish stars.

Observed:

Cassiopeia

Eta Cas: page 45 — A brilliant yellow primary comfortably separated from a fairly faint red secondary.

Observed:

Iota Cas: page 37 — A bright, white primary with a yellow-orange secondary and a dim, colorless third component.

Observed:

Sigma Cas: page 46 — A tight primary with a brilliant blue-white primary almost touching a delicate secondary.

Observed:

Struve 163: page 69 — A wide binary with a strongly orange primary and blue secondary.

Observed:

Struve 3053: page 43 — A bright yellow primary with an easily apparent white companion, easily separated. There is a very faint third component distantly separated from the central two stars.

Observed:

Struve 45: page 44 — A wide double with a yellow primary.

Observed:

Struve 7: page 43 — A balanced pair with a bluish primary, with extremely tight separation.

Observed:

Cepheus

Beta Cep: page 40 — A brilliant white primary split comfortably from a moderately faint blue companion.

Observed:

Delta Cep: page 224 — A bright, widely separated yellow and blue pair.

Observed:

Kappa Cep: page 37 — A scattered triple system, with a very bright blue primary with one close and one dim distant companion.

Observed:

Struve 2816: page 221 — Possibly yellow and white (the yellow primary being bracketed by by two fainter white stars). Alternately, the primary might be blue.

Observed:

Xi Cep: page 221 — A bright white primary with a close moderately fainter white secondary.

Observed:

Cetus

12 Cet: page 62 — A bright red primary separated comfortably from a very faint companion.

Observed:

37 Cet: page 63 — A very widely separated pair, with a brilliant yellowish primary and a significantly fainter, strongly yellow secondary.

Observed:

66 Cet: page 92 — A comfortably separated yellow and blue pair.

Observed:

HJ 1968 AB: page 65 — A yellowish primary very widely separated from a faint secondary.

Observed:

HJ 2004: page 65 — A fairly bright white primary with a very close, faint secondary.

Observed:

S 390: page 61 — A close and equal pair of bluish stars.

Observed:

STF 39: page 63 — A wide pair with a yellow primary and pale yellow secondary.

Observed:

STF 49: page 60 — A close pair with a yellow primary and tiny orange secondary.

Observed:

STF 80 AB: page 56 — An orange primary widely separated from a slightly fainter yellow secondary.

Observed:

Coma Berenices

2 Com: page 156 — A white primary with a tightly bound and fairly apparent secondary.

Observed:

24 Com: page 157 — An orange-blue pair, with a reasonable bright secondary and easy separation.

Observed:

Corona Borealis

STT305: page 169 — A close orange-blue pair, but the secondary is quite faint.

Observed:

Sigma CrB: page 169 — A well balanced yellow pair with quite close separation.

Observed:

Struve 1932: page 176 — A perfectly balanced pair of yellow stars, but extremely close.

Observed:

Zeta CrB: page 168 — A well-matched pair of bright bluish stars, closely separated. The pair are both blue, but some observers report seeing the fainter companion as greenish.

Observed:

Corvus

58 Crv: page 163 — A close pair of bright, yellowish stars, with a third faint, widely separated component.

Observed:

Delta Crv: page 163 — A brilliant bluish primary widely separated from a moderately faint companion.

Observed:

Crater

Gamma Crt: page 164 — A close pair with a brilliant white primary somewhat fainter secondary.

Observed:

Cygnus

17 Cyg: page 223 — A bright yellowish primary widely separated from a dim secondary.

Observed:

26 Cyg: page 224 — A bright orange primary very widely separated from a dim secondary.

Observed:

61 Cyg: page 222 — An orange-red pair with wide separation. I see both components as orange.

Observed:

Beta Cyg: page 223 — This is the renowned Albireo, a brilliant deep yellow primary with a bright and delicate blue companion.

Observed:

Delta Cyg: page 222 — A very close and unbalanced pair with a brilliant blueish primary and reasonably bright white secondary.

Observed:

STT394: page 225 — An orange primary with a faint blue secondary, easily split.

Observed:

STT437: page 226 — A balanced yellow-orange pair, very narrowly separated.

Observed:

Struve 2486: page 190 — A close and equal pair of yellow suns.

Observed:

Delphinus

Gamma Del: page 230 — A very bright yellow primary close to a bright blue secondary.

Observed:

Struve 2725: page 234 — A close yellow and blue pair.

Observed:

Draco

16 Dra: page 190 — 16 Draconis forms a triple with nearby 17 Draconis, which in turn is a close double.

Observed:

40/41 Dra: page 36 — A comfortably separated pair of bright yellow stars.

Observed:

Mu Dra: page 194 — A tightly bound pair of yellow stars.

Observed:

Nu Dra: page 189 — A very wide pair of balanced, very bright white stars.

Observed:

Omi Dra: page 193 — A widely separated pair. The strongly yellow primary has an adequately bright blue companion.

Observed:

Psi1 Dra: page 39 — A wide pair of reasonably balanced, bright white stars.

Observed:

Struve 1362: page 35 — A close and equal pair of pale yellow stars.

Observed:

Struve 2155: page 189 — A yellow-blue pairing. Easily separated but the small blue component lacks brightness in smaller telescopes.

Observed:

Struve 2348: page 194 — A yellow primary widely separated from a moderately faint white secondary.

Observed:

Equuleus

Eps Equ: page 232 — A yellow-blue combination with a moderately bright secondary. Easy separation.

Observed:

Lamda Equ: page 234 — An extremely tight and exactly equal pair of yellow stars.

Observed:

Struve 2786: page 231 — An extremely close and fairly balanced pair of white stars.

Observed:

Eridanus

32 Eri: page 93 — A close double with bright components; yellow and white.

Observed:

55 Eri: page 120 — An equal pair of quite close, moderately bright, yellow stars.

Observed:

62 Eri: page 119 — A distantly separated pair, with a bright, blue primary and a significantly fainter secondary.

Observed:

66 Eri: page 118 — A bright, bluish primary with an extremely close faint secondary; a further faint, white C component lies at some distance from A and B.

Observed:

Burnham 1042: page 92 — A very wide and unequal pairing. The primary is yellow, while the secondary is a very faint, balanced double (1.3", p.a. 40°).

Observed:

Gamma Eri: page 94 — A brilliant red primary widely separated from a very dim companion.

Observed:

Omicron2 Eri: page 94 — A brilliant yellow-orange primary distantly separated from a dim white companion.

Observed:

Rho2 Eri: page 93 — A bright yellow-orange star with an extremely close, faint companion.

Observed:

Gemini

15 Gem: page 110 — A widely separated orange and blue pairing.

Observed:

20 Gem: page 111 — A widely separated but balanced yellow-white pair.

Observed:

38 Gem: page 114 — A brilliant white primary with close yellow companion.

Observed:

Castor: page 133 — A tight pair of very brilliant, bluish stars.

Observed:

Kappa Gem: page 142 — A brilliant orange primary with a small blue companion close by.

Observed:

STT134: page 112 — A very wide pair with a yellow primary and a moderately fainter secondary.

Observed:

Struve 1083: page 110 — A close, relatively balanced pair. The primary is white.

Observed:

Struve 1108: page 139 — A yellow primary comfortably separated from a blue secondary.

Observed:

Wasat: page 109 — Delta Geminorum or Wasat is a brilliant white star with a close orange-yellow companion.

Observed:

Hercules

100 Her: page 205 — Two almost identical bright white stars, comfortably separated.

Observed:

56 Her: page 201 — A bright yellow-orange primary comfortably separated from very faint possibly bluish secondary. The secondary can be challenging to spot in a smaller telescope, especially with light pollution.

Observed:

95 Her: page 202 — A bright white-yellow pairing with close separation.

Observed:

Alpha Her: page 203 — A reasonably balanced orange-blue pair, very close with a brilliant primary and bright secondary.

Observed:

Delta Her: page 201 — A close white-blue pairing. The primary is brilliant but the secondary is just over 5 magnitudes fainter.

Observed:

Gamma Her: page 177 — A yellow-yellow pairing with a brilliant primary and dim secondary. Distantly separated.

Observed:

Kappa Her: page 174 — A reasonably balanced and bright, but widely separated, pair of yellow stars.

Observed:

Mu Her: page 193 — A brilliant yellow primary widely separated from a vastly fainter red secondary.

Observed:

Rho Her: page 191 — A very close equally matched pair with a brilliant white white primary and slightly fainter blue companion.

Observed:

Struve 2063: page 195 — An easily separated white-yellow double.

Observed:

Struve 2120: page 197 — A wide pair with an orange primary and somewhat fainter secondary.

Observed:

Struve 2411: page 207 — A comfortably separated pair with a yellow primary and a faint secondary.

Observed:

Hydra

27 Hya: page 148 — A brilliant orange-yellow primary with a pale yellow secondary, distantly separated.

Observed:

HJ 99: page 147 — A yellow primary with a reasonably balanced secondary, distantly separated.

Observed:

STF 1329: page 146 — A close and equal yellow pairing.

Observed:

Struve 1347: page 144 — A wide pair of slightly yellowish stars.

Observed:

Lacerta

8 Lac: page 44 — A fairly equally balanced and bright pair of blue-white stars, comfortably separated.

Observed:

Struve 2894: page 225 — A fairly bright yellow primary comfortably separated from a faint blue secondary.

Observed:

Leo

49 Leo: page 159 — A bright white primary with an extremely close, reasonably apparent companion.

Observed:

54 Leo: page 156 — A bright white primary which shines very close to a fairly bright white companion.

Observed:

78 Leo: page 158 — A tight white-yellow pair. The secondary is not too faint, but the primary shines brilliantly.

Observed:

83 Leo: page 160 — A fairly bright yellow primary with an easily apparent orange secondary, widely separated.

Observed:

90 Leo: page 158 — A balanced pair of fairly bright bluish stars, very closely separated.

Observed:

93 Leo: page 157 — A bright white primary very widely separated from a faint companion.

Observed:

Gamma Leo: page 140 — Known variously as Gamma Leonis or Algeiba, this is one of the finest yellow-yellow doubles, being both bright, fairly balanced and tightly bound.

Observed:

Lepus

Alpha Lep: page 128 — A brilliant yellowish primary widely separated from a very faint companion.

Observed:

BU 314: page 121 — An extremely tight pair of yellowish stars, with a faint, distant third companion.

Observed:

HJ 3780: page 122 — Four moderately bright stars, very widely separated.

Observed:

South 476: page 128 — A pair of fairly bright, blue stars, widely separated.

Observed:

Libra

Alpha Lib: page 184 — A brilliant white primary with distant bright, white companion.

Observed:

Iota Lib: page 185 — A distantly separated pair, with a brilliant white primary and tiny secondary.

Observed:

SHJ 195: page 184 — A widely separated, fairly balanced pair of yellowish stars.

Observed:

Struve 1962: page 182 — An easily separated equal pair of yellow stars.

Observed:

Lynx

12 Lyn: page 97 — A close pair with a bright yellow primary and a reasonably bright blue companion.

Observed:

19 Lyn: page 97 — An easily separated and reasonably balanced yellow-blue pairing.

Observed:

38 Lyn: page 134 — A bright white primary narrowly separated from a brightish white secondary.

Observed:

Struve 1282: page 135 — A faint double consisting of two equal and very close yellow stars.

Observed:

Struve 1333: page 132 — A challenging pair of equal white stars separated by less than two arc seconds.

Observed:

Struve 1338: page 132 — The tightest double in this book, Struve 1338 consists of two well-balanced white stars split by a mere arc second.

Observed:

Struve 1369: page 134 — An orange-yellow pair, widely separated.

Observed:

Struve 958: page 102 — Two tightly bound, perfectly matched bright stars.

Observed:

Lyra

Beta Lyr: page 192 — Two very widely separated white stars.

Observed:

Epsilon Lyr: page 191 — Two pairs of tightly bound and very well balanced bright white stars. The pairs are separated by over three arc minutes (one tenth of a full Moon), but each pair is split by only just over 2 arc seconds.

Observed:

STT525: page 196 — A colorless pair very widely separated. In addition to the two main components, a third faint component might be glimpsed within 2" of the primary.

Observed:

Struve 2470: page 196 — An easily split white-blue pairing.

Observed:

Struve 2474: page 192 — An easily split couple of yellow stars.

Observed:

Zeta Lyr: page 195 — A very widely separated double that can be split in the finder scope. It has two bright yellow components differing in brightness by 1.6 magnitudes.

Observed:

Monoceros

Beta Mon: page 125 — A wonderful triple showing a brilliant bluish primary closely separated from a tight pair of bluish stars.

Observed:

Epsilon Mon: page 114 — An unequal pair of bright yellow stars, easily separated.

Observed:

STF 1112: page 147 — A yellow primary widely separated from a somewhat fainter white secondary.

Observed:

STF 914: page 120 — A fairly bright white primary widely separated from a faint secondary.

Observed:

Zeta Mon: page 146 — A widely separated triple system with two brighter yellow components and a fainter orange companion.

Observed:

Ophiuchus

41 Oph: page 213 — A fantastically close unequal orange-white pairing.

Observed:

61 Oph: page 205 — A widely separated pair of white stars. Both components are fairly bright.

Observed:

70 Oph: page 209 — A brilliant yellow star with a bright orange companion. The pair are very close, especially given their apparent magnitude. The gap is currently near the maximum.

Observed:

Struve 2276: page 204 — A balanced and close pair of white stars.

Observed:

Tau Oph: page 217 — An extremely tight, balanced pair of yellowish stars.

Observed:

Orion

42/45 Ori: page 124 — A very wide and bright binocular pair, the brighter star (42 Ori) being bluish and the other white.

Observed:

Delta Ori: page 117 — A very wide pair consisting of a brilliant primary and significantly fainter blue secondary.

Observed:

Iota Ori: page 125 — In the same field as Struve 747, Iota Orionis is a brilliant white star with an easily separated and reasonably bright blue companion.

Observed:

Lamda Ori: page 111 — A close pair of white stars, with a brilliant primary and bright secondary.

Observed:

Rigel: page 126 — Rigel, one of the brightest stars in the sky, has a moderately bright companion that seems very faint in the glare of its primary. The separation is reasonable and the white secondary contrasts nicely with the blue primary.

Observed:

Sigma Ori: page 117 — A blue primary, flanked by one fainter star to the west, and two relatively bright white stars to the east, all easily separated from the primary.

Observed:

Struve 747: page 119 — A very wide pair of well matched and bright white stars.

Observed:

Struve 790: page 123 — A close blue-yellow pair roughly a degree north-east of the Orion Nebula.

Observed:

Theta1 Ori: page 118 — Better known as the Trapezium, this multiple star system pushes the boundaries between a multiple star system and a star cluster. The 4 brightest components form a trapezium, but fainter components can also be picked out.

Observed:

Theta2 Ori: page 124 — A very wide line of three bright white stars, often overlooked as it is on the border of the spectacular Orion Nebula.

Observed:

Zeta Ori: page 123 — A fiercely brilliant close blue-blue pairing, made difficult by the brightness of the primary.

Observed:

Pegasus

1 Peg: page 229 — A triple system, with a brilliant orange primary with two faint companions, one very close and the other quite widely separated.

Observed:

3 Peg: page 231 — A bright white primary distantly separated from a reasonably apparent yellowish secondary.

Observed:

57 Peg: page 52 — A bright red primary widely separated from a faint white secondary.

Observed:

Struve 2841: page 232 — A wide yellow-blue pairing. Some see some green in the secondary.

Observed:

Struve 2848: page 235 — An equal and easily split pair of yellow stars.

Observed:

Struve 3007: page 51 — A close pair with a brighter yellow component and a very faint orange dwarf companion.

Observed:

Perseus

56 Per: page 72 — A bright yellow primary with a close yellow companion.

Observed:

57 Per: page 102 — A distantly separated pair of moderately bright, balanced, white stars.

Observed:

Eta Per: page 70 — A bright orange primary with a much fainter blue secondary.

Observed:

Struve 270: page 75 — A wide yellow-blue double.

Observed:

Struve 304: page 76 — A faint, wide white and blue pair.

Observed:

Struve 331: page 75 — A bright and easily separated white-blue pair.

Observed:

Struve 336: page 77 — An orange primary easily separated from a bluish secondary.

Observed:

Struve 369: page 76 — A fairly balanced yellow-blue pairing. Very widely separated.

Observed:

Struve 392: page 70 — An orange-blue pair, widely separated. Neither companion is particularly bright.

Observed:

Struve 434: page 72 — A widely separated, balanced pair with an orange primary.

Observed:

Struve 533: page 77 — A bluish primary easily separated from somewhat fainter companion; there is a distant and very faint third component.

Observed:

Theta Per: page 71 — A wide and unbalanced double with a deep yellow primary and a very faint blue secondary.

Observed:

Pisces

100 Psc: page 88 — A comfortably separated pair of white stars.

Observed:

34 Psc: page 54 — A bright bluish primary with a faint secondary close by.

Observed:

35 Psc: page 52 — An easy, bright double star with comfortable separation and a reasonably bright secondary, consisting of a white primary and light yellow secondary.

Observed:

38 Psc: page 55 — A very close and equal pair of yellow stars.

Observed:

55 Psc: page 54 — A bright orange primary with a much fainter white secondary close by.

Observed:

65 Psc: page 47 — An equal pair of fairly bright light yellow stars.

Observed:

77 Psc: page 56 — A wide, fairly bright pairing of two yellow-white stars, separated in brightness by nearly one magnitude.

Observed:

Alrisha: page 89 — An extremely tight pair of bright, white stars.

Observed:

Psi1 Psc: page 51 — An equally matched and widely separated pair of blue-white stars.

Observed:

STF 3019: page 53 — A balanced pair with a yellowish primary and white secondary.

Observed:

STF 8: page 59 — A yellowish primary with a close and faint secondary.

Observed:

Struve 3009: page 53 — A close combination of an orange primary close to a 2 magnitude fainter secondary. The secondary at magnitude 8.76 is too faint to show much color in smaller scopes, but some report it to be be blue.

Observed:

Zeta Psc: page 55 — A widely separated pair of closely matched bright white stars.

Observed:

Puppis

STF 1121: page 148 — A close and equal pair of bluish stars.

Observed:

Sagitta

H N 84: page 233 — A wide pair with a strongly orange primary and fainter blue companion.

Observed:

Zet Sge: page 230 — A bright white star with a relatively dim companion, closely separated.

Observed:

Sagittarius

Zeta Sge: page 233 — A bright yellow primary with a much fainter blue secondary.

Observed:

Scorpius

Nu Sco: page 185 — A bright, extremely tight and balanced pair of blue stars.

Observed:

Struve 1999: page 183 — An easily separated and well balanced pair of deep yellow stars.

Observed:

Xi Sco: page 183 — Xi Sco (Grafias) is a triple star system. The yellow primary can be split by larger telescopes into a an equal pale yellow pair with a separation of 1.1". Lesser telescopes show a single yellow point distantly separated from a fairly apparent blue companion.

Observed:

Scutum

S Sct: page 214 — A deep red primary with an easily separated, tiny orange companion.

Observed:

STF 2306: page 217 — A deep yellow primary with a balanced secondary, closely separated.

Observed:

Struve 2313: page 216 — A close yellow and blue pair.

Observed:

Serpens

AC 11: page 213 — A balanced but difficult white-white double with a tiny separation.

Observed:

Delta Ser: page 178 — A reasonably balanced and very tight yellow-yellow pair.

Observed:

Eta Ser: page 216 — The primary is a a brilliant orange but the companion is very faint indeed.

Observed:

STF 2204: page 215 — An equal pair of easily separated white stars.

Observed:

STT300: page 175 — An easily separated yellow-blue pair, although the B component is quite dim.

Observed:

Struve 1919: page 174 — A less bright and quite wide yellow-blue pairing.

Observed:

Struve 1987: page 176 — A white primary with a somewhat fainter blue companion, easily separated.

Observed:

Theta Ser: page 209 — A widely separated pair of bright blue stars.

Observed:

Sextans

35 Sex: page 159 — An unusual orange-yellow pairing, reasonably balanced and closely separated.

Observed:

HJ 2530: page 141 — An bright equal pair, extremely widely separated. Best enjoyed in the finder scope!

Observed:

Taurus

118 Tau: page 109 — A bright white primary with a closely bound yellow secondary. The secondary is reasonably bright, enhancing the color of the pair.

Observed:

30 Tau: page 84 — An unusual blue-red color combination, with reasonable separation, but the faint red companion needs a larger telescope to bring out its color.

Observed:

Chi Tau: page 81 — An easily separated white-blue pairing, where the secondary is also reasonably bright so seeing the color is easier.

Observed:

Phi Tau: page 78 — A bright yellow primary with a widely separated faint blue companion.

Observed:

Struve 401: page 78 — An easily separated equal pair of fairly bright white stars.

Observed:

Struve 422: page 85 — A bright yellow primary close to a relatively faint orange companion.

Observed:

Struve 449: page 82 — A bluish primary with a close, faint companion.

Observed:

Struve 450: page 82 — A close pair of white stars, not very bright but easily found.

Observed:

Struve 495: page 84 — A close pair of yellow stars. The primary is almost three magnitudes brighter than the secondary, meaning it is roughly 15 times brighter.

Observed:

Struve 572: page 101 — A close and equal pair of yellow stars.

Observed:

Struve 670: page 113 — A balanced, very close pair; the primary is bluish.

Observed:

Struve 740: page 113 — A faint pair with wide separation.

Observed:

Struve 742: page 112 — A nearly equal pair of yellowish stars with very close separation.

Observed:

Theta Tau: page 88 — A balanced blue-yellow pair of stars, with a barely visible distant companion.

Observed:

Triangulum

Iota Tri: page 73 — A tight, bright pair of well-matched yellow and blue stars.

Observed:

Struve 239: page 73 — A comfortably separated yellow-blue pairing.

Observed:

Ursa Major

21 UMa: page 131 — A close yellow-blue pair.

Observed:

23 UMa: page 133 — A brilliant yellowish primary well separated from a faint secondary.

Observed:

65 Uma: page 151 — A white primary with a tightly bound secondary.

Observed:

Mizar: page 150 — A delightful triple system of white stars easily separated in any telescope.

Observed:

Struve 1520: page 151 — An easily separated pairing of two yellowish stars.

Observed:

Struve 1695: page 150 — A bright yellow primary tightly separated from a fainter blue companion.

Observed:

Xi UMa: page 153 — A bright white-yellow pair separated by anything between 1.6 and 3.0 arc seconds.

Observed:

Ursa Minor

Herschel 2682: page 38 — A widely separated triple star system with a white primary and two fainter blue companions.

Observed:

Pi1 UMi: page 36 — A very wide and reasonably balanced yellow-white pair.

Observed:

Polaris: page 39 — A brilliant yellow primary separated comfortably from a vastly fainter white secondary.

Observed:

Virgo

Phi Vir: page 182 — A very close and unequal yellow-blue pair.

Observed:

Porrima: page 162 — An almost perfectly equal and very close pair of brilliant yellowish stars.

Observed:

STF 1627: page 162 — An equal and easily separated pair of fairly bright white stars.

Observed:

Vulpecula

Struve 2445: page 206 — An easily separated white-blue pair.

Observed:

Struve 2455: page 206 — A close white-blue pair.

Observed:

Struve 2457: page 202 — An easily separated white-blue pair.

Observed:

Struve 2540: page 229 — A close white-blue pair.

Observed:

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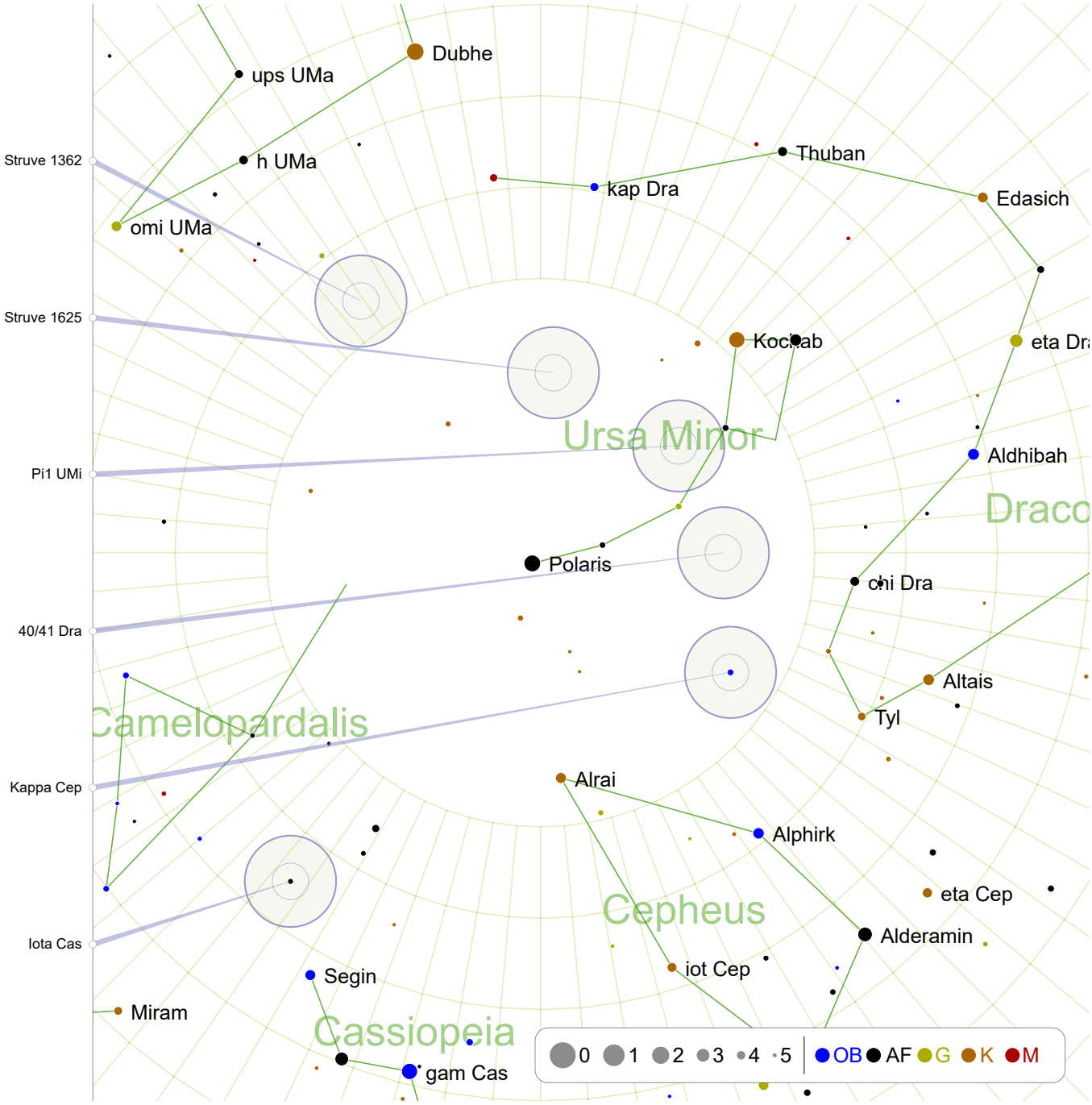
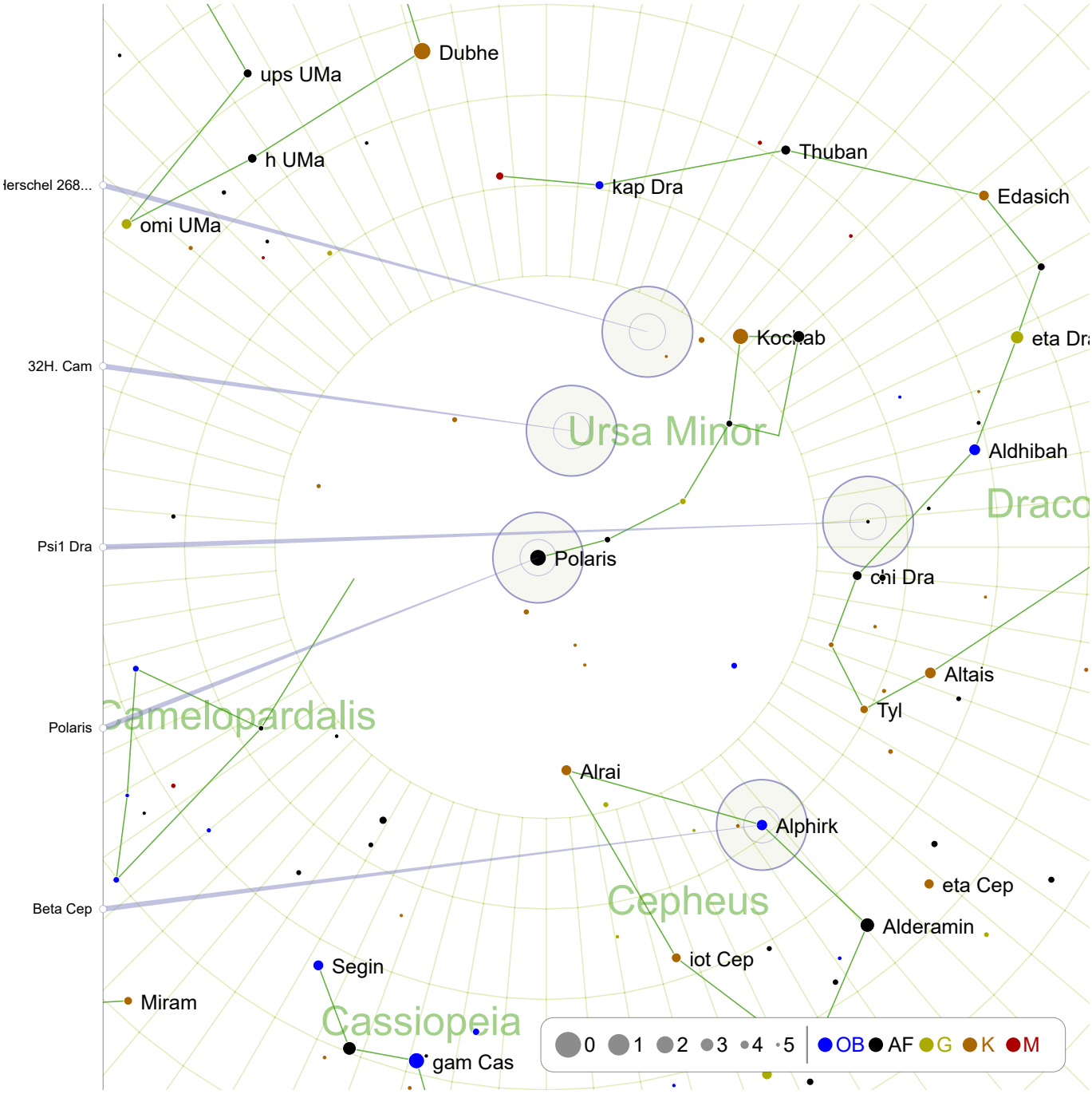
Northern Circumpolar Sky (1)

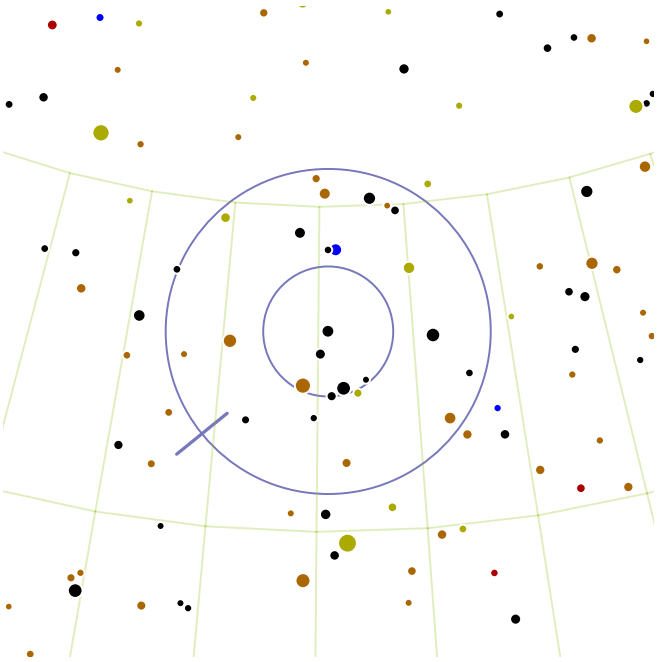


Struve 1362: page 35 Struve 1625: page 35 Pi1 UMi: page 36 40/41 Dra: page 36
Kappa Cep: page 37 Iota Cas: page 37

Northern Circumpolar Sky (2)



Herschel 2682: page 38 32H. Cam: page 38 Psi1 Dra: page 39 Polaris: page 39
Beta Cep: page 40



Struve 1362

RA: 144.48° | 9h 37.89' — DEC: 73.08° | 73° 5'

Magnitude: 7.2 | 7.2

Separation: 4.9"

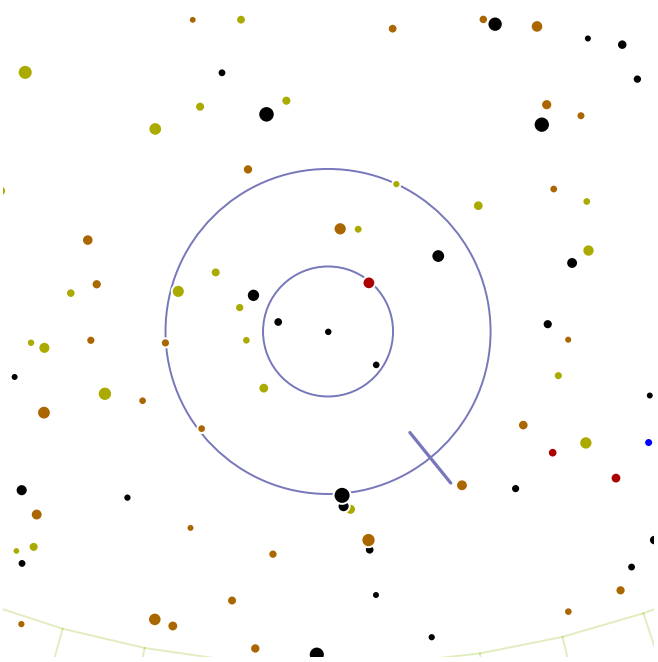
Position Angle: 129°

SAO 6915 | HIP 47260 | GDR2 50284462208

A close and equal pair of pale yellow stars.

Very hard to find. Draw a line from through magnitude 3.0 Pherkad through magnitude 2.0 Kochab (the "other" two brightish stars in Ursa Minor), and extend the line to form an isosceles triangle with Polaris. This puts you near this double.

This pair of F-type dwarfs is only 231 light-years away. They orbit in only 7.9 years, with the position angle changing strongly from year to year and the separation varying from 6" to 13". One to keep an eye on!



Struve 1625

RA: 184.05° | 12h 16.2' — DEC: 80.13° | 80° 8'

Magnitude: 7.3 | 7.8

Separation: 14.4"

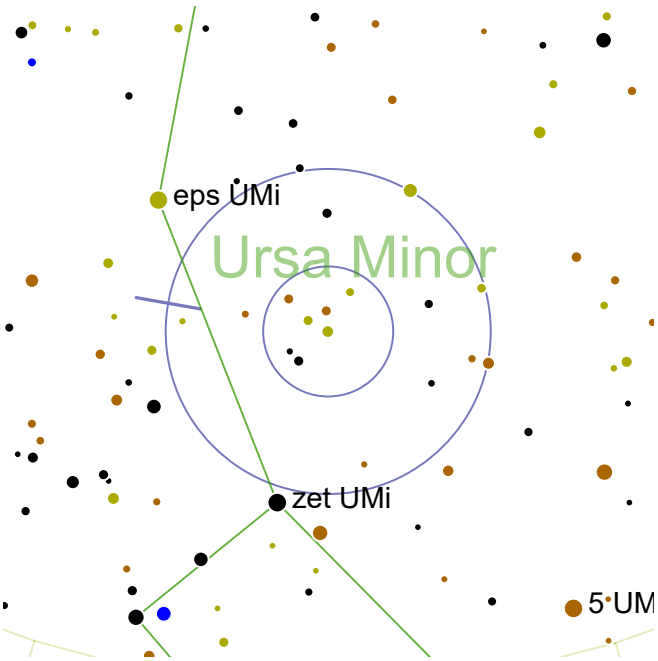
Position Angle: 219°

SAO 2009 | HIP 59836 | GDR2 05156264704

A balanced pair of yellow stars, comfortably separated.

Forms an obtuse angle with Kochab and Polaris. It lies on the southern edge of a scattering of sixth and seventh magnitude stars that should cover the northern half of the finder.

This pair of bright yellow-white dwarfs is 1623 light-years from the Sun.



Pi1 UMi

RA: 232.3° | 15h 29.2' — DEC: 80.45° | 80° 27'

Magnitude: 6.6 | 7.3

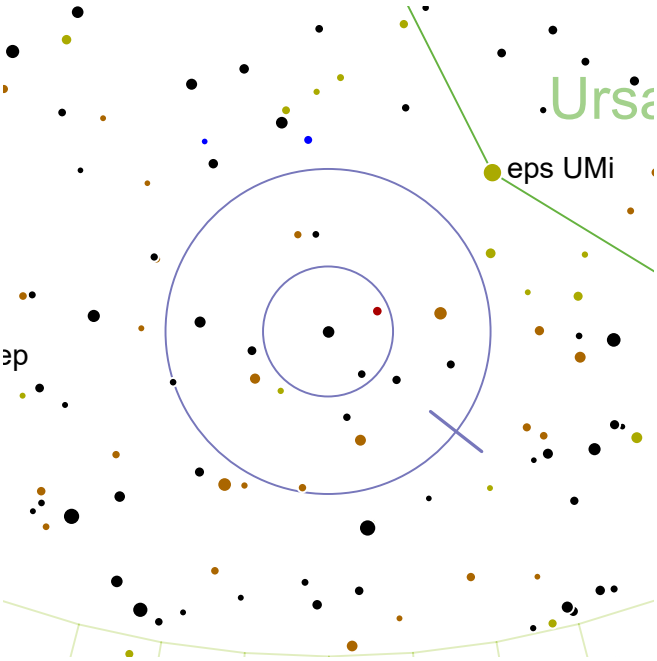
Separation: 31"

Position Angle: 80°

SAO 2556 | HIP 75809 | GDR2 98827435648

A very wide and reasonably balanced yellow-white pair.

Starting at magnitude 2.05 Kochab, move one and a half finder circles towards Polaris.



40/41 Dra

RA: 270.05° | 18h 0.2' — DEC: 80.0° | 80° 0'

Magnitude: 5.7 | 6.1

Separation: 19.3"

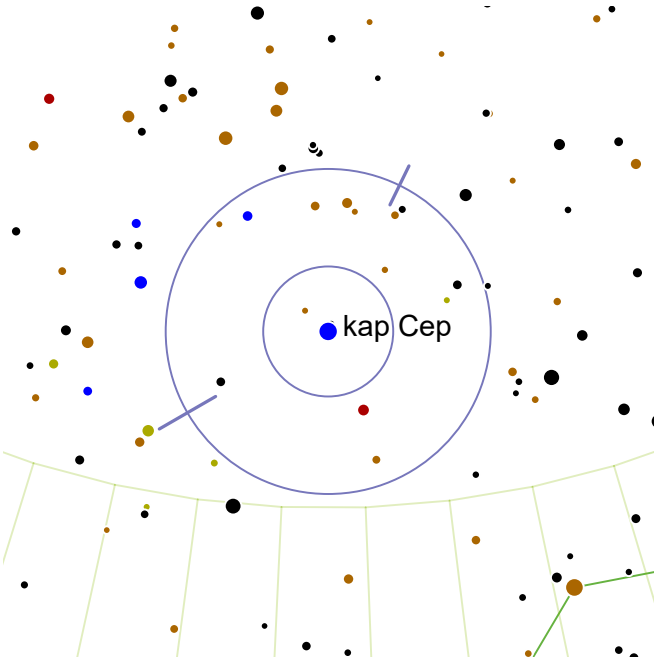
Position Angle: 232°

SAO 8996 | HIP 88136 | GDR2 24838599808

A comfortably separated pair of bright yellow stars.

Three degrees south-east of Epsilon Ursae Minoris. Alternately, draw a line from Kochab through Zeta Ursae Minoris (the star marking the point the long tail of the Little Bear joins the body). Continue this line an equal distance to get in the vicinity of 40/41 Draconis.

This system of yellow-white dwarfs is only 207 light-years from the Sun.



Kappa Cep

RA: 302.23° | 20h 8.9' — DEC: 77.72° | 77° 43'

Magnitude: 4.4 | 8.3 | 10.3

Separation: 7.3" | 170.2"

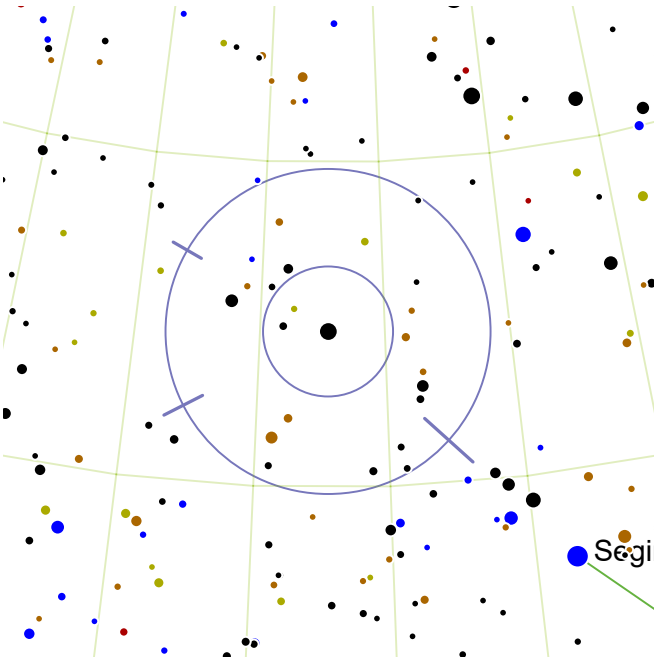
Position Angle: 120° | 334°

SAO 9665 | HIP 99255 | GDR2 1128758246 4

A scattered triple system, with a very bright blue primary with one close and one dim distant companion.

One and a half finder circles N from magnitude 3.99 Tyl. One and a half finder circles NE from magnitude 3.69 chi Dra.

The two brighter components are bound together by gravity but the third companion is merely a background star.



Iota Cas

RA: 37.28° | 2h 29.09' — DEC: 67.4° | 67° 24'

Magnitude: 4.6 | 6.9 | 9.0 | 8.4

Separation: 3.0" | 6.7" | 211"

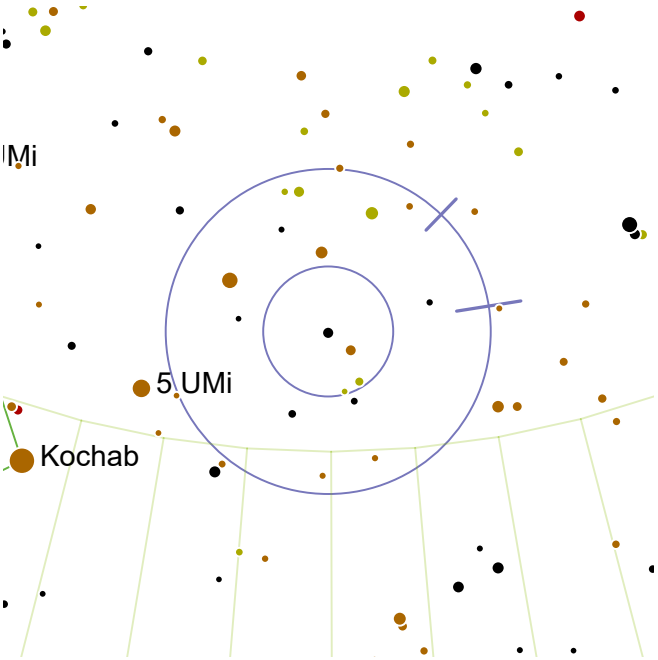
Position Angle: 228° | 117° | 60°

SAO 12298 | HIP 11569 | GDR2 517650349234855424

A bright, white primary with a yellow-orange secondary and a dim, colorless third component.

One finder circle NE from magnitude 3.44 Segin. Two finder circles NE from magnitude 2.25 gam Cas.

The needle-like reflection nebula VdB 8 (mag. 8.5) is on the NEE edge of the finder circle.



Herschel 2682

RA: 205.18° | 13h 40.7' — DEC: 76.85° | 76° 51'

Magnitude: 6.7 | 9.7 | 9.0

Separation: 26.3" | 45.9"

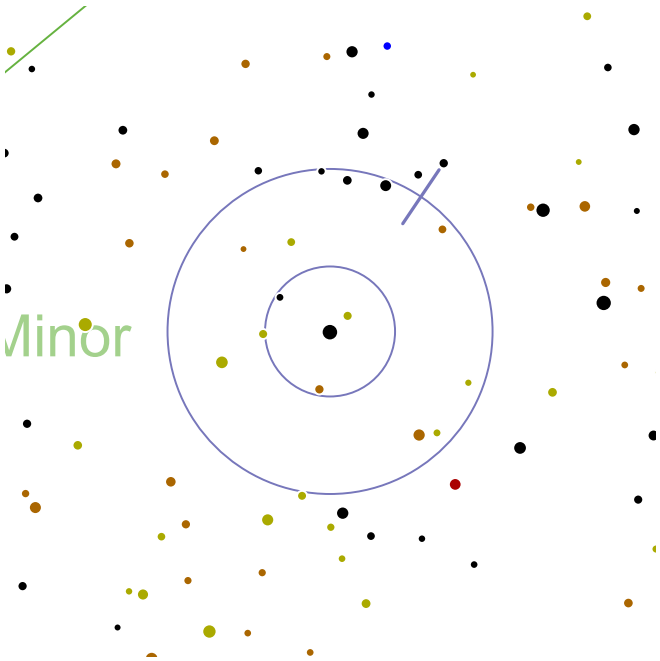
Position Angle: 279° | 316°

SAO 7867 | HIP 66728 | GDR2 33167493120

A widely separated triple star system with a white primary and two fainter blue companions.

Draw a line from Pherkad (magnitude 3.0) through Kochab (magnitude 2.05) and continue for just over one finder circle.

Hipparchos data indicates this triple is only a line-of-sight coincidence and the stars are not gravitationally bound together.



32H. Cam

RA: 192.3° | 12h 49.2' — DEC: 83.42° | 83° 25'

Magnitude: 5.3 | 5.8

Separation: 21.6"

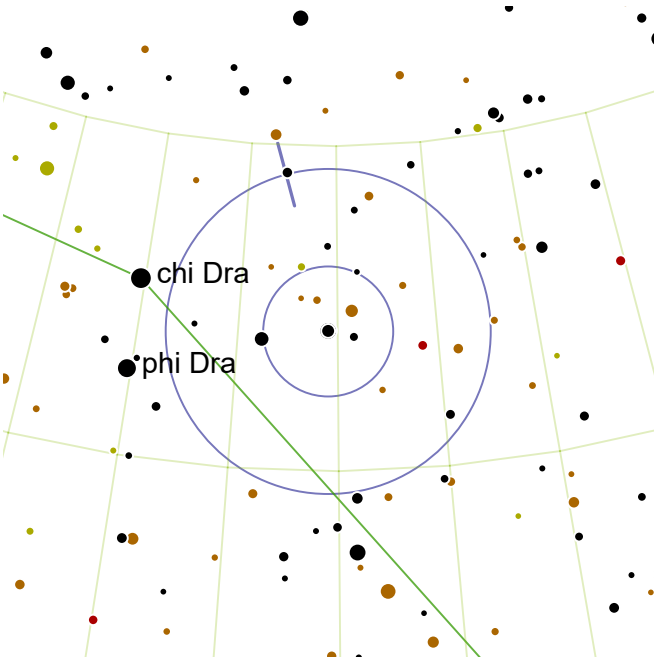
Position Angle: 326°

SAO 2102 | HIP 62572 | GDR2 77354219648

A bright and balanced white-white pair, widely separated.

From Polaris move one and a half finder circles towards bright Dubhe in Ursa Major, then half a finder towards the other brightish star in Ursa Minor, Kochab.

Also known as Struve 1694, 32H. Camelopardalis is not to be confused with Flamsteed's 32 Cam, which is now confusingly named as Xi Aurigae. "32H." means Hevelius' 32nd of Camelopardalis.



Psi1 Dra

RA: 265.48° | 17h 41.9' — DEC: 72.15° | 72° 9'

Magnitude: 4.9 | 6.1

Separation: 30.3"

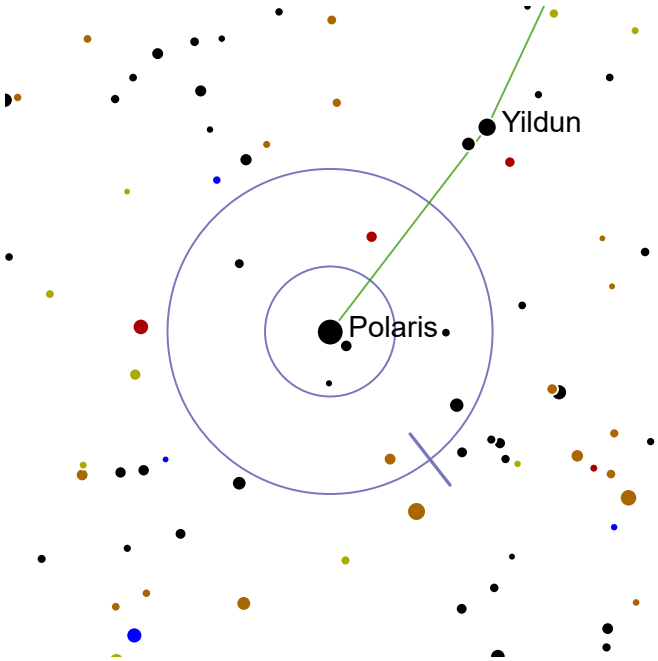
Position Angle: 15°

SAO 8890 | HIP 86614 | GDR2 60202647296

A wide pair of reasonably balanced, bright white stars.

Particularly difficult to locate in light polluted skies, Psi 1 Draconis is two and half finder circles east of Kochab. Look for a triangle of four fifth and sixth magnitude stars filling the finder and pointing west. Psi 1 Draconis is the westernmost of these stars.

Only 75 light-years away, the B component is orbited by an exoplanet (Psi1 Dra Bb) which is at least 50% more massive than Jupiter. It orbits Psi1 Dra B every 8.5 years.



Polaris

RA: 37.95° | 2h 31.8' — DEC: 89.27° | 89° 16'

Magnitude: 2.0 | 9.0

Separation: 18.4"

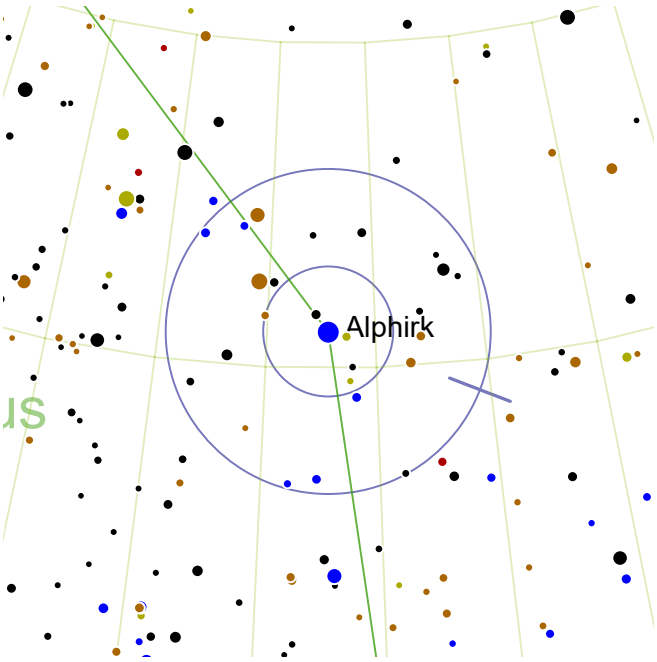
Position Angle: 218°

SAO 308 | HIP 11767 | GDR2 9921505664

A brilliant yellow primary separated comfortably from a vastly fainter white secondary.

Polaris being the Pole star should be easy to find.

Although Delta Cephei is the model of all Cepheid variables, Polaris is the best-known member of this class of stars, although it currently varies with a very small amplitude. The variability was significantly more pronounced when it was first measured in 1911.



Beta Cep

RA: 322.18° | 21h 28.7' — DEC: 70.57° | 70° 34'

Magnitude: 3.2 | 7.9

Separation: 13.3"

Position Angle: 249°

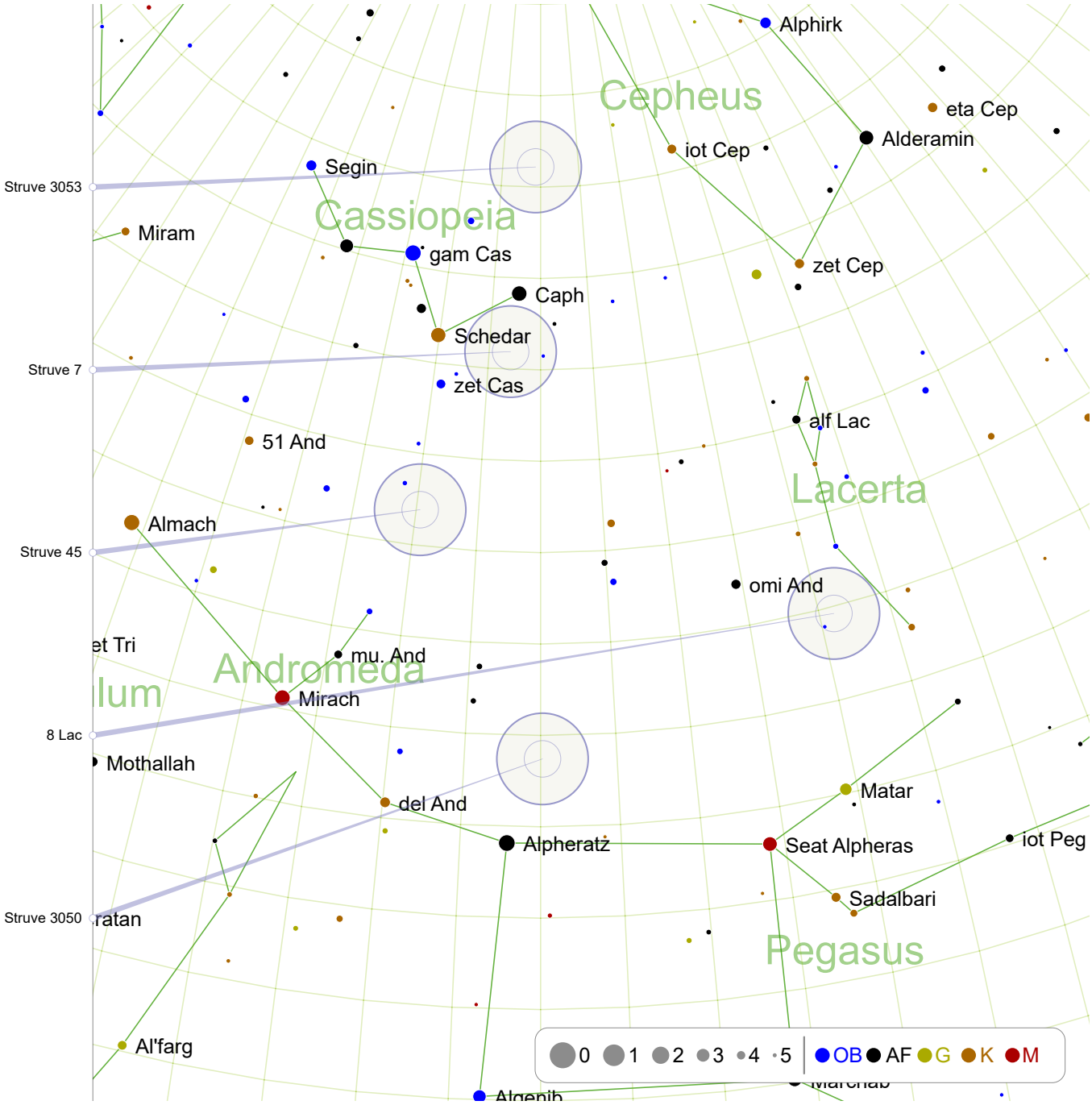
SAO 10057 | HIP 106032 | GDR2 59992826624

A brilliant white primary split comfortably from a moderately faint blue companion.

One of the brightest stars of the Cepheus polygon, Beta Cephei is the second furthest north of these stars.

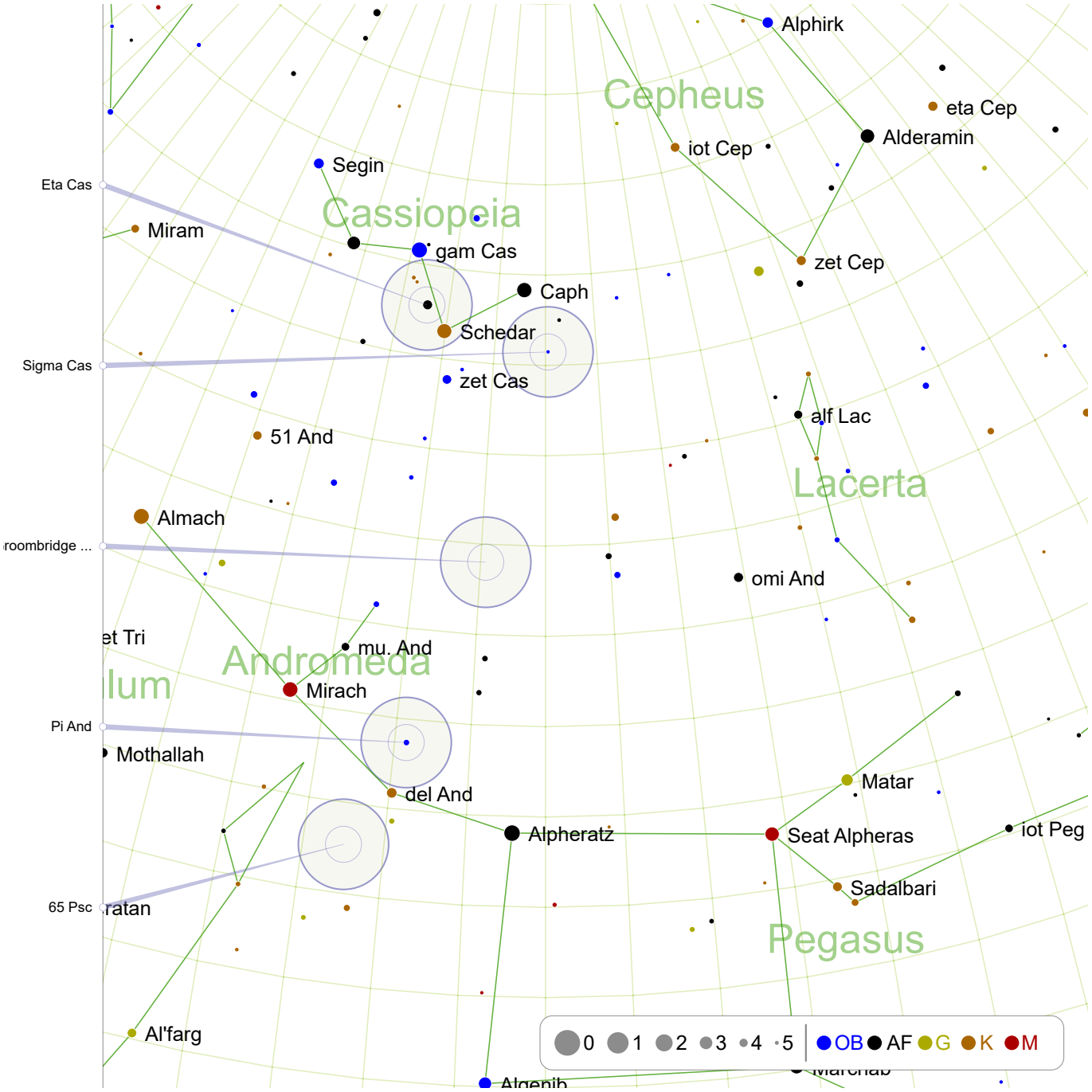
If you position Beta Cephei (also known as Alfirk) in the north-east quadrant of a finder, the famous Iris nebula is on the opposite quadrant.

Early Autumn - Looking North (1)

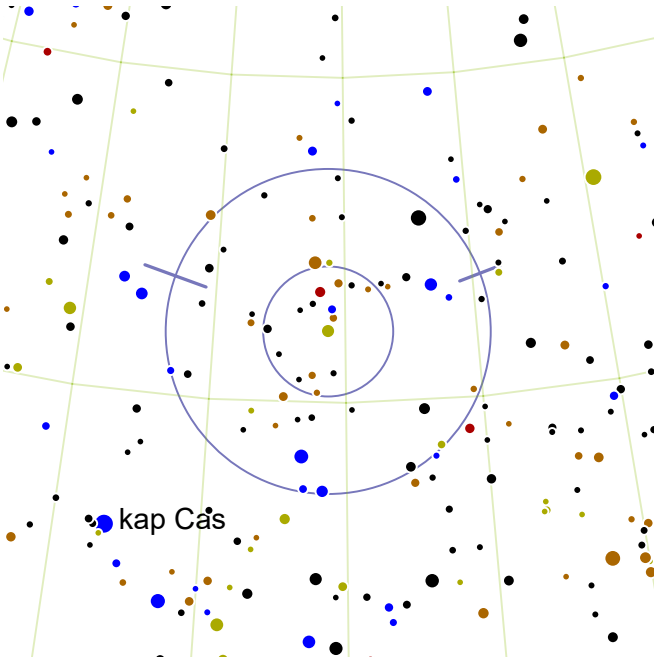


Struve 3053: page 43 Struve 7: page 43 Struve 45: page 44 8 Lac: page 44
Struve 3050: page 45

Early Autumn - Looking North (2)



Eta Cas: page 45 Sigma Cas: page 46 Groombridge 34: page 46 Pi And: page 47
65 Psc: page 47



Struve 3053

RA: 0.65° | 0h 2.6' — DEC: 66.1° | 66° 6'

Magnitude: 6.0 | 7.2 | 11.0

Separation: 15.2" | 98.5"

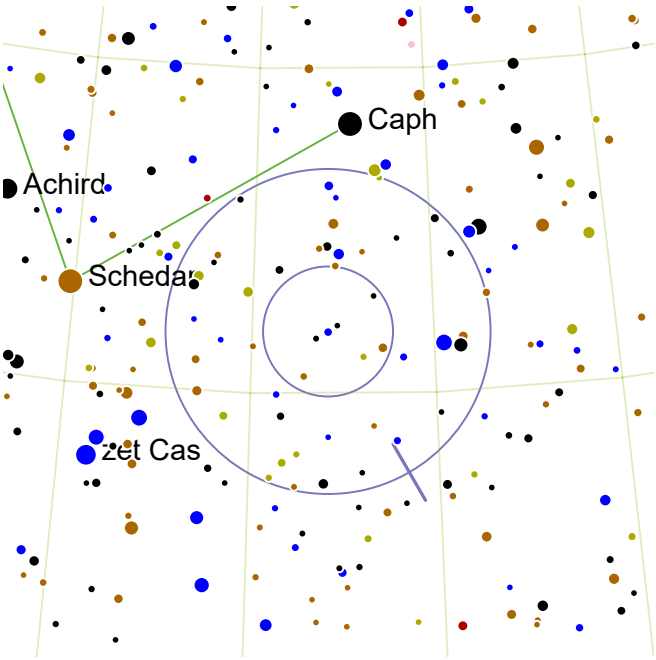
Position Angle: 70° | 291°

SAO 10937 | HIP 207 | GDR2 6794345472

A bright yellow primary with an easily apparent white companion, easily separated. There is a very faint third component distantly separated from the central two stars.

One finder circle N from magnitude 2.42 Caph. One and a half finder circles NNW from magnitude 3.64 Achird.

The primary star is a giant with the same temperature as the Sun (but much larger) while the white companion is an A-class main sequence star.



Struve 7

RA: 2.92° | 0h 11.66' — DEC: 55.97° | 55° 58'

Magnitude: 8.0 | 8.5

Separation: 1.3"

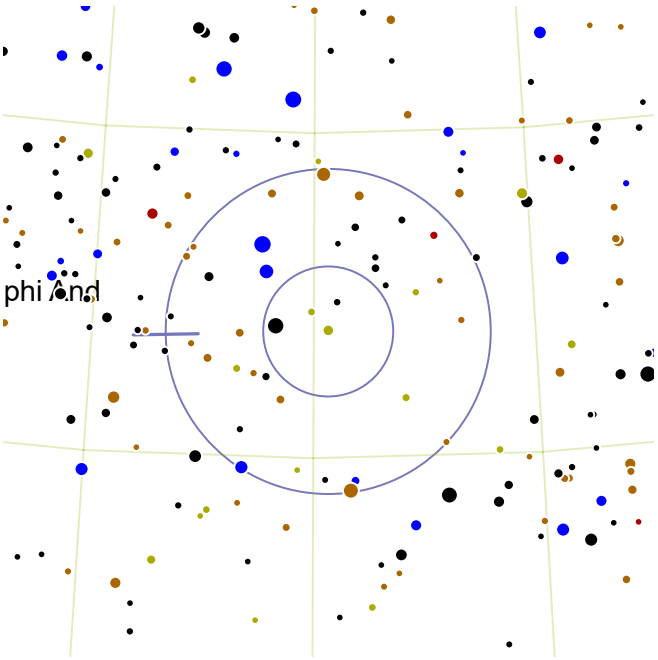
Position Angle: 210°

SAO 21191 | HIP 945 | GDR2 7309603456

A balanced pair with a bluish primary, with extremely tight separation.

Half a finder circle S from magnitude 2.42 Caph. Half a finder circle W from magnitude 2.47 Schedar.

With this double centered, Caroline's Rose Cluster (NGC 7789) is on the NWW edge of the finder



Struve 45

RA: 9.68° | 0h 38.7' — DEC: 46.95° | 46° 57'

Magnitude: 6.9 | 10.0

Separation: 19.1"

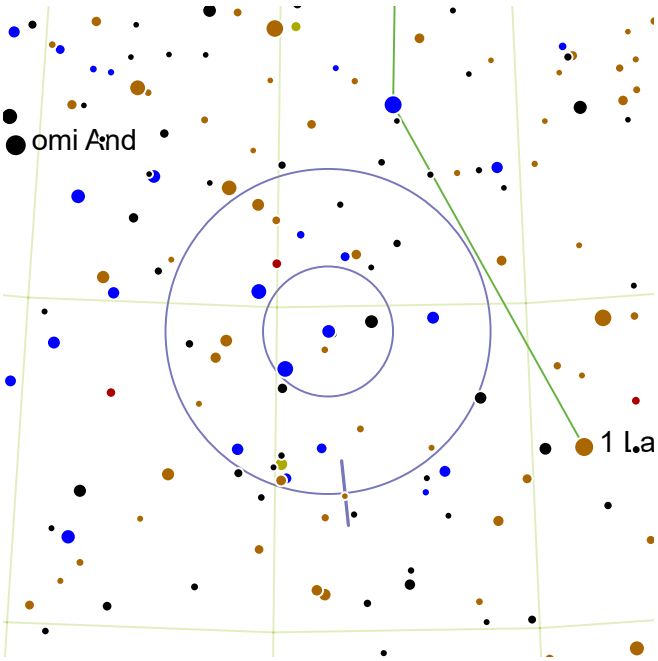
Position Angle: 91°

SAO 36542 | HIP 3045 | GDR2 8318472192

A wide double with a yellow primary.

One finder circle S from magnitude 3.72 zet Cas. One and a half finder circles NNW from magnitude 3.94 mu. And.

The primary is a bright yellow giant, 366 light-years from Earth. The Galaxy Caldwell 18 (NGC 185) is 1.5 degrees north of this double. A degree to the west of Caldwell 17 is another galaxy, Caldwell 17 (NGC 147).



8 Lac

RA: 338.98° | 22h 35.9' — DEC: 39.63° | 39° 38'

Magnitude: 5.7 | 6.5

Separation: 22.4"

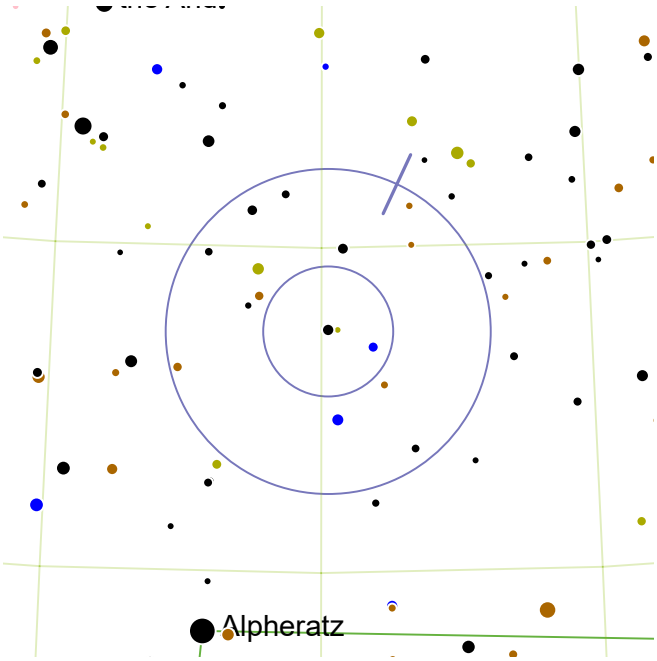
Position Angle: 186°

SAO 72509 | HIP 111546 | GDR2 97999299840

A fairly equally balanced and bright pair of blue-white stars, comfortably separated.

There are also possibly C, D and E components, much fainter and very widely separated.

Very slightly more than one finder circle due south is the Deer Lick group of galaxies (Caldwell 30).



Struve 3050

RA: 359.88° | 23h 59.5' — DEC: 33.72° | 33° 43'

Magnitude: 6.6 | 6.6

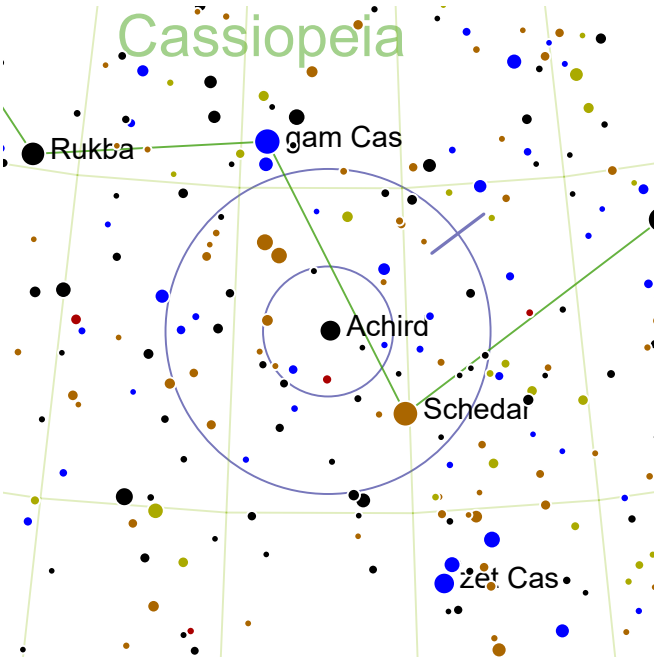
Separation: 1.7"

Position Angle: 335°

SAO 73656 | HIP 118281 | GDR2 78193873024

A tightly bound and perfectly balanced pair of bright yellow stars.

One finder circle north and slightly west of Alpheratz.



Eta Cas

RA: 12.28° | 0h 49.1' — DEC: 57.82° | 57° 49'

Magnitude: 3.4 | 7.5

Separation: 12"

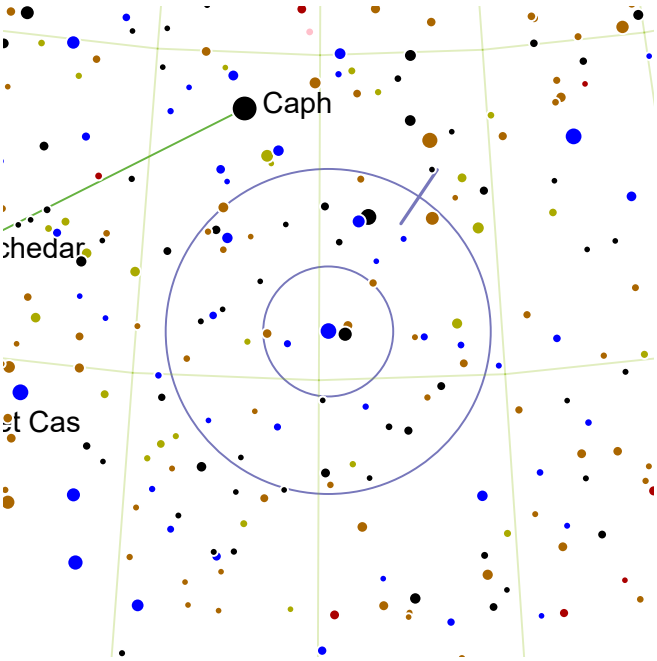
Position Angle: 307°

SAO 21732 | HIP 3821 | GDR2 425040000951479424

A brilliant yellow primary comfortably separated from a fairly faint red secondary.

Center Schedar in the finder; Eta Cas lies less than 2 degrees to the north-east.

William Herschel discovered the binary nature of this system in August 1779. The meaning and origin of the common name “Achird” is unknown. Note that Achird is one of the closest stars to us, at only 19 light-years distance. The primary star is very similar to the Sun, while the companion is a much dimmer K-type star roughly half as massive.



Sigma Cas

RA: 359.75° | 23h 59.0' — DEC: 55.75° | 55° 45'

Magnitude: 5.0 | 7.1

Separation: 3"

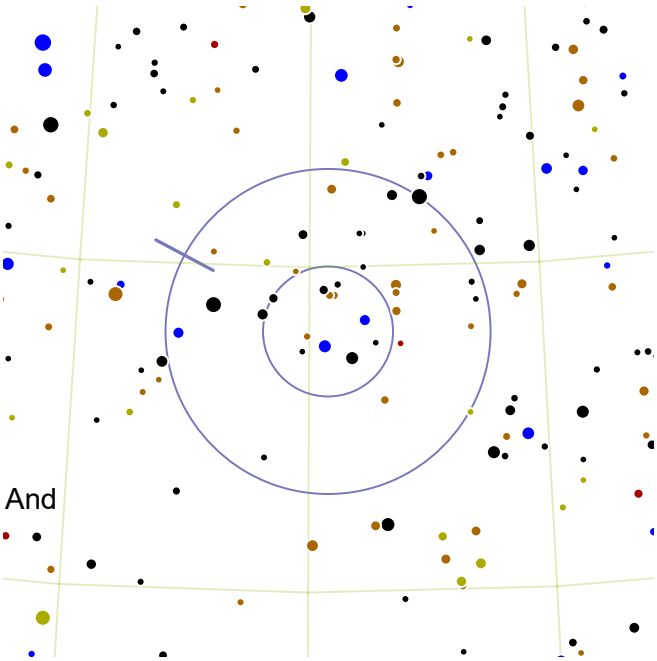
Position Angle: 326°

SAO 35947 | HIP 118243 | GDR2 37220412288

A tight primary with a brilliant blue-white primary almost touching a delicate secondary.

Position magnitude 2.25 Caph towards the north-east of the finder. Sigma Cas is at the southern end of the finder field. It can be found a quarter of a degree to the east of V1022 Cas.

The system is roughly 5000 light-years from us. The primary is 25,000 times more luminous than the Sun. One degree to the north of Sigma Cas is the star cluster NGC 7789, found by Caroline Herschel in 1783.



Groombridge 34

RA: 4.6° | 0h 18.39' — DEC: 44.02° | 44° 1'

Magnitude: 8.2 | 10.6

Separation: 40.0"

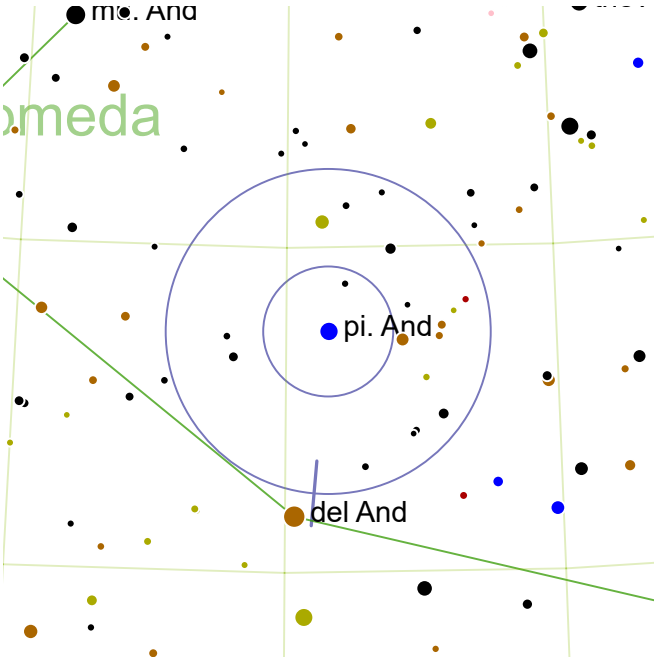
Position Angle: 62°

SAO 36248 | HIP 1475

A little pair of red stars, very widely separated.

Groombridge 34 is midway between Alpheratz in the square of Pegasus and Schedar, the southernmost bright star of Cassiopeia.

This curiosity is a pair of red dwarfs 11.6 light-years away, zooming through the sky at 2.9" per year from Earth's perspective. The brighter component is two fifths of the Suns mass, while the fainter companion is less than half that. Two exoplanets have been found in this system.



Pi And

RA: 9.23° | 0h 36.9' — DEC: 33.72° | 33° 43'

Magnitude: 4.4 | 7.1

Separation: 36.2"

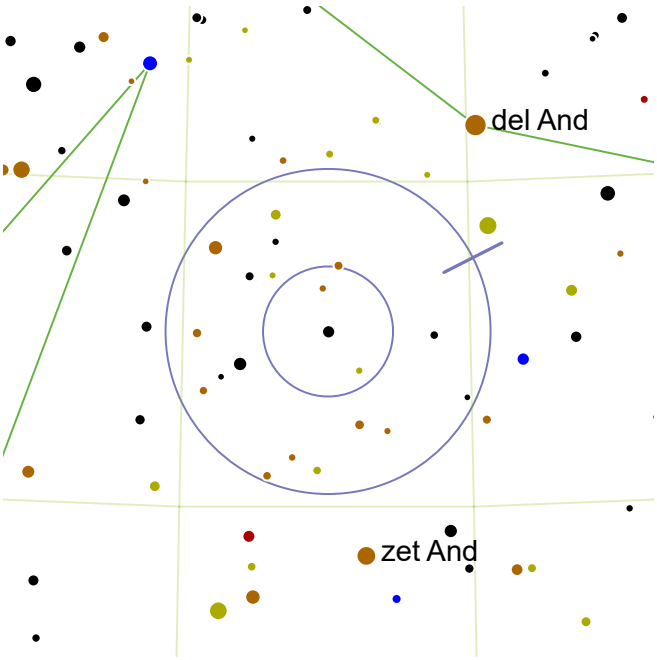
Position Angle: 175°

SAO 54033 | HIP 2912 | GDR2 8611467520

A bright blue primary widely separated from a fairly bright secondary.

Half a finder circle N from magnitude 3.49 del And. One finder circle SW from magnitude 3.94 mu. And.

The primary is a spectroscopic binary with an orbital period of 143 days.



65 Psc

RA: 12.48° | 0h 49.9' — DEC: 27.72° | 27° 43'

Magnitude: 6.3 | 6.3

Separation: 4.4"

Position Angle: 297°

SAO 74296 | HIP 3885 | GDR2 72903101824

An equal pair of fairly bright light yellow stars.

One and a half finder circles east of Alpheratz, the magnitude 2.05 north east corner of the square of Pegasus.

This double was found by William Herschel in 1783.

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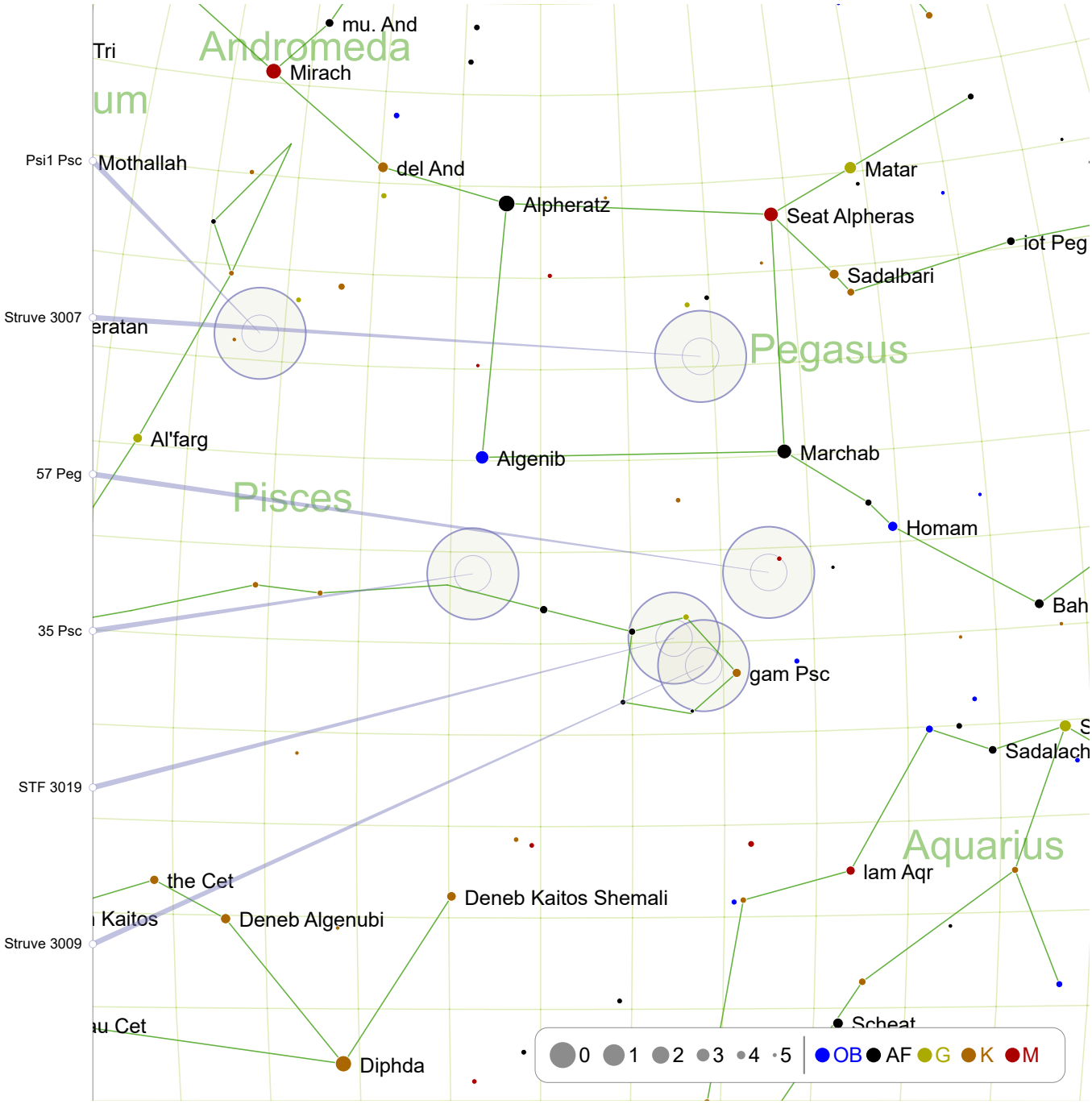
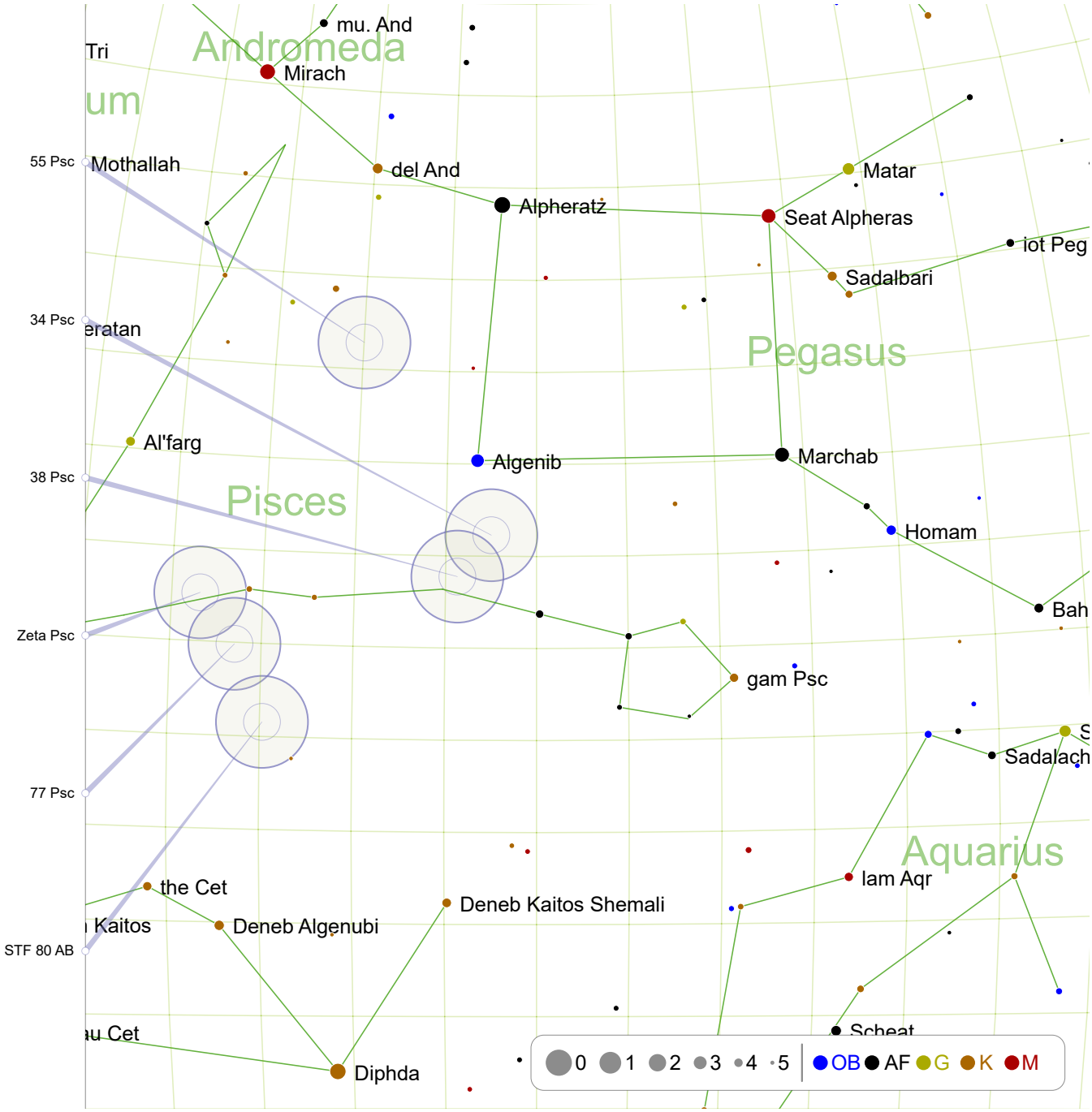
Early Autumn - Looking South (1)



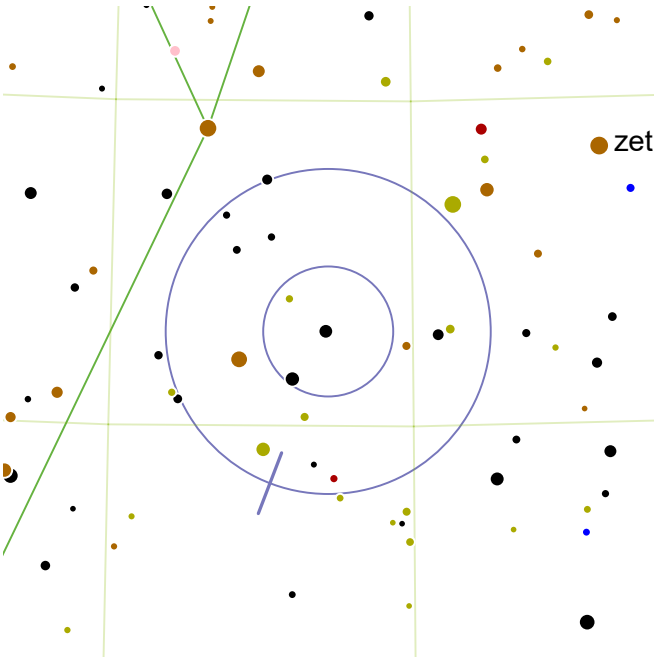
Psi1 Psc: page 51 Struve 3007: page 51 57 Peg: page 52 35 Psc: page 52

STF 3019: page 53 Struve 3009: page 53

Early Autumn - Looking South (2)



55 Psc: page 54
34 Psc: page 54
38 Psc: page 55
Zeta Psc: page 55
77 Psc: page 56
STF 80 AB: page 56



Psi1 Psc

RA: 16.4° | 1h 5.59' — DEC: 21.47° | 21° 28'

Magnitude: 5.6 | 5.8

Separation: 30"

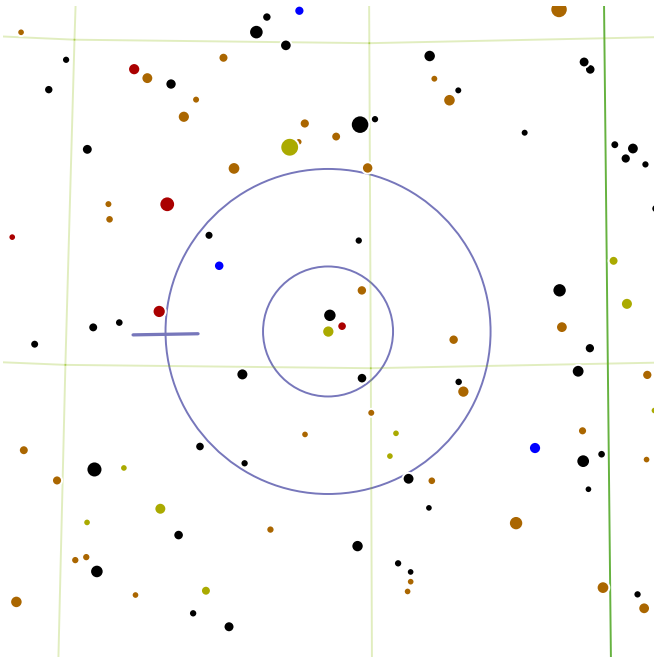
Position Angle: 159°

SAO 74482 | HIP 5131 | GDR2 34190737152

An equally matched and widely separated pair of blue-white stars.

Two and a half finder circles east and slightly north of magnitude 2.8 Algenib, the south-eastern star of the square of Pegasus.

The primary is reported to be a close binary.



Struve 3007

RA: 350.7° | 23h 22.79' — DEC: 20.57° | 20° 34'

Magnitude: 6.6 | 9.6

Separation: 5.9"

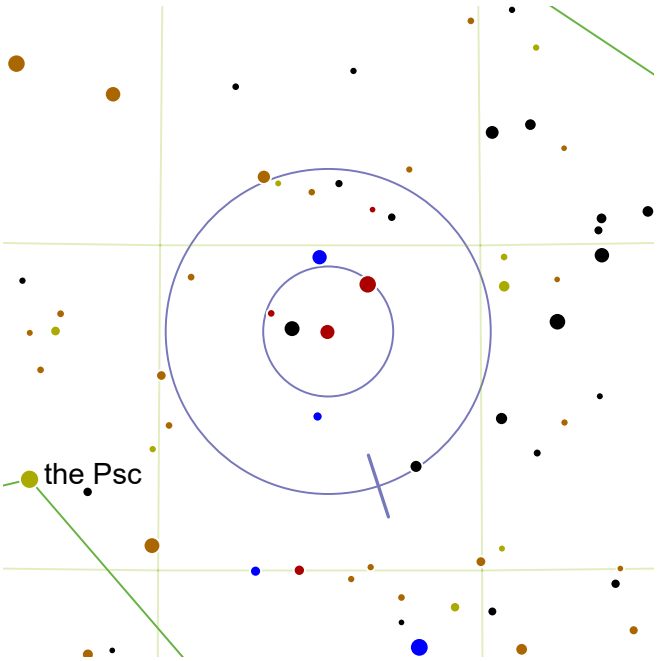
Position Angle: 91°

SAO 91222 | HIP 115417 | GDR2 74536867584

A close pair with a brighter yellow component and a very faint orange dwarf companion.

One and a half finder circles north east of Marchab.

The primary is very similar to the Sun, the Sun being a G2V star and Struve 3007 A is a G3V. The system is only 37 light-years away.



57 Peg

RA: 347.38° | 23h 9.5' — DEC: 8.68° | 8° 41'

Magnitude: 5.3 | 10.1

Separation: 32.6"

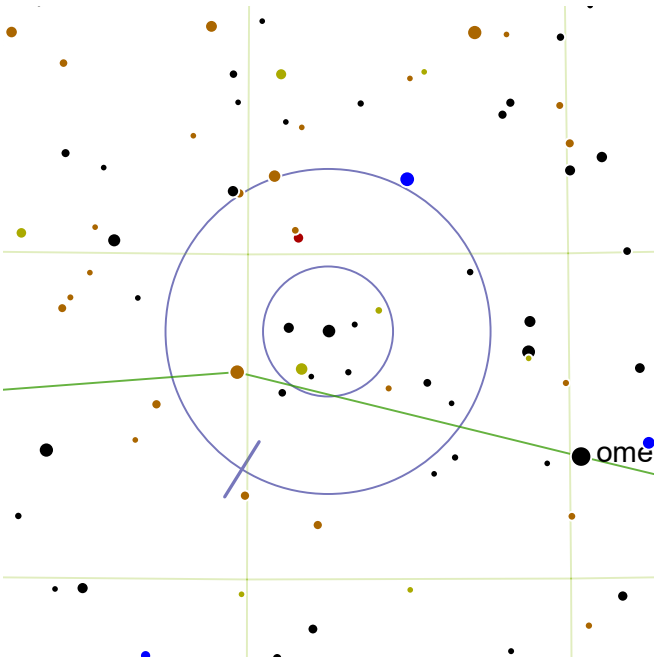
Position Angle: 198°

SAO 128001 | HIP 114347 | GDR2 26470336768

A bright red primary widely separated from a faint white secondary.

One finder circle NNW from magnitude 3.85 gam Psc. One finder circle S from magnitude 2.57 Marchab.

The primary is a semiregular variable designated as GZ Pegasi, varying in brightness from 4.95 to 5.23 over a period of roughly 93 days. Although the brightness range is quite small, the star can be compared to 55 Pegasi to 59 Peg (mag. 5.15) less than a degree to the east.



35 Psc

RA: 3.75° | 0h 15.0' — DEC: 8.82° | 8° 49'

Magnitude: 6.0 | 7.6

Separation: 11.6"

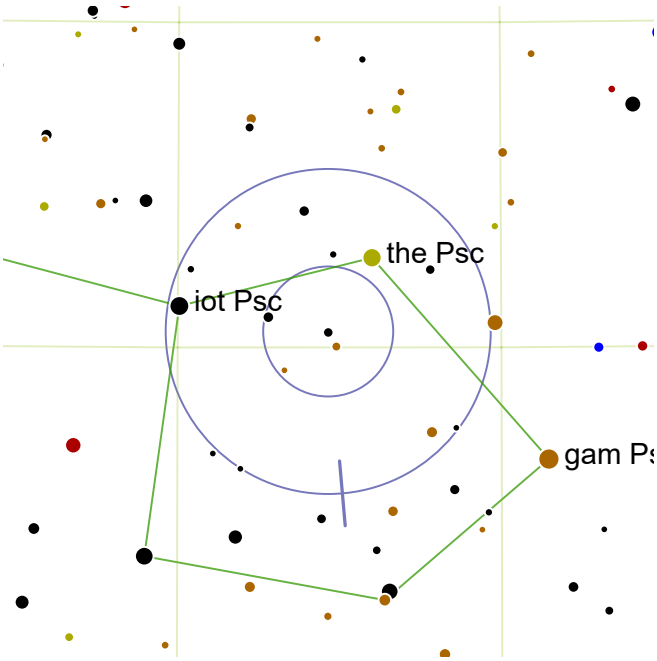
Position Angle: 148°

SAO 109087 | HIP 1196 | GDR2 27234710784

An easy, bright double star with comfortable separation and a reasonably bright secondary, consisting of a white primary and light yellow secondary.

One and a half finder circles south of magnitude 2.8 Algenib.

35 Piscium is a triple star system roughly 250 light-years from the Sun. The primary star is itself a spectroscopic binary, with two stars circling each other in just 0.84 days. This causes a slight variability in the primary star, which shows two dips of slightly less than 0.1 magnitude each cycle.



STF 3019

RA: 352.68° | 23h 30.7' — DEC: 5.25° | 5° 15'

Magnitude: 7.8 | 8.4

Separation: 10.7"

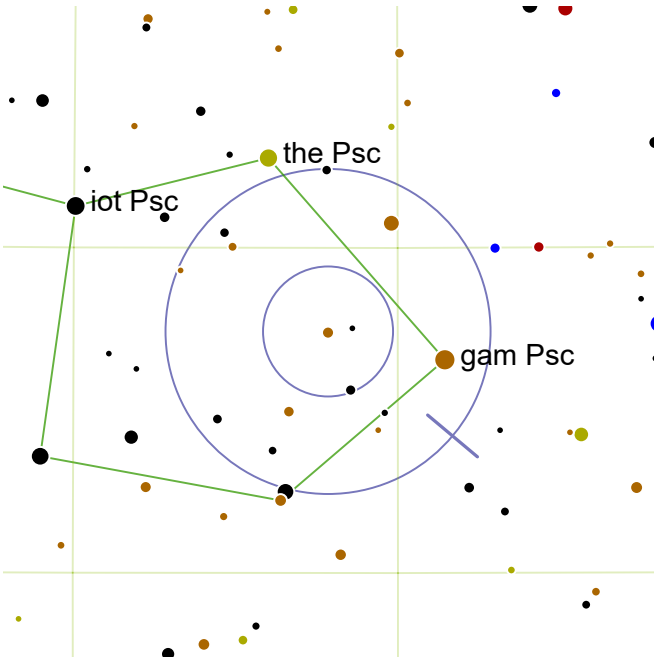
Position Angle: 185°

SAO 128216 | HIP 116035 | GDR2 60632206720

A balanced pair with a yellowish primary and white secondary.

Half a finder circle NEE from magnitude 3.85 gam Psc. Two finder circles SSE from magnitude 2.57 Marchab.

This highly luminous pair is gravitationally bound and is very distant - 5931 light-years from Earth.



Struve 3009

RA: 351.08° | 23h 24.29' — DEC: 3.72° | 3° 43'

Magnitude: 6.8 | 8.8

Separation: 7.0"

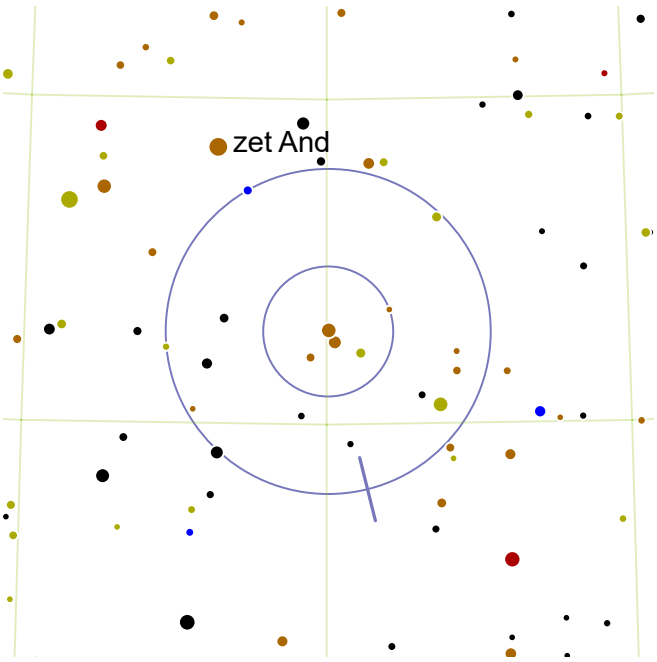
Position Angle: 230°

HIP 115544 | GDR2 98163694976 | TY2 0581-01198-1

A close combination of an orange primary close to a 2 magnitude fainter secondary. The secondary at magnitude 8.76 is too faint to show much color in smaller scopes, but some report it to be be blue.

Two and a half finder circles south east of Marchab.

The primary is a small K class giant star, similar in mass to the Sun but much older.



55 Psc

RA: 9.98° | 0h 39.9' — DEC: 21.43° | 21° 26'

Magnitude: 5.4 | 8.7

Separation: 6.5"

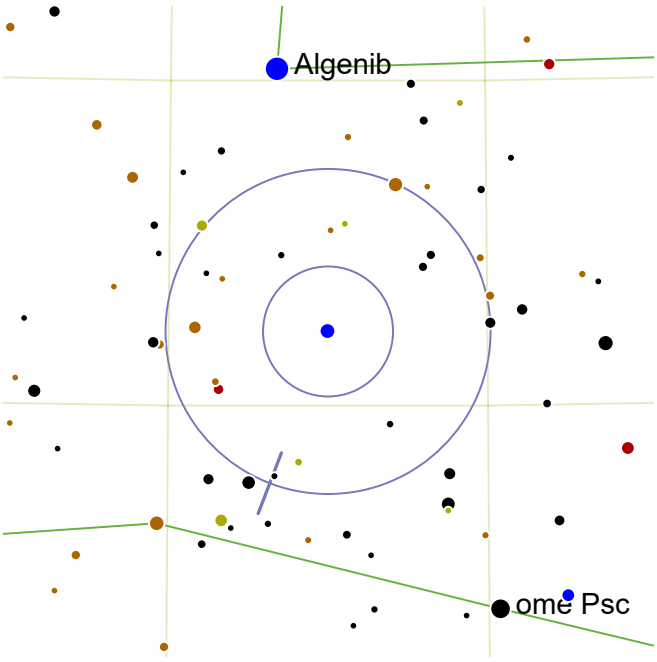
Position Angle: 194°

SAO 74182 | HIP 3138 | GDR2 79926374144

A bright orange primary with a much fainter white secondary close by.

One and a half finder circles north-east of magnitude 2.8 Algenib, the south-eastern star of the square of Pegasus.

The primary is an orange giant star similar in color to Arcturus.



34 Psc

RA: 2.5° | 0h 10.0' — DEC: 11.15° | 11° 9'

Magnitude: 5.5 | 9.4

Separation: 7.6"

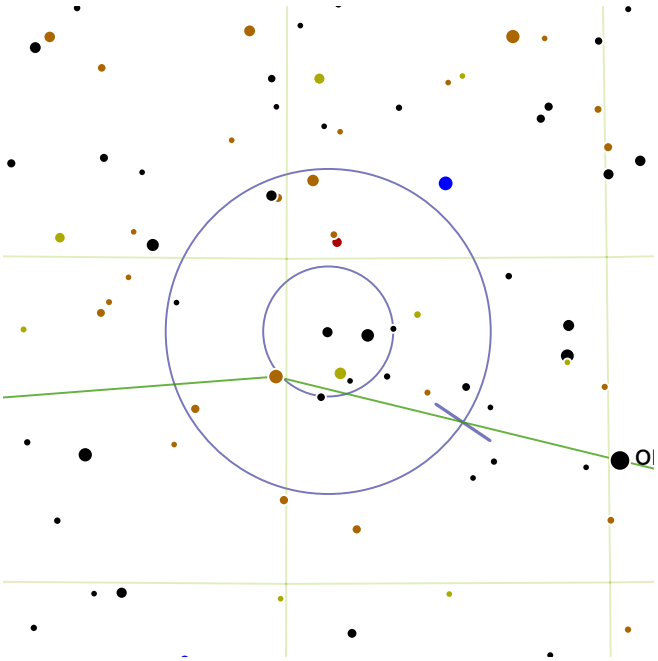
Position Angle: 159°

SAO 91750 | HIP 813 | GDR2 22041820928

A bright bluish primary with a faint secondary close by.

Half a finder circle S from magnitude 2.87 Algenib.

It is not known if this double is gravitationally bound. The primary is 305 light-years from Earth.



38 Psc

RA: 4.35° | 0h 17.39' — DEC: 8.88° | 8° 53'

Magnitude: 7.9 | 7.8

Separation: 4.3"

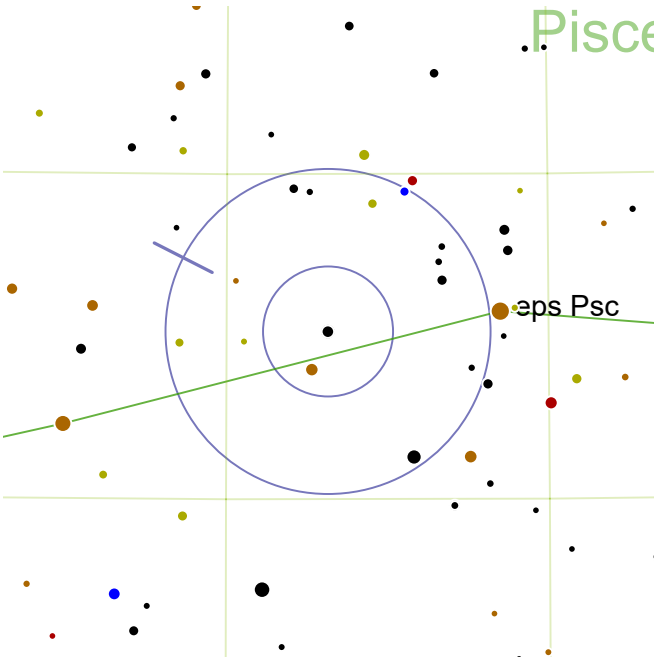
Position Angle: 236°

SAO 109111 | HIP 1317

A very close and equal pair of yellow stars.

One and a half finder circles south of Algenib, the magnitude 2.8 star marking the south-eastern corner of the square of Pegasus.

38 Psc shares the same finder circle as the slightly brighter 35 Psc, which lies half a degree to the west.



Zeta Psc

RA: 18.43° | 1h 13.7' — DEC: 7.58° | 7° 35'

Magnitude: 5.6 | 6.5

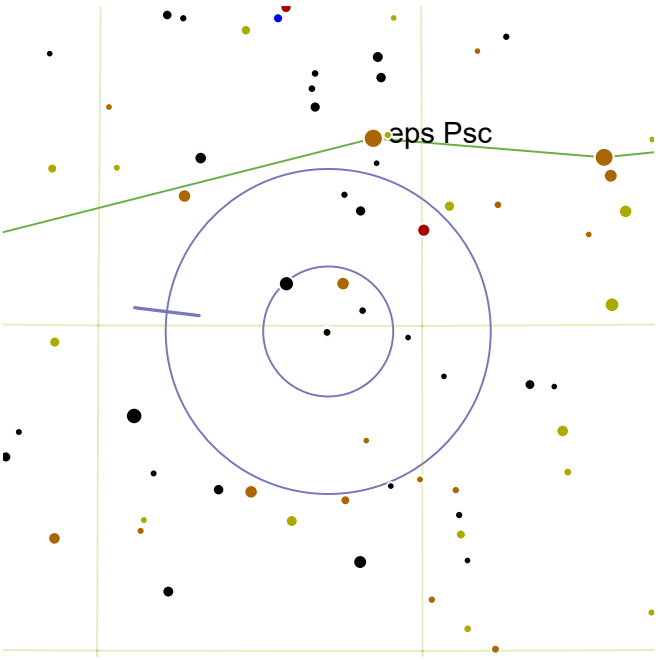
Separation: 23"

Position Angle: 63°

SAO 109739 | HIP 5737 | GDR2 92921353984

A widely separated pair of closely matched bright white stars.

The primary is a pair of A class stars with separation of 0.15”. The secondary is a triplet of stars - a spectroscopic pair of F and G stars, and a further magnitude 12.2 star separated by 1”.



77 Psc

RA: 16.45° | 1h 5.79' — DEC: 4.92° | 4° 55'

Magnitude: 6.8 | 7.6

Separation: 33"

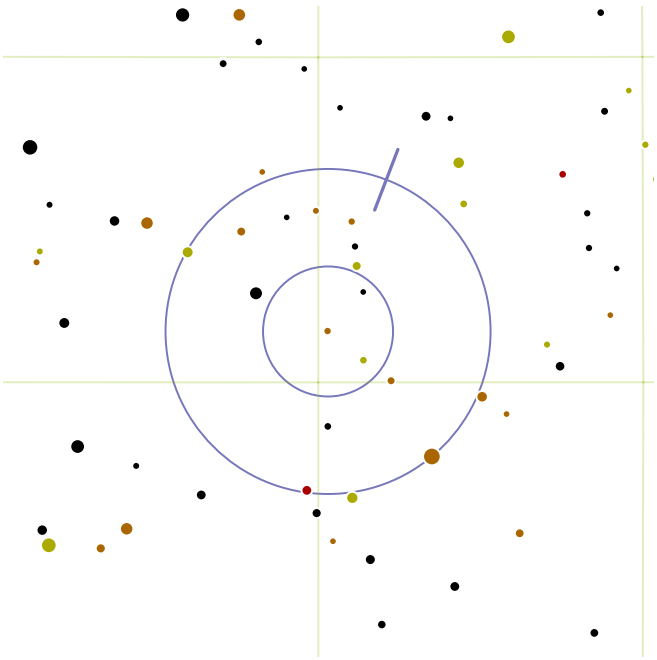
Position Angle: 83°

SAO 109666 | HIP 5141 | GDR2 91858705024

A wide, fairly bright pairing of two yellow-white stars, separated in brightness by nearly one magnitude.

Starting in the square of Pegasus, draw a line from the north-west corner (magnitude 2.40 Seat Alpheras) through the opposite corner (magnitude 2.8 Algenib), and extend the line an equal distance out to 77 Psc.

Only 132 light-years away, this system is composed of two F-class dwarfs.



STF 80 AB

RA: 14.85° | 0h 59.4' — DEC: 0.78° | 0° 47'

Magnitude: 7.8 | 9.1

Separation: 29.9"

Position Angle: 339°

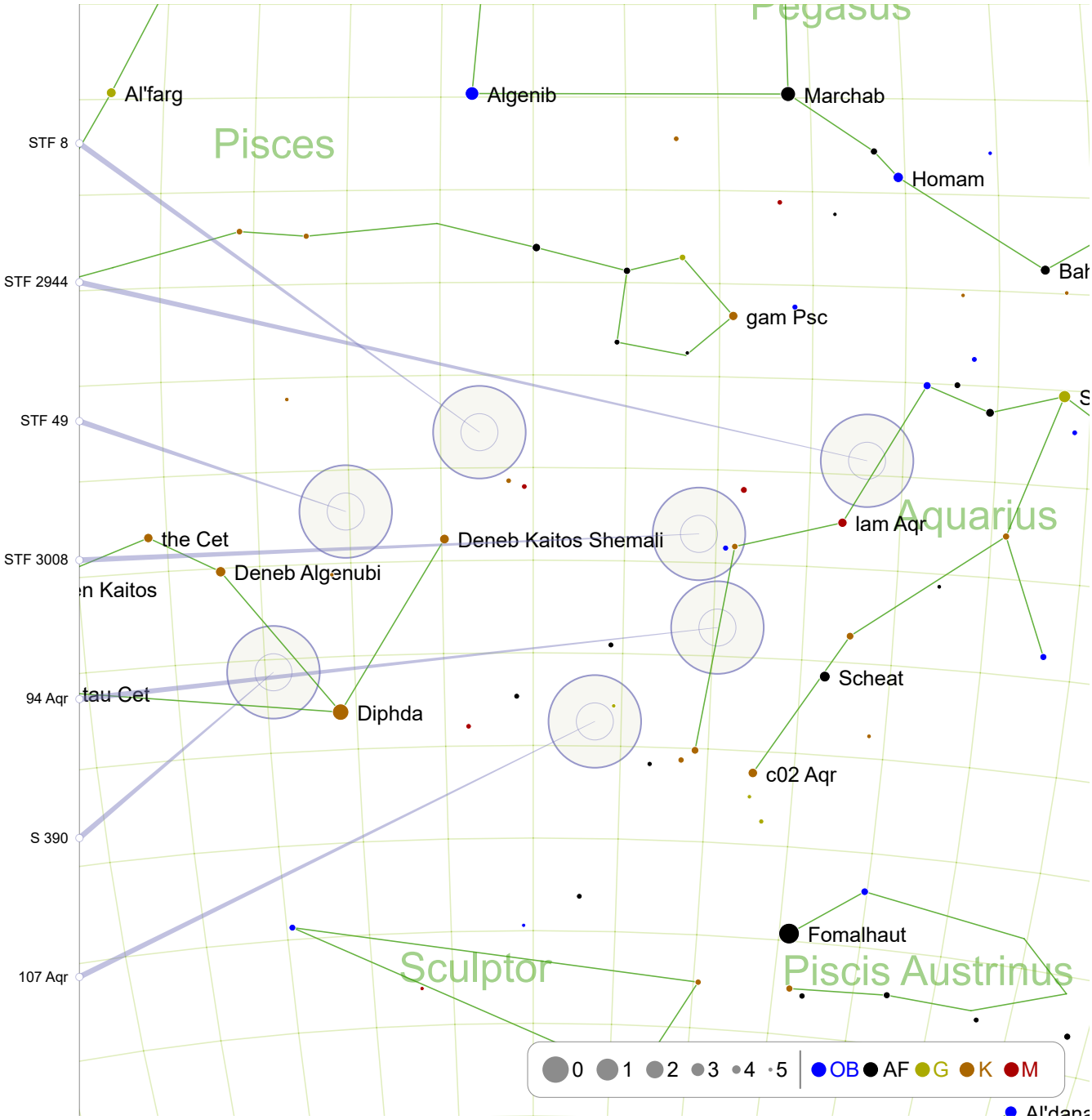
SAO 109577 | HIP 4624 | GDR2 39382201856

An orange primary widely separated from a slightly fainter yellow secondary.

Two finder circles NW from magnitude 3.83 the Cet. Two finder circles NNW from magnitude 3.6 Deneb Algenubi.

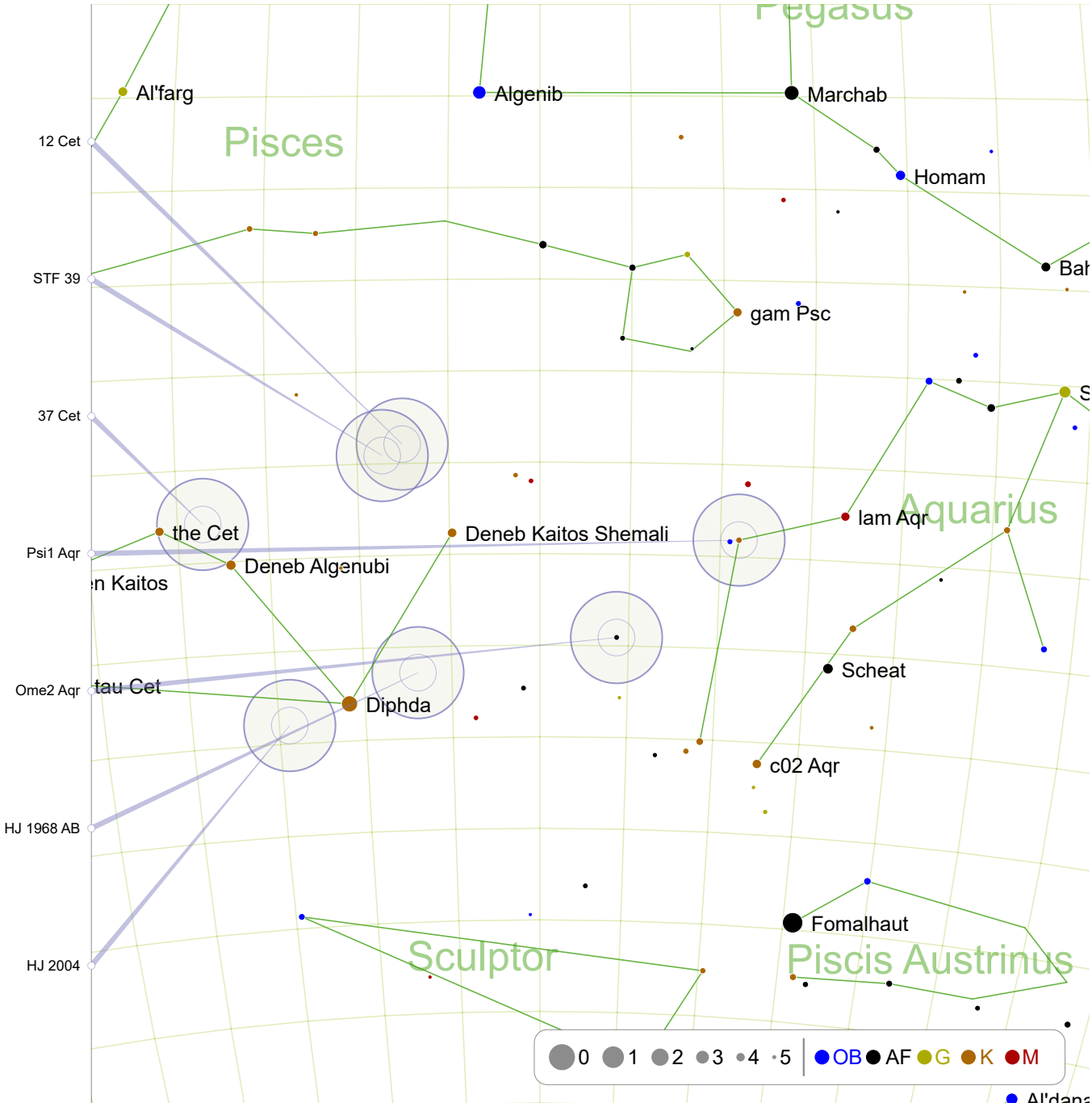
With the double centered in the finder, Caldwell 51 (mag. 9.2 galaxy) is in the north-eastern quarter of the finder view.

Early Autumn - Southern Horizon (1)

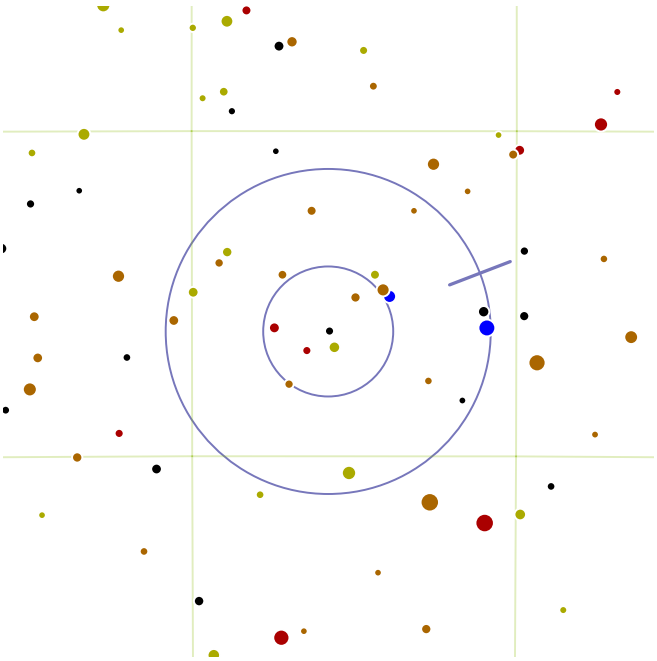


STF 8: page 59
STF 2944: page 59
STF 49: page 60
STF 3008: page 60
94 Aqr: page 61
S 390: page 61
107 Aqr: page 62

Early Autumn - Southern Horizon (2)



12 Cet: page 62
STF 39: page 63
37 Cet: page 63
Psi1 Aqr: page 64
Ome2 Aqr: page 64
HJ 1968 AB: page 65
HJ 2004: page 65



STF 8

RA: 2.9° | 0h 11.6' — DEC: -3.08° | -3° 4'

Magnitude: 7.8 | 9.3

Separation: 7.8"

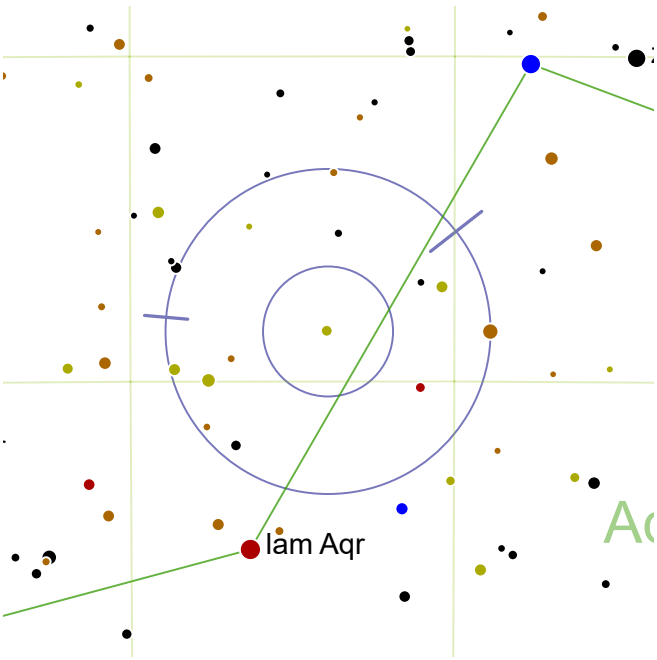
Position Angle: 291°

SAO 128631 | HIP 931 | GDR2 82076017408

A yellowish primary with a close and faint secondary.

One finder circle NNW from magnitude 3.75 Deneb Kaitos Shemali.

The star is surrounded in the finder view by a lovely grouping of fairly bright orange and red stars.



STF 2944

RA: 341.95° | 22h 47.79' — DEC: -4.23° | -4° 13'

Magnitude: 7.3 | 7.7 | 8.6

Separation: 1.8" | 60.6"

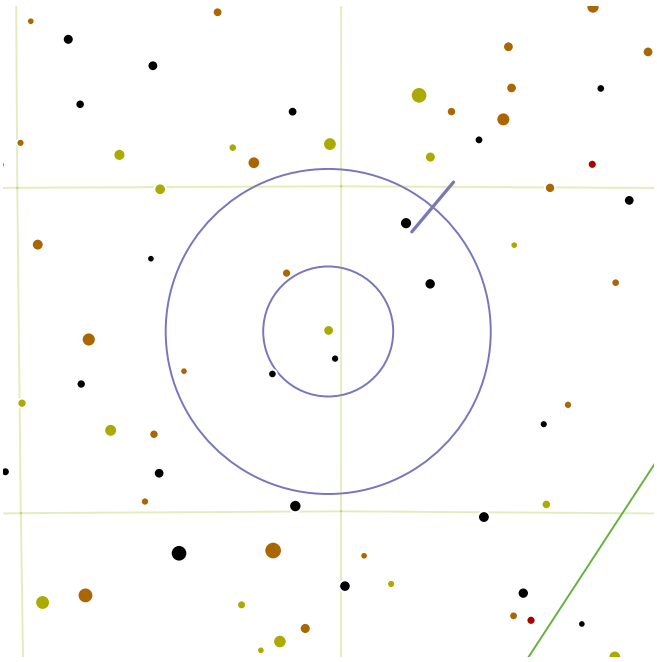
Position Angle: 308° | 85°

SAO 146315 | HIP 112559

An extremely tight pair of yellow stars, with a fainter distant third component.

Half a finder circle NNW from magnitude 3.84 lam Aqr. One finder circle SEE from magnitude 3.97 Sadalachbia.

The two brightest components are very similar to the Sun in color and absolute magnitude. This gravitationally bound system is 104 light-years from Earth.



STF 49

RA: 10.2° | 0h 40.79' — DEC: -7.23° | -7° 13'

Magnitude: 7.1 | 10.0

Separation: 8.6"

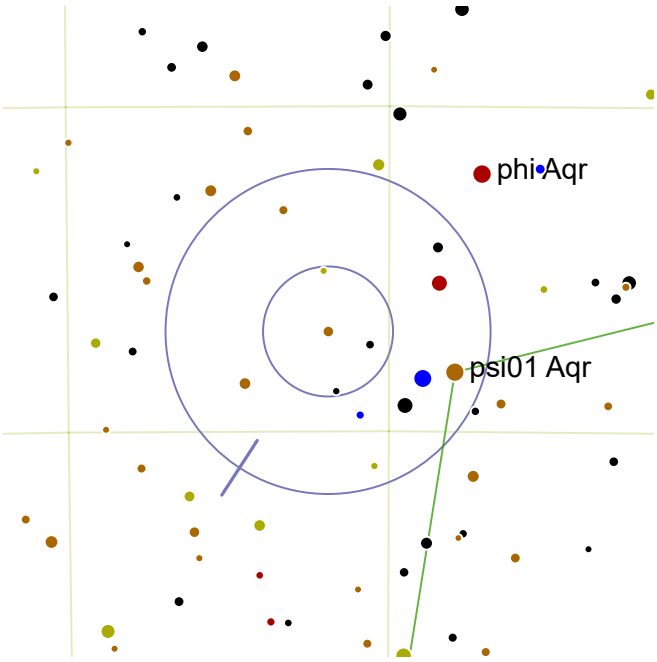
Position Angle: 320°

SAO 128892 | HIP 3203 | GDR2 51179609344

A close pair with a yellow primary and tiny orange secondary.

One finder circle NEE from magnitude 3.75 Deneb Kaitos Shemali. One finder circle NWW from magnitude 3.6 Deneb Algenubi.

Only 86 light-years away, the primary is a slightly brighter version of our Sun.



STF 3008

RA: 350.95° | 23h 23.79' — DEC: -8.47° | -8° 27'

Magnitude: 7.2 | 7.7

Separation: 7.1"

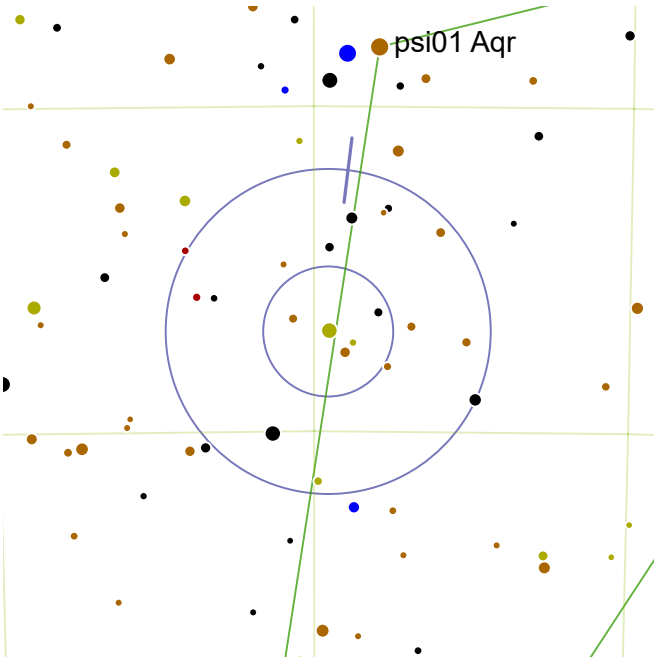
Position Angle: 147°

HIP 115495 | GDR2 34443398656

An equal pair, with an orange primary closely separated from a slightly fainter secondary.

One and a half finder circles E from magnitude 3.84 lam Aqr. Two finder circles NE from magnitude 3.51 Scheat.

The pair are not gravitationally bound. The primary is K-class giant 588 light-years from Earth.



94 Aqr

RA: 349.78° | 23h 19.09' — DEC: -13.47° | -13° 27'

Magnitude: 5.3 | 7.0

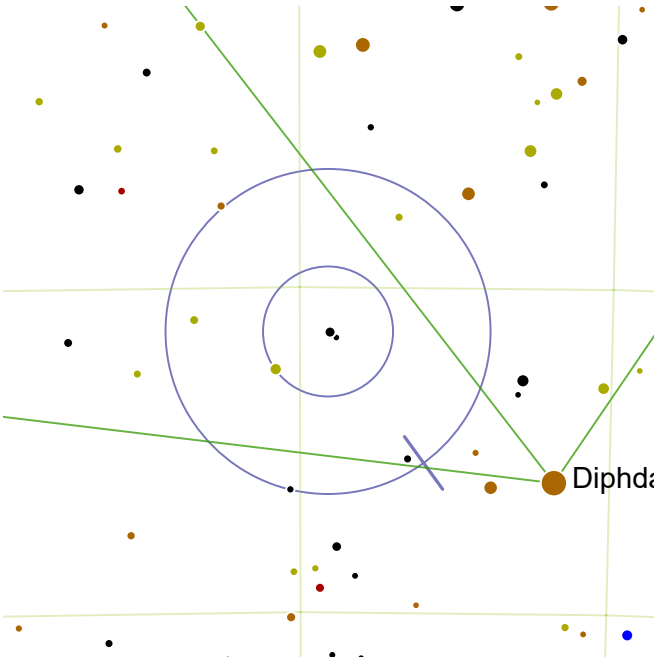
Separation: 12.1"

Position Angle: 353°

SAO 165625 | HIP 115126

A bright yellowish primary easily separated from a fairly bright companion.

One finder circle NEE from magnitude 3.51 Scheat.



S 390

RA: 14.55° | 0h 58.2' — DEC: -15.68° | -15° 40'

Magnitude: 7.8 | 7.9

Separation: 6.5"

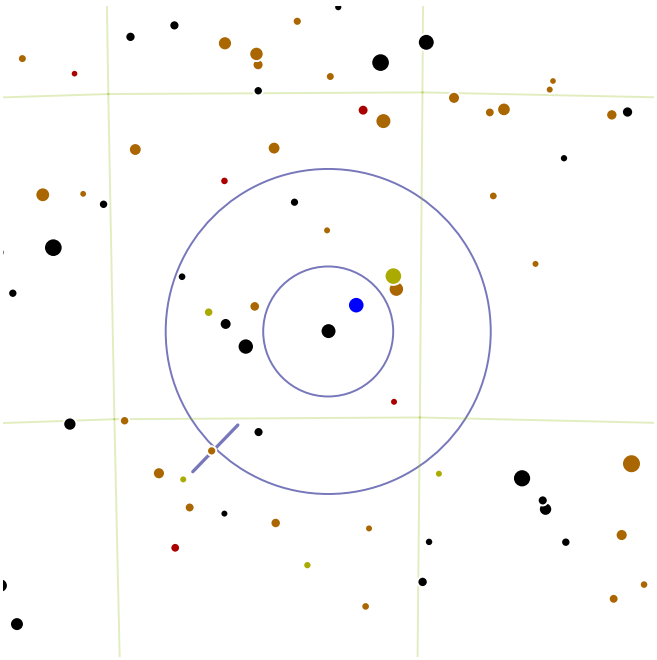
Position Angle: 216°

SAO 147543 | HIP 4540 | GDR2 73629560704

A close and equal pair of bluish stars.

Half a finder circle NEE from magnitude 2.24 Diphda.

This pair of hot bluish stars is 194 light-years from Earth.



107 Aqr

RA: 356.5° | 23h 46.0' — DEC: -18.68° | -18° 40'

Magnitude: 5.7 | 6.5

Separation: 7.0"

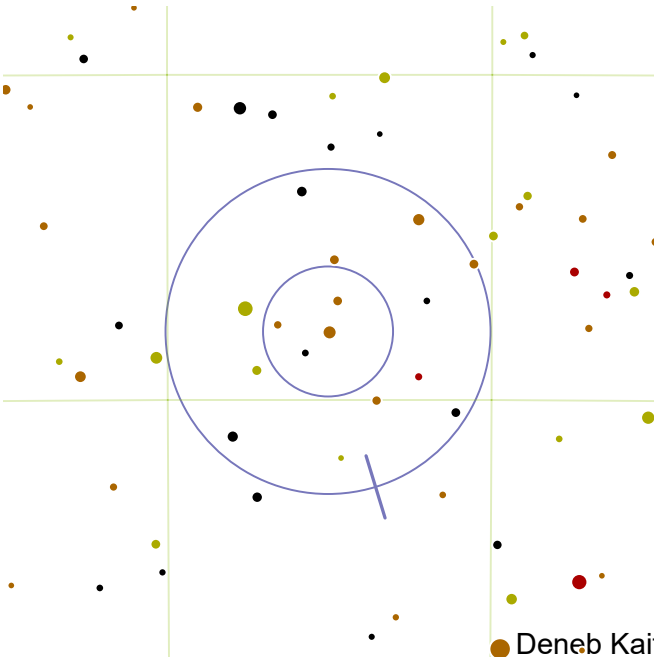
Position Angle: 136°

SAO 165867 | HIP 117218 | GDR2 07944627712

A bright white primary with a fairly bright yellowish companion close by.

One and a half finder circles NEE from magnitude 3.8 c02 Aqr. Two and a half finder circles SEE from magnitude 3.51 Scheat.

This double is not gravitationally bound and is only a line of sight coincidence. The primary is 239 light-years from Earth.



12 Cet

RA: 7.53° | 0h 30.1' — DEC: -3.95° | -3° 56'

Magnitude: 6.5 | 11

Separation: 10.7"

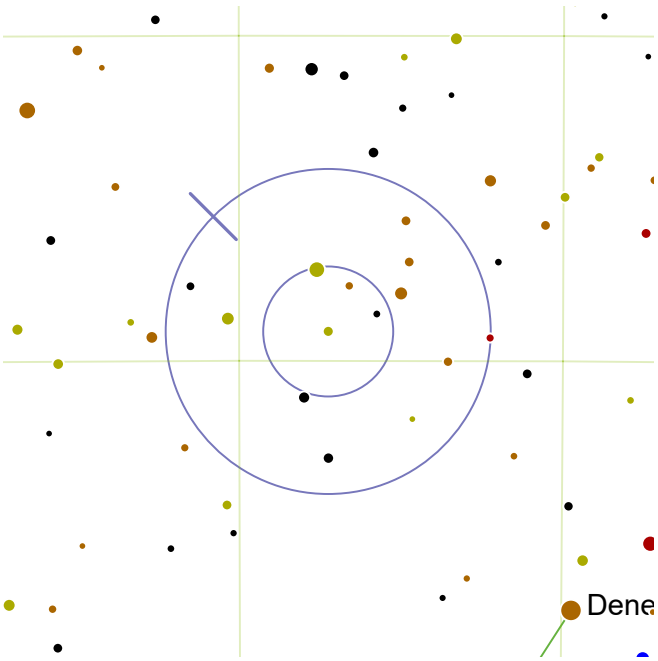
Position Angle: 197°

SAO 128791 | HIP 2353 | GDR2 21022169728

A bright red primary separated comfortably from a very faint companion.

One finder circle NNE from magnitude 3.75 Deneb Kaitos Shemali. Two finder circles NWW from magnitude 3.6 Deneb Algenubi.

Also known as h 322, the primary is a notably red Carbon Star.



STF 39

RA: 8.63° | 0h 34.5' — DEC: -4.55° | -4° 32'

Magnitude: 7.1 | 8.7

Separation: 20.1"

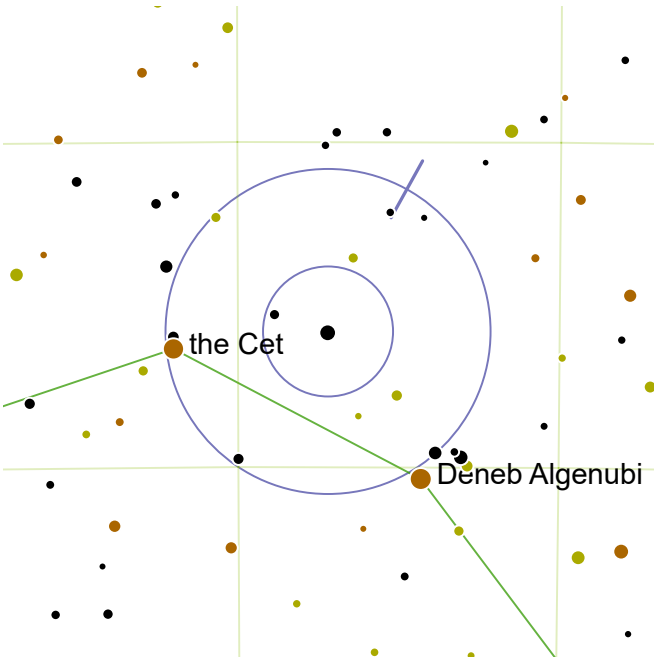
Position Angle: 45°

SAO 128831 | HIP 2713 | GDR2 34557758464

A wide pair with a yellow primary and pale yellow secondary.

One finder circle NE from magnitude 3.75 Deneb Kaitos Shemali. Two finder circles NWW from magnitude 3.6 Deneb Algenubi.

Caldwell 51 (mag. 9.2 galaxy) lies two and a half finder circles north east of this double. With Caldwell 51 centered in the finder,



37 Cet

RA: 18.6° | 1h 14.4' — DEC: -7.92° | -7° 54'

Magnitude: 5.2 | 7.9

Separation: 47.1"

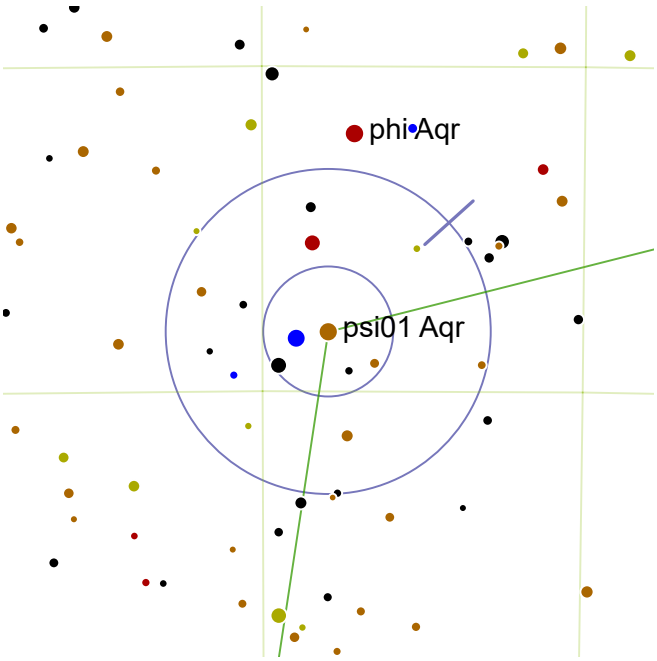
Position Angle: 331°

SAO 129193 | HIP 5799 | GDR2 28340199936

A very widely separated pair, with a brilliant yellowish primary and a significantly fainter, strongly yellow secondary.

One and a half degrees W from magnitude 3.83 the Cet. Half a finder circle NNE from magnitude 3.6 Deneb Algenubi.

This gravitationally bound system is only 73 light-years from Earth.



Psi1 Aqr

RA: 348.98° | 23h 15.9' — DEC: -9.08° | -9° 4'

Magnitude: 4.4 | 9.6

Separation: 49"

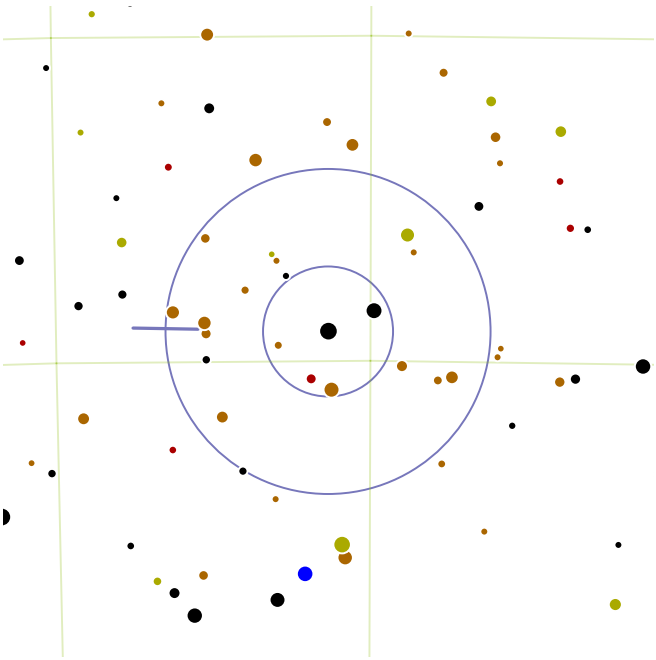
Position Angle: 312°

SAO 146598 | HIP 114855

A brilliant orange primary distantly separated from a faint orange secondary.

One finder circle SEE from magnitude 3.84 lam Aqr. One and a half finder circles NE from magnitude 3.51 Scheat.

The secondary is itself a reasonably balanced double with a separation of 0.4". Also known as 91 Aqr, the primary is orbited by a massive exoplanet as least 3.2 times the mass of Jupiter.



Ome2 Aqr

RA: 355.68° | 23h 42.7' — DEC: -14.55° | -14° 32'

Magnitude: 4.5 | 9.5

Separation: 5.5"

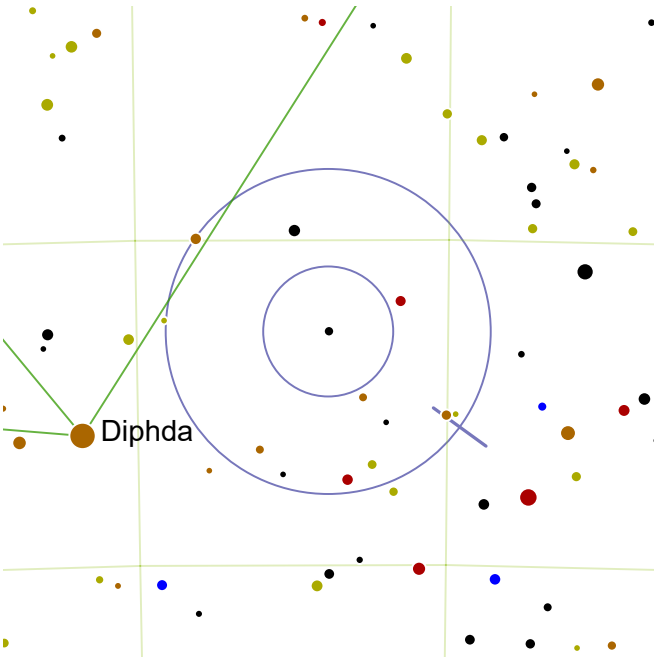
Position Angle: 89°

SAO 165842 | HIP 116971 | GDR2 49815948416

A brilliant bluish primary with a faint orange companion close by.

Two finder circles NE from magnitude 3.8 c02 Aqr. Two finder circles SWW from magnitude 3.75 Deneb Kaitos Shemali.

The system is a strong nearby X-ray source, as the primary is a hot B-type main sequence star with a surface temperature of 10,500 K.



HJ 1968 AB

RA: 6.93° | 0h 27.7' — DEC: -16.42° | -16° 24'

Magnitude: 7.3 | 10.0

Separation: 37.0"

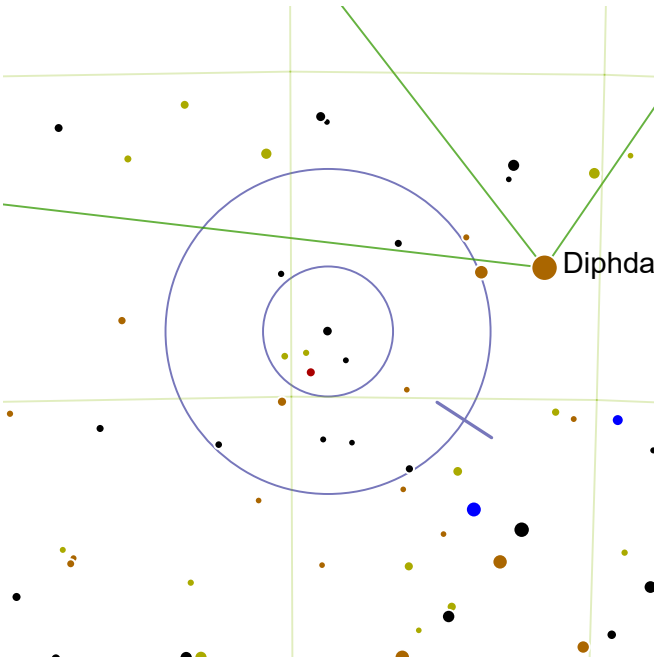
Position Angle: 234°

SAO 147286 | HIP 2190 | GDR2 26008993152

A yellowish primary very widely separated from a faint secondary.

Half a finder circle NWW from magnitude 2.24 Diphda.

Two and a half finder circles SSE is the bright galaxy Caldwell 65 (mag. 8.0) and globular cluster NGC 288 (mag. 8.1). Just over one finder circle SE is Caldwell 62 (mag. 9.1 active galaxy).



HJ 2004

RA: 14.4° | 0h 57.6' — DEC: -19.0° | -18° 59'

Magnitude: 7.0 | 9.8

Separation: 3.3"

Position Angle: 237°

SAO 147537 | HIP 4496 | GDR2 63244742016

A fairly bright white primary with a very close, faint secondary.

Half a finder circle SEE from magnitude 2.24 Diphda.

Position this little double in the north-eastern quarter of the finder, and Caldwell 62 (mag. 9.1 active galaxy) is in the south-western quarter.

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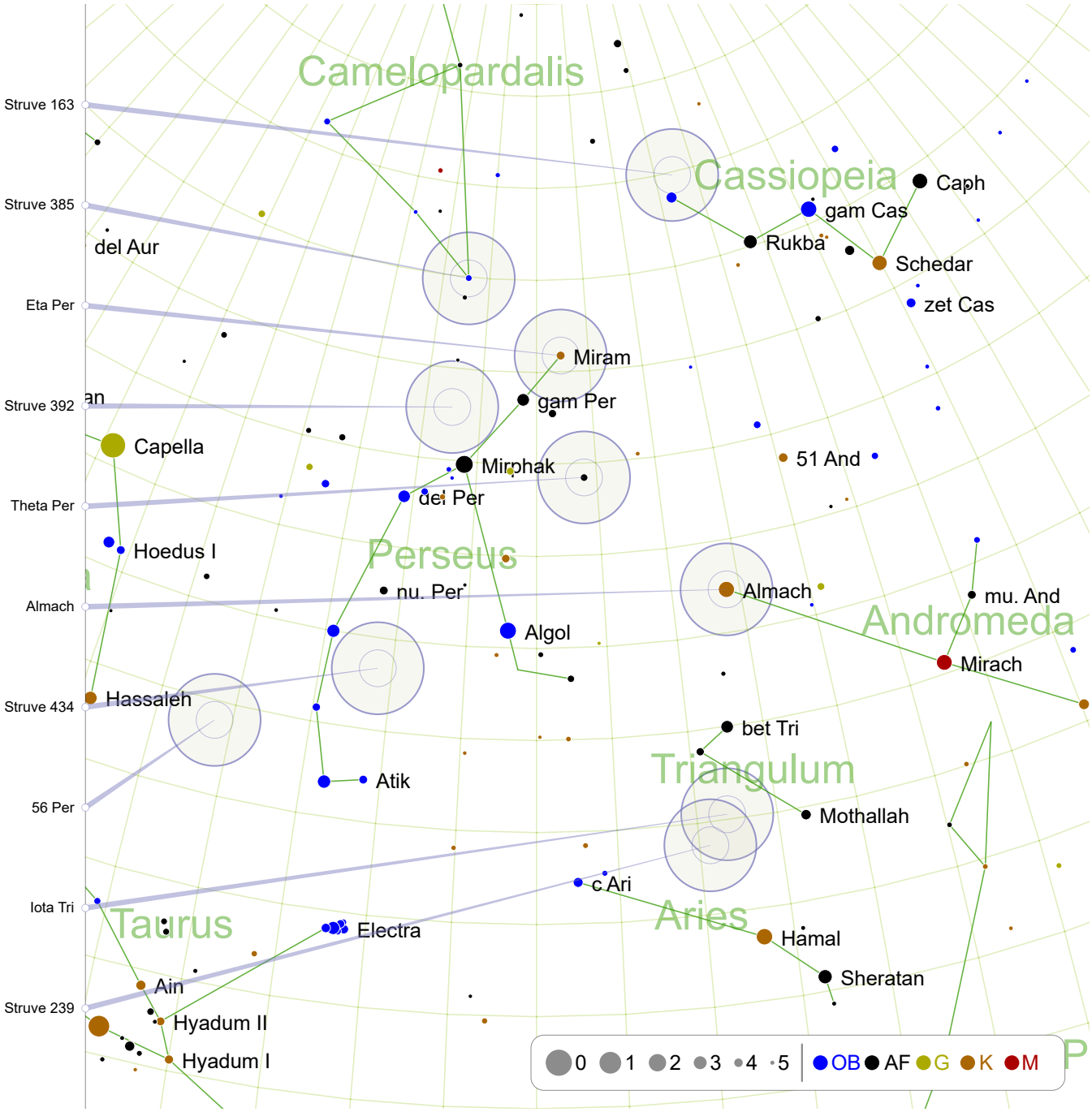
Late Autumn - Looking North (1)



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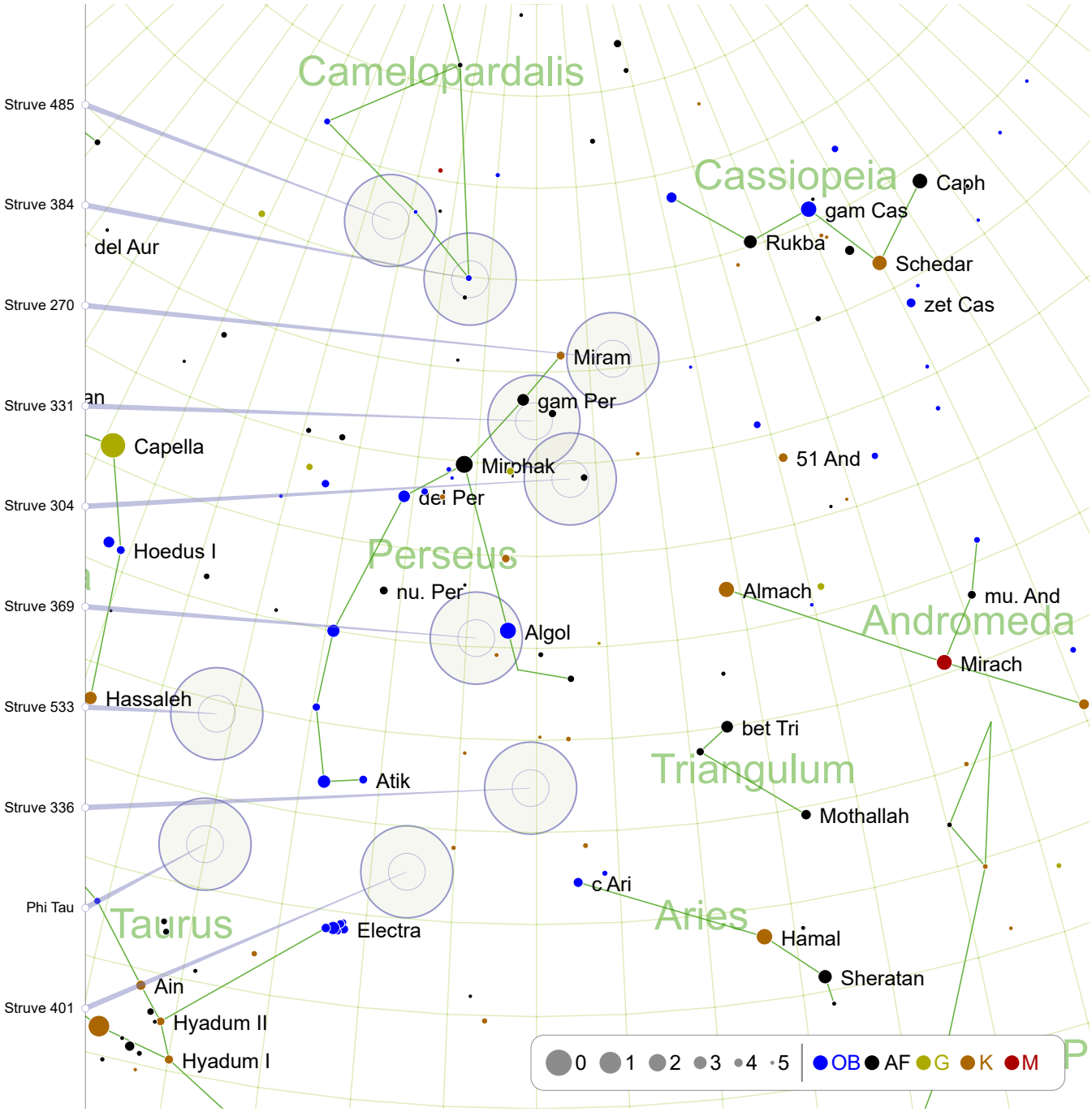
Struve 385: page 69
Eta Per: page 70
Struve 392: page 70
Theta Per: page 71
Almach: page 71
Struve 434: page 72
56 Per: page 72
Iota Tri: page 73
Struve 239: page 73

Late Autumn - Looking North (2)



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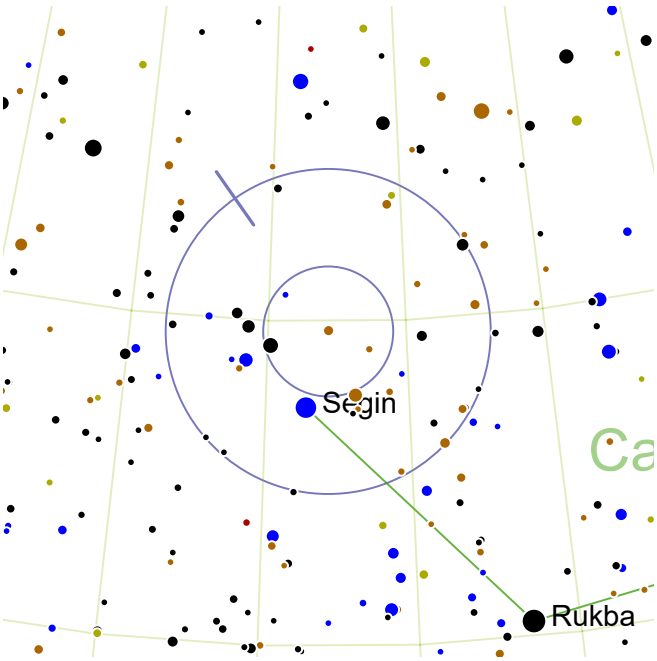


Struve 163

RA: 27.83° | 1h 51.3' — DEC: 64.85° | 64° 51'

Magnitude: 6.8 | 8.8

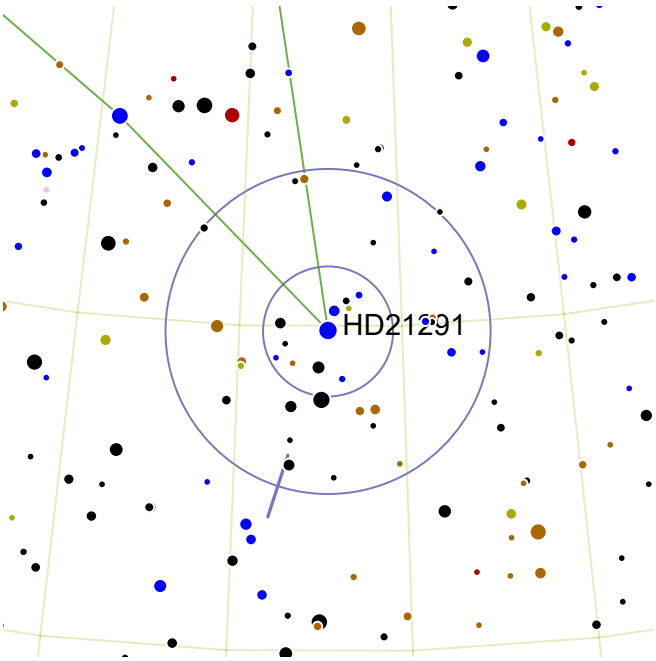
Separation: 34.8"

Position Angle: 35°

SAO 12006 | HIP 8626 | GDR2 8783536768

A wide binary with a strongly orange primary and blue secondary.

A degree north and slightly west of Segin, the faintest of the five stars of Cassiopeia's "W".



Struve 385

RA: 52.28° | 3h 29.09' — DEC: 59.93° | 59° 56'

Magnitude: 4.2 | 7.8

Separation: 2.3"

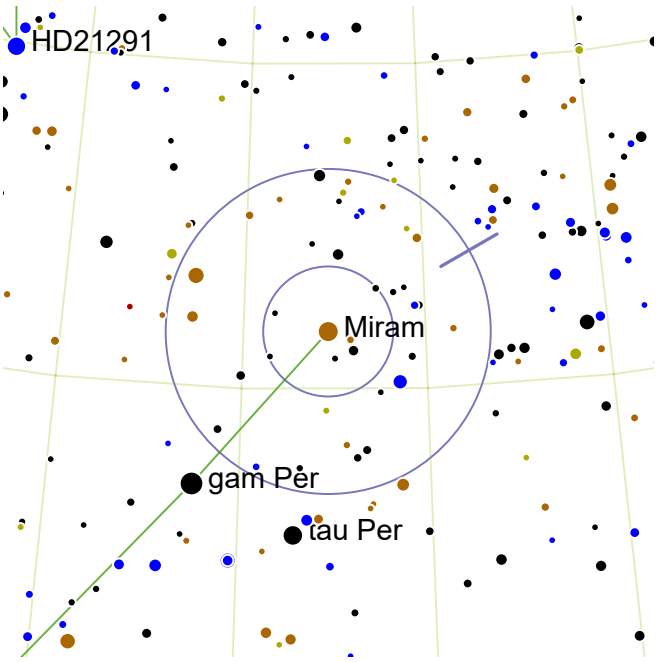
Position Angle: 162°

SAO 24054 | HIP 16228 | GDR2 8616785152

A brilliant blue primary with a moderately faint companion, very tightly separated.

One finder circle NE from magnitude 3.93 Miram. Two finder circles E from magnitude 3.44 Segin.

This system is also known as CS Cam, indicating it is a variable star (of type Alpha Cygni). The magnitude range is barely 0.05 magnitudes, so this is not apparent to visual observers. The star is located in te dim reflection nebula VdB 14.



Eta Per

RA: 42.68° | 2h 50.69' — DEC: 55.9° | 55° 54'

Magnitude: 3.8 | 8.5

Separation: 28.3"

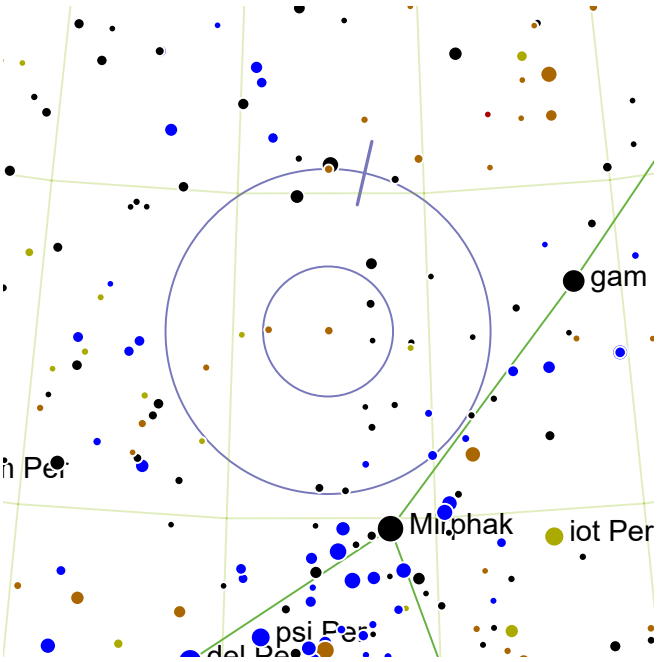
Position Angle: 300°

SAO 23655 | HIP 13268 | GDR2 1980370304

A bright orange primary with a much fainter blue secondary.

Shares the same finder circle as the slightly brighter Gamma Persei to the south east.

The common name for the system, “Miram”, originates in the 20th century but its meaning (if any) is unclear. The primary is about ten times the Sun’s mass with approximately 4130 times the luminosity and 220 times the radius.



Struve 392

RA: 52.58° | 3h 30.3' — DEC: 52.9° | 52° 54'

Magnitude: 7.4 | 9.6

Separation: 25.8"

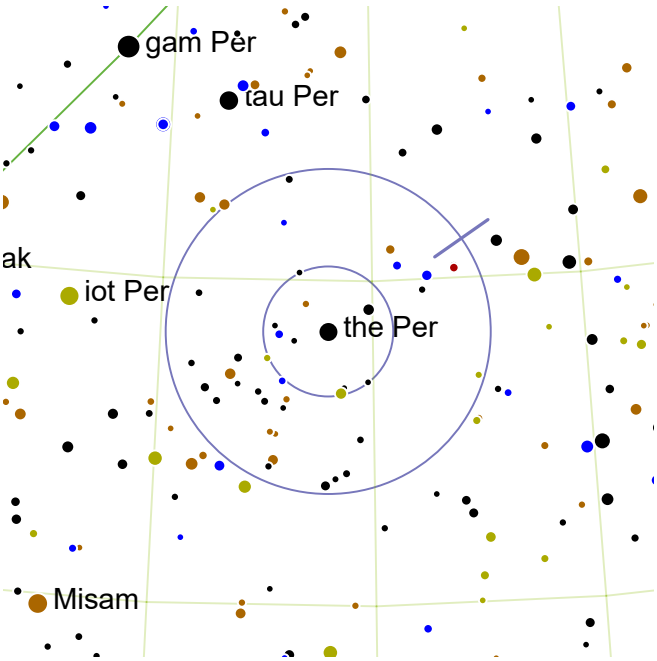
Position Angle: 347°

SAO 24068 | HIP 16316 | GDR2 5262878720

An orange-blue pair, widely separated. Neither companion is particularly bright.

Easily lost in the busy star fields of Perseus. Position magnitude 1.75 Mirphak at the southern edge of the finder. Struve 392 is a brightish star just north of center.

Open cluster NGC 1444 lies just beyond the eastern edge of the finder with this double centered. Fainter open cluster NGC 1496 lies a further 2.5 degrees further east.



Theta Per

RA: 41.05° | 2h 44.19' — DEC: 49.23° | 49° 14'

Magnitude: 4.1 | 9.9

Separation: 20"

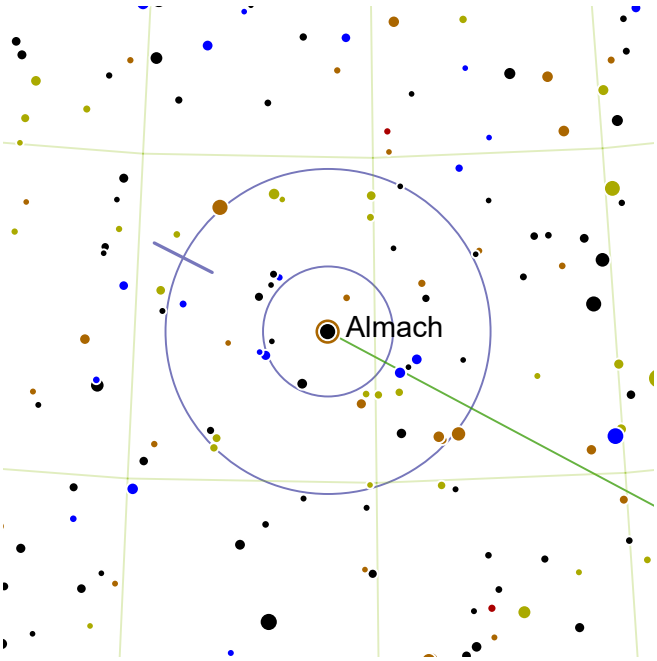
Position Angle: 305°

SAO 38288 | HIP 12777

A wide and unbalanced double with a deep yellow primary and a very faint blue secondary.

One finder circle south west of Gamma Persei.

Only 38 light-years away, the primary is 2.3 times brighter than the Sun, while the companion is an above-averagely bright "early" red dwarf. The term early comes from an old mistaken belief that stars grow fainter as they age, meaning a brighter star would be early and fainter star would be late. We now know stars get brighter as they age.



Almach

RA: 30.98° | 2h 3.9' — DEC: 42.33° | 42° 20'

Magnitude: 2.3 | 5.5

Separation: 9.8"

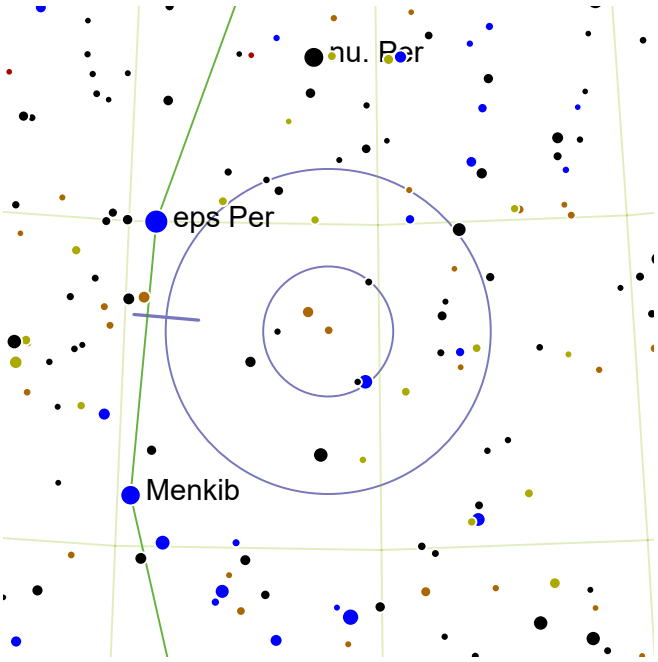
Position Angle: 63°

SAO 37734 | HIP 9640

A spectacular pairing of an intense orange primary with a fainter blue secondary.

The secondary component is a triple system consisting a two closely bound B class stars separated by less than 0.2” from an A class star.

Johann Tobias Mayer discovered the binary nature of this strongly colored system in 1778. In 1842, Wilhelm Struve found the blue B component is itself a double star with a separation of around 1". Spectroscopy reveals the fainter component of the B system is also a double resulting in a quadruple star system.



Struve 434

RA: 56.0° | 3h 44.0' — DEC: 38.37° | 38° 22'

Magnitude: 7.8 | 8.6

Separation: 31"

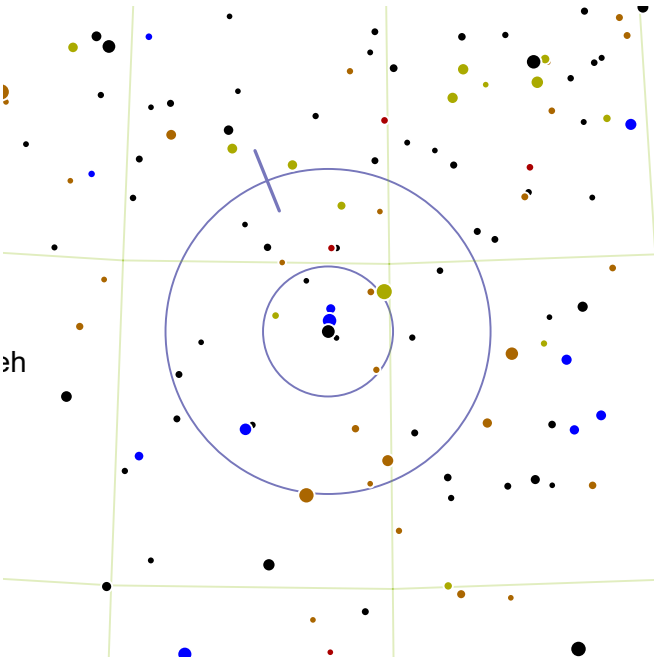
Position Angle: 85°

SAO 56667 | HIP 17424 | GDR2 3312776960

A widely separated, balanced pair with an orange primary.

Half a finder circle SWW from magnitude 2.96 eps Per. Half a finder circle S from magnitude 3.93 nu. Per.

The pair does not seem to be gravitationally bound. The primary is a K-class orange giant, 1426 light-years from Earth.



56 Per

RA: 66.15° | 4h 24.6' — DEC: 33.97° | 33° 58'

Magnitude: 5.9 | 8.7

Separation: 4.2"

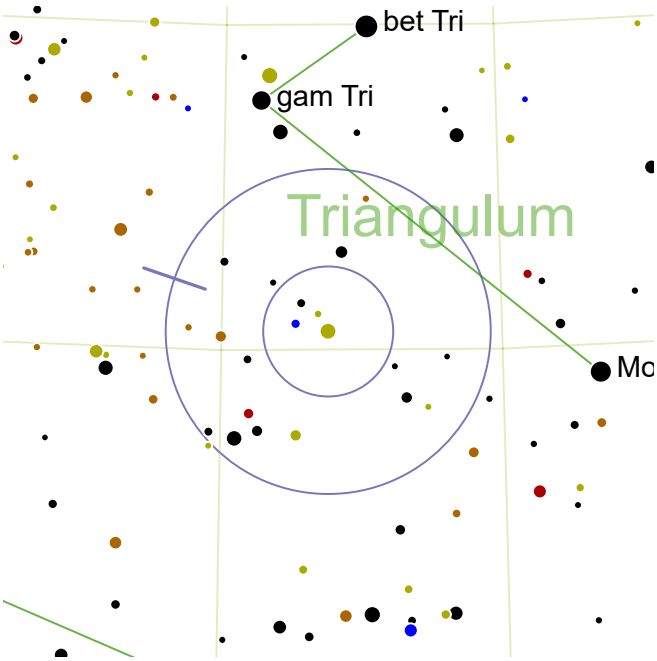
Position Angle: 22°

SAO 57216 | HIP 20591 | GDR2 9818083712

A bright yellow primary with a close yellow companion.

One and a half finder circles north of Zeta Persei.

The primary star is an F4V main sequence star 50% more massive than the Sun and seven times brighter. It has a very dim close white dwarf companion (magnitude 15), but the brighter star identified as the B component is further separated and 86% of the mass of the sun.



Iota Tri

RA: 33.1° | 2h 12.4' — DEC: 30.3° | 30° 18'

Magnitude: 5.3 | 6.9

Separation: 3.9"

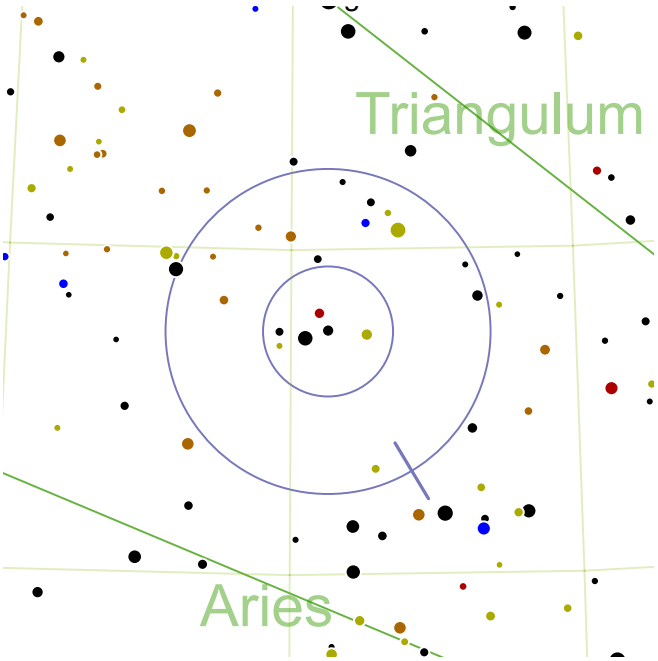
Position Angle: 71°

SAO 55347 | HIP 10280

A tight, bright pair of well-matched yellow and blue stars.

A finder circle south of Gamma Trianguli.

Although only two stars are visible, this system is quadruple as the A and B components are spectroscopic binaries.



Struve 239

RA: 34.35° | 2h 17.4' — DEC: 28.75° | 28° 45'

Magnitude: 7.0 | 8.0

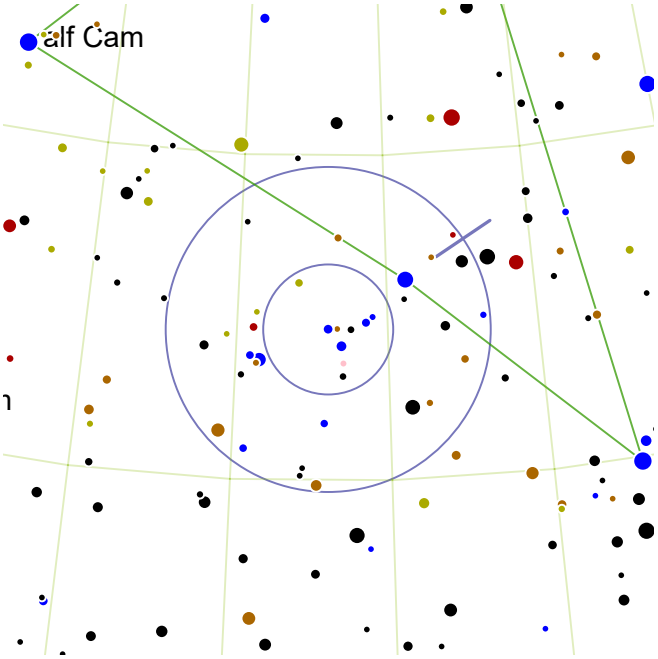
Separation: 13.8"

Position Angle: 211°

SAO 75265 | HIP 10680 | GDR2 2769886848

A comfortably separated yellow-blue pairing.

Just over a finder circle north and slightly east of Hamal.



Struve 485

RA: 61.98° | 4h 7.9' — DEC: 62.33° | 62° 20'

Magnitude: 7.0 | 7.1

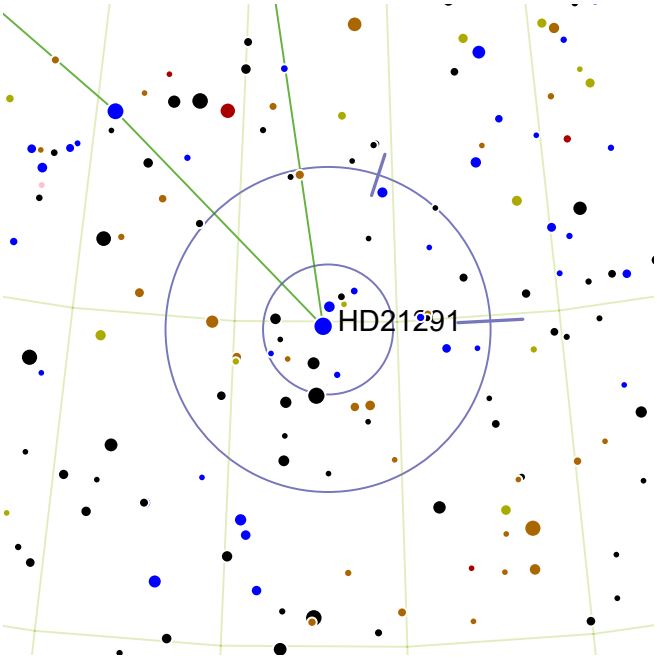
Separation: 18"

Position Angle: 304°

SAO 13031 | HIP 19272 | GDR2 4001466752

A widely separated equal pair of white stars.

Situated in the star cluster NGC 1502. one of the two stars is variable, ranging from magnitude 7.0 to 7.3 in roughly two days.



Struve 384

RA: 52.13° | 3h 28.5' — DEC: 59.9° | 59° 54'

Magnitude: 8.1 | 8.9 | 10.6

Separation: 2.0" | 116"

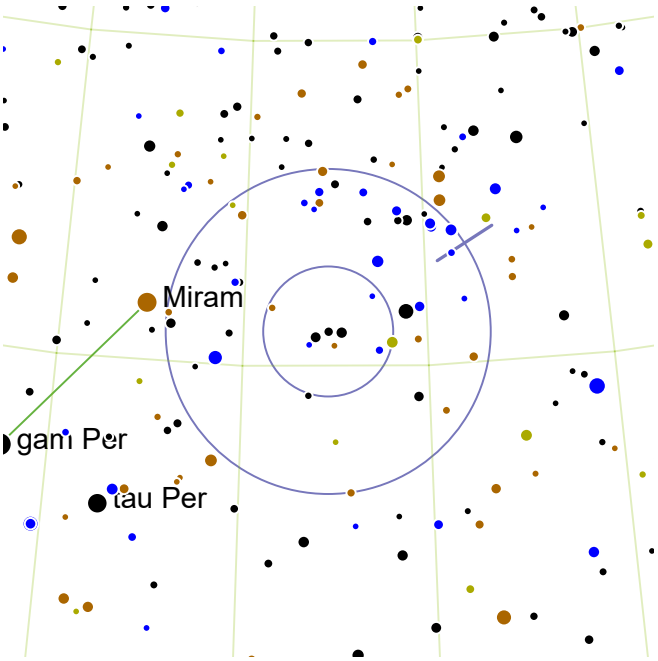
Position Angle: 273° | 342°

HIP 16183 | GDR2 7609785600

A very tight pair of relatively faint stars, with a loosely associated dim third component.

One finder circle NE from magnitude 3.93 Miram. Two finder circles E from magnitude 3.44 Segin.

Even at high magnification, this shares the field with the bright double Struve 385. Many nebulae are close by. One finder circle to the west is the Soul Nebula, and a couple of degrees further is the Heart Nebula.



Struve 270

RA: 37.7° | 2h 30.8' — DEC: 55.55° | 55° 33'

Magnitude: 7.4 | 9.2

Separation: 21.2"

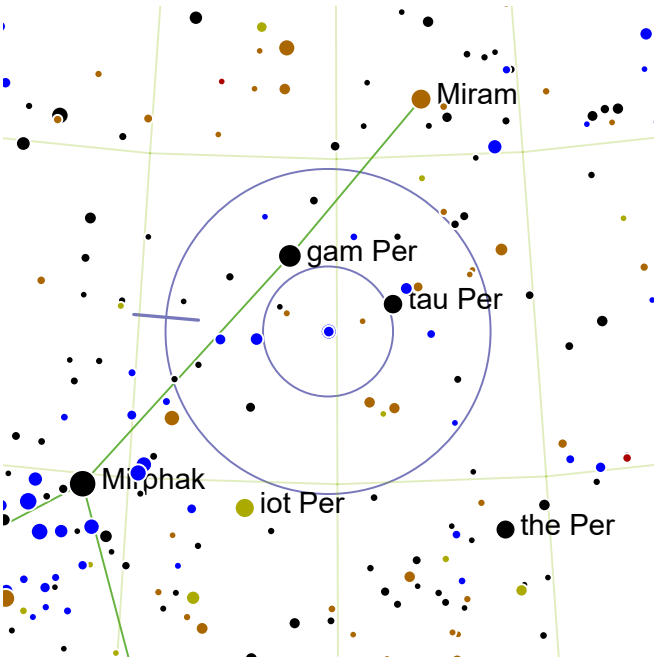
Position Angle: 303°

SAO 23389 | HIP 11696 | GDR2 0673147264

A wide yellow-blue double.

Located midway between magnitude 2.65 Ruchbah in Cassiopeia and magnitude 1.75 Mirphak in Perseus, either two finder circles north west of Mirphak or two finder circles south east of Ruchbah.

If you have the famous Double cluster in view, you are nearly there. Position the Double Cluster on the north west edge of the finder and Struve 270 is in the center of the finder, closely flanked by two equally bright stars.



Struve 331

RA: 45.23° | 3h 0.9' — DEC: 52.35° | 52° 21'

Magnitude: 5.3 | 6.7

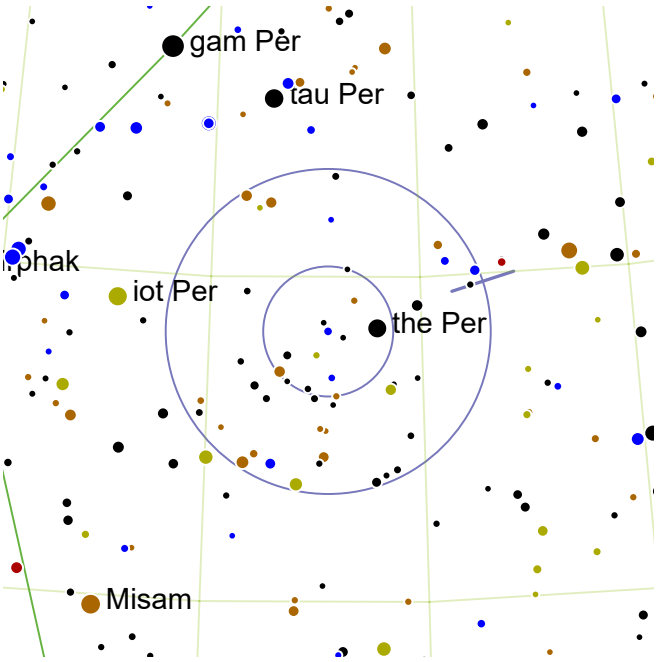
Separation: 12.1"

Position Angle: 85°

SAO 23763 | HIP 14043 | GDR2 9385318656

A bright and easily separated white-blue pair.

Just over one degree to the south of Gamma Persei.



Struve 304

RA: 42.2° | 2h 48.8' — DEC: 49.18° | 49° 11'

Magnitude: 7.5 | 10.7

Separation: 25"

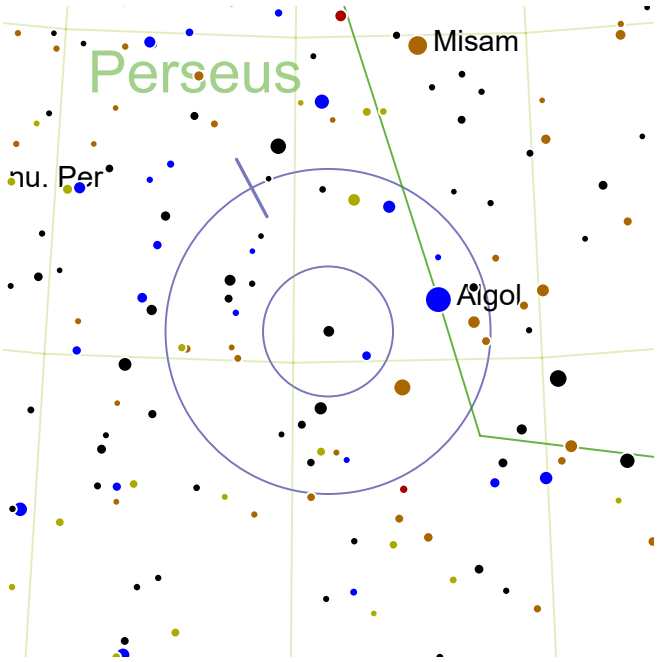
Position Angle: 288°

SAO 38352 | HIP 13124 | GDR2 9992325504

A faint, wide white and blue pair.

One and a half finder circles west of Mirphak.

This system is 604 light-years from the Sun.



Struve 369

RA: 49.3° | 3h 17.19' — DEC: 40.48° | 40° 29'

Magnitude: 6.7 | 8.0

Separation: 3.5"

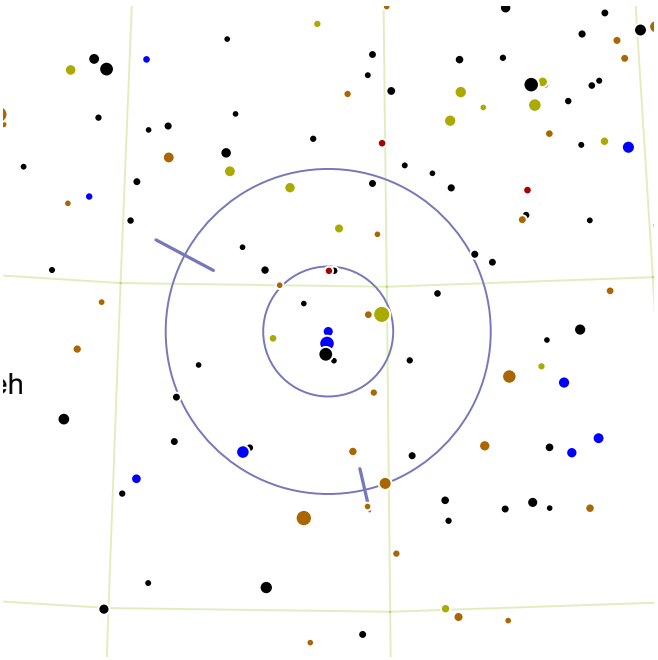
Position Angle: 28°

SAO 38700 | HIP 15282 | GDR2 5109311360

A fairly balanced yellow-blue pairing. Very widely separated.

Center Algol in the finder; Struve 369 lies to the eastern edge of the finder.

Algol (the "Demon Star") is the most famous of eclipsing binaries, with a period of 2.867 days dropping from magnitude 2.1 to 3.4 in a matter of hours.



Struve 533

RA: 66.1° | 4h 24.39' — DEC: 34.32° | 34° 19'

Magnitude: 7.3 | 8.5 | 12.0

Separation: 19" | 107"

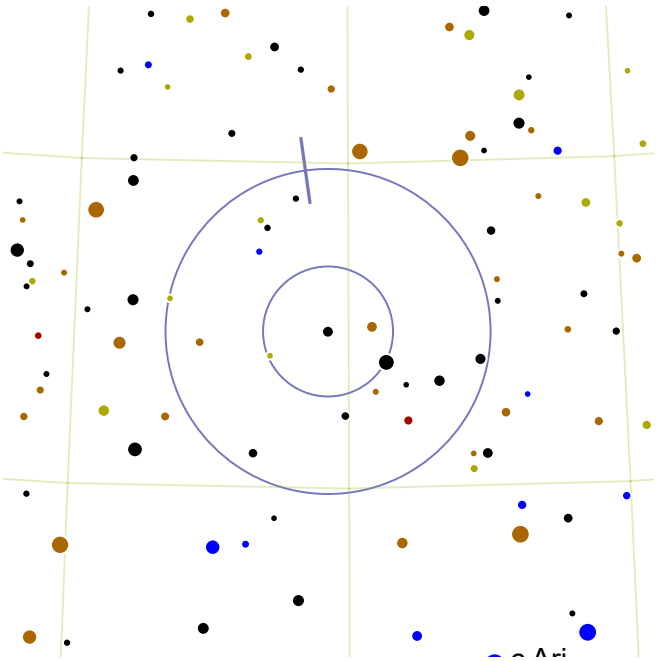
Position Angle: 62° | 193°

SAO 57211 | HIP 20570 | GDR2 3071472512

A bluish primary easily separated from somewhat fainter companion; there is a distant and very faint third component.

One finder circle NEE from magnitude 2.91 zet Per. One and a half finder circles NEE from magnitude 3.94 Atik.

The primary is also identified as variable star V590 Per, with a small magnitude range of 7.2 to 7.44. Two degrees to the north east is NGC 1679, an emission nebula.



Struve 336

RA: 45.38° | 3h 1.5' — DEC: 32.42° | 32° 25'

Magnitude: 6.9 | 8.4

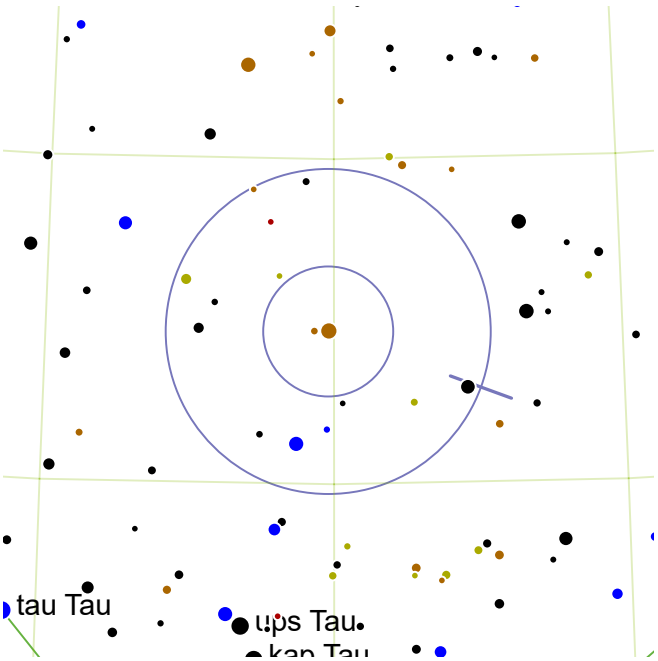
Separation: 8.4"

Position Angle: 8°

SAO 56095 | HIP 14081 | GDR2 5089525248

An orange primary easily separated from a bluish secondary.

Nearly two finder circles south of Algol.



Phi Tau

RA: 65.1° | 4h 20.39' — DEC: 27.35° | 27° 21'

Magnitude: 5.0 | 8.4

Separation: 52.1"

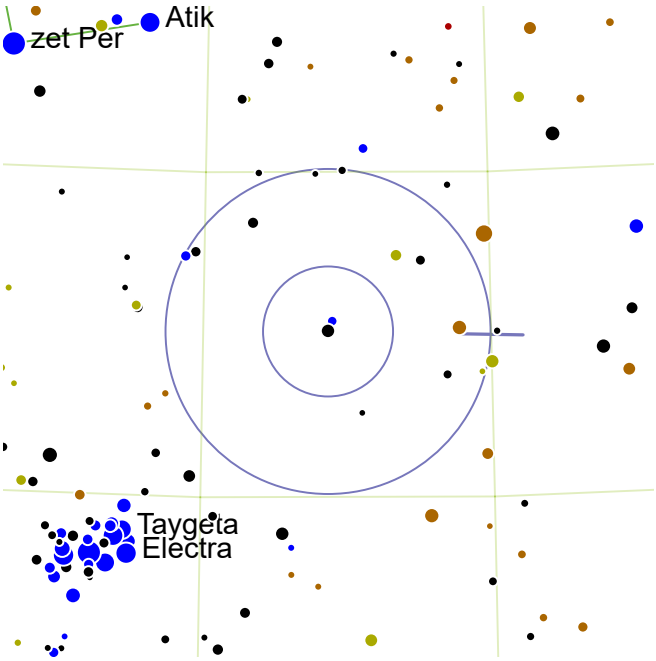
Position Angle: 250°

SAO 76558 | HIP 20250 | GDR2 6556443904

A bright yellow primary with a widely separated faint blue companion.

One and a half finder circles south east of Zeta Persei.

This double is only a line-of-sight coincidence and the components are not gravitationally related.



Struve 401

RA: 52.83° | 3h 31.32' — DEC: 27.57° | 27° 34'

Magnitude: 6.6 | 6.9

Separation: 11.4"

Position Angle: 269°

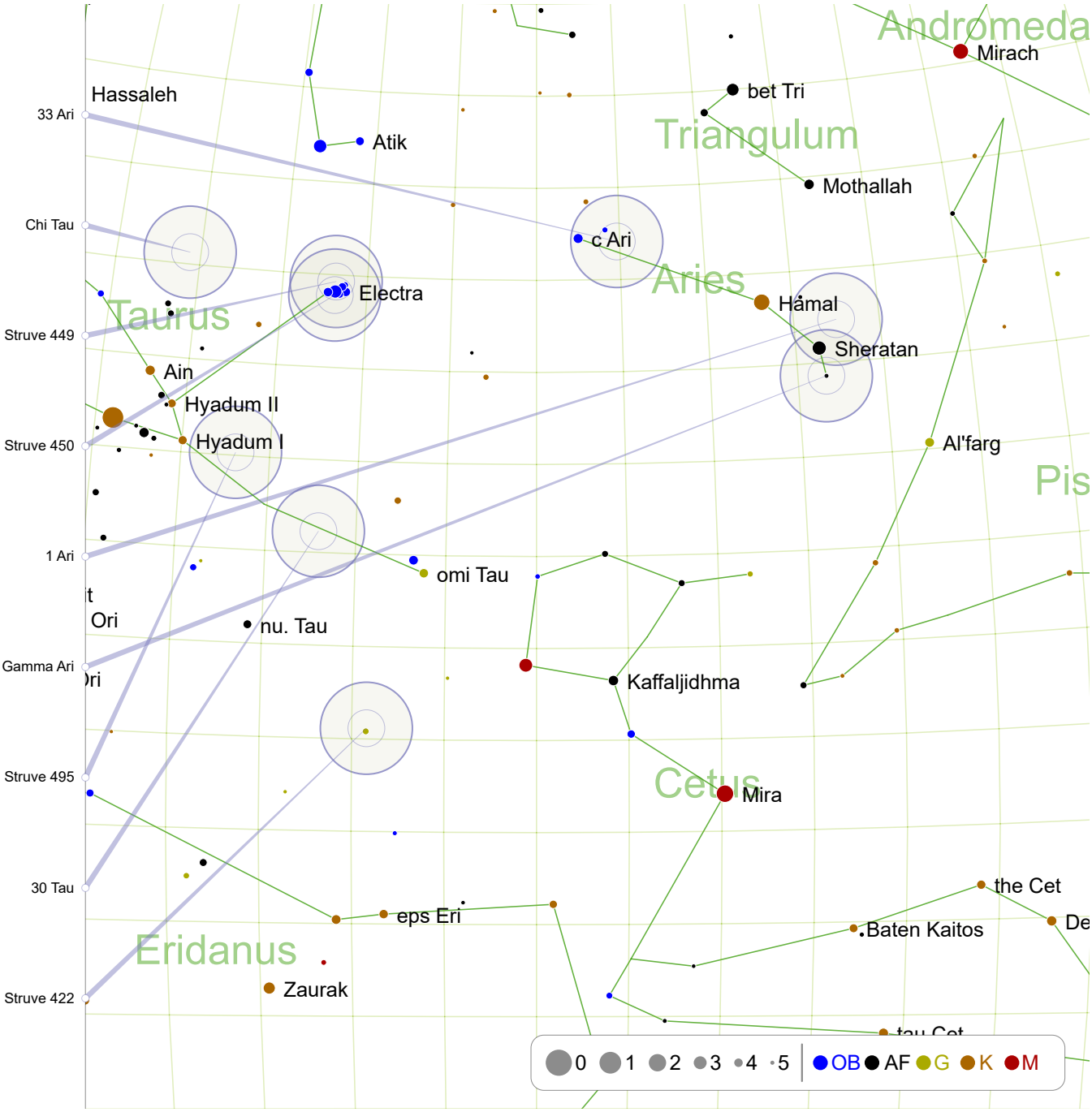
SAO 75970 | HIP 16411 | GDR2 5464382080

An easily separated equal pair of fairly bright white stars.

Half a finder circle NW from magnitude 3.81 Electra. One finder circle SSW from magnitude 3.94 Atik.

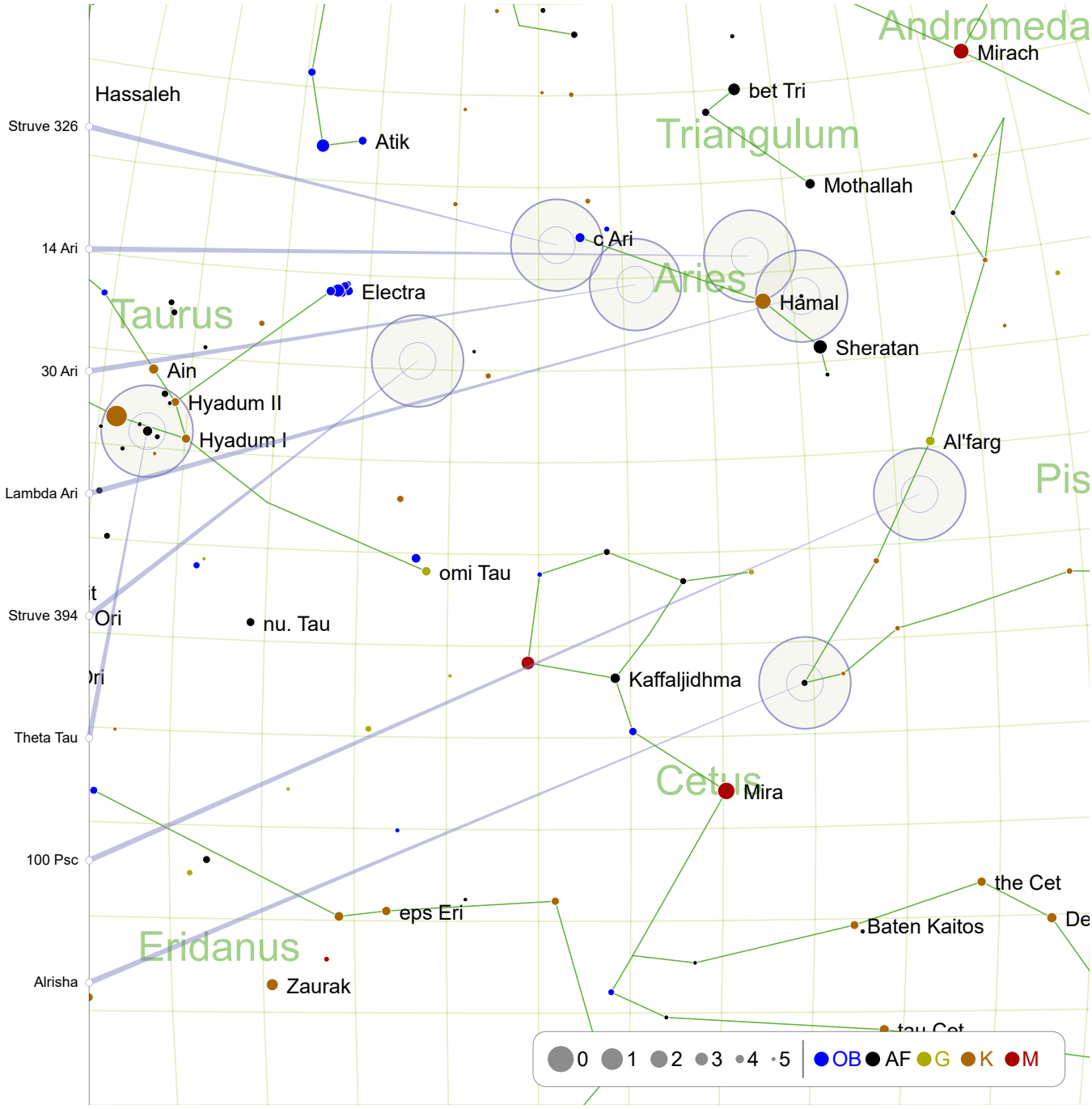
This system lies one finder circle north west of the Pleiades.

Late Autumn - Looking South (1)

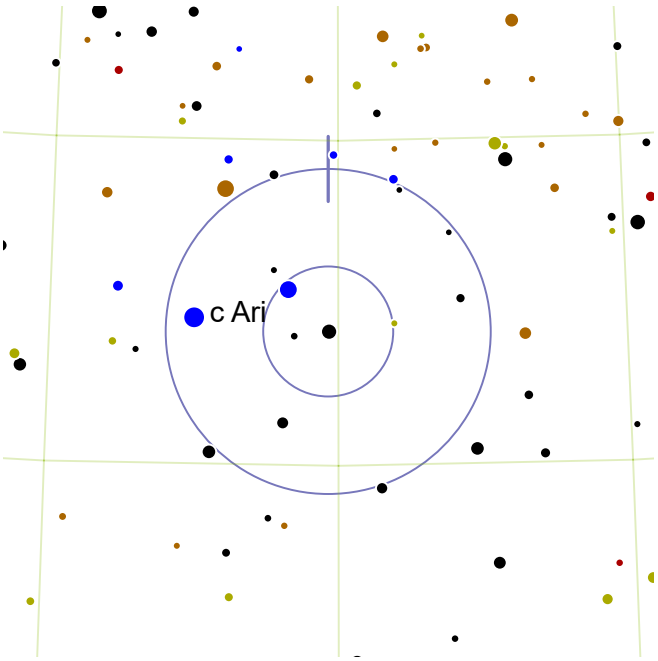


33 Ari: page 81
Chi Tau: page 81
Struve 449: page 82
Struve 450: page 82
1 Ari: page 83
Gamma Ari: page 83
Struve 495: page 84
30 Tau: page 84
Struve 422: page 85

Late Autumn - Looking South (2)



Struve 326: page 85 | 14 Ari: page 86 | 30 Ari: page 86 | Lambda Ari: page 87
Struve 394: page 87 | Theta Tau: page 88 | 100 Psc: page 88 | Alrisha: page 89



33 Ari

RA: 40.17° | 2h 40.69' — DEC: 27.07° | 27° 4'

Magnitude: 5.5 | 8.4

Separation: 28.6"

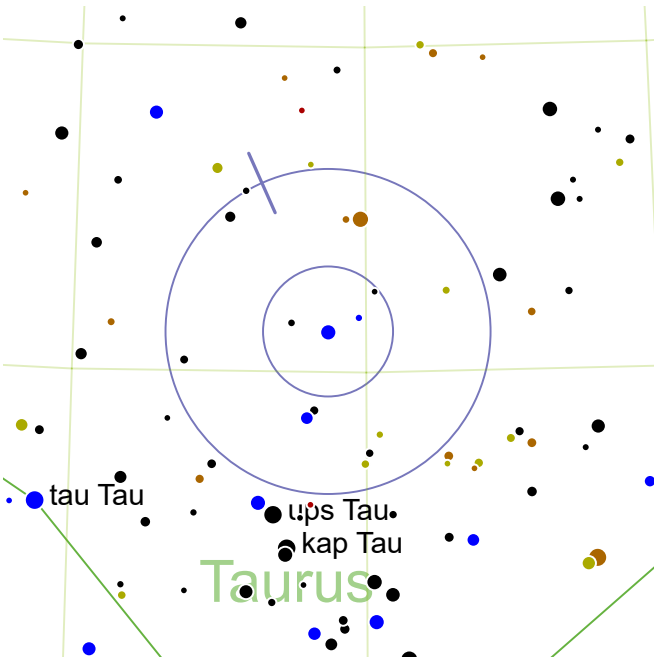
Position Angle: 0°

SAO 75510 | HIP 12489 | GDR2 4883932160

A bright yellow primary with a faint blue companion, widely separated.

Nearly two finder circles east and slightly north of Hamal.

Also known as Barani I. Circumstellar dust has been detected in this system.



Chi Tau

RA: 65.65° | 4h 22.6' — DEC: 25.63° | 25° 38'

Magnitude: 5.5 | 7.6

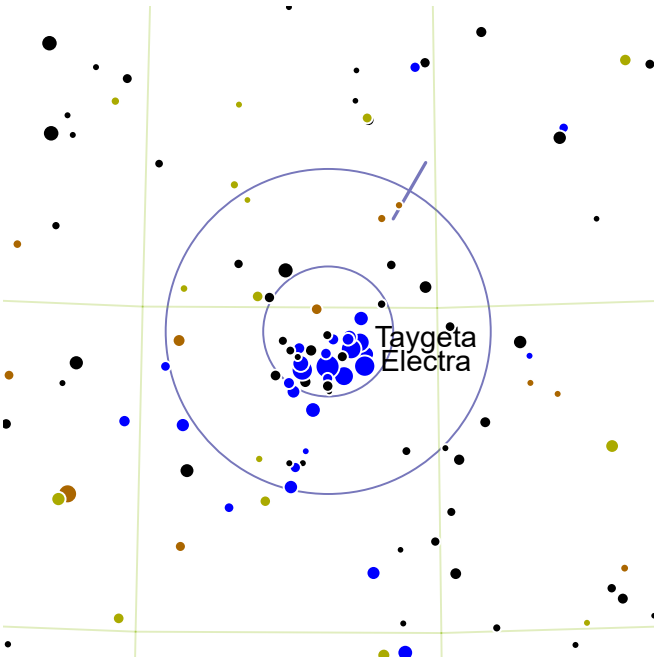
Separation: 19.4"

Position Angle: 24°

SAO 76573 | HIP 20430 | GDR2 2453366528

An easily separated white-blue pairing, where the secondary is also reasonably bright so seeing the color is easier.

Also known as Alkalbain II. Find Alkalbain I two degrees to the north.



Struve 449

RA: 56.85° | 3h 47.4' — DEC: 24.65° | 24° 39'

Magnitude: 8.5 | 11.0

Separation: 6.8"

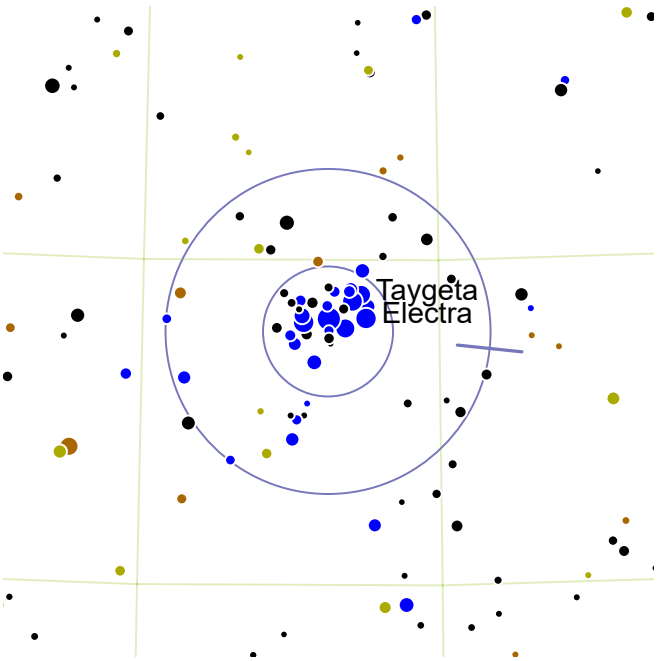
Position Angle: 330°

SAO 76194 | GDR2 985307264

A bluish primary with a close, faint companion.

Less than half a degree N from magnitude 2.96 Alcyone. Half a degree NE from magnitude 3.81 Electra.

Located on the north-eastern edge of the Pleiades.



Struve 450

RA: 56.88° | 3h 47.5' — DEC: 23.92° | 23° 55'

Magnitude: 7.1 | 9.1

Separation: 6.2"

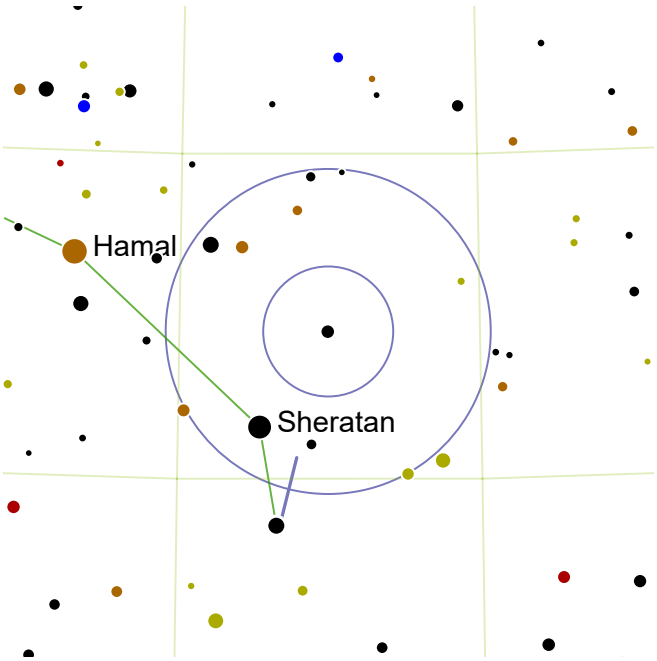
Position Angle: 264°

SAO 76197 | GDR2 611941376

A close pair of white stars, not very bright but easily found.

Located in the Pleiades less than a quarter of a degree south of Alcyone (at magnitude 2.85, the brightest member of the Pleiades).

The Pleiades is the nearest objected in the Messier catalog to the Earth as it is only 444 light-years away. It contains over 1000 stars with a total mass of around 800 solar masses.



1 Ari

RA: 27.53° | 1h 50.09' — DEC: 22.28° | 22° 17'

Magnitude: 6.2 | 7.2

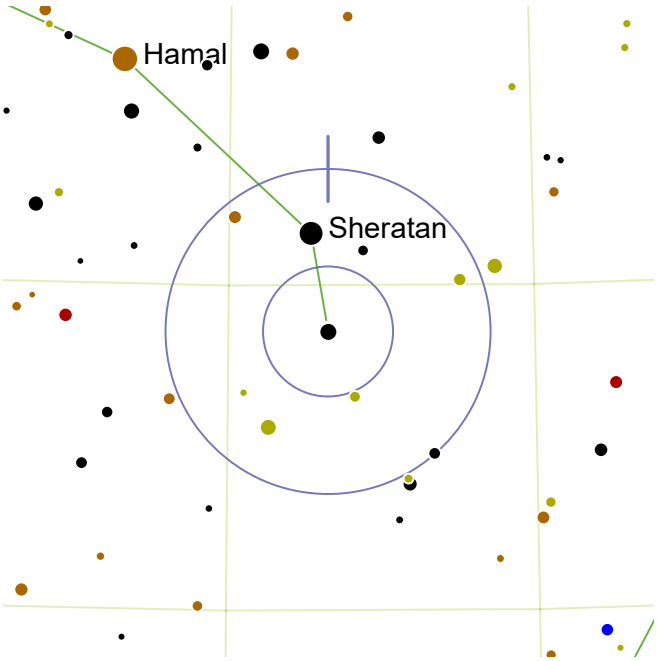
Separation: 2.8"

Position Angle: 166°

SAO 74966 | HIP 8544 | GDR2 357332864

A close pair with a brighter yellow primary and blue secondary.

The secondary is sufficiently bright to fully appreciate its color in smaller telescopes.



Gamma Ari

RA: 28.38° | 1h 53.5' — DEC: 19.3° | 19° 18'

Magnitude: 4.8 | 4.8

Separation: 7.8"

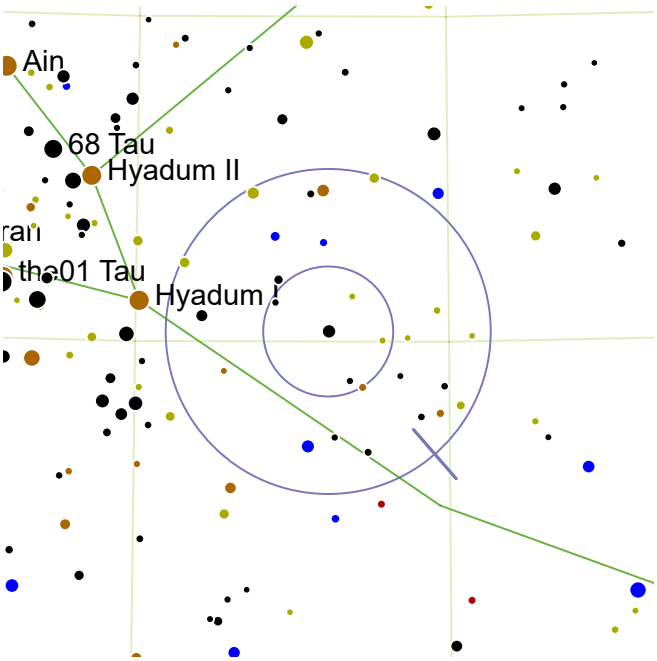
Position Angle: 0°

SAO 92681 | HIP 8832 | GDR2 367308544

An equal pair of icy blue stars with close separation.

The faint galaxy NGC 772 lies 1.5 degrees SEE of Gamma Ari in the finder view.

Robert Hooke discovered this double in 1664. Hooke is most famous for his microscope work, but made significant contributions in physics, geology, architecture and paleontology, as well as astronomy.



Struve 495

RA: 61.93° | 4h 7.69' — DEC: 15.17° | 15° 10'

Magnitude: 6.0 | 8.8

Separation: 3.8"

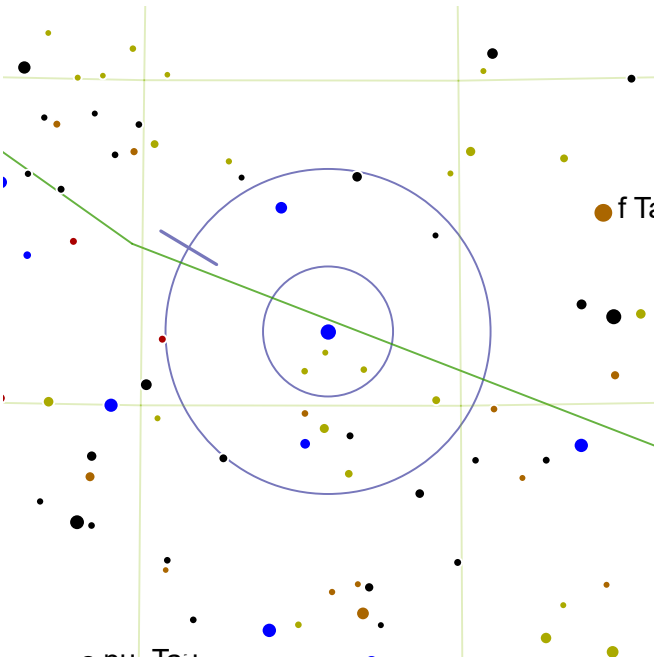
Position Angle: 221°

SAO 93775 | HIP 19261 | GDR2 521351552

A close pair of yellow stars. The primary is almost three magnitudes brighter than the secondary, meaning it is roughly 15 times brighter.

One and a half finder circles west of Aldebaran.

This binary lies 5 degrees to the west of the Hyades, the nearest star cluster to the Earth, only 153 light-years distant.



30 Tau

RA: 57.08° | 3h 48.3' — DEC: 11.15° | 11° 9'

Magnitude: 5.1 | 10.2

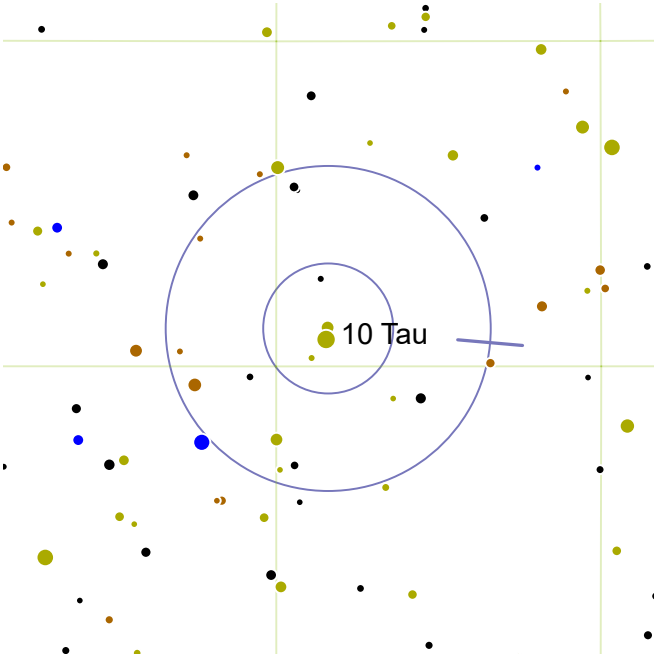
Separation: 9"

Position Angle: 59°

SAO 93611 | HIP 17771 | GDR2 767519232

An unusual blue-red color combination, with reasonable separation, but the faint red companion needs a larger telescope to bring out its color.

One finder circle NEE from magnitude 3.75 ksi Tau. One finder circle NEE from magnitude 3.8 omi Tau.



Struve 422

RA: 54.2° | 3h 36.8' — DEC: 0.58° | 0° 35'

Magnitude: 5.9 | 8.8

Separation: 6.6"

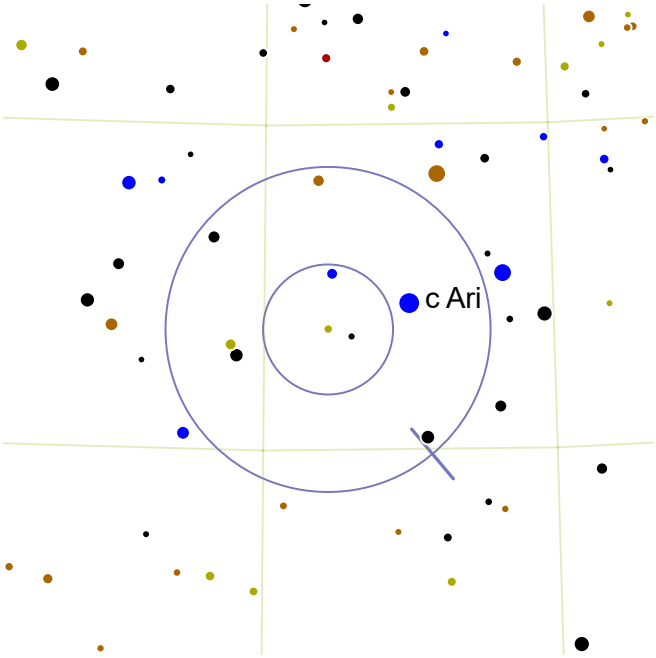
Position Angle: 265°

SAO 111291 | HIP 16846 | GDR2 92671872384

A bright yellow primary close to a relatively faint orange companion.

Start at magnitude 2.5 Alpha Ceti (Menkar) and move two and a bit finder circles SEE. Struve 422 lies a fifth of a degree north of the slightly brighter 10 Taurus.

The system is an RS Cvn-type variable system, where an evolved G-class star with a spectroscopic companion has significant starspots that rotate in and out of view.



Struve 326

RA: 43.9° | 2h 55.59' — DEC: 26.87° | 26° 52'

Magnitude: 7.6 | 9.8

Separation: 5.9"

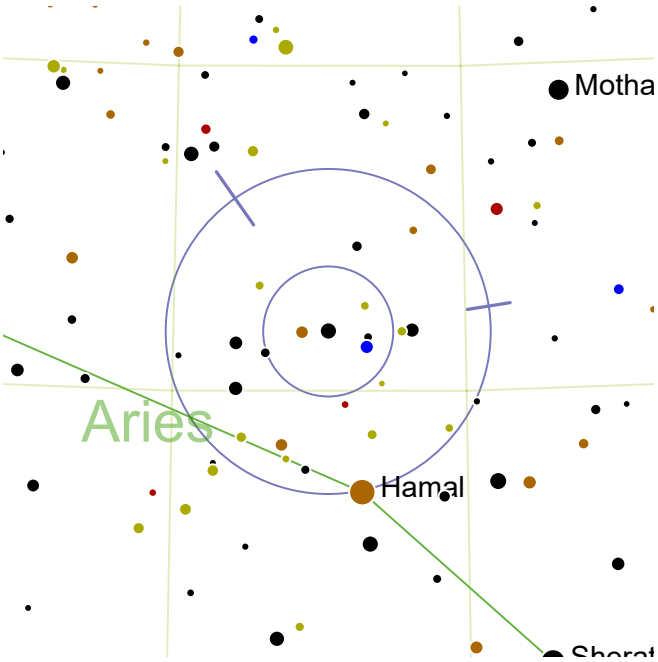
Position Angle: 220°

SAO 75644 | HIP 13642

A faint, close orange-red pair.

Two and a half finder circles east and slightly north of magnitude 2.0 Hamal.

This system is very close (only 76 light-years from us), consisting of an orange subgiant and a relatively bright red dwarf.



14 Ari

RA: 32.35° | 2h 9.4' — DEC: 25.93° | 25° 56'

Magnitude: 5.0 | 8.0 | 8.0

Separation: 93.1" | 106"

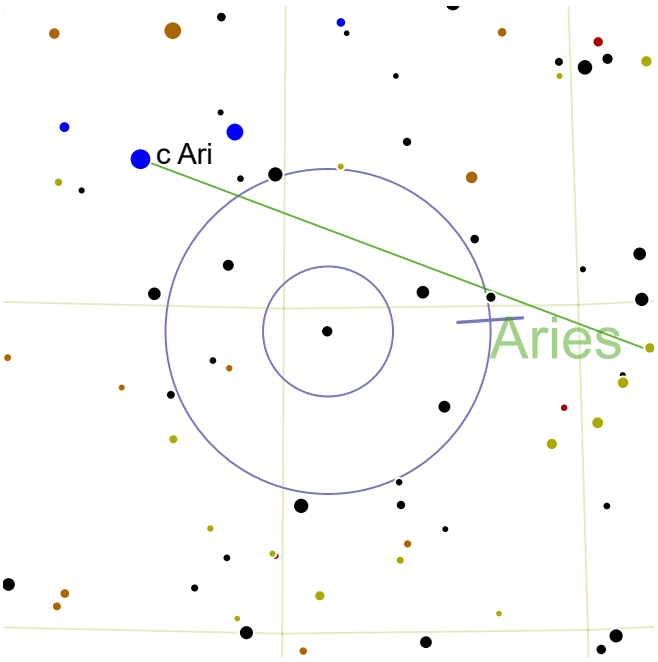
Position Angle: 35° | 279°

SAO 75171 | HIP 10053 | GDR2 2601324672

A very wide triangle of three stars; the bright primary is yellowing and the other two components are significantly fainter.

Half a finder circle NNE from magnitude 2.23 Hamal. One finder circle SE from magnitude 3.58 Mothallah.

This is a gravitationally bound, physical double, 289 light-years from the Earth.



30 Ari

RA: 39.25° | 2h 37.0' — DEC: 24.65° | 24° 39'

Magnitude: 6.6 | 7.4

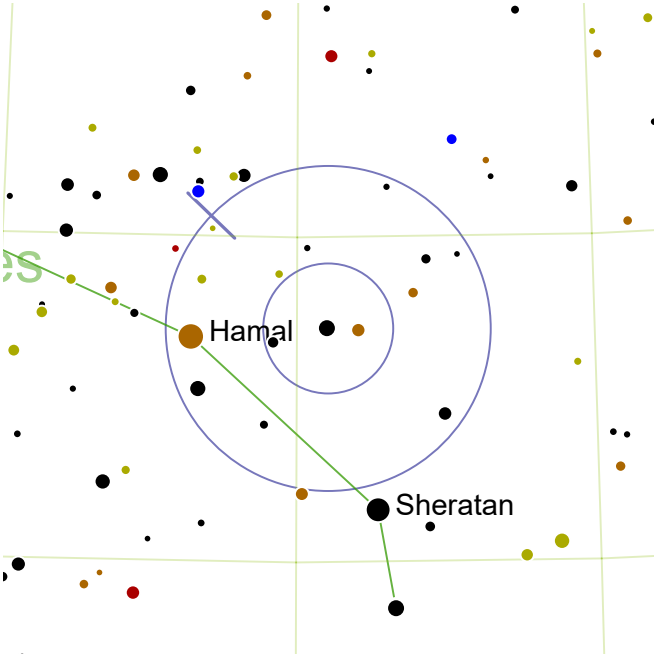
Separation: 38.6"

Position Angle: 274°

SAO 75471 | HIP 12189 | GDR2 9030066560

Two bright yellow stars, almost equally matched and widely separated.

One and a half finders east and slightly north of Hamal.



Lambda Ari

RA: 29.48° | 1h 57.9' — DEC: 23.6° | 23° 36'

Magnitude: 4.9 | 7.7

Separation: 37"

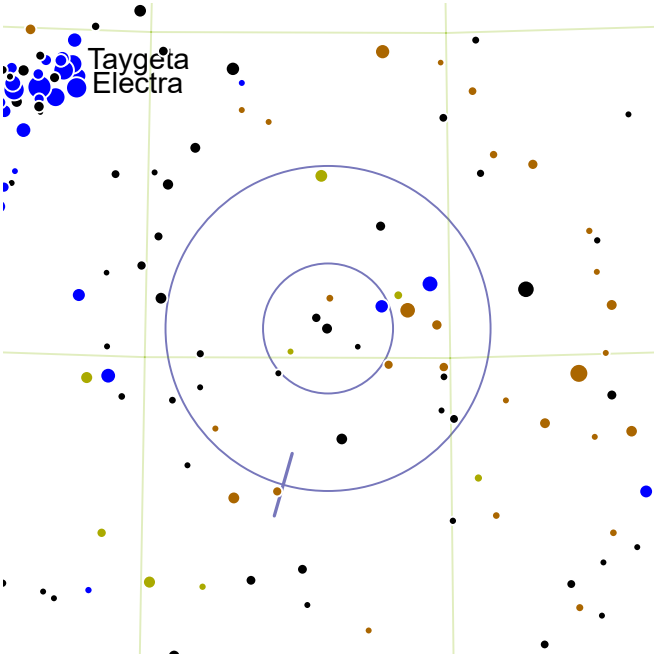
Position Angle: 46°

SAO 75051 | HIP 9153 | GDR2 7609412352

A bright, wide pair with good colors: the A component is yellow and the B component is blue.

Center Hamal in the finder; Lambda Ari is in the western edge of the finder.

"Lambda" is the traditional English spelling, but the official Unicode spelling for the character is "lamda", following representations during drafting of the Unicode standard by the Greek national body.



Struve 394

RA: 52.0° | 3h 28.0' — DEC: 20.47° | 20° 28'

Magnitude: 7.1 | 8.2

Separation: 6.8"

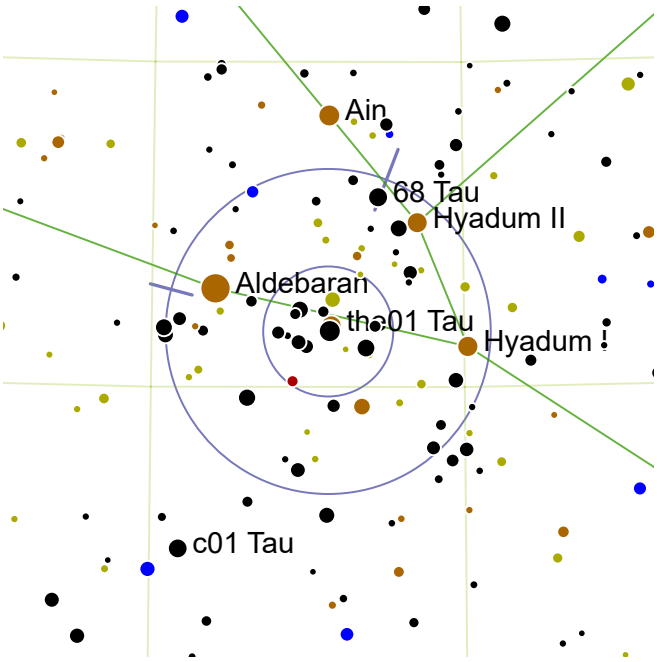
Position Angle: 164°

SAO 75940 | HIP 16143 | GDR2 004372224

A close white-yellow pairing.

Center the Pleiades, and move one and a half finder circles south west.

The finder circle shows many brilliant stars completely overwhelming little Struve 394.



Theta Tau

RA: 67.18° | 4h 28.69' — DEC: 15.87° | 15° 52'

Magnitude: 3.4 | 3.9 | 12.0

Separation: 347.9" | 268.3"

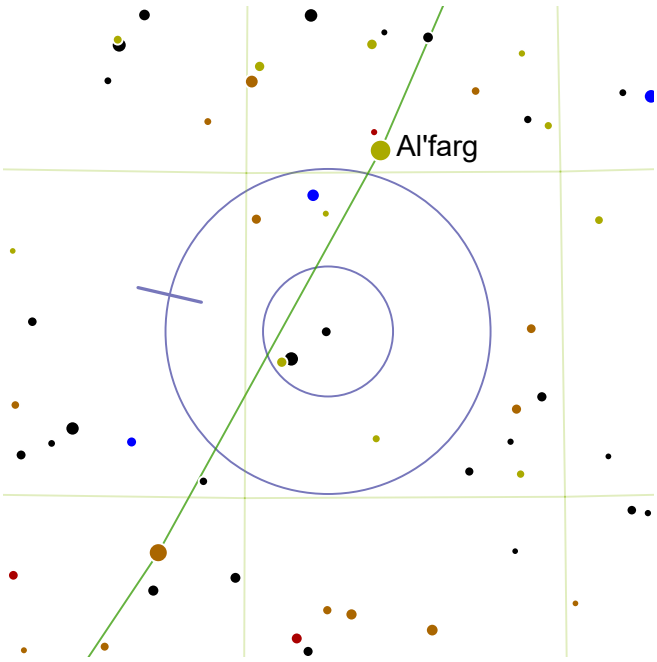
Position Angle: 339° | 75°

SAO 93957 | HIP 20894 | GDR2 19987686144

A balanced blue-yellow pair of stars, with a barely visible distant companion.

Theta Tau is a bright star in Taurus. One and a half degrees E from magnitude 3.86 Hyadum I.

Composed of Theta2 and Theta1 Tauri, with Theta2 being brighter, this system is in the heart of the Hyades cluster, the closest open cluster to the Sun. Theta1 and Theta2 are both impossibly tight doubles themselves.



100 Psc

RA: 23.7° | 1h 34.79' — DEC: 12.57° | 12° 34'

Magnitude: 7.3 | 8.3

Separation: 15.7"

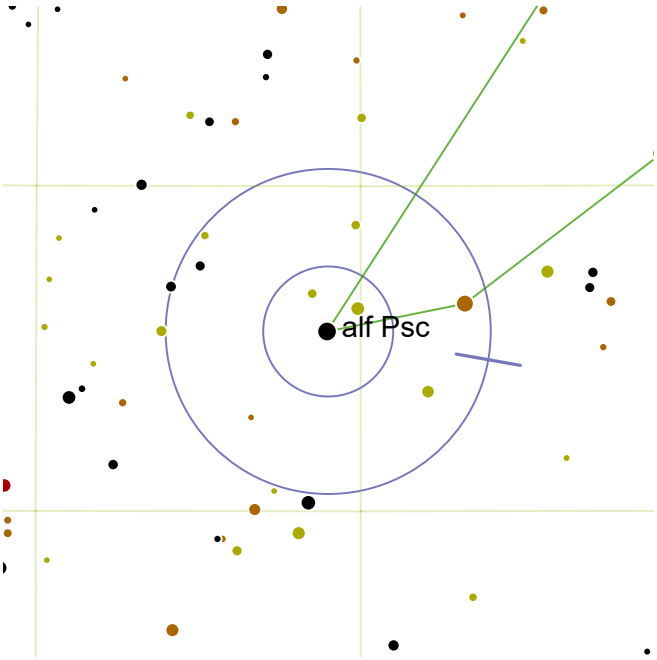
Position Angle: 77°

SAO 92521 | HIP 7364 | GDR2 88972205696

A comfortably separated pair of white stars.

From magnitude 2.6 Sheratan in Aries, hop two finder circles south west.

With this double centered, faint galaxy NGC 660 lies on the north-eastern edge of the finder circle.



Alrisha

RA: 30.5° | 2h 2.0' — DEC: 2.77° | 2° 46'

Magnitude: 4.1 | 5.2

Separation: 1.8"

Position Angle: 260°

SAO 110291 | HIP 9487 | GDR2 2517584007848935808

An extremely tight pair of bright, white stars.

Aside from the infrequently visible Mira, no bright star is near Alrisha. Look for a fourth magnitude star 14 degrees west of magnitude 2.5 Menkar.

Although classified as Alpha Piscium, Alrisha (or Alrescha) is only the third brightest star in the dim constellation of Pisces.

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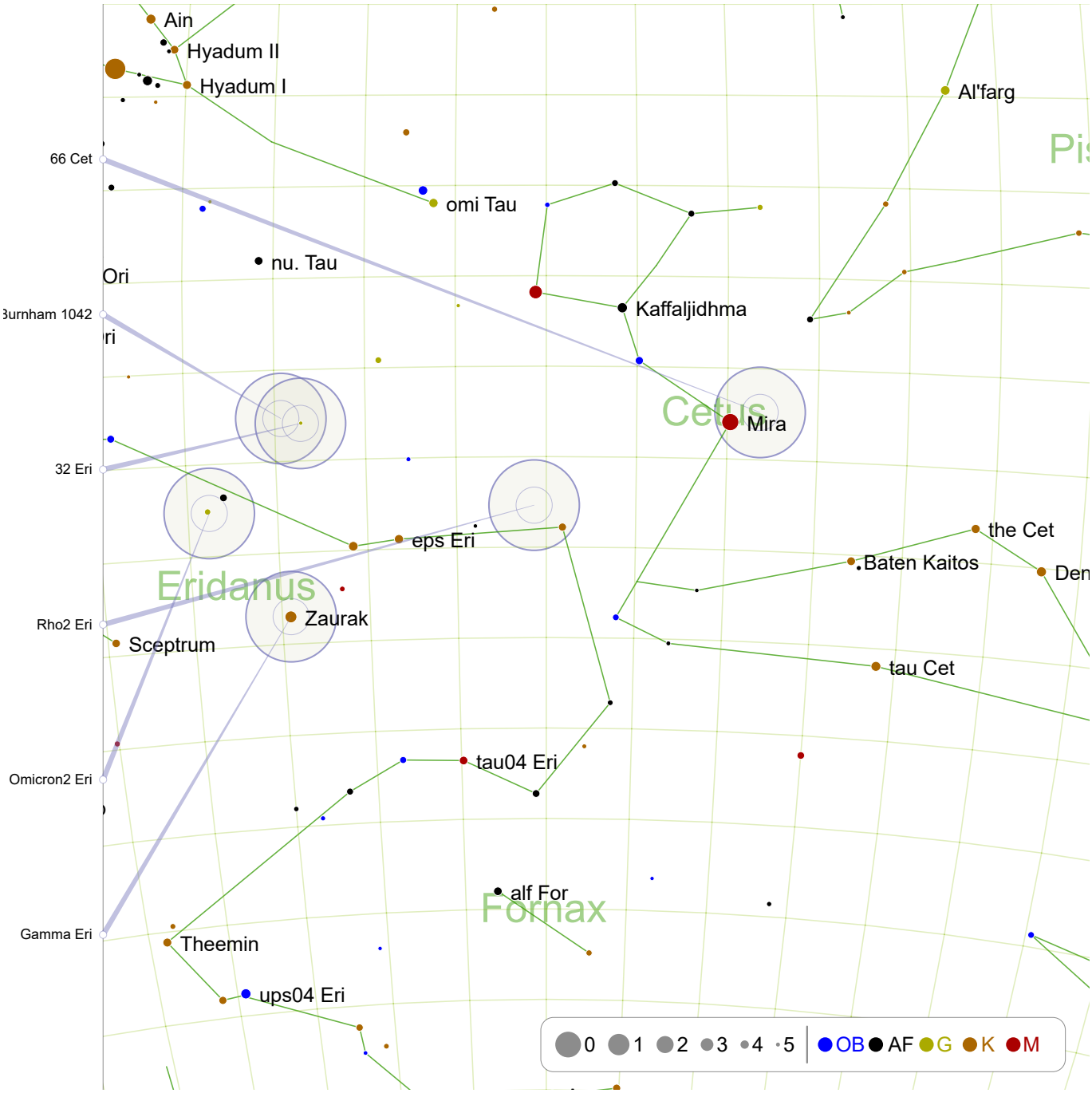
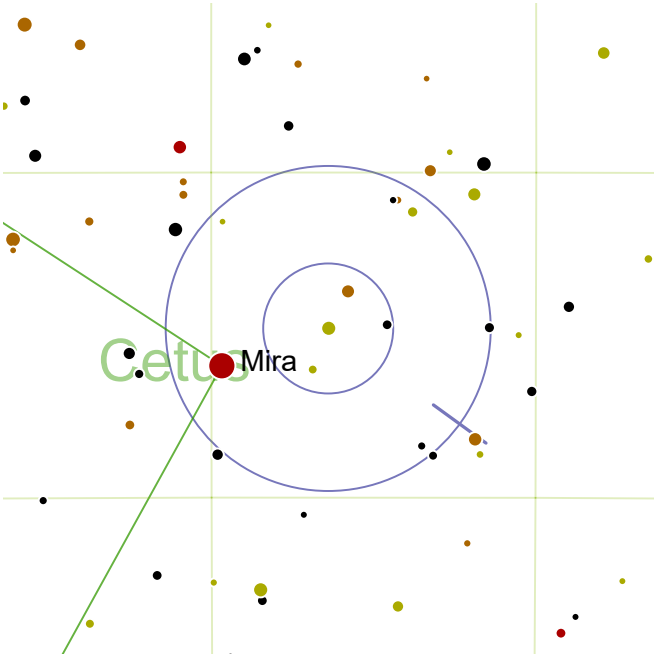
Late Autumn - Southern Horizon



66 Cet: page 92 Burnham 1042: page 92 32 Eri: page 93 Rho2 Eri: page 93
Omicron2 Eri: page 94 Gamma Eri: page 94



66 Cet

RA: 33.2° | 2h 12.8' — DEC: -2.4° | -2° 23'

Magnitude: 5.7 | 7.5

Separation: 16.5"

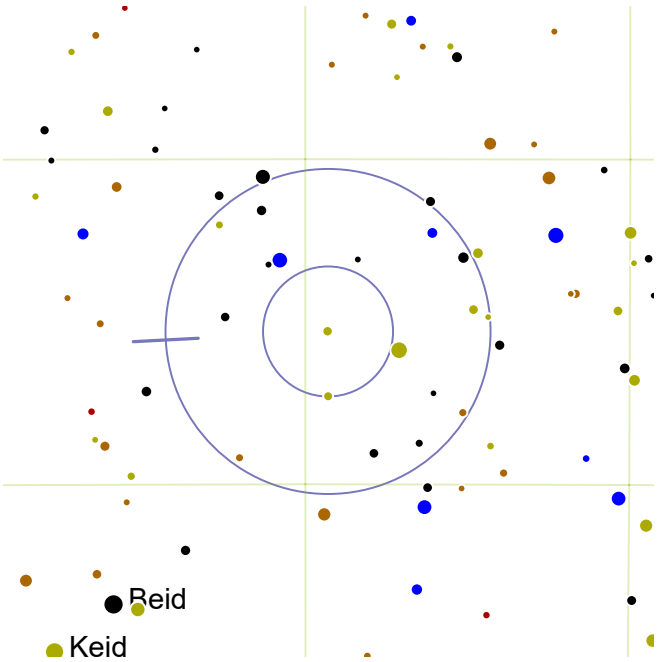
Position Angle: 234°

SAO 129752 | HIP 10305 | TY2 4690-01110-1

A comfortably separated yellow and blue pair.

The primary star is a shines brilliantly in the finder, while the secondary is also relatively bright and only appears dim in contrast to the primary.

Nearby Mira is a wildly variable star, varying between magnitude 3.0 and 10.1 over a period of 332 days. Sometimes Mira peaks at magnitude 2.0 but this is rare. The next peaks in visual luminosity are at 2021-08-18, 2022-07-16, and 2023-06-13.



Burnham 1042

RA: 59.65° | 3h 58.59' — DEC: -2.65° | -2° 38'

Magnitude: 7.5 | 8.5

Separation: 56"

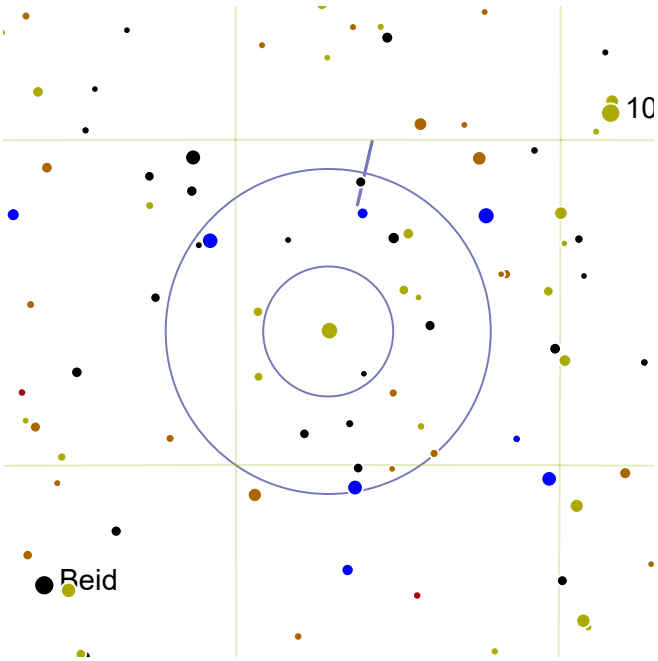
Position Angle: 93°

SAO 130858 | HIP 18583 | GDR2 3253028059856131456

A very wide and unequal pairing. The primary is yellow, while the secondary is a very faint, balanced double (1.3", p.a. 40°).

One and a half finder circles NNE from magnitude 3.72 Rana. One and a half finder circles NE from magnitude 3.81 eps Eri.

The Burnham Double Star Catalog was a comprehensive collection of all known double stars within 121° of the celestial North Pole. It was finally published in 1906, but Burnham had been attempting to publish it since 1870.



32 Eri

RA: 58.58° | 3h 54.3' — DEC: -2.95° | -2° 56'

Magnitude: 4.8 | 6.1

Separation: 6.8"

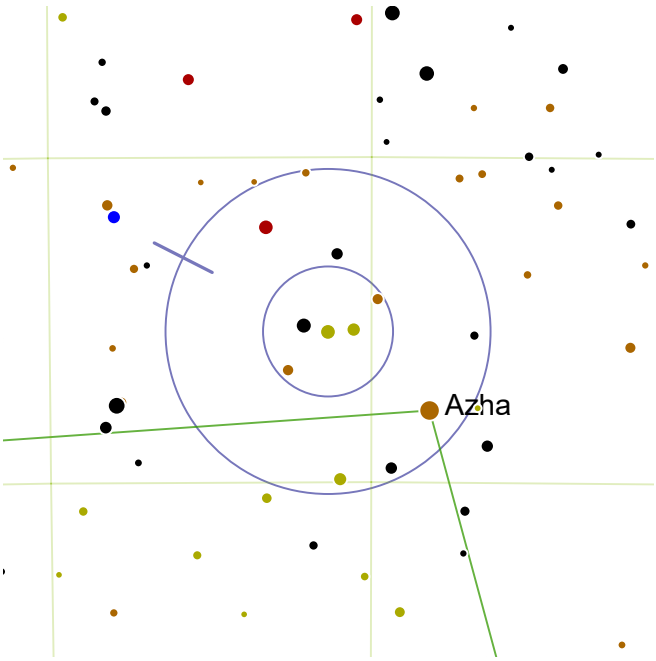
Position Angle: 347°

SAO 130806 | HIP 18255 | GDR2 73003772032

A close double with bright components; yellow and white.

One finder circle NNE from magnitude 3.72 Rana. One and a half finder circles NE from magnitude 3.81 eps Eri.

This double offers a very strong color contrast, because of the intrinsic color of the stars and their apparent brilliance.



Rho2 Eri

RA: 45.68° | 3h 2.69' — DEC: -7.68° | -7° 40'

Magnitude: 5.3 | 8.9

Separation: 1.4"

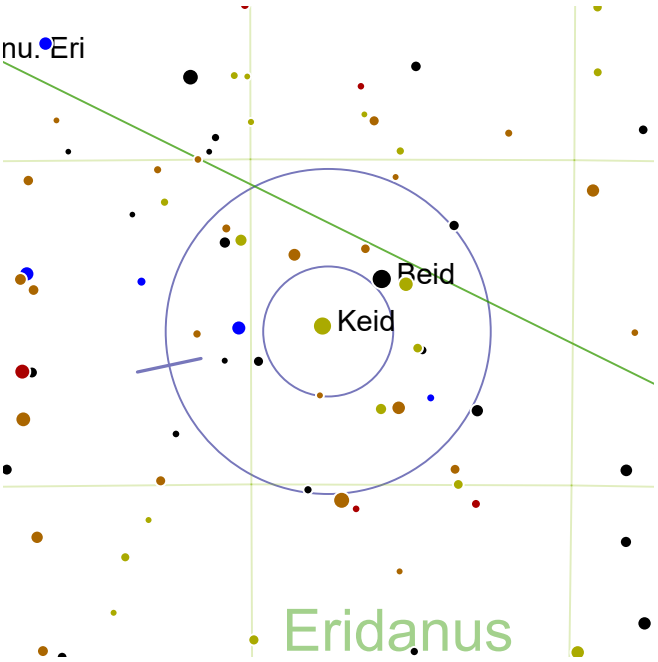
Position Angle: 63°

SAO 130254 | HIP 14168

A bright yellow-orange star with an extremely close, faint companion.

One and a half finder circles NWW from magnitude 3.81 eps Eri.

Rho2 is the central star of asterism of three equally bright stars in a 1° long line, namely Rho1, Rho2 and Rho3 Eridani.



Omicron2 Eri

RA: 63.8° | 4h 15.19' — DEC: -7.65° | -7° 38'

Magnitude: 4.4 | 9.3

Separation: 82.7"

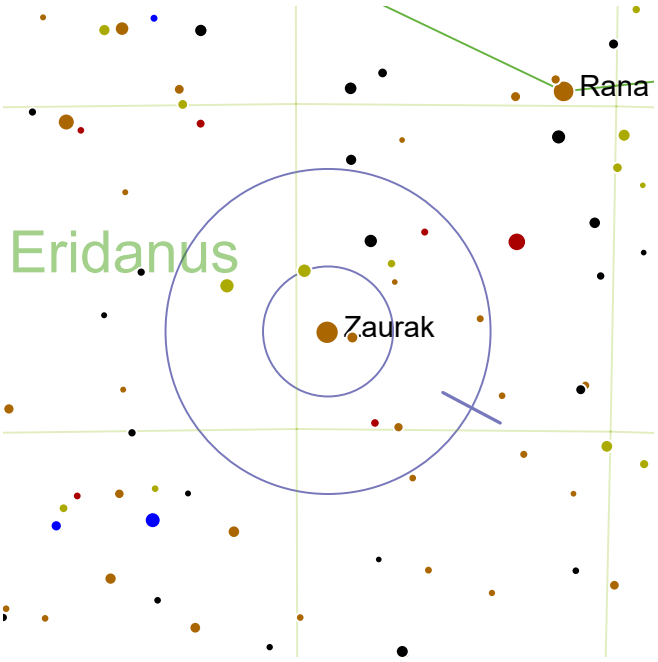
Position Angle: 102°

SAO 131063 | HIP 19849

A brilliant yellow-orange primary distantly separated from a dim white companion.

One finder circle NE from magnitude 3.19 Zaurak. One and a half finder circles NEE from magnitude 3.72 Rana.

The secondary component is a white dwarf (spectral class DA3). The primary is is an orange dwarf, and only shines so brightly in our skies as the system lies just 16 light-years from Earth.



Gamma Eri

RA: 59.5° | 3h 58.0' — DEC: -13.5° | -13° 29'

Magnitude: 3.5 | 11

Separation: 52.8"

Position Angle: 242°

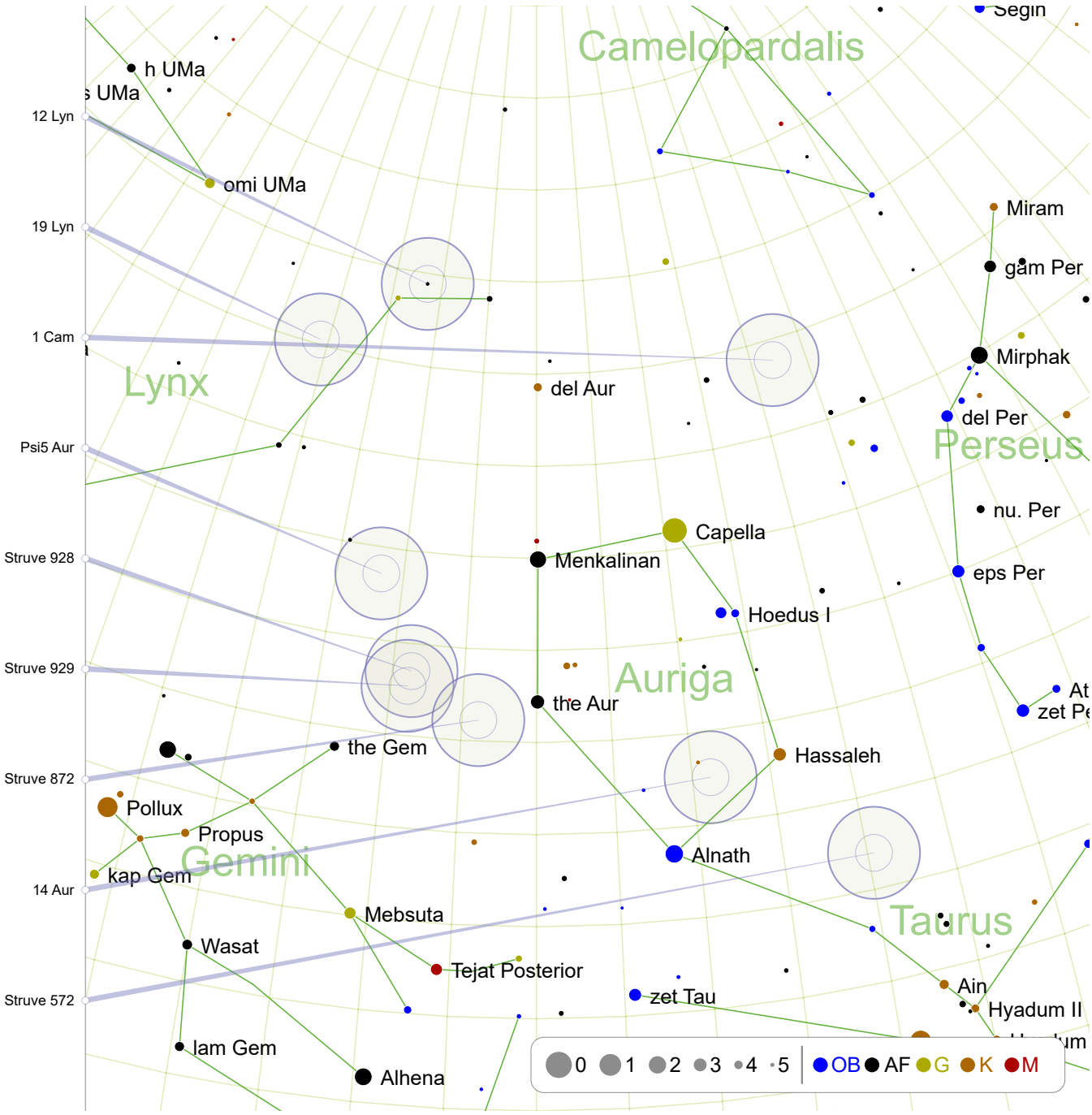
SAO 149283 | HIP 18543

A brilliant red primary widely separated from a very dim companion.

Gamma Eri is a bright star in Eridanus. One finder circle SE from magnitude 3.72 Rana.

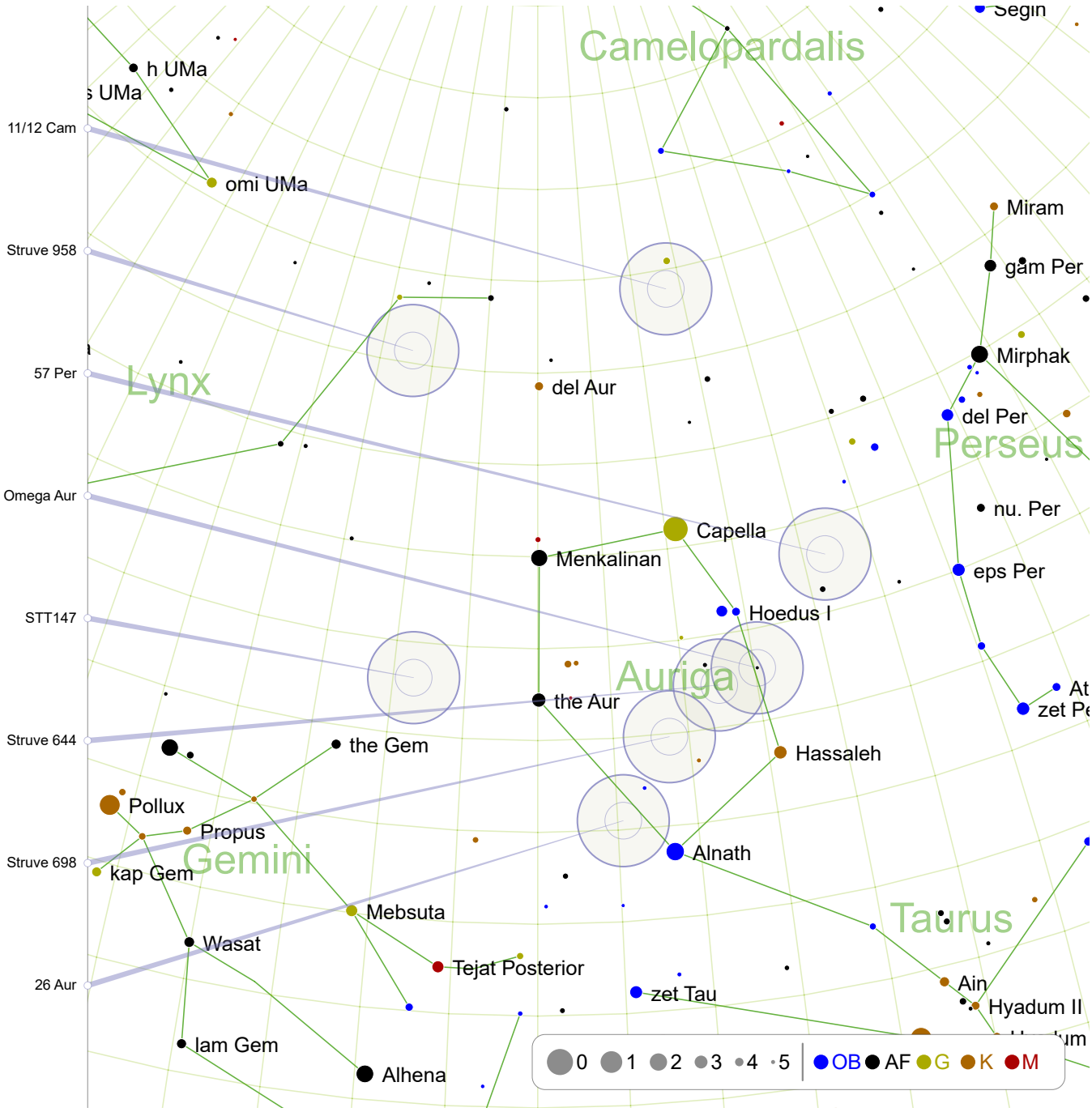
This gravitationally bound system consists of a red giant and a very faint companion, lying 203 light-years from us. The primary bears the proper name Zaurak.

Early Winter - Looking North (1)

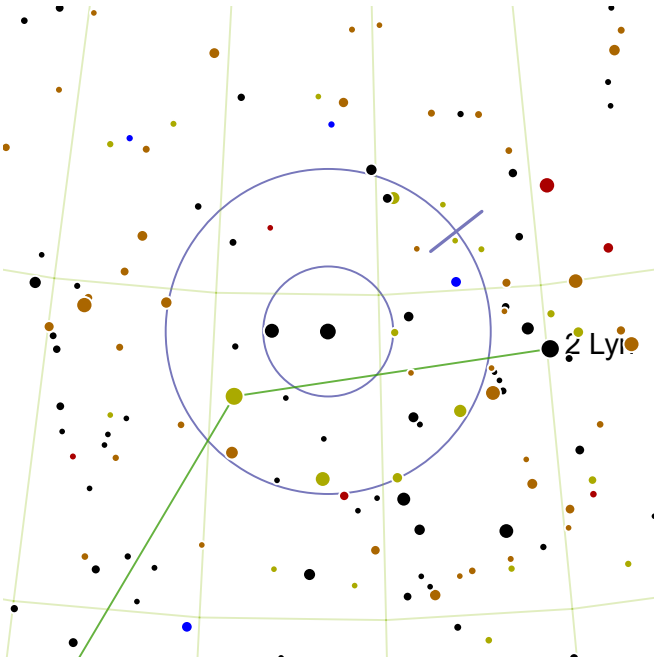


12 Lyn: page 97
19 Lyn: page 97
1 Cam: page 98
Psi5 Aur: page 98
Struve 928: page 99
Struve 929: page 99
Struve 872: page 100
14 Aur: page 100
Struve 572: page 101

Early Winter - Looking North (2)



11/12 Cam: page 101
Struve 958: page 102
57 Per: page 102
Omega Aur: page 103
STT147: page 103
Struve 644: page 104
Struve 698: page 104
26 Aur: page 105



12 Lyn

RA: 101.55° | 6h 46.19' — DEC: 59.45° | 59° 27'

Magnitude: 5.4 | 7.3

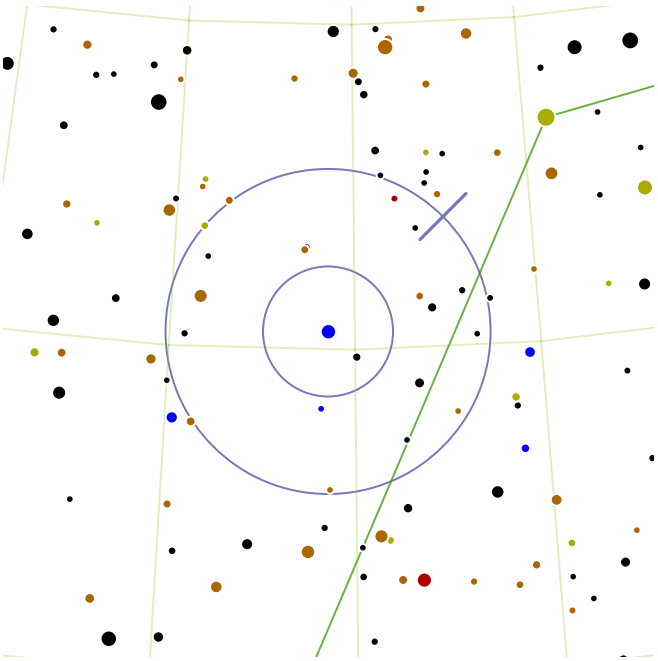
Separation: 8.7"

Position Angle: 308°

SAO 25939 | HIP 32438 | GDR2 71970061184

A close pair with a bright yellow primary and a reasonably bright blue companion.

Hard to find as it is out in the void away from any good signposts. Draw a line from Alnath through Menkalinan and double it out to the north. This will put you in the neighborhood of 12 Lyncis and Struve 958.



19 Lyn

RA: 110.73° | 7h 22.89' — DEC: 55.28° | 55° 17'

Magnitude: 5.6 | 6.5

Separation: 14.8"

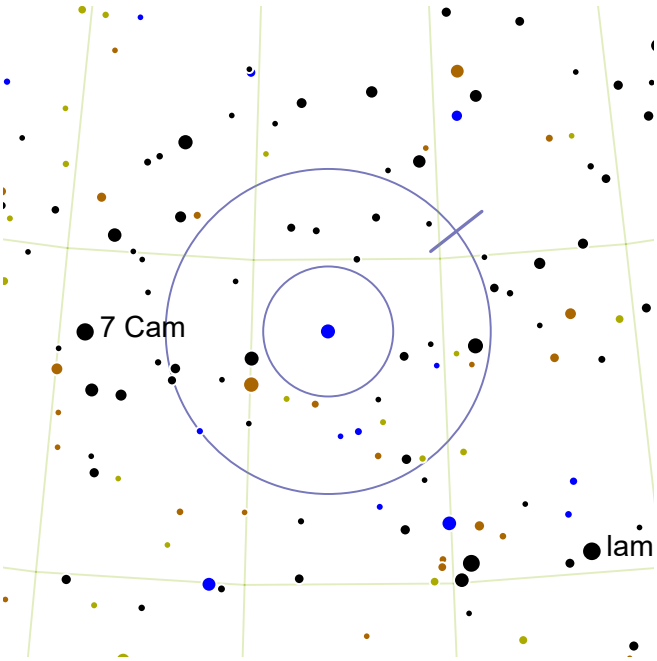
Position Angle: 315°

SAO 26312 | HIP 35785 | GDR2 8587778432

An easily separated and reasonably balanced yellow-blue pairing.

Draw a line from Hassaleh (Iota Aurigae) through Menkalinan and double it out to the north east. This puts you in the vicinity of 19 Lyncis.

This system of two hot B-class stars is about 680 light-years away. The primary is 166 times more luminous than the Sun.



1 Cam

RA: 68.0° | 4h 32.0' — DEC: 53.92° | 53° 55'

Magnitude: 5.7 | 6.8

Separation: 10.3"

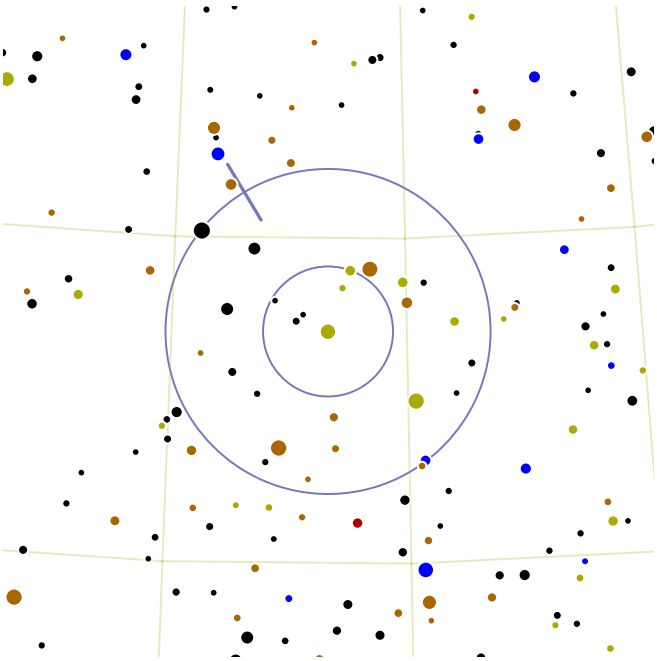
Position Angle: 308°

SAO 24672 | HIP 21148 | GDR2 1446188288

A reasonably balanced and separated white-blue pair.

Two finder circles north east of Delta Persei.

Position 1 Camelopardalis on the north-eastern edge of the finder and a bright pair of clusters will come into view on the opposite edge: NGC 1528 and NGC 1545. The clusters are each around the size of the full Moon and separated by 1.5 degrees, so the cluster pair make a nice sight at very low magnification.



Psi5 Aur

RA: 101.68° | 6h 46.69' — DEC: 43.58° | 43° 35'

Magnitude: 5.3 | 8.3

Separation: 36.2"

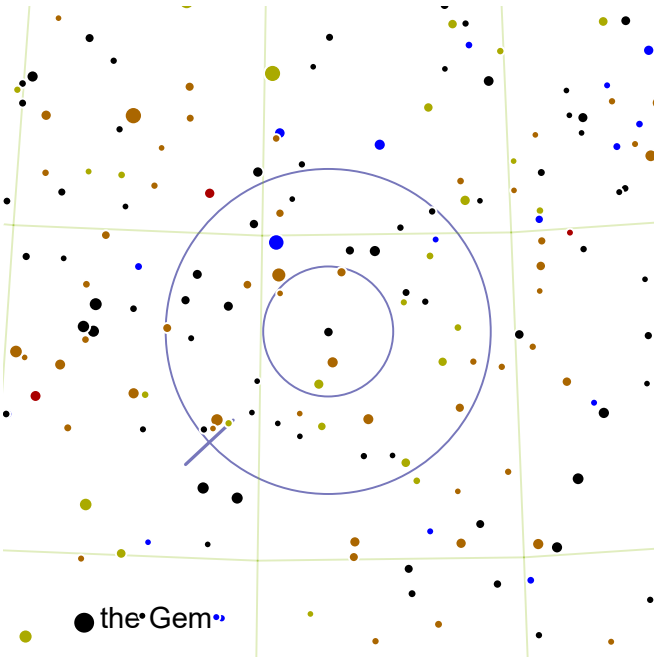
Position Angle: 31°

SAO 41330 | HIP 32480 | GDR2 4452337792

A very wide yellow-blue duo. The primary is very bright and strongly colored.

Draw a line from Capella through Menkalinan, and extend it east an equal distance.

With Psi 5 Aurigae centered in the finder, bright open cluster NGC 2281 is is just on the southern edge of the finder.



Struve 928

RA: 98.68° | 6h 34.69' — DEC: 38.53° | 38° 32'

Magnitude: 7.6 | 8.2

Separation: 3.5"

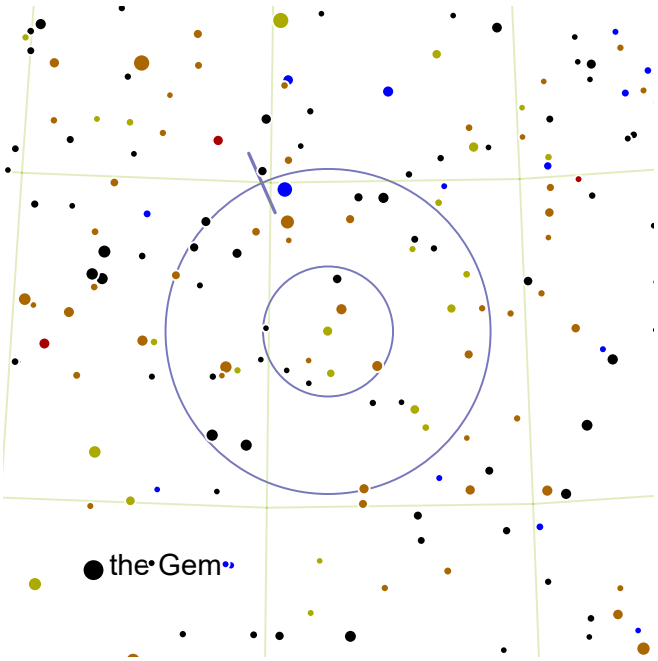
Position Angle: 133°

SAO 59239 | HIP 31373 | GDR2 0770768640

A very close pair of white stars.

Two finder circles south east of magnitude 1.9 Menkalinan in Auriga.

The variable UU Aurigae (magnitude 5.4) is 0.3 degrees to the east of this star. Open cluster NGC 2281 is visible in the north-eastern quadrant if you place Struve 928 on the south-western edge of the finder.



Struve 929

RA: 98.85° | 6h 35.39' — DEC: 37.72° | 37° 43'

Magnitude: 7.4 | 8.4

Separation: 6.2"

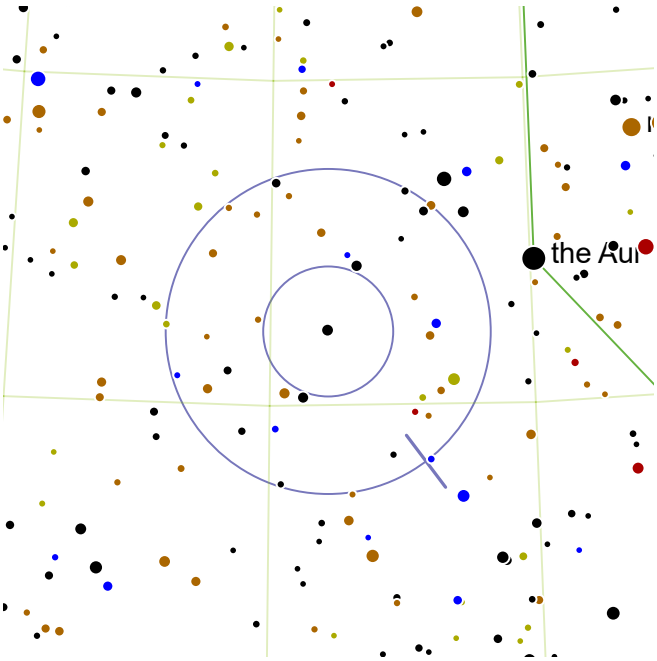
Position Angle: 24°

SAO 59259 | HIP 31454 | GDR2 6010105344

A close yellow-blue pair.

Two finder circles south east of magnitude 1.9 Menkalinan in Auriga.

The primary is 600 light-years from the Sun, but it is not clear if the secondary is gravitationally bound.



Struve 872

RA: 93.9° | 6h 15.6' — DEC: 36.15° | 36° 9'

Magnitude: 6.9 | 7.9

Separation: 11.3"

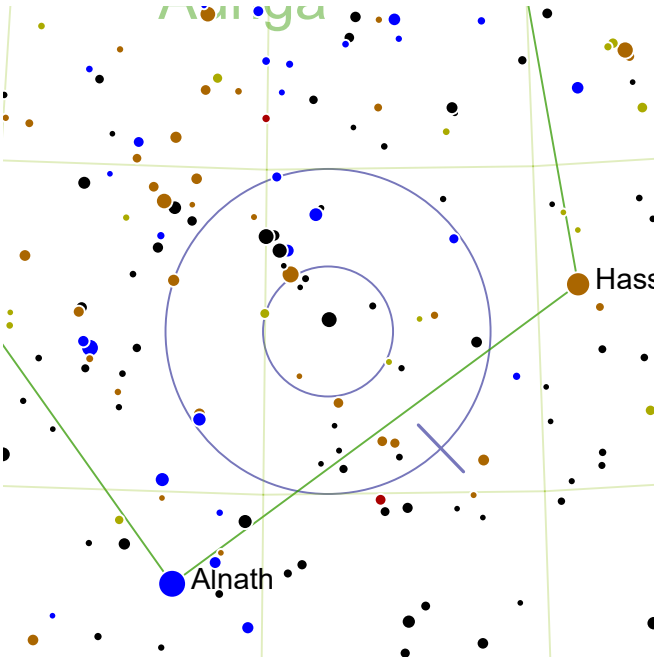
Position Angle: 217°

SAO 58905 | HIP 29725 | GDR2 11912257664

An easily separated pair of stars. Neither star is particularly bright, perhaps leading to fanciful star colors variously reported as pinkish or lilac.

Located one and a half finder circles due east from Theta Aurigae, one of the stars of the Auriga pentagon.

Theta itself is a challenging double with components separated by 4.1" and 4.6 magnitudes.



14 Aur

RA: 78.85° | 5h 15.39' — DEC: 32.52° | 32° 31'

Magnitude: 5.1 | 7.4

Separation: 14.6"

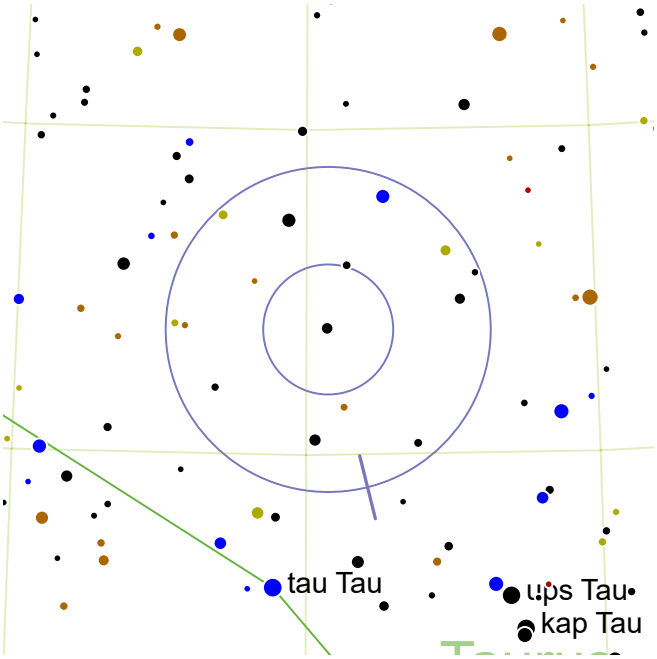
Position Angle: 224°

SAO 57799 | HIP 24504 | GDR2 8220217344

A bright yellow-blue pairing with comfortable separation.

Find 14 Aurigae one and a half finder circles north west from Alnath (the southernmost star of the Auriga pentagon).

The bright emission Flaming Star nebula is two degrees to the north of this double.



Struve 572

RA: 69.63° | 4h 38.5' — DEC: 26.93° | 26° 56'

Magnitude: 7.3 | 7.3

Separation: 4.0"

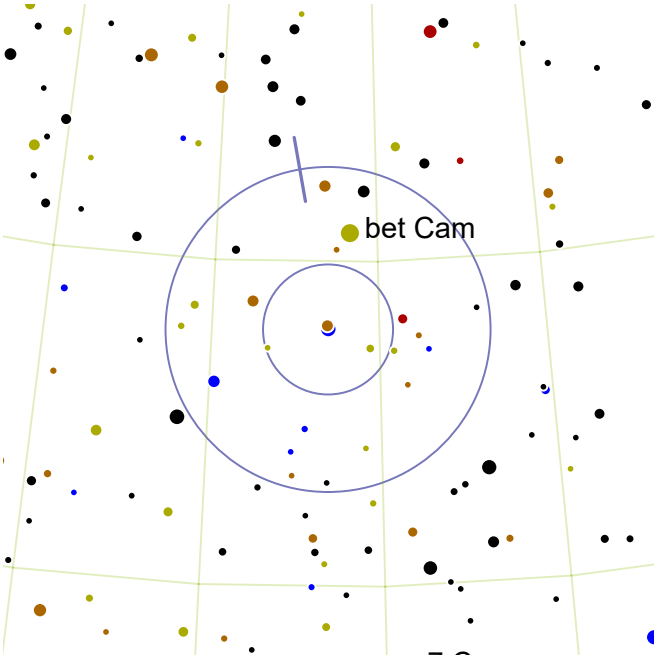
Position Angle: 194°

SAO 76682 | HIP 21619 | GDR2 6504442624

A close and equal pair of yellow stars.

Two and a half finder circles west of Elnath, the southernmost star of the Auriga polygon.

This double lies on the northern edge of the dark nebula B22, which has a span of about 2 degrees.



11/12 Cam

RA: 76.53° | 5h 6.12' — DEC: 58.97° | 58° 58'

Magnitude: 5.20 | 6.21

Separation: 178"

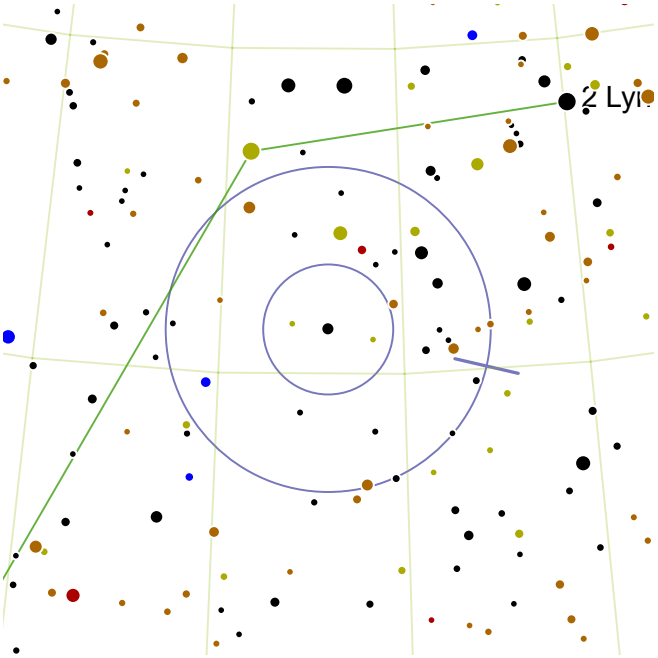
Position Angle: 10°

SAO 25001 | HIP 23734 | GDR2 9317110400

A distantly separated but strongly colored orange-blue pairing, both components being bright. 11 Cam is the blue star and 12 Cam is the orange star.

Find 11/12 Cam 1.5 degrees south of magnitude 4.00 Beta Camelopardalis. Alternately, find first magnitude Capella and move two and a half finder circles due north.

This pair are shown on the cover of this book.



Struve 958

RA: 102.05° | 6h 48.19' — DEC: 55.7° | 55° 42'

Magnitude: 6.3 | 6.3

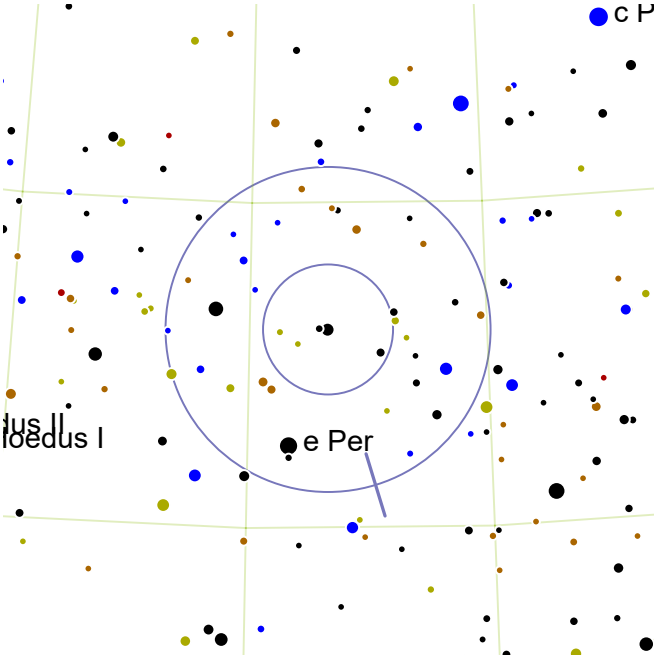
Separation: 4.8"

Position Angle: 257°

SAO 25962 | HIP 32609 | GDR2 8386708864

Two tightly bound, perfectly matched bright stars.

Hard to find as it is out in the void away from any good signposts. Draw a line from Alnath through Menkalinan and double it out to the north. This will put you in the neighborhood of 12 Lyncis and Struve 958.



57 Per

RA: 68.35° | 4h 33.39' — DEC: 43.07° | 43° 4'

Magnitude: 6.1 | 6.8

Separation: 121.4"

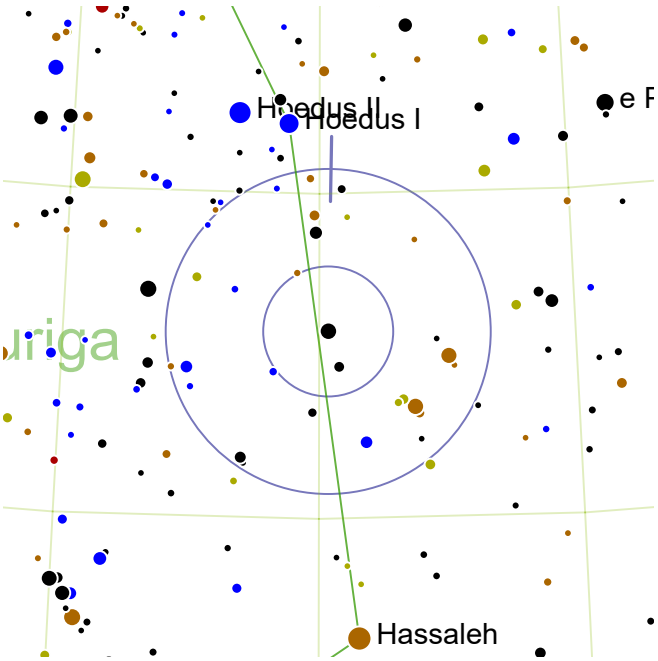
Position Angle: 197°

SAO 39604 | HIP 21242

A distantly separated pair of moderately bright, balanced, white stars.

One finder circle NWW from magnitude 3.94 Hoedus I. One finder circle NWW from magnitude 3.94 32069.

This pair is very wide nd best viewed in the finder scope or binoculars. Open cluster NGC 1582 lies a degree to the north.



Omega Aur

RA: 74.83° | 4h 59.3' — DEC: 37.88° | 37° 53'

Magnitude: 5.0 | 8.0

Separation: 5.4"

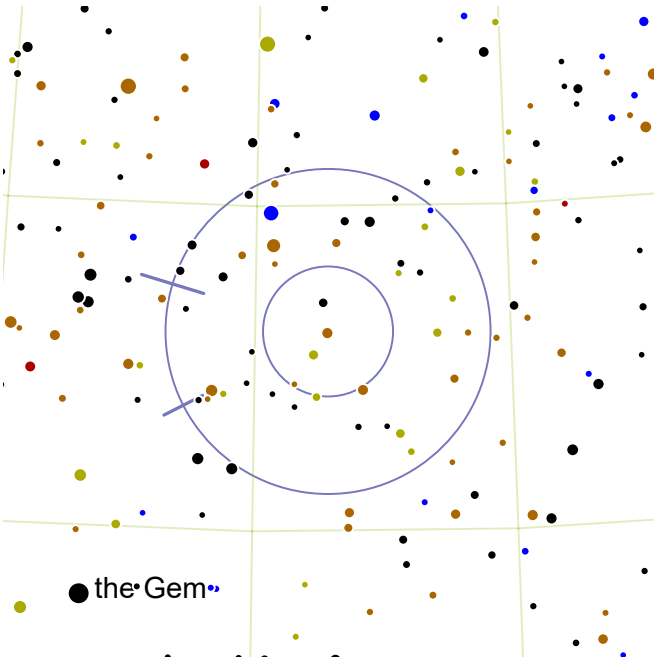
Position Angle: 359°

SAO 57548 | HIP 23179 | GDR2 3956317312

A yellow primary with a closely bound faint orange companion.

Follow the border of the Auriga pentagon south from Capella; Omega Aurigae is located two thirds of the way to the next corner.

Open star cluster NGC 1778 lies two degrees to the south east of this double.



STT147

RA: 98.58° | 6h 34.3' — DEC: 38.08° | 38° 5'

Magnitude: 6.6 | 10.0 | 10.6

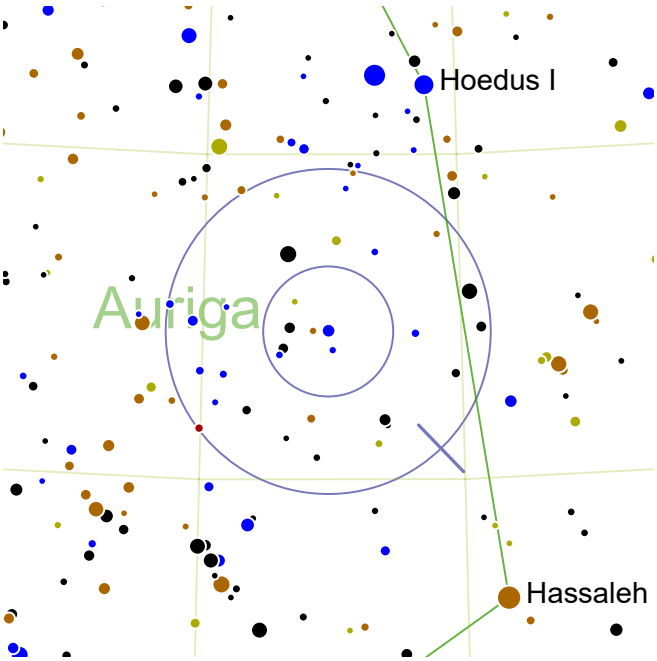
Separation: 43" | 46"

Position Angle: 73° | 117°

SAO 59230 | HIP 31340 | GDR2 4998228864

A moderately bright yellow primary with two small blue companions, forming a widely separated triangle.

Located two and a half finder circles east of Theta Aurigae, this double is harder to spot.



Struve 644

RA: 77.58° | 5h 10.3' — DEC: 37.3° | 37° 18'

Magnitude: 6.8 | 7.0

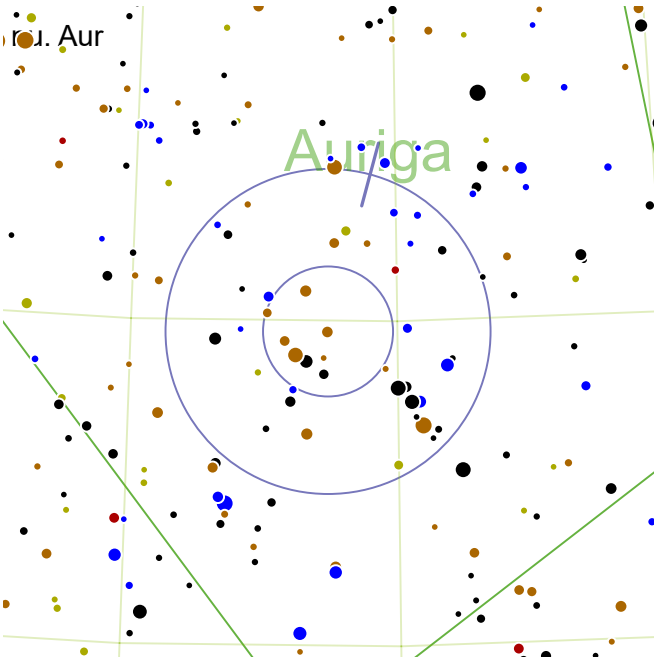
Separation: 1.6"

Position Angle: 224°

SAO 57704 | GDR2 9467977984

Struve 644 is a real challenge with the two stars separated by much less than 2". The components are equally bright and contrasting yellow and blue.

First find Omega Aurigae: Struve 644 lies at the eastern edge of the finder circle.



Struve 698

RA: 81.3° | 5h 25.19' — DEC: 34.85° | 34° 51'

Magnitude: 6.6 | 8.7

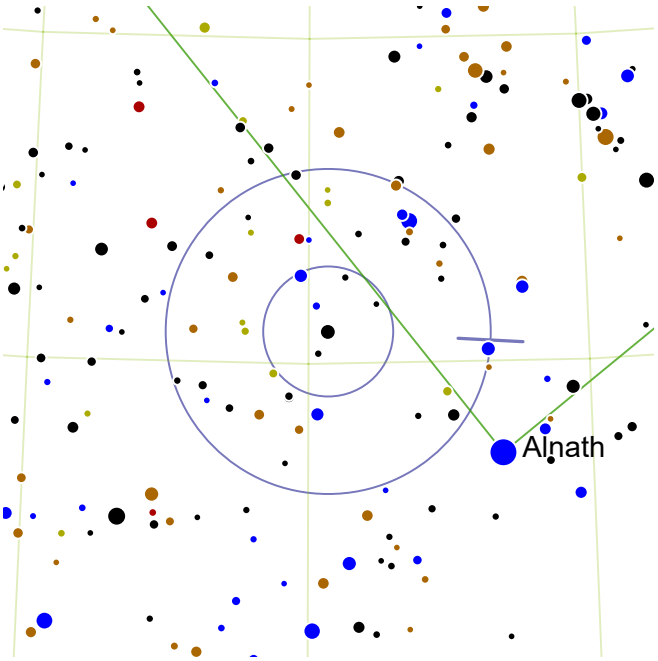
Separation: 31.2"

Position Angle: 345°

SAO 57999 | HIP 25343 | GDR2 4103451264

A wide orange-blue pair. The two stars are separated in brightness by almost exactly two magnitudes.

Struve 698 lies two finder circles north of Alnath. If you first locate the brighter 14 Aurigae and then move the finder north-east, the both 14 Aurigae and Struve 698 will be visible in opposite quadrants of the finder.



26 Aur

RA: 84.65° | 5h 38.6' — DEC: 30.5° | 30° 30'

Magnitude: 6.0 | 8.0

Separation: 12.4"

Position Angle: 267°

SAO 58280 | HIP 26536 | GDR2 41986921216

A bright yellow primary easily separated from a significantly fainter blue companion.

Another good double in the vicinity of Alnath, find 26 Aurigae one and a half finder circles to the north-east of Alnath.

Wonderful open cluster Messier 37 lies just three degrees to the north-east.

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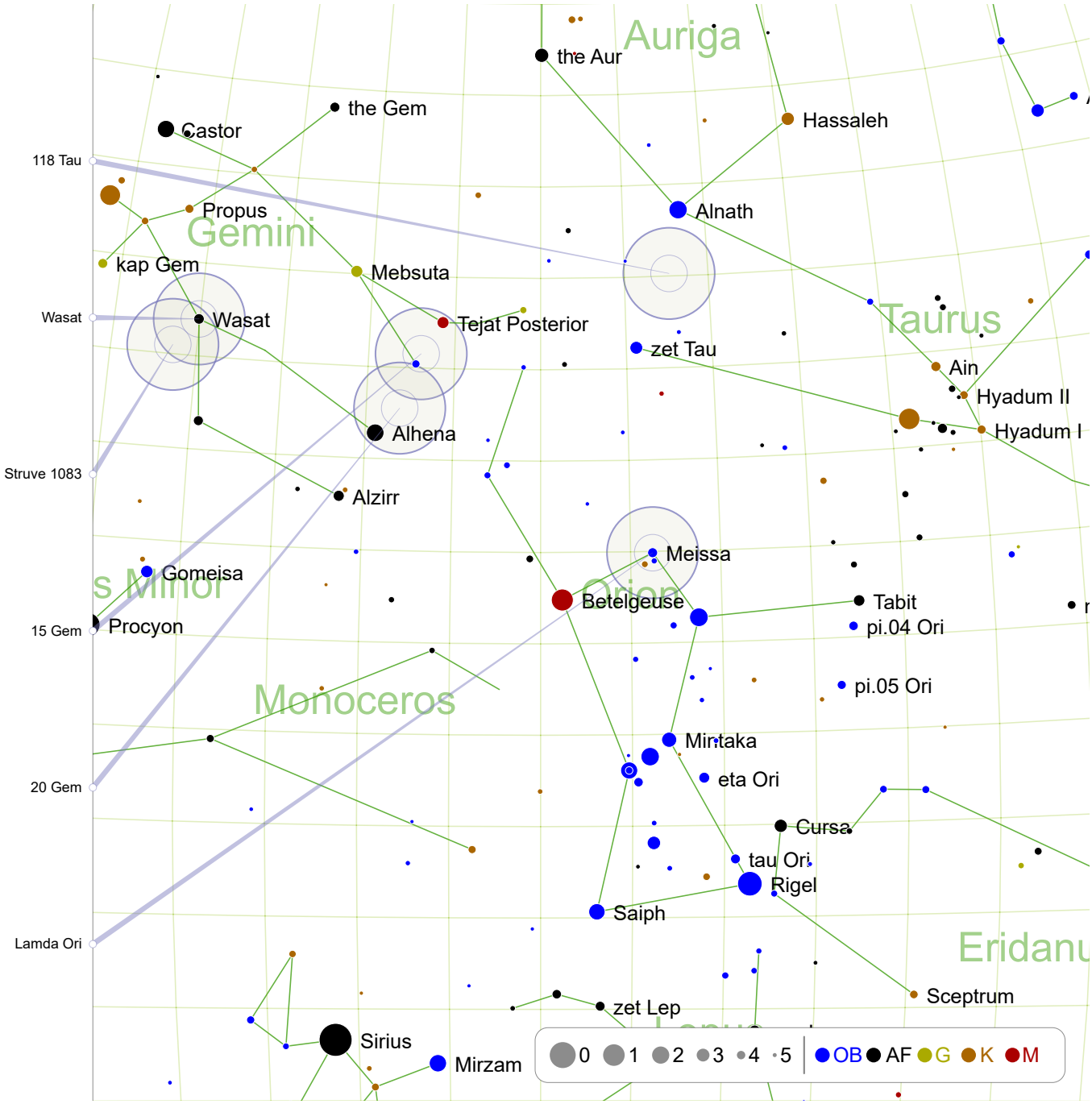
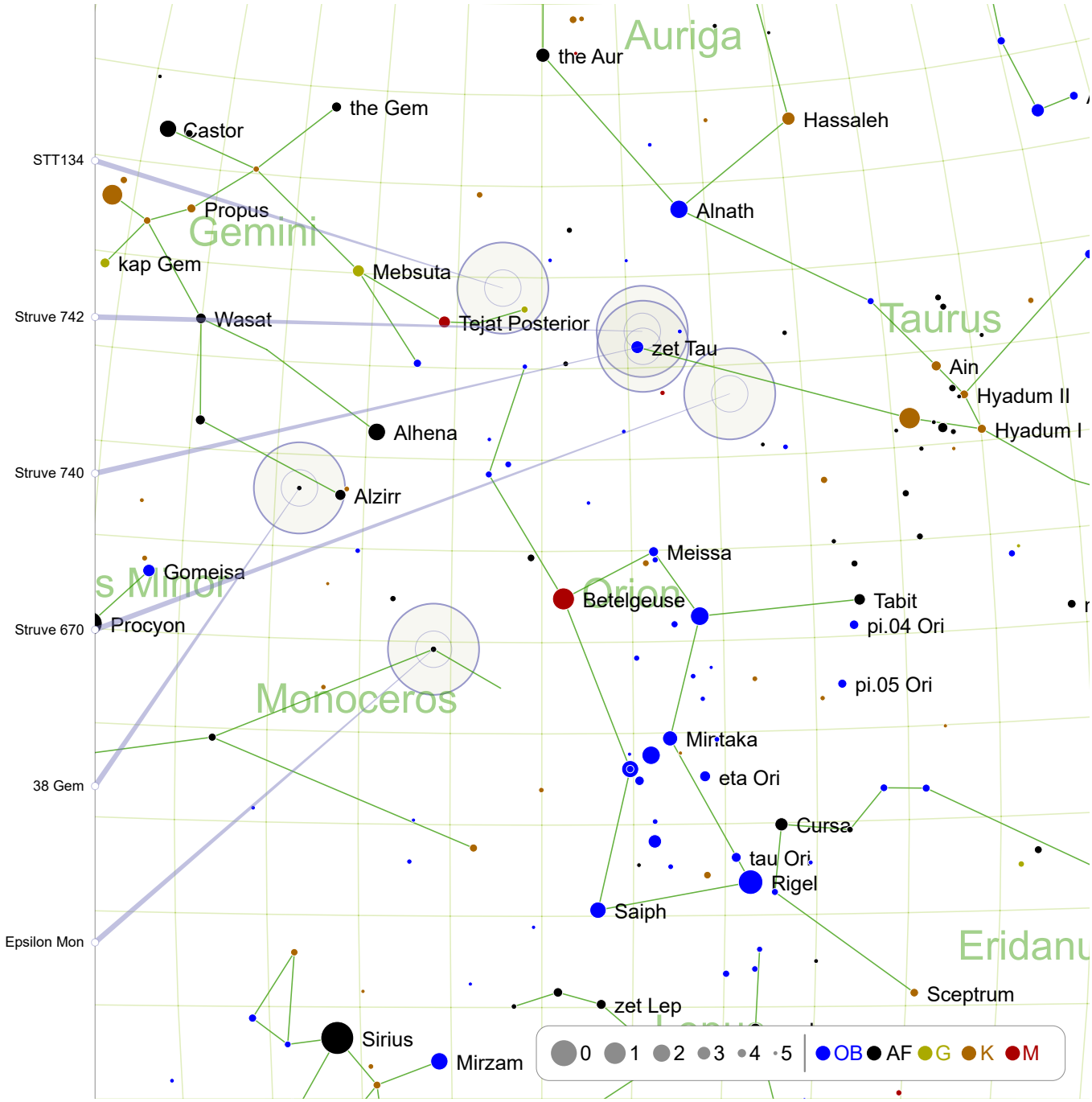
Early Winter - Looking South (1)

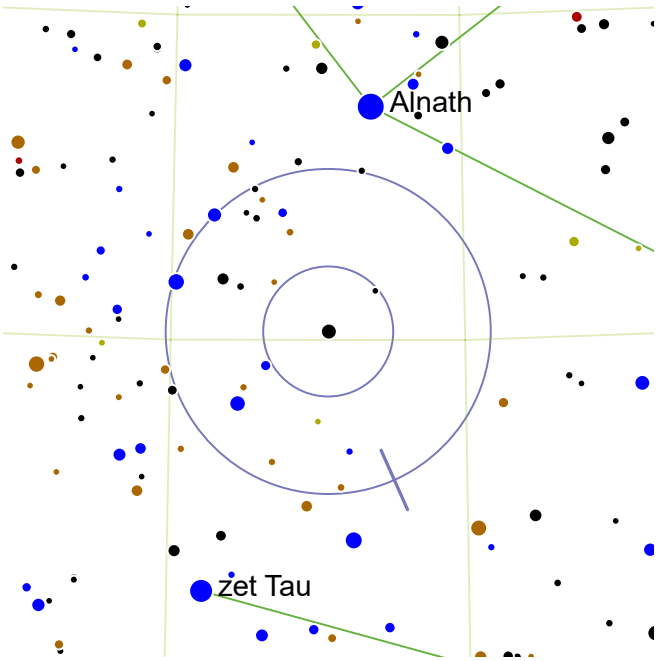


118 Tau: page 109 Wasat: page 109 Struve 1083: page 110 15 Gem: page 110
20 Gem: page 111 Lamda Ori: page 111

Early Winter - Looking South (2)



STT134: page 112 Struve 742: page 112 Struve 740: page 113 Struve 670: page 113
38 Gem: page 114 Epsilon Mon: page 114



118 Tau

RA: 82.33° | 5h 29.3' — DEC: 25.15° | 25° 9'

Magnitude: 5.8 | 6.6

Separation: 4.8"

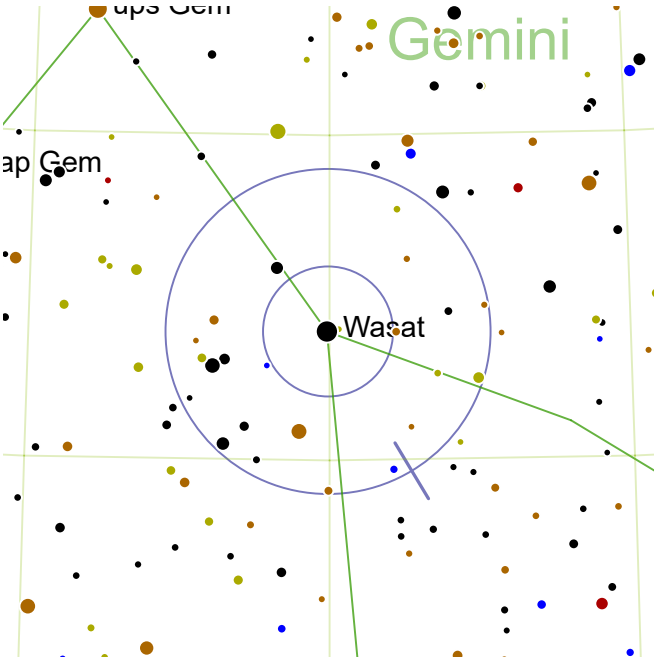
Position Angle: 204°

SAO 77201 | HIP 25695 | GDR2 01913604352

A bright white primary with a closely bound yellow secondary. The secondary is reasonably bright, enhancing the color of the pair.

Just over half a finder circle south of Alnath.

118 Tauri is 118 light-years away. If you position 118 Tauri in the northern quadrant of the finder, the supernova remnant the Crab Nebula will appear on the south-eastern edge of the finder.



Wasat

RA: 110.03° | 7h 20.1' — DEC: 21.98° | 21° 59'

Magnitude: 3.5 | 8.2

Separation: 6.8"

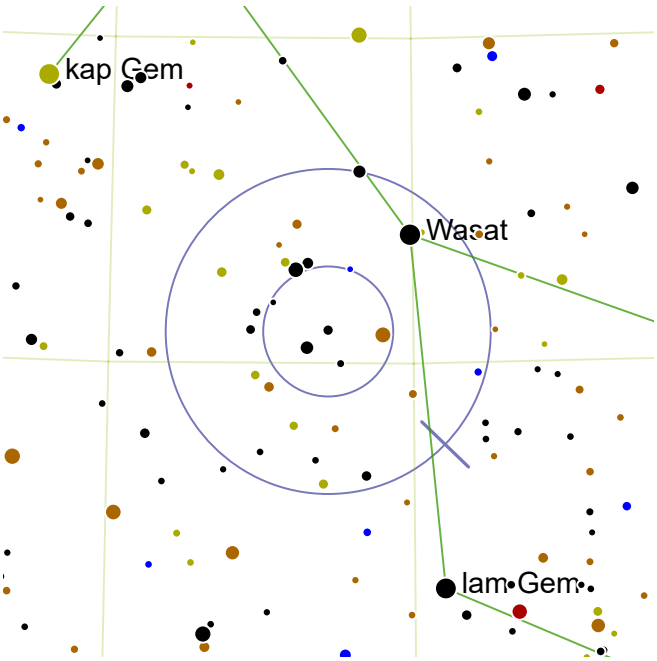
Position Angle: 211°

SAO 79294 | HIP 35550 | GDR2 1953646464

Delta Geminorum or Wasat is a brilliant white star with a close orange-yellow companion.

Easily found as one of the bright stars of Gemini, Wasat is midway between Alhena to the south-west and Pollux to the north-east.

The primary is a subgiant star 61 light-years from the Sun. The system is believed to be 1.6 billion years old.



Struve 1083

RA: 111.4° | 7h 25.6' — DEC: 20.5° | 20° 30'

Magnitude: 7.3 | 8.1

Separation: 6.9"

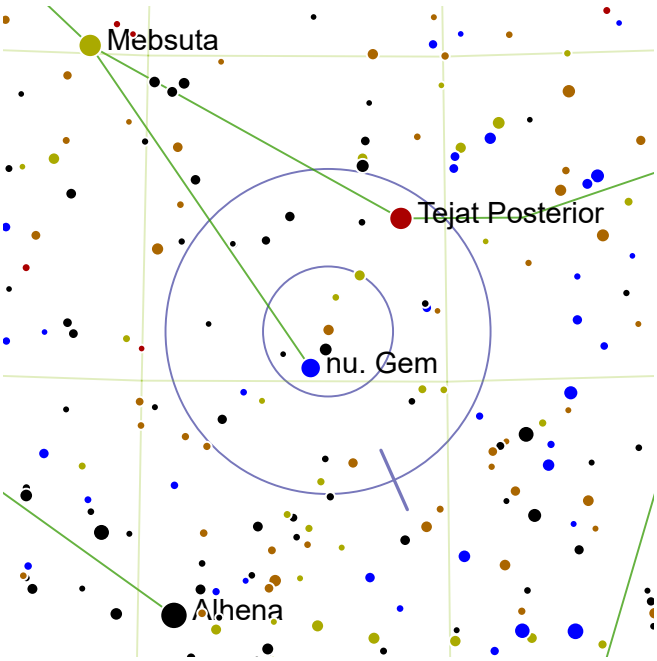
Position Angle: 226°

SAO 79375 | HIP 36035 | GDR2 9064340864

A close, relatively balanced pair. The primary is white.

One degree SE from magnitude 3.51 Wasat. Half a finder circle NNE from magnitude 3.65 lam Gem.

The Eskimo Nebula, a bright planetary nebula, is one degree to the north east. Just beyond the north eastern edge of the finder circle is open star cluster NGC2420.



15 Gem

RA: 96.95° | 6h 27.8' — DEC: 20.78° | 20° 47'

Magnitude: 6.6 | 8.0

Separation: 27.1"

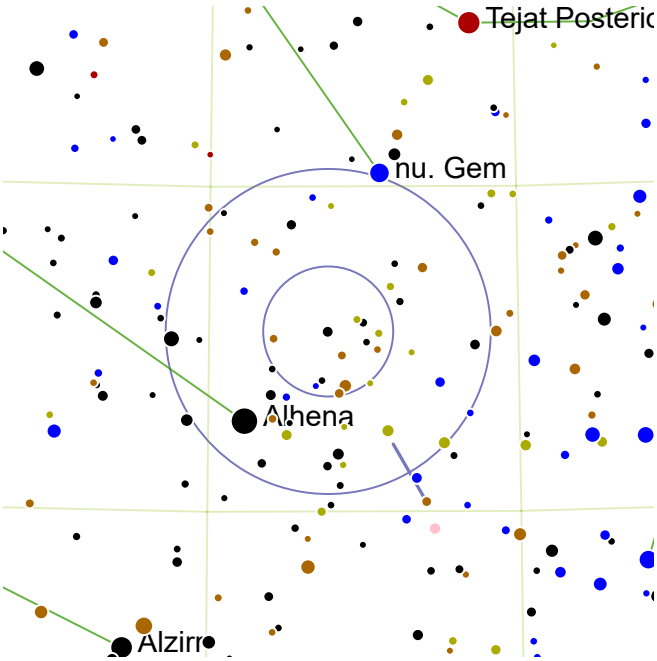
Position Angle: 204°

SAO 78395 | HIP 30757 | GDR2 03574840832

A widely separated orange and blue pairing.

Within half a degree of Nu Geminorum.

561 light-years away, the A component is a cool K class giant star.



20 Gem

RA: 98.08° | 6h 32.3' — DEC: 17.78° | 17° 47'

Magnitude: 6.3 | 6.9

Separation: 20.0"

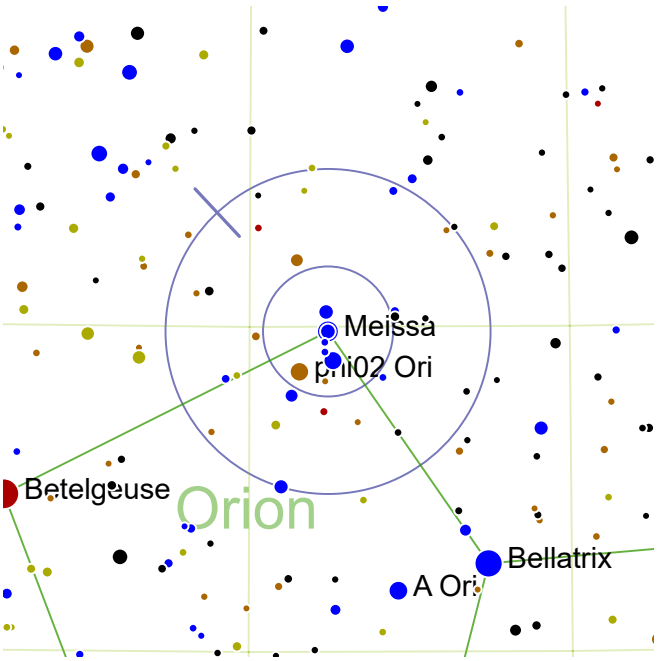
Position Angle: 210°

SAO 95795 | HIP 31158 | GDR2 88717092096

A widely separated but balanced yellow-white pair.

20 Geminorum lies exactly in the middle of the feet of Castor and Pollux.

The primary is a yellowish giant star 262 light-years away.



Lamda Ori

RA: 83.78° | 5h 35.1' — DEC: 9.93° | 9° 56'

Magnitude: 3.6 | 5.5

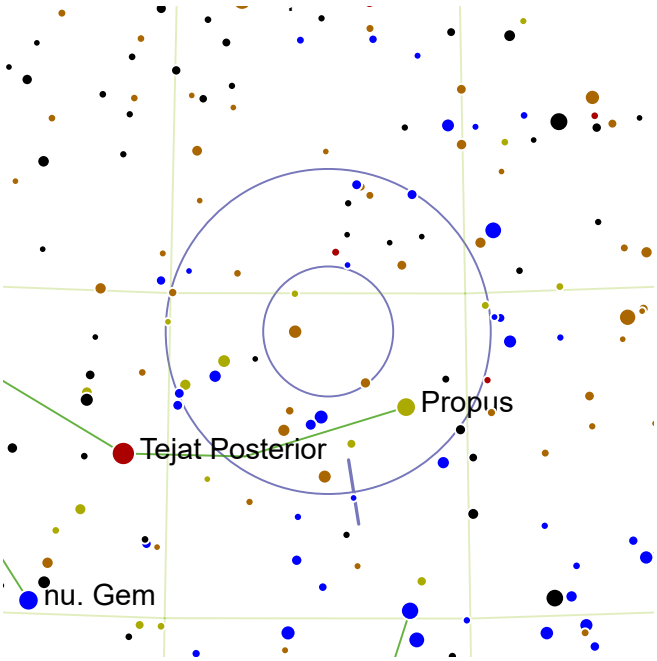
Separation: 4.4"

Position Angle: 43°

SAO 112921 | HIP 26207 | GDR2 83942617088

A close pair of white stars, with a brilliant primary and bright secondary.

Lamda Orionis is one of the three stars forming Orion's head, and is situated in the loose star cluster Collinder 69.



STT134

RA: 92.33° | 6h 9.3' — DEC: 24.43° | 24° 26'

Magnitude: 7.6 | 9.1

Separation: 31"

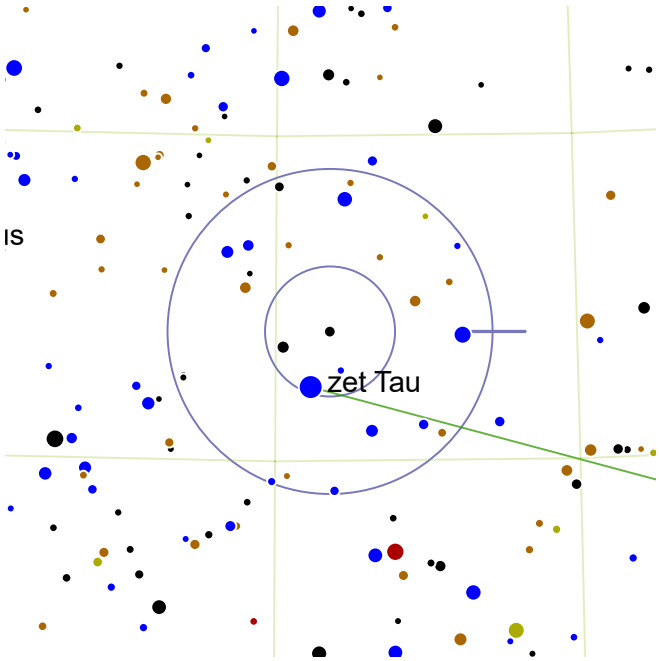
Position Angle: 189°

SAO 78038 | GDR2 72539132032

A very wide pair with a yellow primary and a moderately fainter secondary.

Half a finder circle NWW from magnitude 3.19 Tejat Posterior. One and a half finder circles NEE from magnitude 3.0 zet Tau.

The double lies on the north-eastern margins of the open cluster M35. Another open cluster, NGC 2129, lies 2,5 degrees to the south west.



Struve 742

RA: 84.1° | 5h 36.39' — DEC: 22.0° | 22° 0'

Magnitude: 7.2 | 7.8

Separation: 3.9"

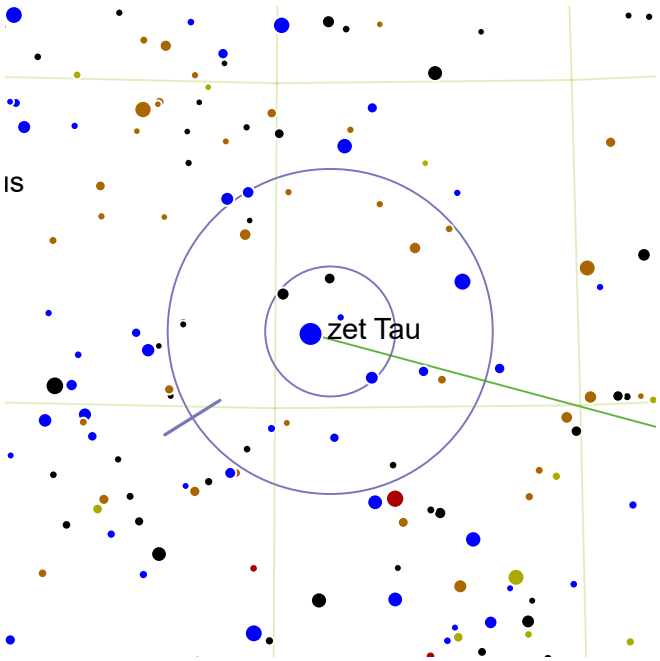
Position Angle: 270°

SAO 77313 | HIP 26328 | GDR2 51001136256

A nearly equal pair of yellowish stars with very close separation.

Half a degree NNW from magnitude 3.0 zet Tau. Two finder circles N from magnitude 3.66 Meissa.

The Crab Nebula lies halt a degree to the west of this system.



Struve 740

RA: 84.1° | 5h 36.37' — DEC: 21.18° | 21° 11'

Magnitude: 9.0 | 9.9

Separation: 21.7"

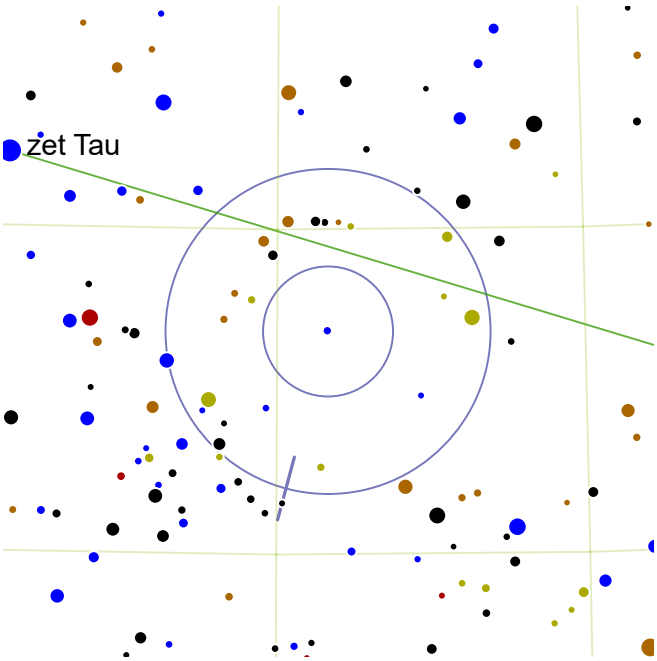
Position Angle: 122°

SAO 77308 | GDR2 12247302528

A faint pair with wide separation.

Less than half a degree W from magnitude 3.0 zet Tau. Two finder circles N from magnitude 3.66 Meissa.

The Crab Nebula, the most famous supernova remnant, lies less than two degrees to the north west.



Struve 670

RA: 79.18° | 5h 16.69' — DEC: 18.43° | 18° 26'

Magnitude: 7.7 | 8.3

Separation: 2.6"

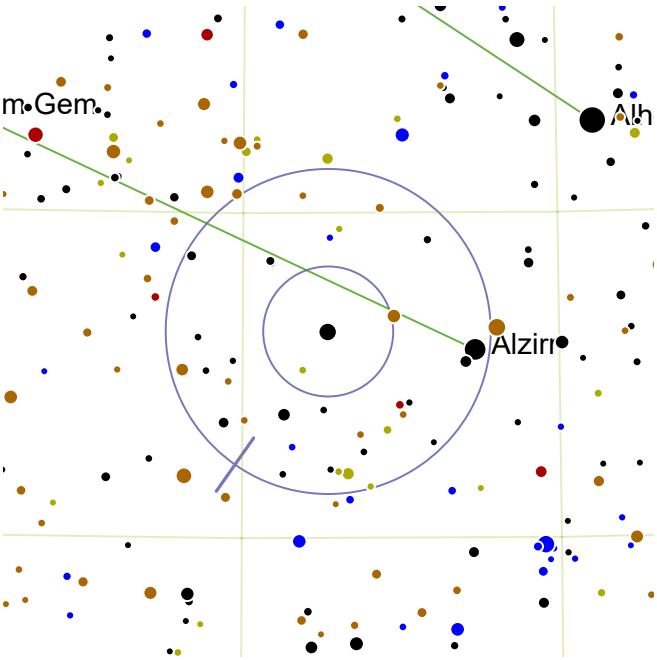
Position Angle: 165°

SAO 94431 | HIP 24612 | GDR2 31577483904

A balanced, very close pair; the primary is bluish.

One finder circle SWW from magnitude 3.0 zet Tau. One and a half finder circles NNW from magnitude 3.66 Meissa.

Open cluster NGC 1807 lies 2.5 degrees to the south west.



38 Gem

RA: 103.65° | 6h 54.6' — DEC: 13.18° | 13° 11'

Magnitude: 4.7 | 7.7

Separation: 7.1"

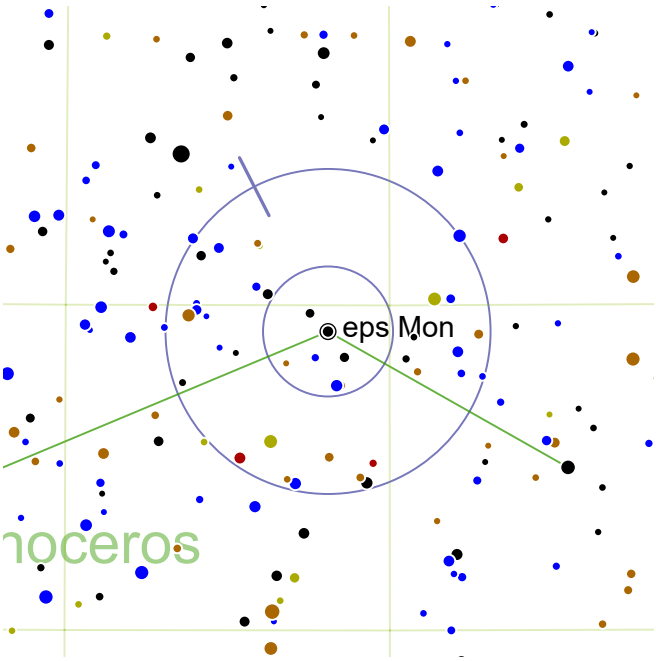
Position Angle: 145°

SAO 96265 | HIP 33202 | GDR2 95121612032

A brilliant white primary with close yellow companion.

About three degrees east of the most southerly foot (third magnitude Alzirr) of the Gemini twins.

Quite close to us, this system is only 98 light-years distant, and the components are separated by about 184 AU. The secondary is a G-class star similar to the Sun but somewhat fainter and yellower.



Epsilon Mon

RA: 95.95° | 6h 23.8' — DEC: 4.6° | 4° 36'

Magnitude: 4.5 | 6.5

Separation: 13.4"

Position Angle: 27°

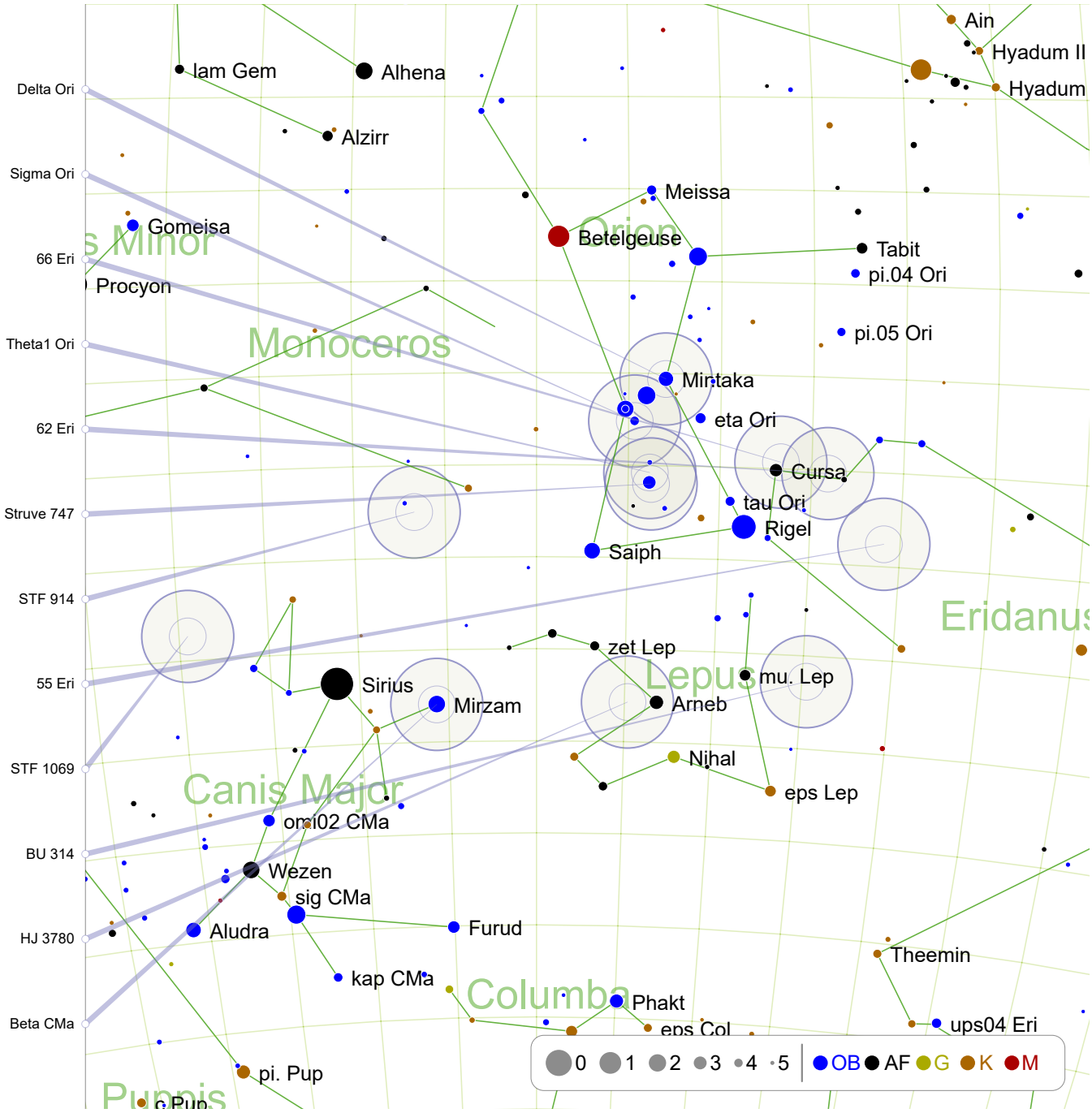
SAO 113810 | HIP 30419 | GDR2 81815810432

An unequal pair of bright yellow stars, easily separated.

Follow a line from the head of Orion through Betelgeuse and extend it an equal distance further east. This should bring you to the vicinity of an isolated fourth magnitude star which is Epsilon Monocerotis.

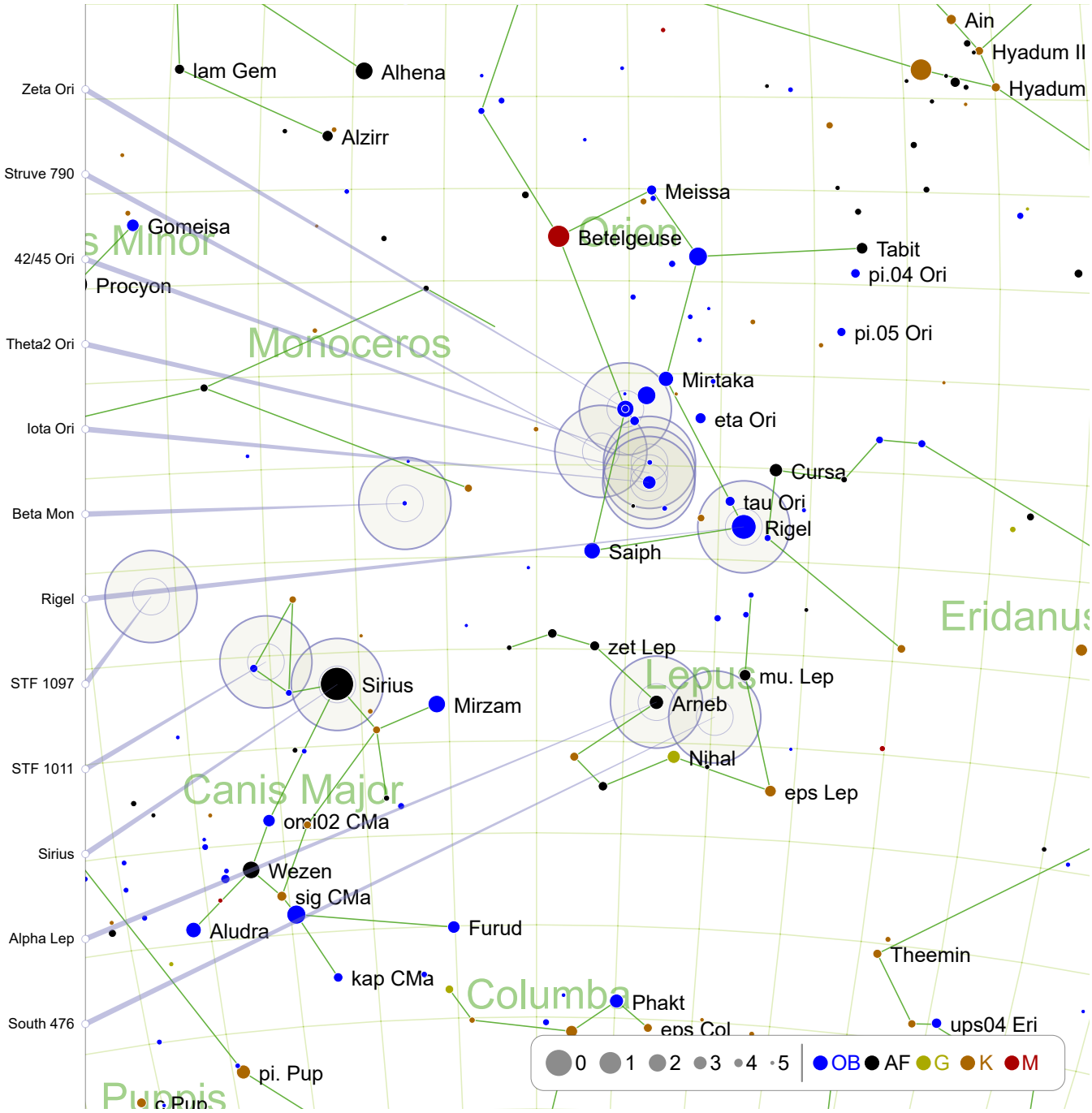
Only 121 light-years away, Epsilon Mon A is a subgiant star 25 times brighter than the Sun, while the B star is only twice as bright as the Sun.

Early Winter - Southern Horizon (1)



Delta Ori: page 117
Sigma Ori: page 117
66 Eri: page 118
Theta1 Ori: page 118
62 Eri: page 119
Struve 747: page 119
STF 914: page 120
55 Eri: page 120
STF 1069: page 121
BU 314: page 121
HJ 3780: page 122
Beta CMa: page 122

Early Winter - Southern Horizon (2)



Zeta Ori: page 123
Struve 790: page 123
42/45 Ori: page 124
Theta2 Ori: page 124
Iota Ori: page 125
Beta Mon: page 125
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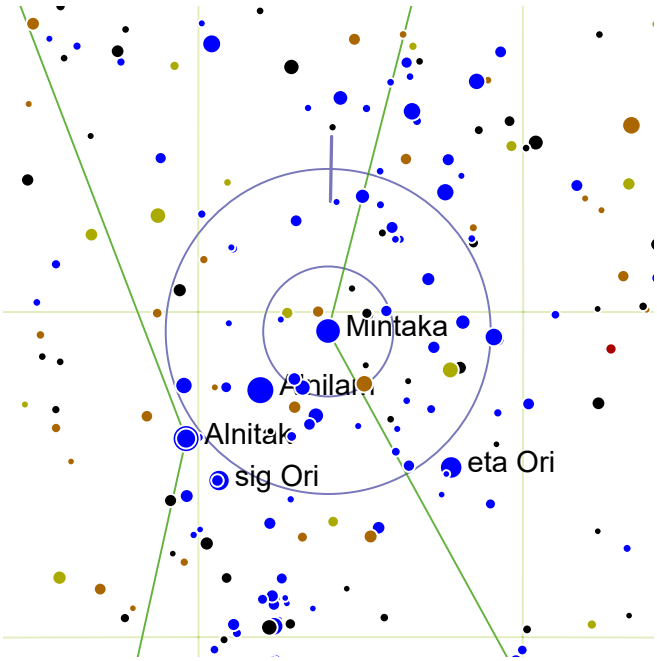


Delta Ori

RA: 83.0° | 5h 32.0' — DEC: -0.3° | 0° 17'

Magnitude: 2.2 | 6.3

Separation: 52.6"

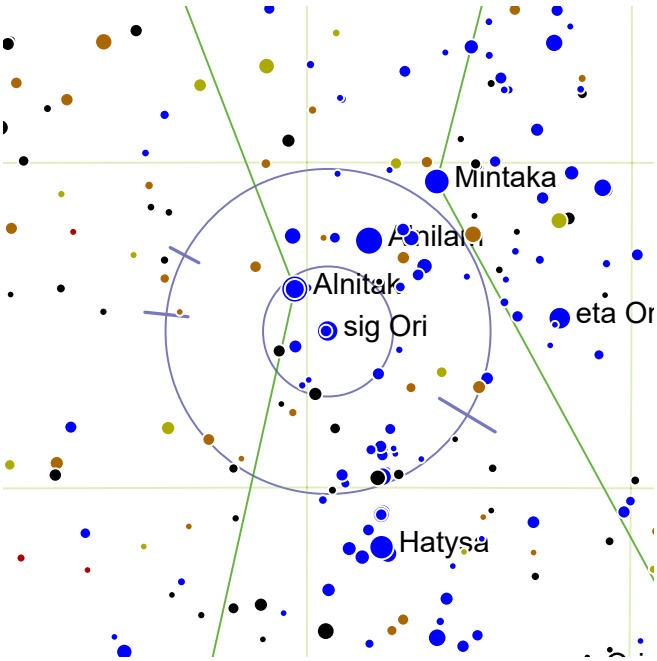
Position Angle: 359°

SAO 132220 | HIP 25930 | HD 36486

A very wide pair consisting of a brilliant primary and significantly fainter blue secondary.

Delta Orionis, better known as Mintaka, is the westernmost star of Orion's belt.

The secondary only appears faint in contrast with the bright primary; in its own right it is a reasonably bright star that that would be visible without a telescope in a dark location.



Sigma Ori

RA: 84.68° | 5h 38.69' — DEC: -2.6° | -2° 35'

Magnitude: 3.8 | 8.8 | 6.6 | 6.3

Separation: 11.4" | 12.9" | 41.4"

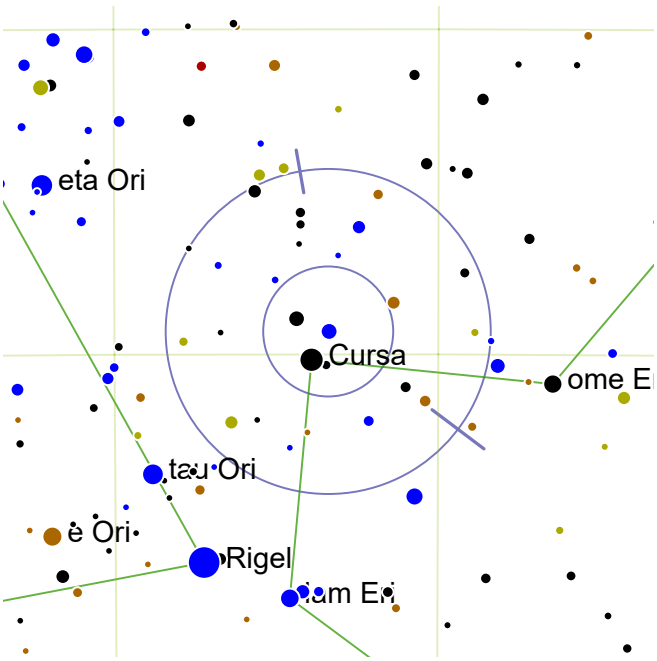
Position Angle: 239° | 84° | 62°

SAO 132406 | HIP 26549 | GDR2 39446556544

A blue primary, flanked by one fainter star to the west, and two relatively bright white stars to the east, all easily separated from the primary.

Sigma Orionis is a degree south-west of Alnitak.

A complex star system, The primary is a very tight pair separated by only 0.3". This can only be split in extremely large telescopes, leaving four easily seen components. A further tiny component lies close to the primary (mag. 12, p.a. 20°, 3.2").



66 Eri

RA: 76.7° | 5h 6.8' — DEC: -4.65° | -4° 38'

Magnitude: 5.1 | 9.4 | 10.8

Separation: 1.6" | 52.2"

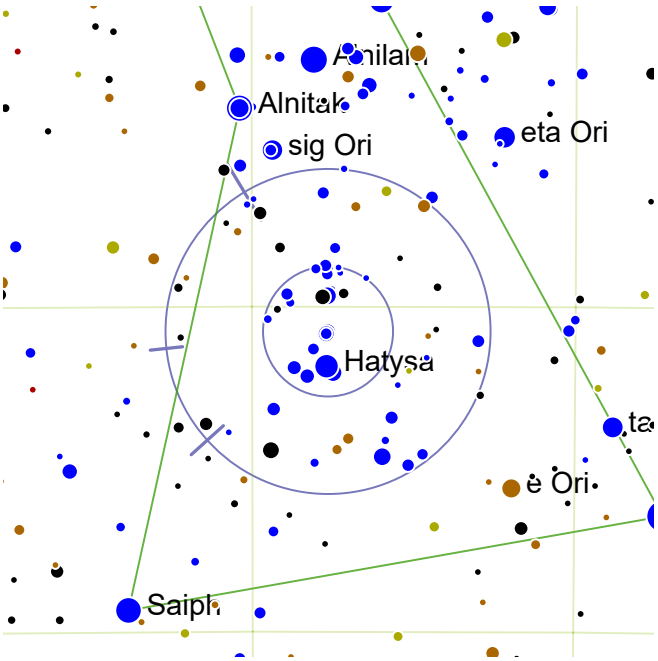
Position Angle: 233° | 10°

SAO 131777 | HIP 23794 | GDR2 15193261568

A bright, bluish primary with an extremely close faint secondary; a further faint, white C component lies at some distance from A and B.

Less than half a degree NNW from magnitude 2.92 Cursa. One finder circle W from magnitude 2.87 Hatysa.

With 66 Eri centered, the famous Witch Head reflection nebula is in the southern quarter of the finder.



Theta1 Ori

RA: 83.83° | 5h 35.3' — DEC: -5.38° | -5° 22'

Magnitude: 6.7 | 7.9 | 5.1 | 6.7

Separation: 8.8" | 13" | 21.5"

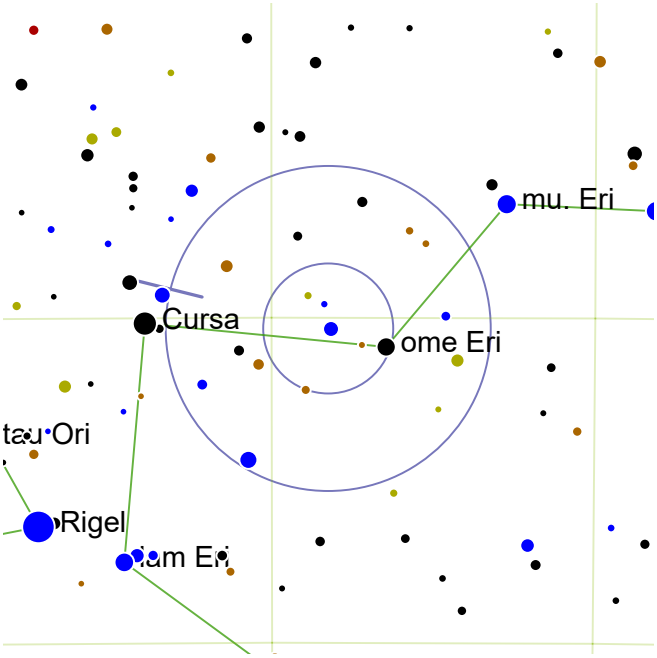
Position Angle: 31° | 132° | 96°

SAO 132314 | HIP 26220 | GDR2 32050194688

Better known as the Trapezium, this multiple star system pushes the boundaries between a multiple star system and a star cluster. The 4 brightest components form a trapezium, but fainter components can also be picked out.

The members of the Trapezium are cosmic babies, less than 100,000 years old. Galileo first sketched the A, C and D components, although he failed to record the bright nebula around the stars!

A 100 mm telescope can see four stars in the Trapezium, while a 150 mm telescope can resolve six.



62 Eri

RA: 74.13° | 4h 56.5' — DEC: -5.17° | -5° 9'

Magnitude: 5.5 | 8.9

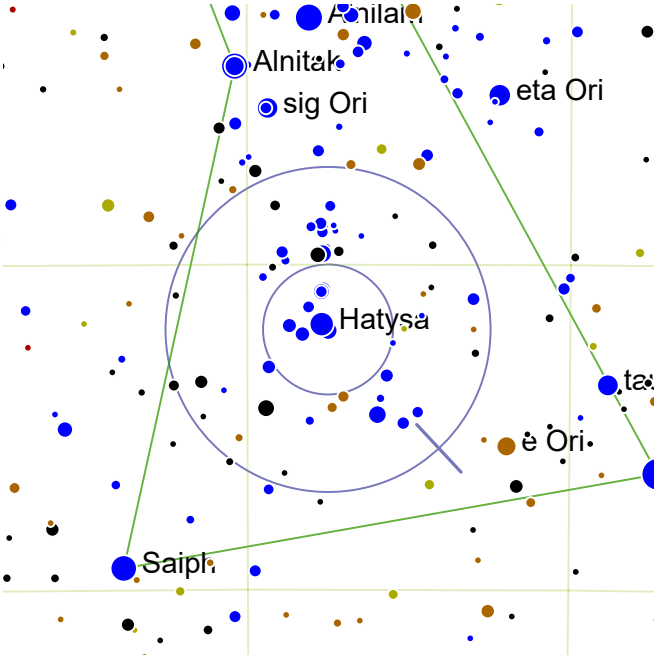
Separation: 66.1"

Position Angle: 76°

SAO 131614 | HIP 22958 | GDR2 89532331904

A distantly separated pair, with a bright, blue primary and a significantly fainter secondary.

Half a finder circle W from magnitude 2.92 Cursa. One and a half finder circles S from magnitude 3.87 pi.05 Ori.



Struve 747

RA: 83.75° | 5h 35.0' — DEC: -6.0° | -6° 0'

Magnitude: 4.8 | 5.7

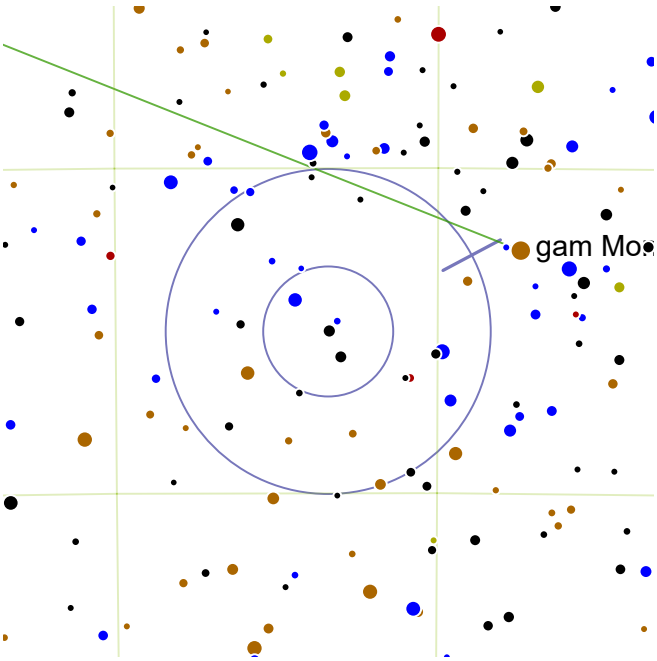
Separation: 35.7"

Position Angle: 223°

SAO 132301 | HIP 26199 | GDR2 66581304832

A very wide pair of well matched and bright white stars.

Right next to Hatysa (Iota Orionis), the bright star at the end of Orion's sword.



STF 914

RA: 96.7° | 6h 26.8' — DEC: -7.52° | -7° 30'

Magnitude: 6.3 | 8.7

Separation: 21.1"

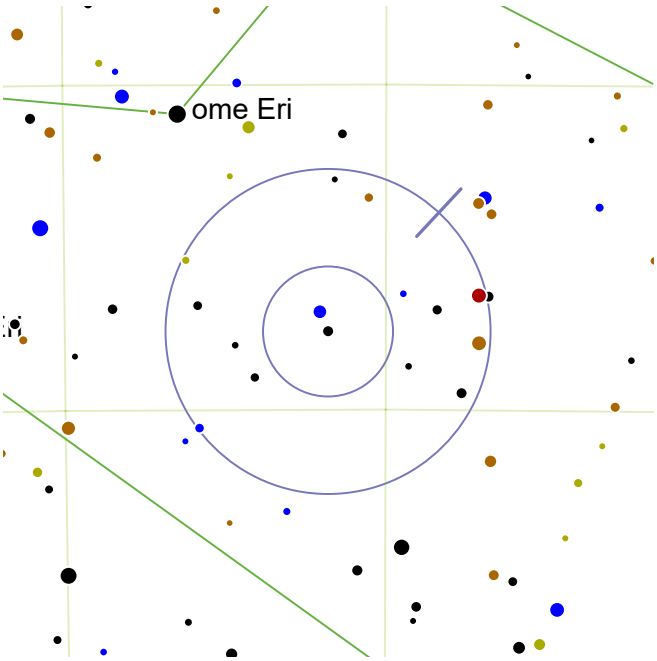
Position Angle: 298°

SAO 133263 | HIP 30675 | GDR2 21199006720

A fairly bright white primary widely separated from a faint secondary.

One and a half finder circles NEE from magnitude 2.2 Saiph. Two finder circles NE from magnitude 3.67 zet Lep.

The bright open star cluster NGC 2232 is three degrees north of STF 914.



55 Eri

RA: 70.9° | 4h 43.6' — DEC: -8.8° | -8° 47'

Magnitude: 6.7 | 6.8

Separation: 9.2"

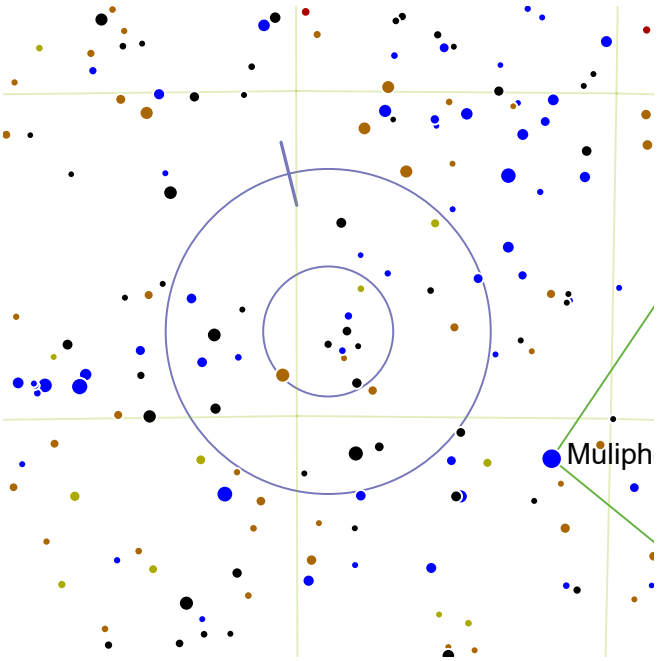
Position Angle: 317°

SAO 131442 | HIP 21986 | GDR2 19107361024

An equal pair of quite close, moderately bright, yellow stars.

One and a half finder circles west and slightly south of Cursa.

According to the Hipparchos satellite, 55 Eridani is 2132 light-years from the Sun.



STF 1069

RA: 109.5° | 7h 18.0' — DEC: -13.7° | -13° 41'

Magnitude: 8.3 | 8.3

Separation: 25.3"

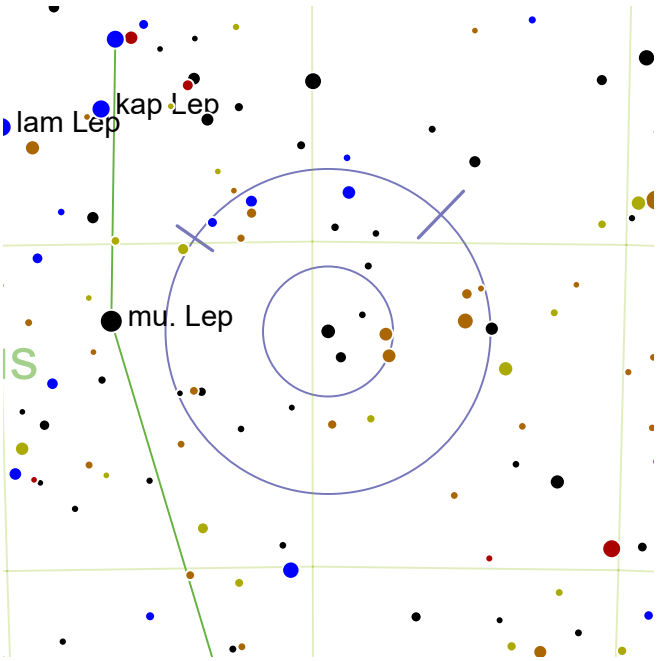
Position Angle: 14°

SAO 152682 | GDR2 48689387648

An equal pair of white stars, widely separated.

One and a half finder circles NEE from magnitude -1.58 Sirius. Two finder circles NNE from magnitude 3.12 omi02 CMa.

With STF 1069 centered in the finder, open cluster Caldwell 58 (Caroline's Cluster, NGC 2360) is in the southern quarter of the finder circle.



BU 314

RA: 74.75° | 4h 59.0' — DEC: -16.38° | -16° 22'

Magnitude: 5.9 | 7.5 | 10.4

Separation: 0.8" | 53"

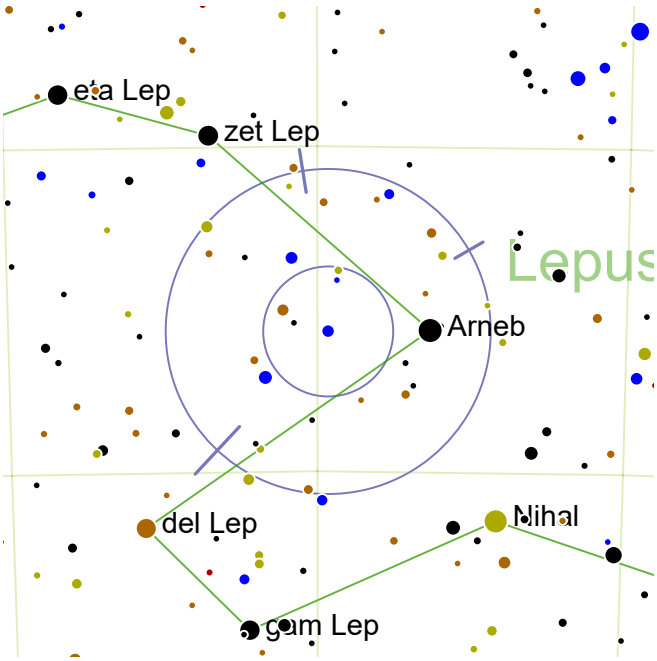
Position Angle: 316° | 55°

SAO 150052 | HIP 23166 | GDR2 39399498240

An extremely tight pair of yellowish stars, with a faint, distant third companion.

Half a finder circle W from magnitude 3.3 mu. Lep. One finder circle SEE from magnitude 3.98 Sceptrum.

This pair of F-type dwarfs is 132 light-years from Earth.



HJ 3780

RA: 84.83° | 5h 39.3' — DEC: -17.85° | -17° 50'

Magnitude: 6.7 | 8.9 | 7.9 | 8.3

Separation: 89" | 75" | 134"

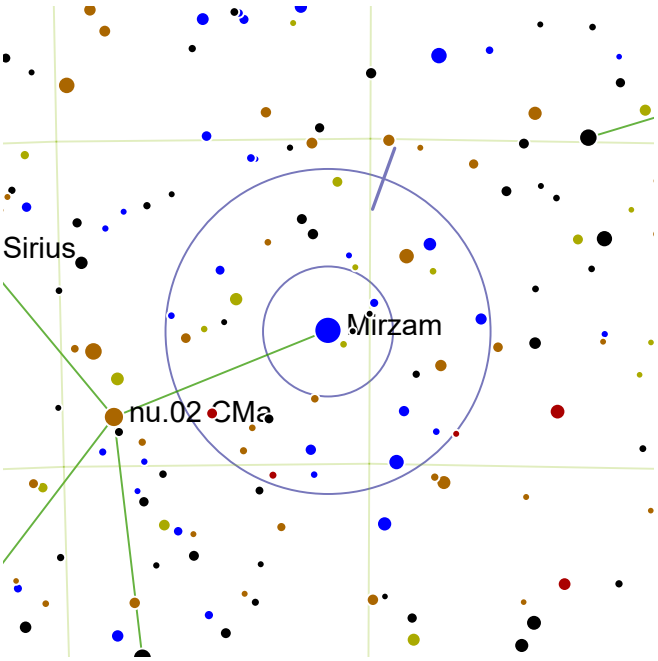
Position Angle: 137° | 9° | 300°

SAO 150652 | HIP 26602 | GDR2 96672325632

Four moderately bright stars, very widely separated.

One degree E from magnitude 2.69 Arneb.

The C component can be split into two very tight but balanced components (1.5" separation).



Beta CMa

RA: 95.68° | 6h 22.69' — DEC: -17.97° | -17° 57'

Magnitude: 1.9 | 10.5

Separation: 186.1"

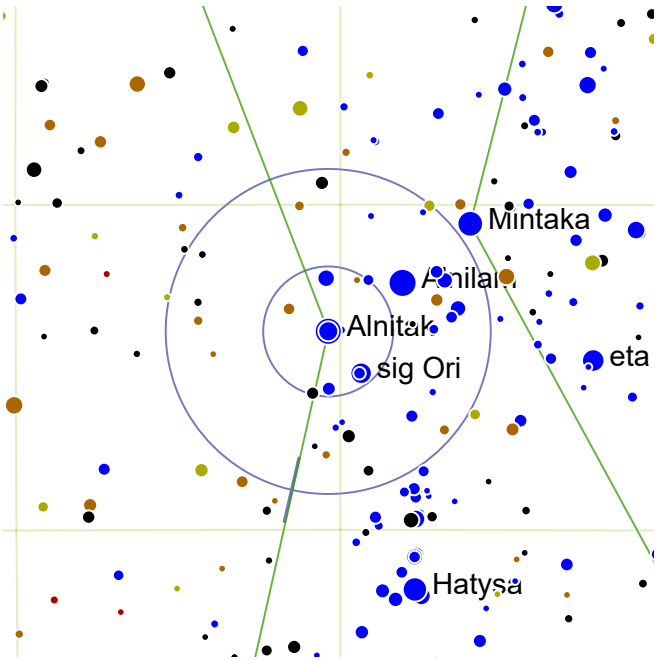
Position Angle: 340°

SAO 151428 | HIP 30324 | GDR2 66754014976

A fiercely brilliant blue primary with a distant very faint companion.

Beta CMa is a bright star in Canis Major. One finder circle SEE from magnitude 3.77 eta Lep.

Also known as Mirzam, 2 CMa, and BUP 88.



Zeta Ori

RA: 85.19° | 5h 40.75' — DEC: -1.95° | -1° 56'

Magnitude: 1.88 | 3.70 | 9.55

Separation: 2.17" | 58.5"

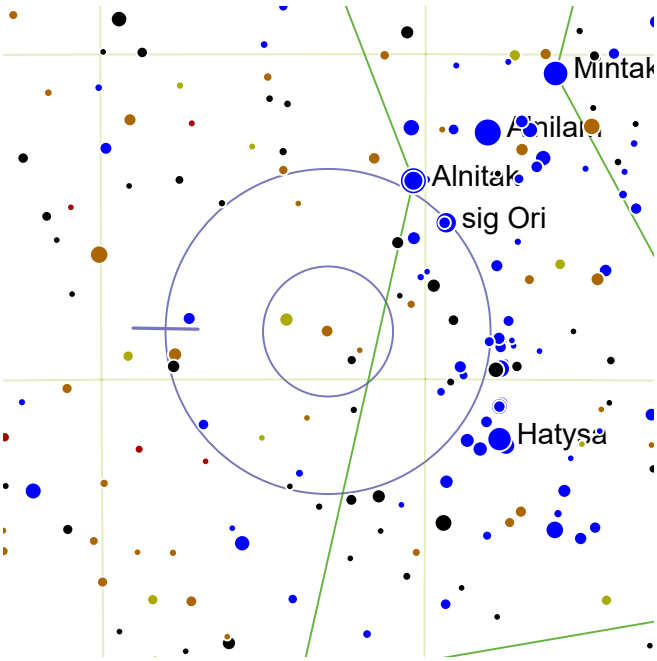
Position Angle: 167°

SAO 132444 | HIP 26727 | GDR2 28221605248

A fiercely brilliant close blue-blue pairing, made difficult by the brightness of the primary.

The eastern star of Orion's belt.

Zeta Orionis, or Alnitak, is the astrophotographer's devil as it overwhelms pictures of the Flame and Horsehead nebulae. In addition it is the brightest O-class star in Earth's sky, which makes it very blue, which is a difficult star color to control in astrophotographs.



Struve 790

RA: 86.5° | 5h 46.0' — DEC: -4.27° | -4° 15'

Magnitude: 6.4 | 8.7

Separation: 6.9"

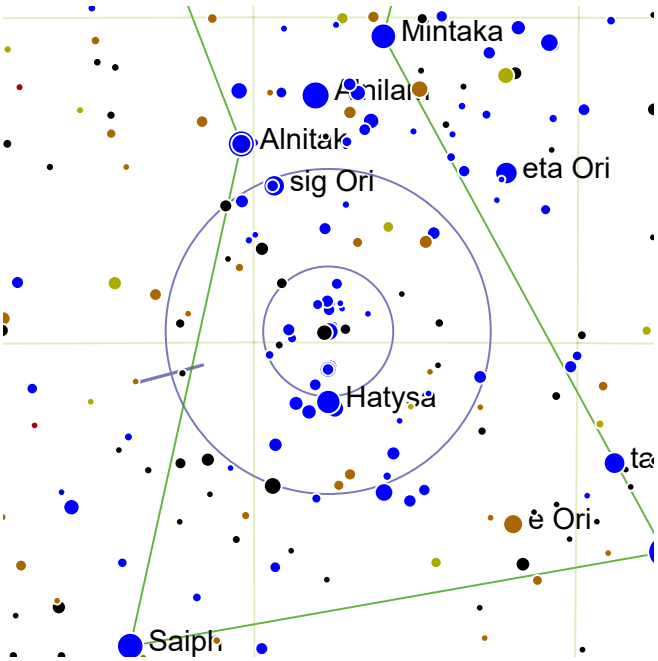
Position Angle: 89°

SAO 132515 | HIP 27212 | GDR2 54756157184

A close blue-yellow pair roughly a degree north-east of the Orion Nebula.

Position Alnitak near the north-western edge of the finder; Struve 790 is near the center of the view.

With Alnitak centered in the finder, both the Flame Nebula and the dark Horsehead Nebula will be in the view, but very difficult to detect from a light polluted location.



42/45 Ori

RA: 83.85° | 5h 35.39' — DEC: -4.83° | -4° 49'

Magnitude: 4.7 | 5.3

Separation: 252"

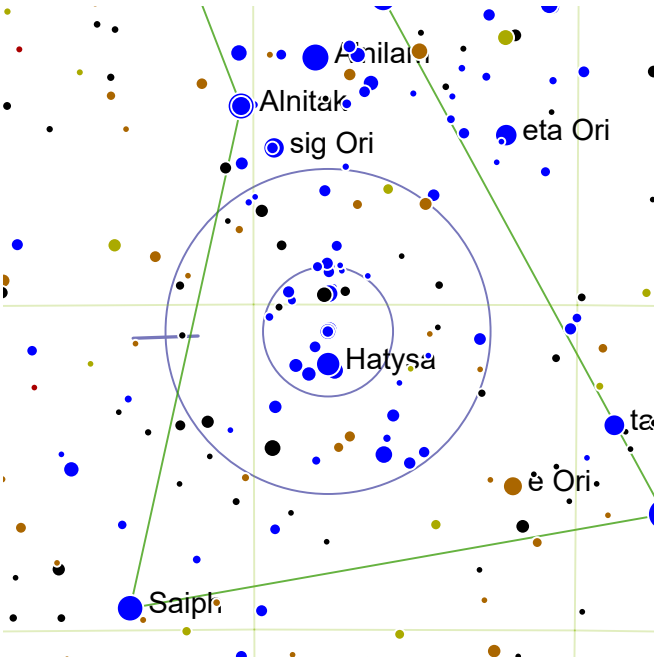
Position Angle: 105°

SAO 132320 | HIP 26237 | GDR2 52067563392

A very wide and bright binocular pair, the brighter star (42 Ori) being bluish and the other white.

Half a degree N from magnitude 2.87 Hatysa. Half a finder circle S from magnitude 2.48 Mintaka.

There is a third magnitude 7.1 star between 42 and 45 Orionis. This optical double is shrouded in the nebulosity of M43 (De Mairan's Nebula).



Theta2 Ori

RA: 83.85° | 5h 35.39' — DEC: -5.42° | -5° 24'

Magnitude: 5.2 | 6.5

Separation: 52"

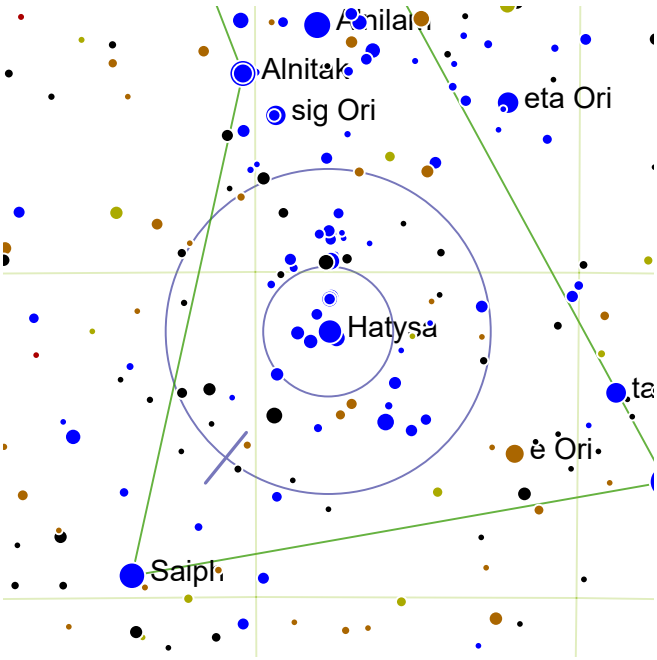
Position Angle: 92°

SAO 132321 | HIP 26235

A very wide line of three bright white stars, often overlooked as it is on the border of the spectacular Orion Nebula.

Half a a degree (one Moon diameter) north of Hatsya.

Best viewed at lower magnifications.



Iota Ori

RA: 83.88° | 5h 35.5' — DEC: -5.92° | -5° 54'

Magnitude: 2.8 | 6.9

Separation: 11.3"

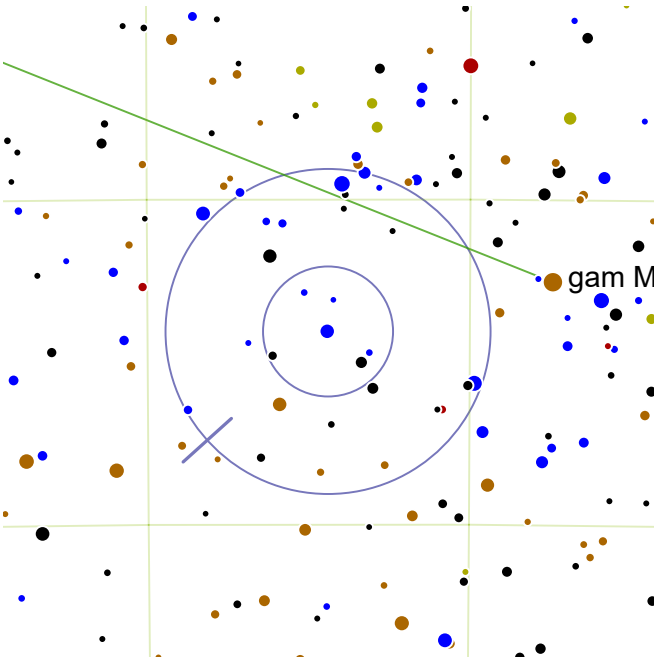
Position Angle: 141°

SAO 132323 | HIP 26241 | GDR2 46640875904

In the same field as Struve 747, Iota Orionis is a brilliant white star with an easily separated and reasonably bright blue companion.

Iota is the southernmost star of Orion's sword.

Iota Orionis is one the brightest member of loose star cluster NGC 1980. NGC 1980 is regarded as a slightly older version of the Trapezium cluster that illuminates the Orion Nebula, but how two similar clusters can form so closely together is a subject of further study.



Beta Mon

RA: 97.2° | 6h 28.8' — DEC: -7.03° | -7° 1'

Magnitude: 4.7 | 5.2

Separation: 7.3"

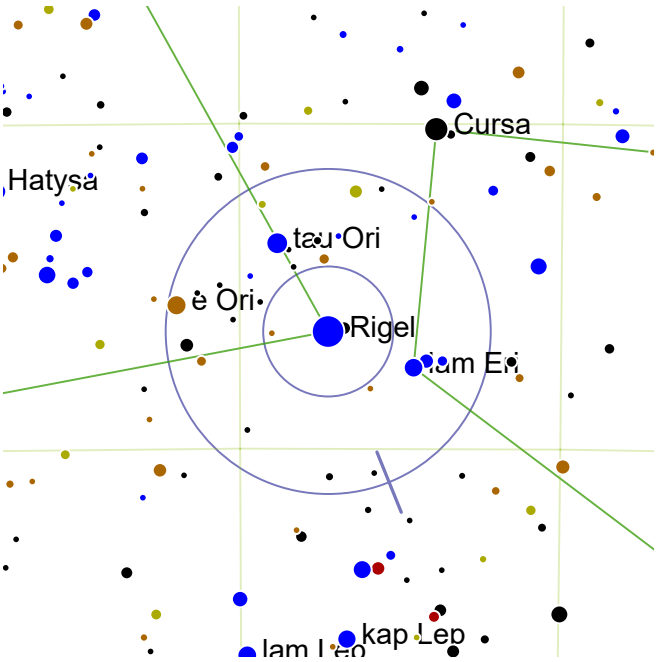
Position Angle: 132°

SAO 133316 | HIP 30867 | GDR2 65675574272

A wonderful triple showing a brilliant bluish primary closely separated from a tight pair of bluish stars.

Locate fourth magnitude Gamma Monocerotis and track east by one-and-a-half finder circles.

Situated in the inky void between Orion and Sirius, this is a hard to find compared to other nearby doubles.



Rigel

RA: 78.63° | 5h 14.5' — DEC: -8.2° | -8° 11'

Magnitude: 0.3 | 6.8

Separation: 9.7"

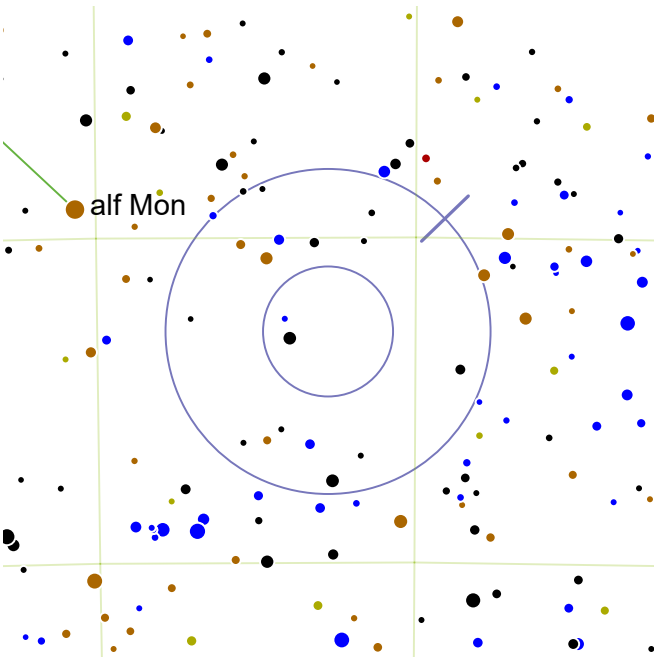
Position Angle: 202°

SAO 131907 | HIP 24436 | HD 34085

Rigel, one of the brightest stars in the sky, has a moderately bright companion that seems very faint in the glare of its primary. The separation is reasonable and the white secondary contrasts nicely with the blue primary.

Rigel is the bright blue star in the south-western corner of the square of Orion.

The secondary is actually a close double but the separation is only 0.1".



STF 1097

RA: 111.38° | 7h 25.5' — DEC: -11.45° | -11° 26'

Magnitude: 5.5 | 8.5

Separation: 20"

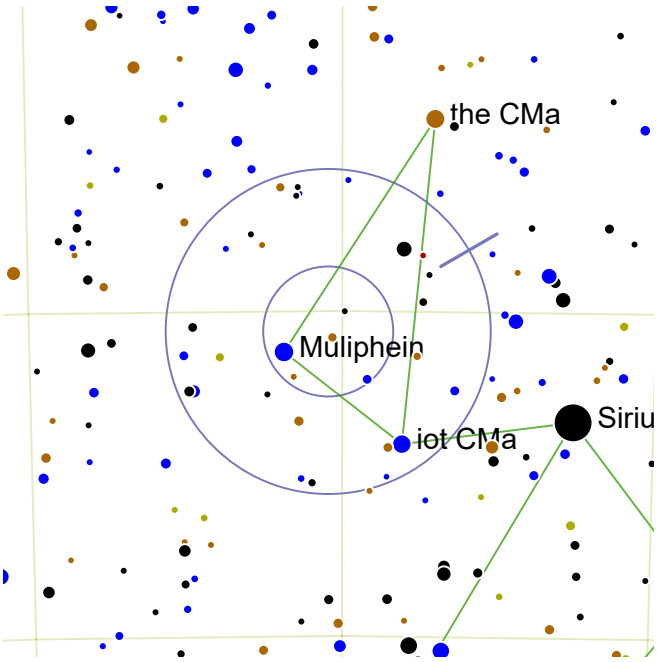
Position Angle: 314°

SAO 152909 | HIP 36251 | GDR2 64130366336

A fairly bright yellow primary with an easily separated and relatively faint companion.

Two finder circles NEE from magnitude -1.58 Sirius. Two and a half finder circles NNE from magnitude 3.12 omi02 CMa.

The double lies on the northern edge of the open star cluster NGC 2396 (magnitude 7.4).



STF 1011

RA: 105.23° | 7h 0.89' — DEC: -15.32° | -15° 18'

Magnitude: 8.5 | 9.0

Separation: 4.2"

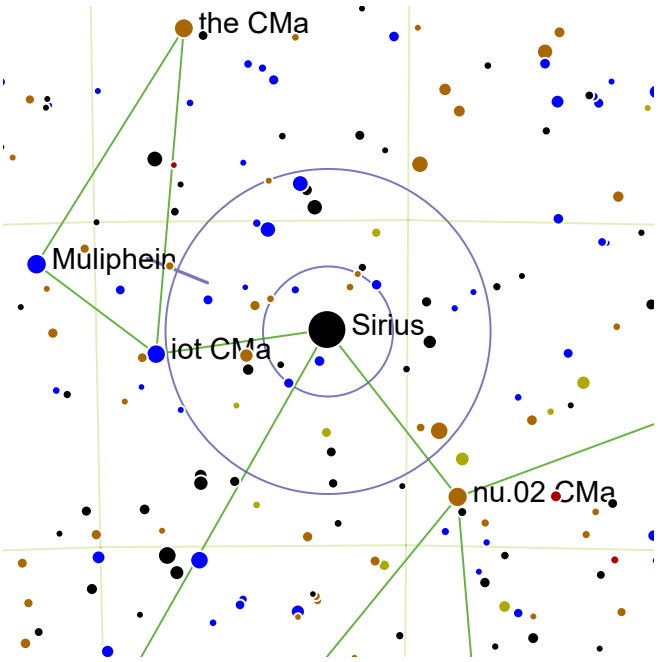
Position Angle: 300°

SAO 152238 | GDR2 78133018240

A very close pair of white stars.

Half a finder circle NEE from magnitude -1.58 Sirius. One and a half finder circles N from magnitude 3.12 omi02 CMa.

Located in a position roughly approximating Canis Major's eye, this unassuming double is well balanced and nicely separated.



Sirius

RA: 101.28° | 6h 45.1' — DEC: -16.72° | -16° 42'

Magnitude: -1.47 | 8.44

Separation: 11.2"

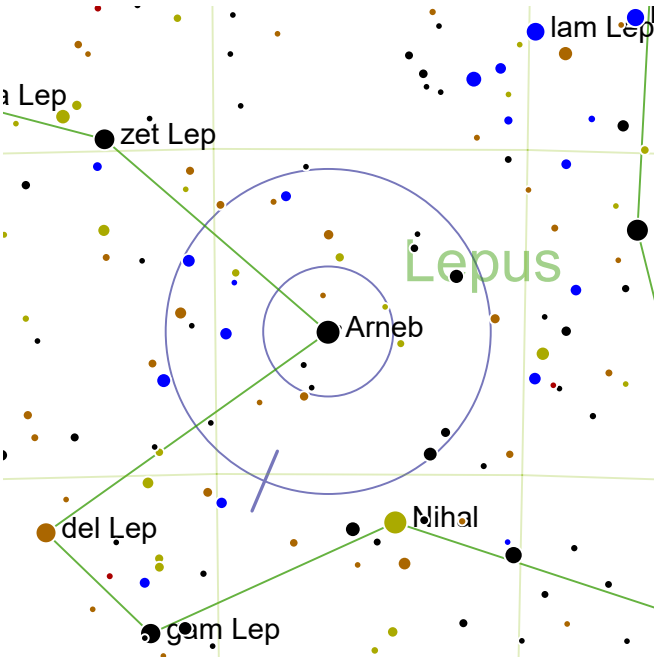
Position Angle: 68°

SAO 151881 | HIP 32349 | HD 48915

A ferociously brilliant white primary moderately separated from a relatively dim white dwarf companion.

Sirius the brightest star in Earth's sky, south-east of Orion.

The secondary is a tiny Earth-sized white dwarf, among the smallest deep sky objects visible in an amateur telescope. The little companion, known affectionately as the "Pup", is lost in the glare of the primary, but standing alone would be an easy binocular target. To tame Sirius, try spotting the Pup in twilight.



Alpha Lep

RA: 83.18° | 5h 32.69' — DEC: -17.82° | -17° 48'

Magnitude: 2.6 | 11.2

Separation: 35.4"

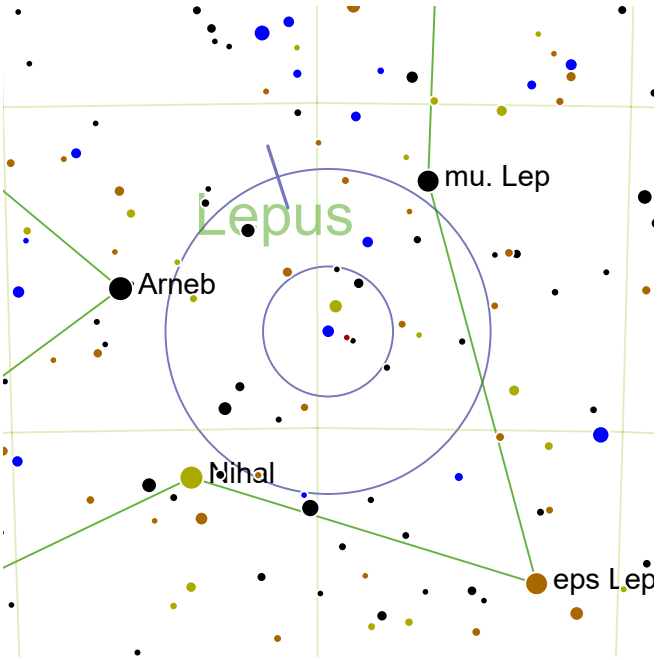
Position Angle: 157°

SAO 150547 | HIP 25985 |GDR2 10610441856

A brilliant yellowish primary widely separated from a very faint companion.

Alpha Lep is a bright star in Lepus.

Also known as Arneb, the primary is an impressive supergiant 2200 light-years from Earth.



South 476

RA: 79.83° | 5h 19.3' — DEC: -18.52° | -18° 30'

Magnitude: 6.2 | 6.4

Separation: 39.4"

Position Angle: 18°

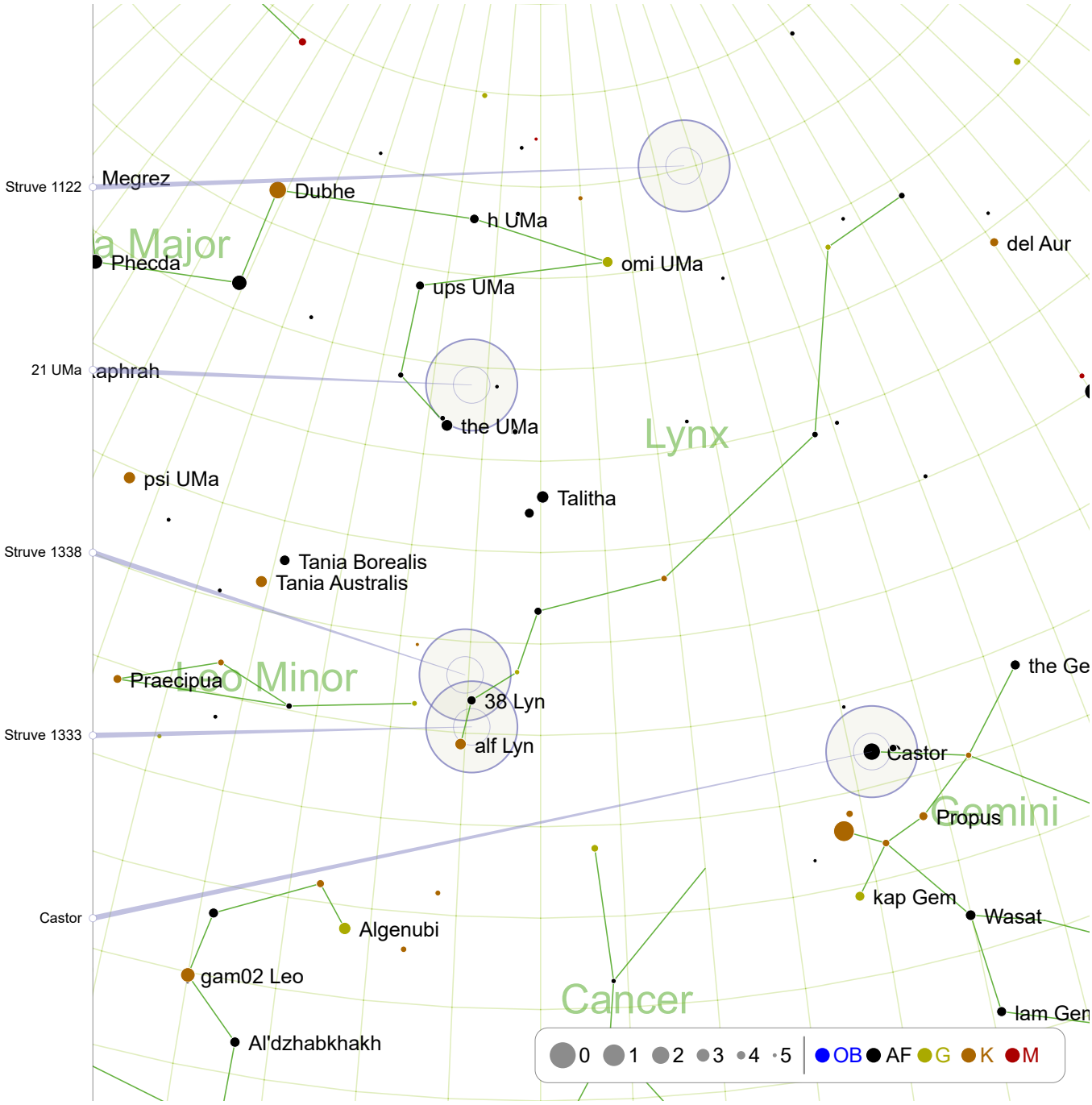
SAO 150336 | HIP 24827

A pair of fairly bright, blue stars, widely separated.

Half a finder circle SSE from magnitude 3.3 mu. Lep. Half a finder circle SWW from magnitude 2.69 Arneb.

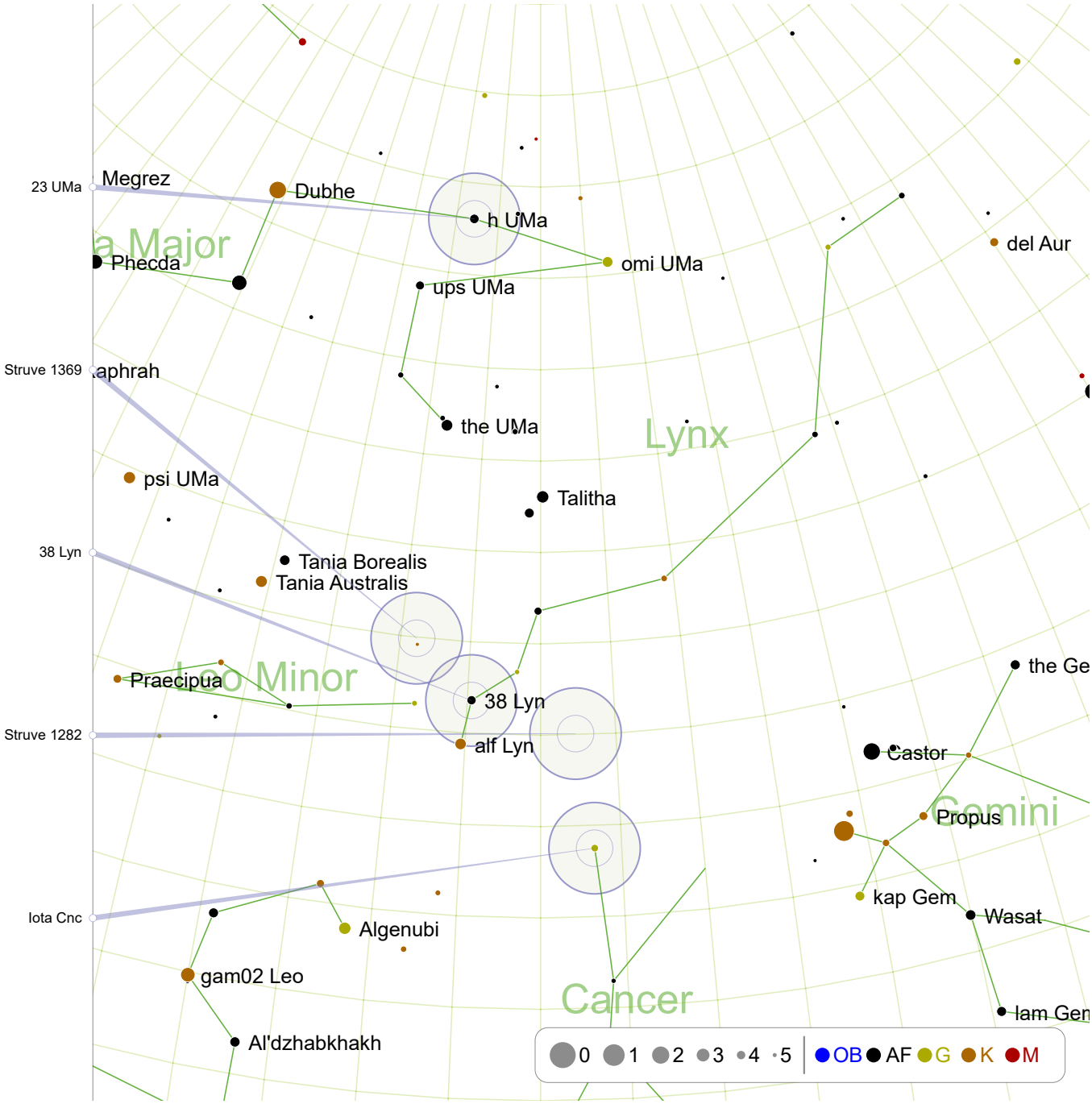
Both stars are cataloged as variables, the brighter being TX Leporis (Δ mag. 0.04) and the fainter being YZ Leporis (Δ mag. 0.06). The primary is a subgiant 257 times brighter than the Sun.

Late Winter - Looking North (1)

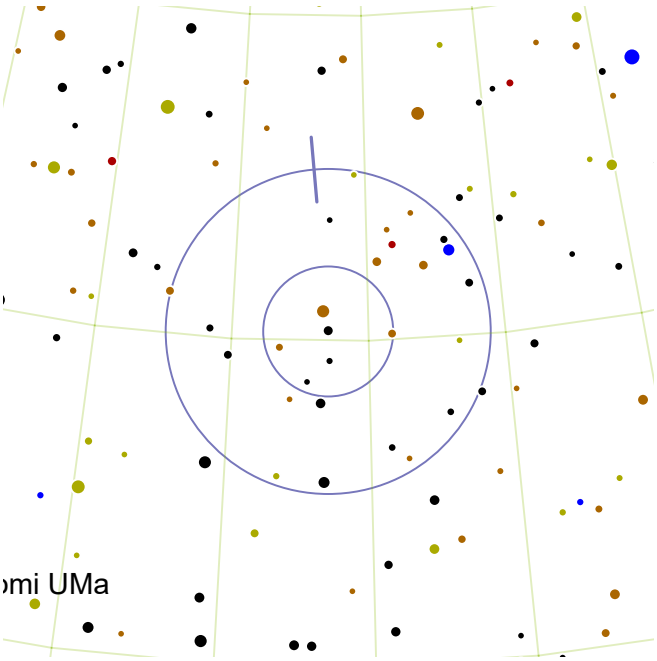


Struve 1122: page 131 21 UMa: page 131 Struve 1338: page 132 Struve 1333: page 132
Castor: page 133

Late Winter - Looking North (2)



23 UMa: page 133 Struve 1369: page 134 38 Lyn: page 134 Struve 1282: page 135
Iota Cnc: page 135



Struve 1122

RA: 116.48° | 7h 45.89' — DEC: 65.15° | 65° 9'

Magnitude: 7.8 | 7.8

Separation: 15.4"

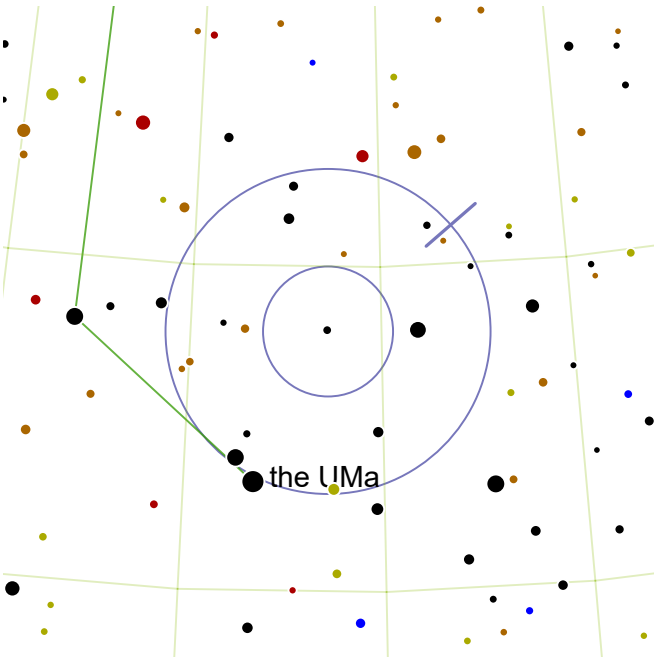
Position Angle: 5°

SAO 14312 | HIP 37884 | GDR2 30663886080

An equal and easily separated pair of white stars.

Starting from magnitude 3.35 Muscida (the great bear's nose), move one and a half finder circles north-west.

A degree to the north west of this double is Caldwell 7, NGC 2403, a relatively bright spiral galaxy with many luminous star-forming regions.



21 UMa

RA: 141.4° | 9h 25.6' — DEC: 54.02° | 54° 1'

Magnitude: 7.8 | 8.8

Separation: 5.7"

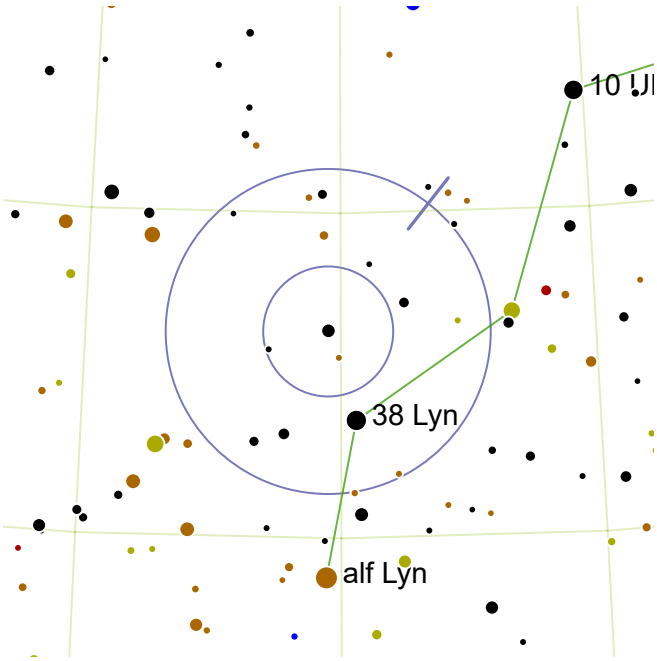
Position Angle: 311°

SAO 27249 | HIP 46239 | GDR2 88145841408

A close yellow-blue pair.

Half a finder circle north and slightly west of Alhaud V, the magnitude 3.15 star in the middle of the great bear's front leg.

Three degrees south of this double is the active galaxy NGC 2841.



Struve 1338

RA: 140.25° | 9h 20.99' — DEC: 38.18° | 38° 11'

Magnitude: 6.72 | 7.08

Separation: 1.00"

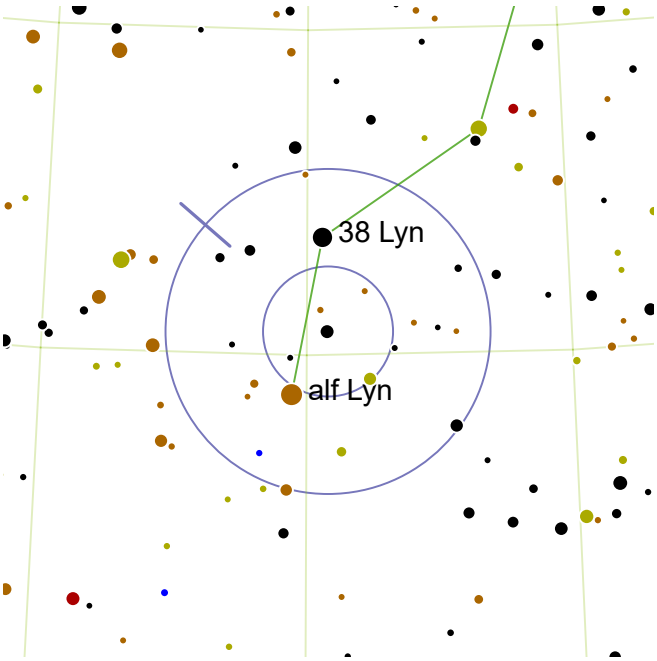
Position Angle: 322°

SAO 61411 | HIP 45858 | GDR2 6439695232

The tightest double in this book, Struve 1338 consists of two well-balanced white stars split by a mere arc second.

Just over a degree north of 38 Lyncis. There are no other equally bright stars within adegree of Struve 1338.

In all but very large telescopes and very good seeing conditions, the most that can be achieved is a slight elongation of the star.



Struve 1333

RA: 139.6° | 9h 18.39' — DEC: 35.37° | 35° 22'

Magnitude: 6.4 | 6.7

Separation: 1.6"

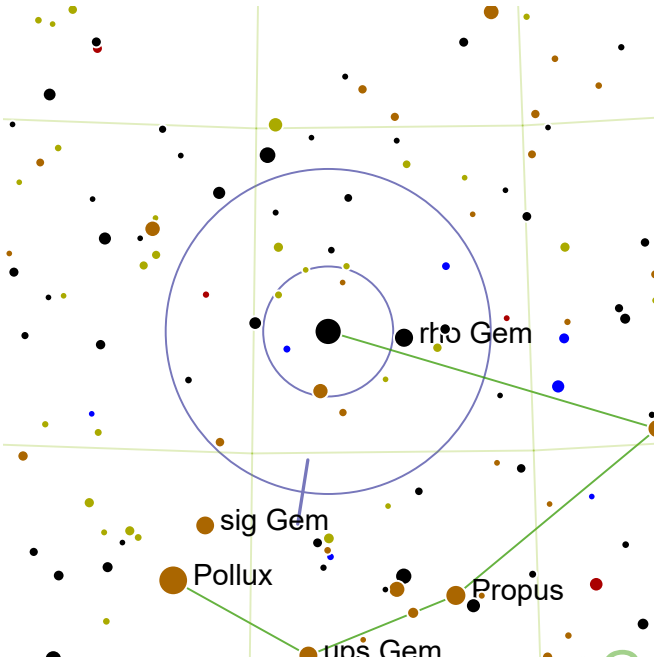
Position Angle: 49°

SAO 61387 | HIP 45661 | GDR2 3219596800

A challenging pair of equal white stars separated by less than two arc seconds.

Located a degree north of Alpha Lyncis, midway to 38 Lyncis.

Once you have Struve 1333 in view, the fine doubles 38 Lyncis, Struve 1338, Struve 1369 and Struve 1282 are short hops away.



Castor

RA: 113.65° | 7h 34.6' — DEC: 31.88° | 31° 53'

Magnitude: 1.9 | 2.9

Separation: 2.2"

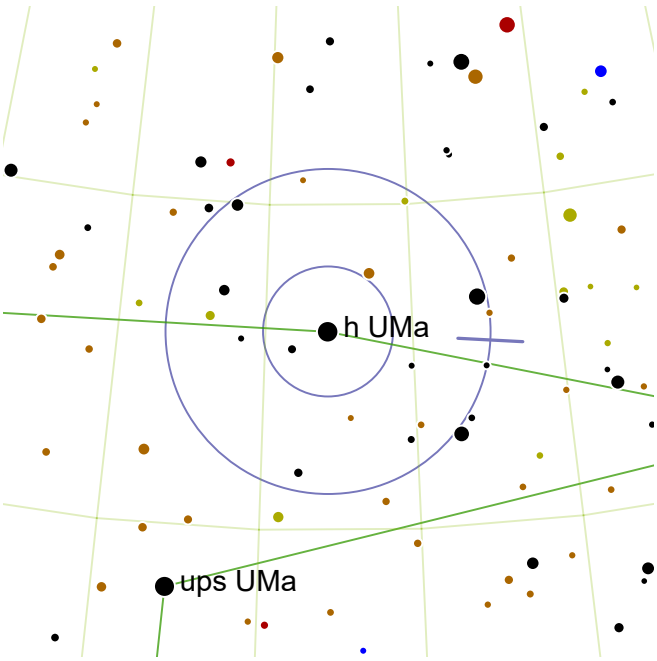
Position Angle: 171°

SAO 60198 | HIP 36850 | GDR2 4913021056

A tight pair of very brilliant, bluish stars.

Castor is one of the brightest stars in the sky, forming a wide visual pair with Pollux.

Perhaps you are like me and occasionally confuse Castor for its evil twin Pollux. For reference, Castor is the one to the north!



23 UMa

RA: 142.88° | 9h 31.5' — DEC: 63.07° | 63° 4'

Magnitude: 3.7 | 9.2

Separation: 22.7"

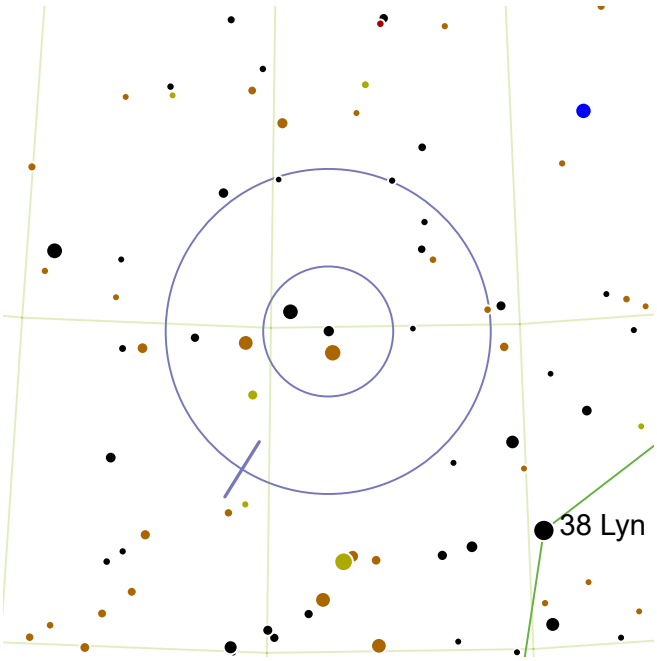
Position Angle: 267°

SAO 14908 | HIP 46733 | GDR2 89128664960

A brilliant yellowish primary well separated from a faint secondary.

23 UMa is a bright star in Ursa Major. Two finder circles NWW from magnitude 1.95 Dubhe.

Located nearly 78 light-years from Earth, the primary of this gravitationally bound system burns with nearly 15 times the light of the Sun.



Struve 1369

RA: 143.85° | 9h 35.39' — DEC: 39.95° | 39° 57'

Magnitude: 7.0 | 8.0

Separation: 24.7"

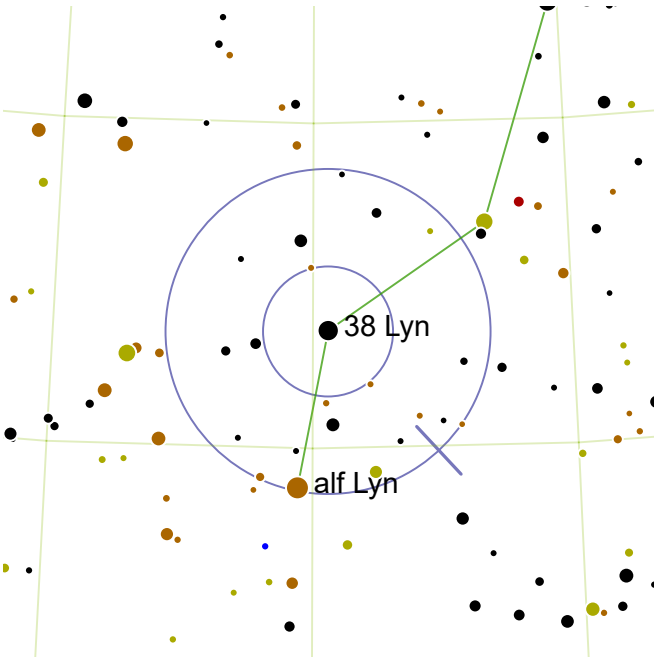
Position Angle: 148°

SAO 42931 | HIP 47053 | GDR2 9701758080

An orange-yellow pair, widely separated.

One and a half finder circles north-east of Struve 1333.

The primary is an eclipsing binary system with a period of 1.68 days.



38 Lyn

RA: 139.71° | 9h 18.84' — DEC: 36.8° | 36° 48'

Magnitude: 3.92 | 6.09

Separation: 2.62"

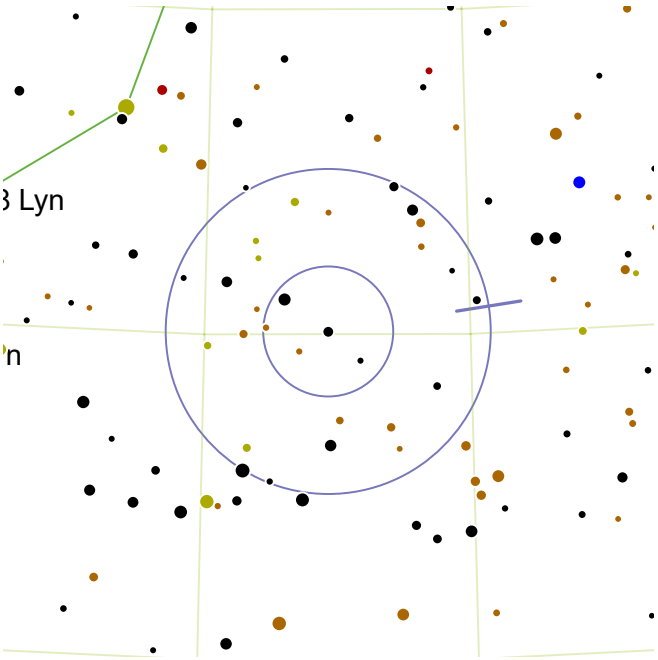
Position Angle: 223°

SAO 61391 | HIP 45688 | GDR2 8347151360

A bright white primary narrowly separated from a brightish white secondary.

Look for the bright star nearly 3 degrees north of Alpha Lyncis.

A dim galaxy, NGC 2859, lies 2.5 degrees SSE of this double.



Struve 1282

RA: 132.68° | 8h 50.7' — DEC: 35.07° | 35° 4'

Magnitude: 7.5 | 7.5

Separation: 3.6"

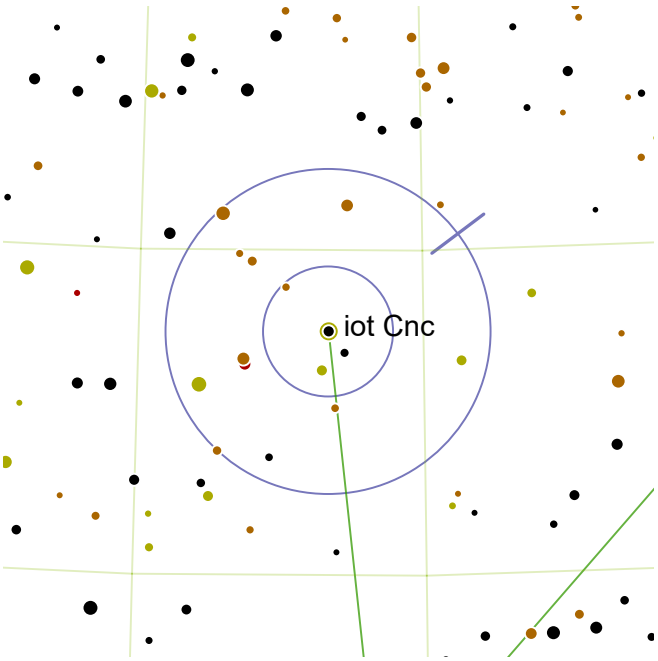
Position Angle: 279°

SAO 61077 | HIP 43426 | GDR2 1236997888

A faint double consisting of two equal and very close yellow stars.

Two finder circles west of Struve 1333.

The primary is a main-sequence F8 star, so it is somewhat brighter and less yellow than our Sun.



Iota Cnc

RA: 131.68° | 8h 46.7' — DEC: 28.77° | 28° 46'

Magnitude: 4.2 | 6.6

Separation: 30"

Position Angle: 307°

SAO 80416 | HIP 43103 | GDR2 0011771264

A strongly colored deeply yellow and blue pair. The separation is wide but both components are bright.

Iota Cancri is a finder circle to the north east of Phi2 Cancri.

The yellow primary is a G-class giant star over 200 times brighter and 3.5 times more massive than the Sun, while secondary is a main-sequence dwarf roughly twice the mass of the Sun and only 16 times brighter.

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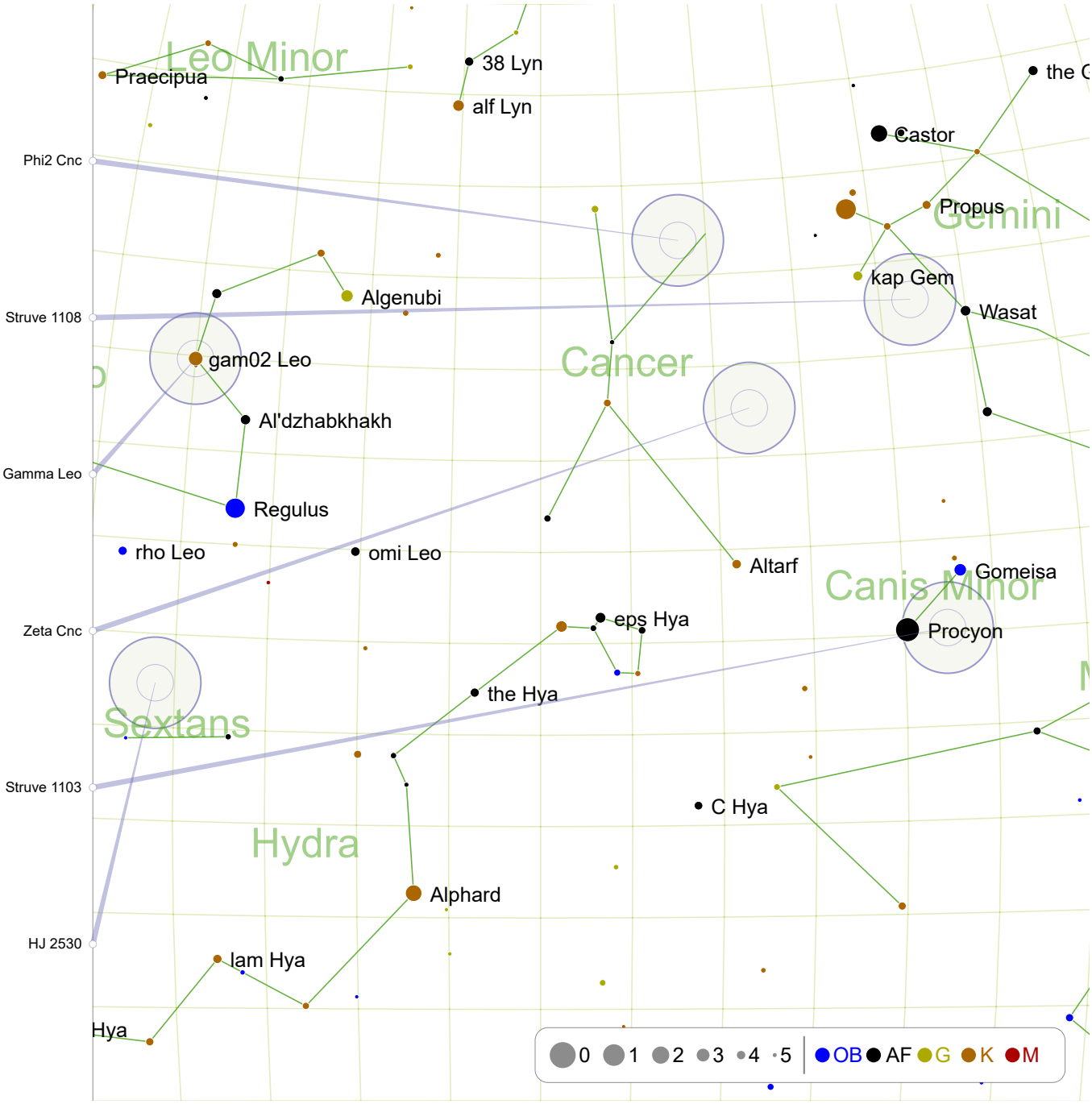
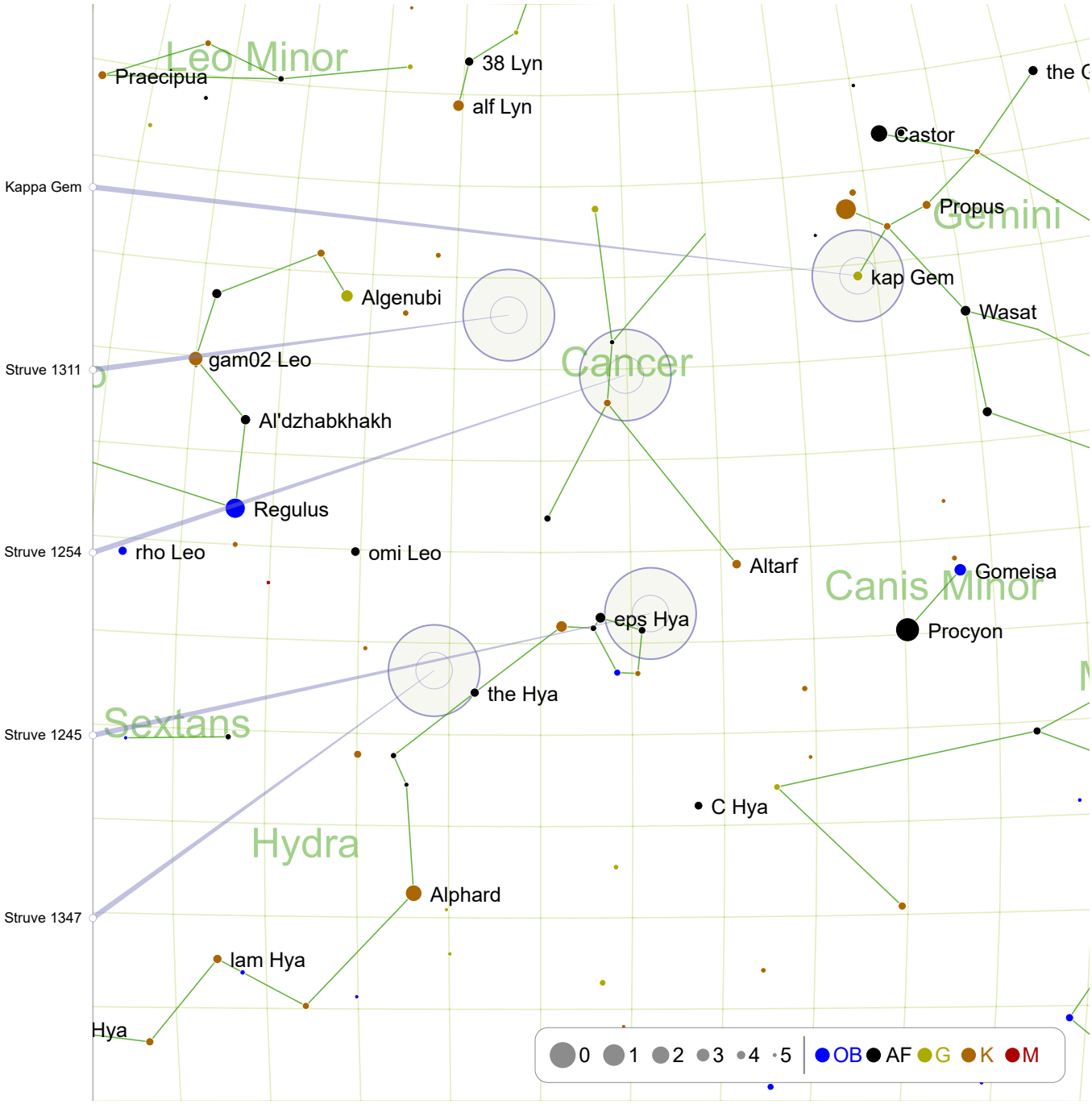
Late Winter - Looking South (1)

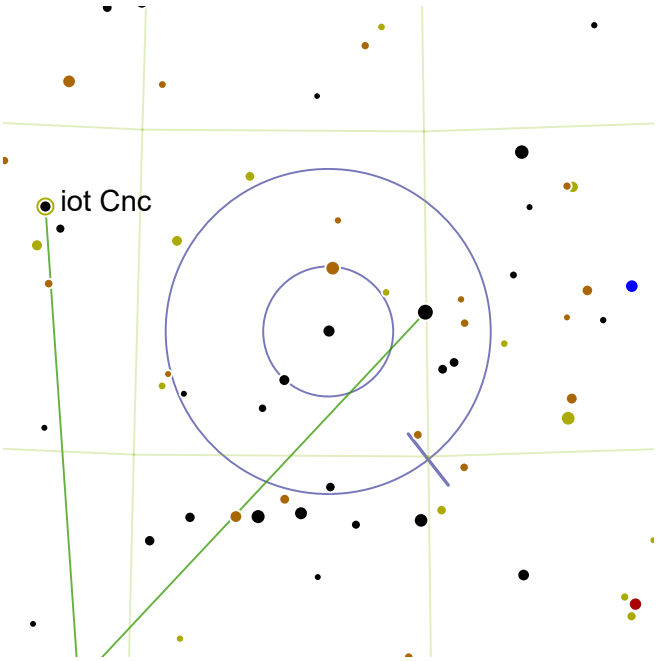


Phi2 Cnc: page 139 Struve 1108: page 139 Gamma Leo: page 140 Zeta Cnc: page 140
Struve 1103: page 141 HJ 2530: page 141

Late Winter - Looking South (2)



Kappa Gem: page 142 Struve 1311: page 142 Struve 1254: page 143 Struve 1245: page 143
Struve 1347: page 144



Phi2 Cnc

RA: 126.7° | 8h 26.8' — DEC: 26.93° | 26° 56'

Magnitude: 6.3 | 6.3

Separation: 5.1"

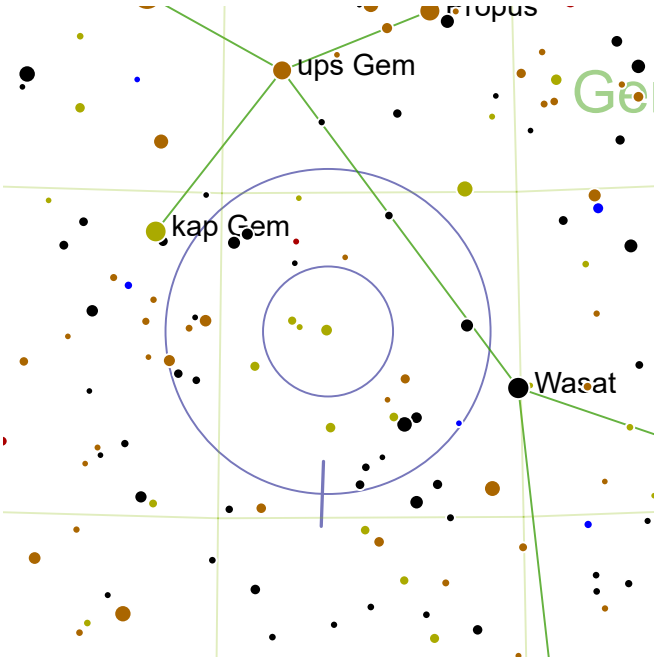
Position Angle: 218°

SAO 80188 | HIP 41404 | GDR2 0631907456

Two identical bright white stars nearly touching each other.

Track east by two finder circles from Pollux to Algeiba. Phi2 is in the middle of a Y of relatively dim stars.

Once you have found this one, the good news is lovely Iota Cancri is a finder circle away to the north east.



Struve 1108

RA: 113.2° | 7h 32.8' — DEC: 22.88° | 22° 53'

Magnitude: 6.6 | 8.3

Separation: 11.5"

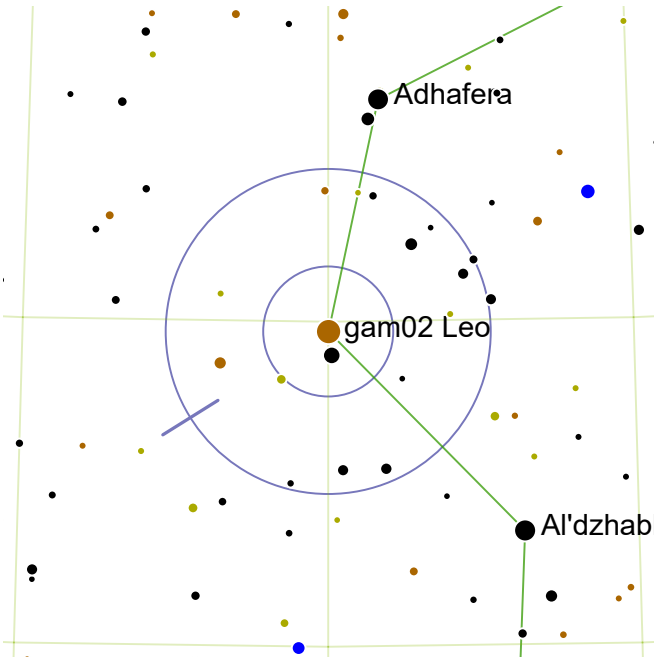
Position Angle: 178°

SAO 79489 | HIP 36690 | GDR2 3847454592

A yellow primary comfortably separated from a blue secondary.

Struve 1108 lies one and a half finder circles east of Wasat, which marks the hips of Pollux. Wasat is a worthy double star in its own right.

With this double centered in the finder, the Eskimo Nebula (a planetary nebula) lies on the SSW edge of the finder circle. Open cluster NGC 2420 is in the SE quadrant of the finder.



Gamma Leo

RA: 155.0° | 10h 20.0' — DEC: 19.85° | 19° 51'

Magnitude: 2.2 | 3.5

Separation: 4.4"

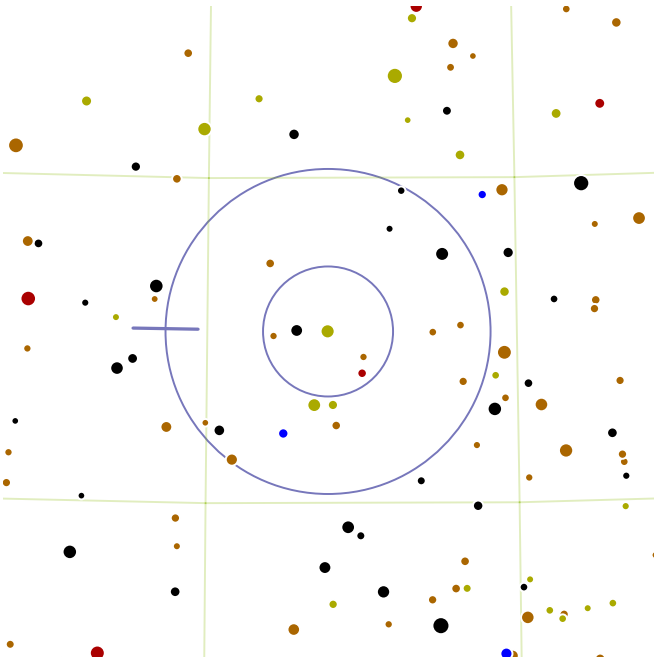
Position Angle: 122°

SAO 81298 | HIP 50583

Known variously as Gamma Leonis or Algeiba, this is one of the finest yellow-yellow doubles, being both bright, fairly balanced and tightly bound.

Unmissable as the bright star at the base of Leo's head.

The components are at least 170 astronomical units apart and orbit each other in roughly 500 years. The A component has at least one exoplanet.



Zeta Cnc

RA: 123.05° | 8h 12.19' — DEC: 17.65° | 17° 39'

Magnitude: 5.6 | 6.0

Separation: 5.9"

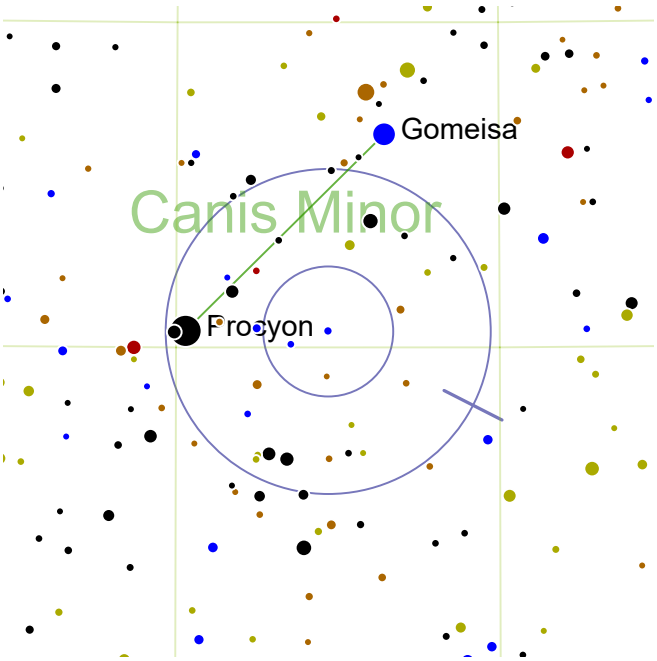
Position Angle: 89°

SAO 97646 | HIP 40167 | GDR2 1593509376

An equal pair of closely bound and bright yellow stars.

Castor and Pollux point south to this double. Follow the imaginary line south-east for three times the separation of Castor and Pollux.

One and a half finder circles NEE is the wonderful Beehive Cluster. Under dark skies this cluster rivals the Pleiades as a naked-eye sight!



Struve 1103

RA: 112.65° | 7h 30.6' — DEC: 5.25° | 5° 15'

Magnitude: 7.7 | 9.2

Separation: 4.4"

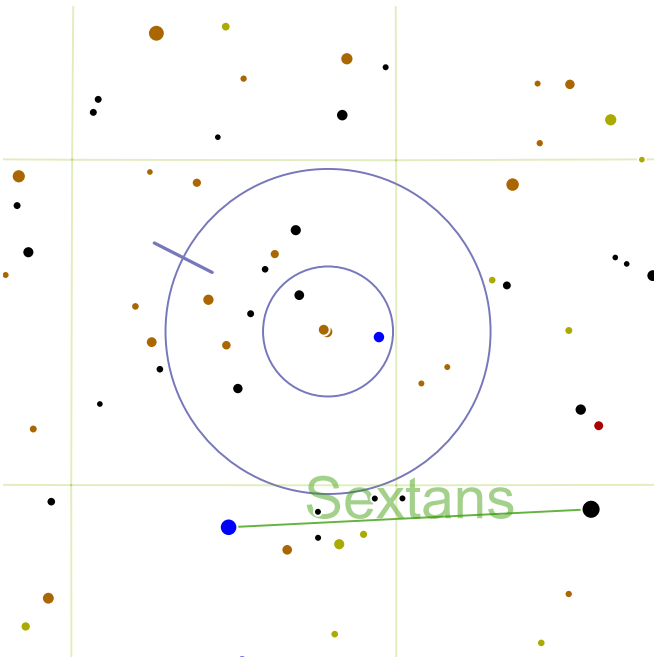
Position Angle: 243°

SAO 115532 | HIP 36499 | GDR2 3141290328124151680

A close but relatively faint yellow-blue pairing.

Position brilliant Procyon on the eastern edge of the finder; Struve 1103 should be in the center.

Procyon is a fine and extremely challenging double star, similar to but harder than Sirius as it is a bright nearby star and its companion is a dim white dwarf (magnitude difference 10.34, position angle 328°, separation 4.8").



HJ 2530

RA: 156.05° | 10h 24.2' — DEC: 2.37° | 2° 22'

Magnitude: 6.4 | 6.7

Separation: 201.6"

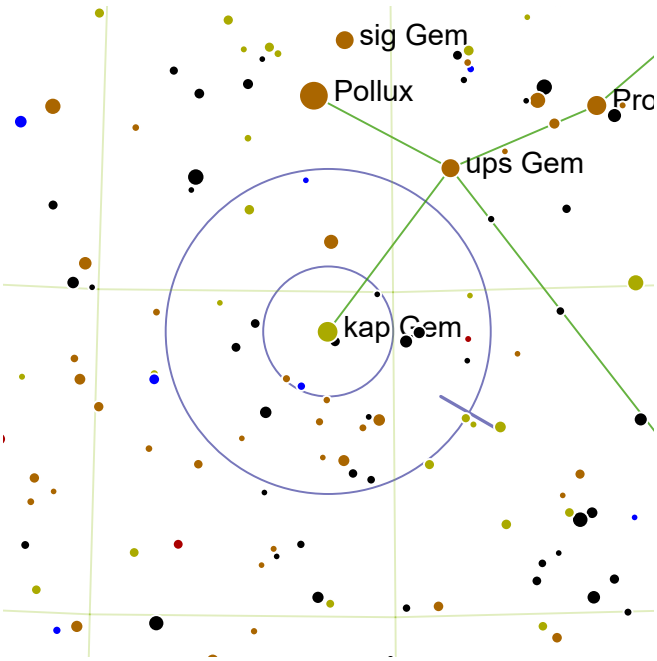
Position Angle: 63°

SAO 118278 | HIP 50939 | GDR2 23812160640

An bright equal pair, extremely widely separated. Best enjoyed in the finder scope!

One finder circle SSW from magnitude 3.85 rho Leo.

The primary is a nearby yellow star slightly cooler than our Sun, and is only 307 light-years away. The secondary component is not gravitationally bound.



Kappa Gem

RA: 116.1° | 7h 44.39' — DEC: 24.4° | 24° 24'

Magnitude: 3.6 | 8.1

Separation: 7.1"

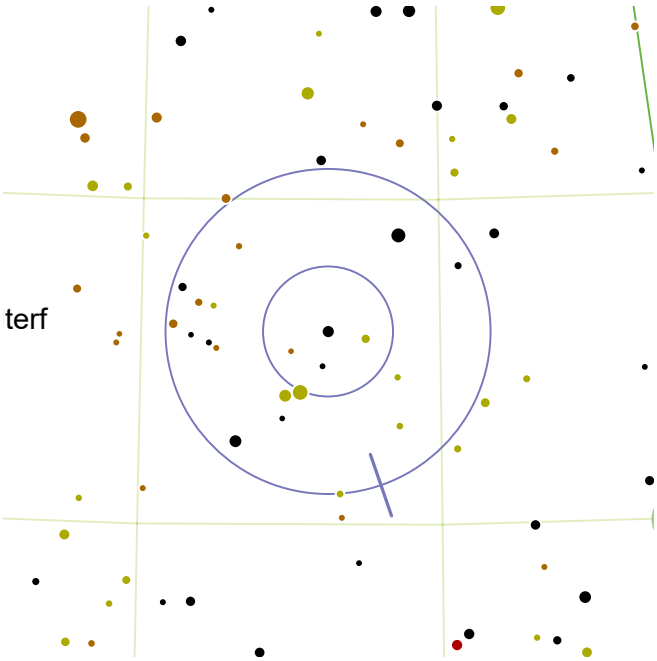
Position Angle: 240°

SAO 79653 | HIP 37740 | GDR2 9158182656

A brilliant orange primary with a small blue companion close by.

Kappa Geminorum is Pollux's right hand, the southernmost of the stars marking their linked arms.

The primary, 68 times brighter than the Sun, is 11 times larger than our star by radius. The system is roughly two billion years old and lies 141 light-years away.



Struve 1311

RA: 136.88° | 9h 7.5' — DEC: 22.98° | 22° 59'

Magnitude: 6.9 | 7.1

Separation: 7.5"

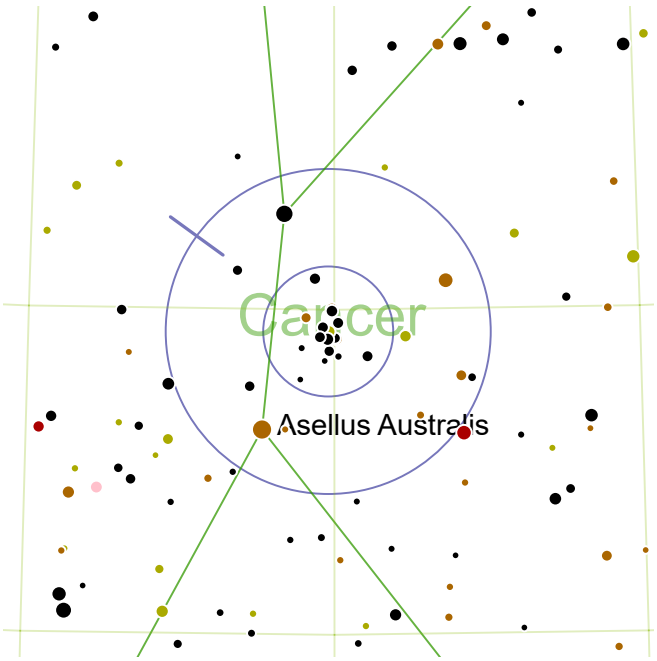
Position Angle: 199°

SAO 80643 | HIP 44768 | GDR2 7313623168

A close pair of equal yellowish stars.

One and a half finder circles W from magnitude 3.12 Algenubi. Two finder circles SSW from magnitude 3.3 alf Lyn.

Only 190 light-years from Earth, this system is composed of two F-class stars. Larger telescopes might spot a C component (magnitude 13.2, separation 27.8, position angle 117°). The C component is not gravitationally bound to the other two components, and is instead only a background star.



Struve 1254

RA: 130.1° | 8h 40.39' — DEC: 19.67° | 19° 40'

Magnitude: 6.4 | 10.4

Separation: 20"

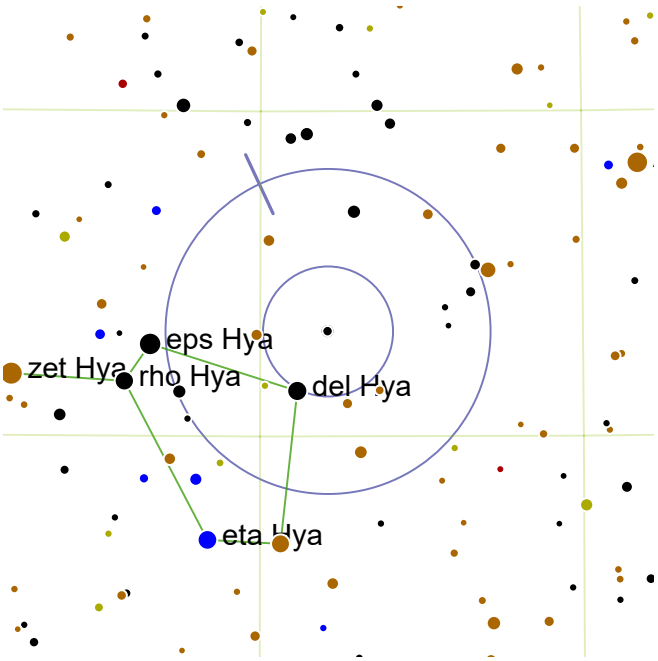
Position Angle: 54°

SAO 98021 | HIP 42549 | GDR2 0936069632

A wide yellow-blue pairing, but the small blue component is very faint.

Found at the very center of the Praesepe cluster.

The primary is a K-class giant 712 light-years from the Sun. It is not clear if the companion is gravitationally bound to the primary, or if this is just a line-of-sight pairing.



Struve 1245

RA: 128.95° | 8h 35.79' — DEC: 6.62° | 6° 37'

Magnitude: 6.0 | 7.2

Separation: 10.3"

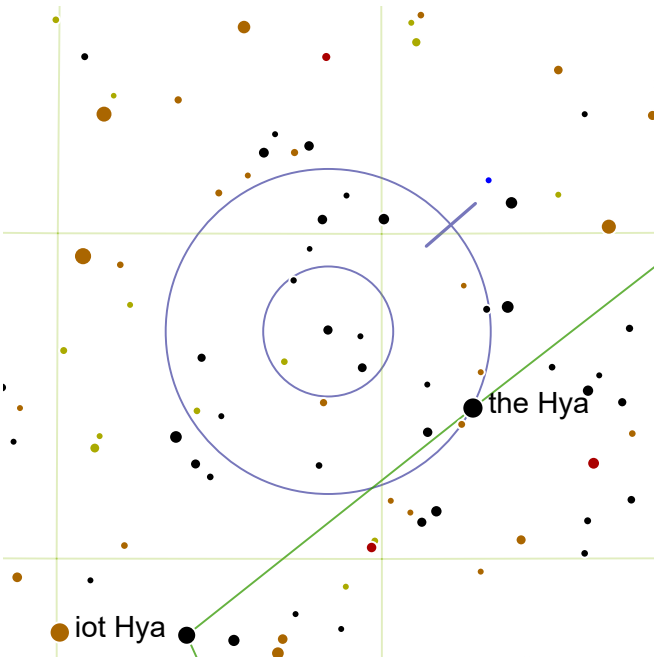
Position Angle: 25°

SAO 116929 | HIP 42172 | GDR2 8593414016

A well matched white-yellow pair, easily separated.

A degree north west of dim Delta Hydra, Struve 1245 might be found more easily by tracking west from Procyon for three finder circles.

Struve 1245 is only 82 light-years from the Sun. The secondary star is similar to the Sun, but slightly cooler.



Struve 1347

RA: 140.82° | 9h 23.29' — DEC: 3.5° | 3° 30'

Magnitude: 7.3 | 8.6

Separation: 21.2"

Position Angle: 311°

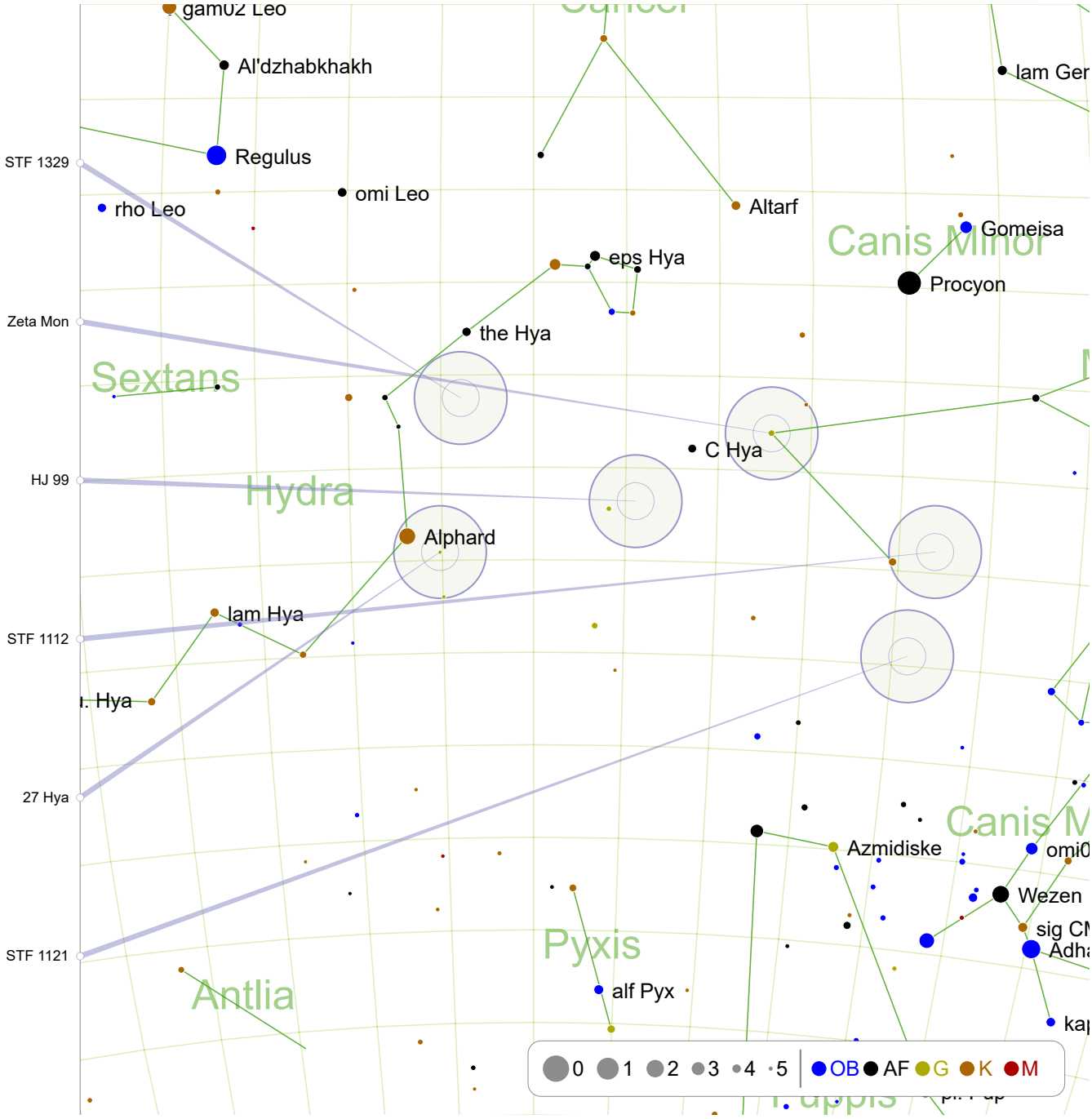
SAO 117641 | HIP 46029

A wide pair of slightly yellowish stars.

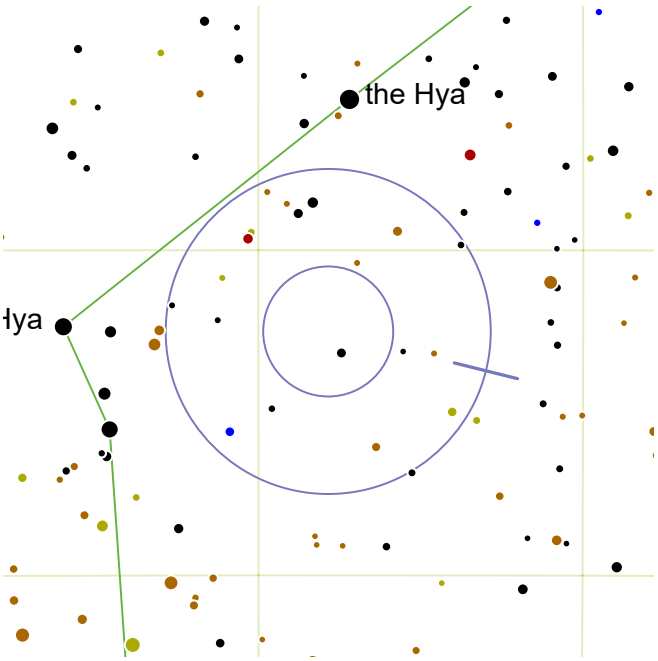
Three finder circles south west of Regulus. Position magnitude 3.85 Theta Hydra on the south western edge of the finder and Struve 1347 should be in the center.

This pair of main-sequence stars is only 109 light-years from the Sun.

Late Winter - Southern Horizon



STF 1329: page 146 Zeta Mon: page 146 HJ 99: page 147 STF 1112: page 147
27 Hya: page 148 STF 1121: page 148



STF 1329

RA: 138.93° | 9h 15.7' — DEC: -1.25° | -1° 14'

Magnitude: 8.7 | 8.7

Separation: 13.1"

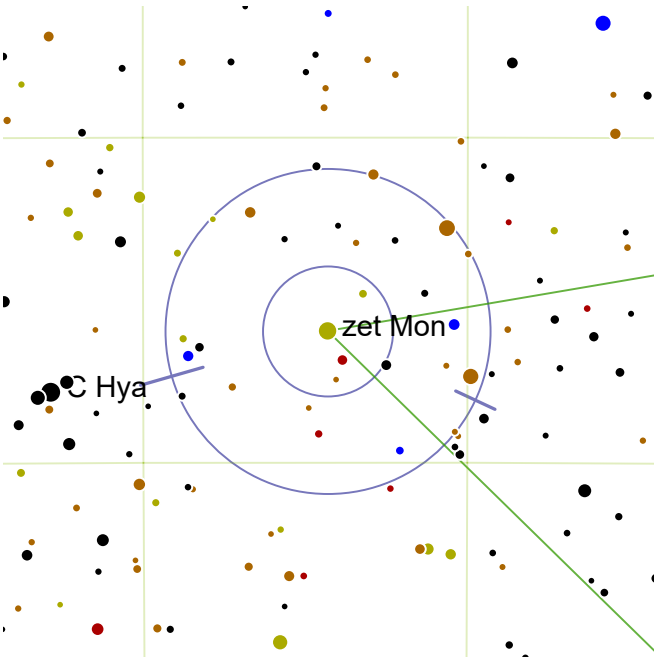
Position Angle: 256°

SAO 136705 | GDR2 3841759877320639360

A close and equal yellow pairing.

Half a finder circle S from magnitude 3.84 the Hya. One and a half finder circles SE from magnitude 3.3 zet Hya.

This double is a line of sight pairing. The components are not gravitationally bound.



Zeta Mon

RA: 122.15° | 8h 8.6' — DEC: -2.98° | -2° 58'

Magnitude: 4.5 | 10.3 | 9.7

Separation: 33" | 67"

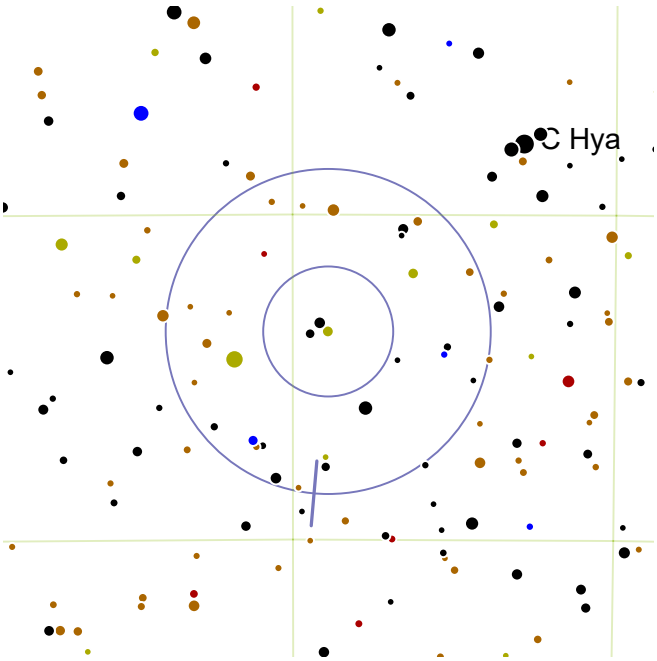
Position Angle: 106° | 245°

SAO 135551 | HIP 39863

A widely separated triple system with two brighter yellow components and a fainter orange companion.

Two finder circles south east of Procyon.

The main component is yellow supergiant six times the mass of the Sun with 2,200 times the luminosity.



HJ 99

RA: 129.45° | 8h 37.79' — DEC: -6.8° | -6° 47'

Magnitude: 6.8 | 8.3

Separation: 60.5"

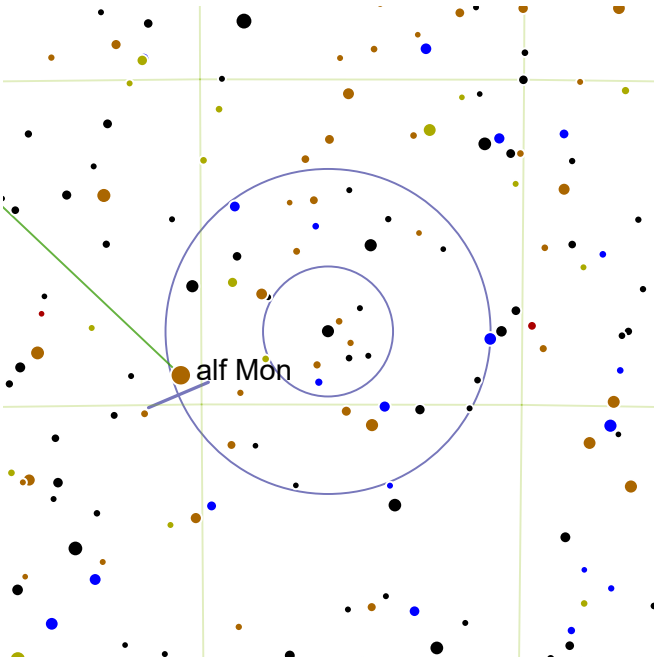
Position Angle: 175°

SAO 136111 | HIP 42333 | GDR2 87956174720

A yellow primary with a reasonably balanced secondary, distantly separated.

Half a finder circle SE from magnitude 3.95 C Hya. Two finder circles W from magnitude 2.16 Alphard.

The primary is also a variable designated V401 Hya (Δ magnitude 0.05).



STF 1112

RA: 113.03° | 7h 32.1' — DEC: -8.88° | -8° 52'

Magnitude: 6.0 | 8.7

Separation: 23.9"

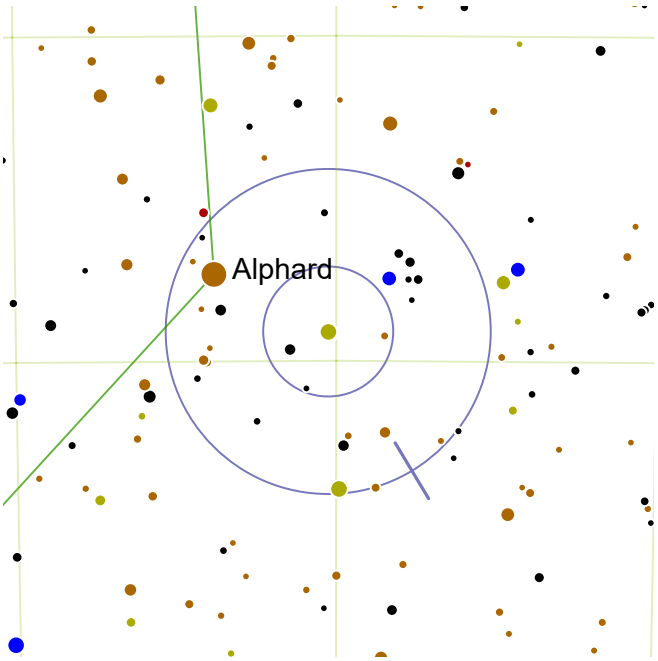
Position Angle: 113°

SAO 134806 | HIP 36640 | GDR2 81541641600

A yellow primary widely separated from a somewhat fainter white secondary.

Two and a half finder circles NEE from magnitude -1.58 Sirius. Two and a half finder circles SWW from magnitude 3.95 C Hya.

The binary system is only 91 light-years from Earth. Open star cluster NGC 2396 (mag. 7.4) lies just beyond the southern edge of the finder circle.



27 Hya

RA: 140.13° | 9h 20.5' — DEC: -9.55° | -9° 32'

Magnitude: 4.8 | 6.9

Separation: 229"

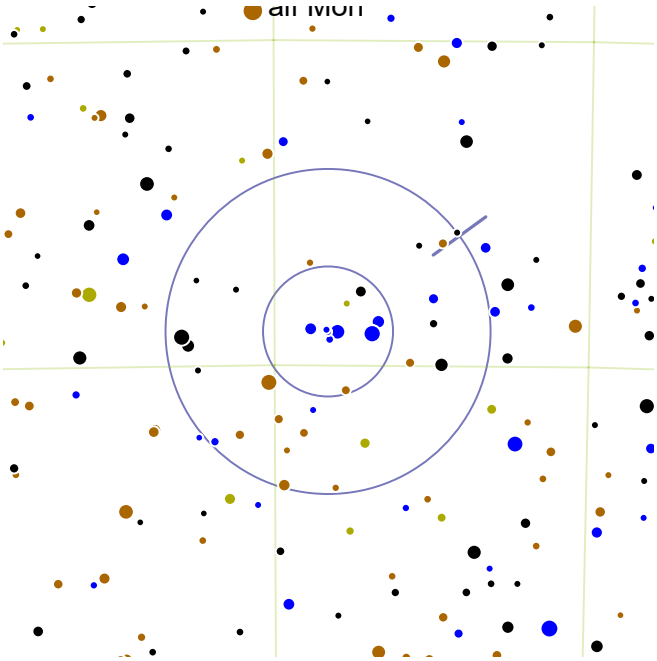
Position Angle: 211°

SAO 136768 | HIP 45811 | GDR2 62061629056

A brilliant orange-yellow primary with a pale yellow secondary, distantly separated.

One degree SWW from magnitude 2.16 Alphard. Two finder circles S from magnitude 3.84 the Hya.

The primary is twice the Sun's mass and roughly 1.9 billion years old, shining with 57.5 the luminosity of the Sun.



STF 1121

RA: 114.15° | 7h 36.6' — DEC: -14.48° | -14° 28'

Magnitude: 6.9 | 7.3

Separation: 7.4"

Position Angle: 306°

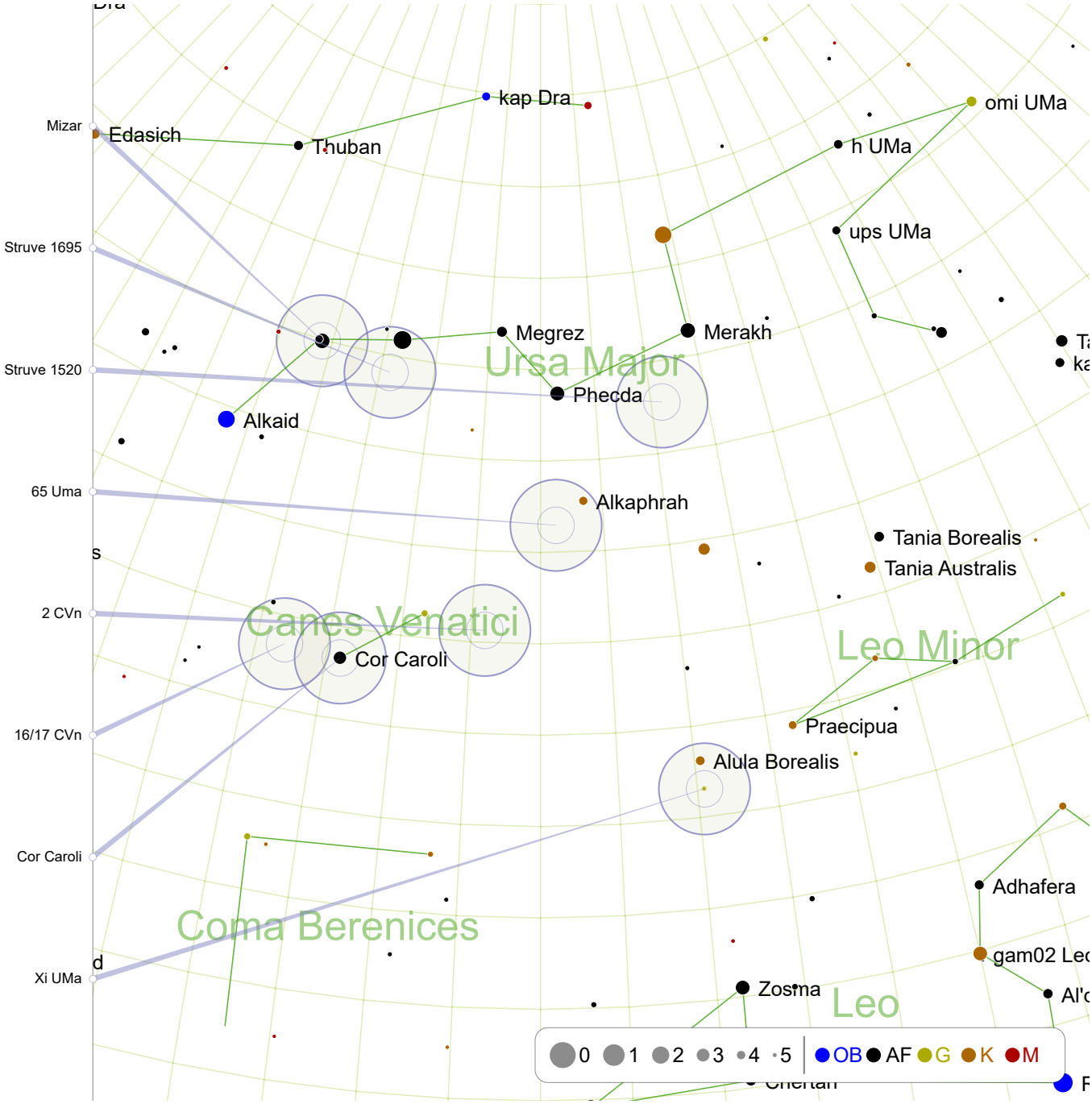
SAO 153143 | GDR2 88012822272

A close and equal pair of bluish stars.

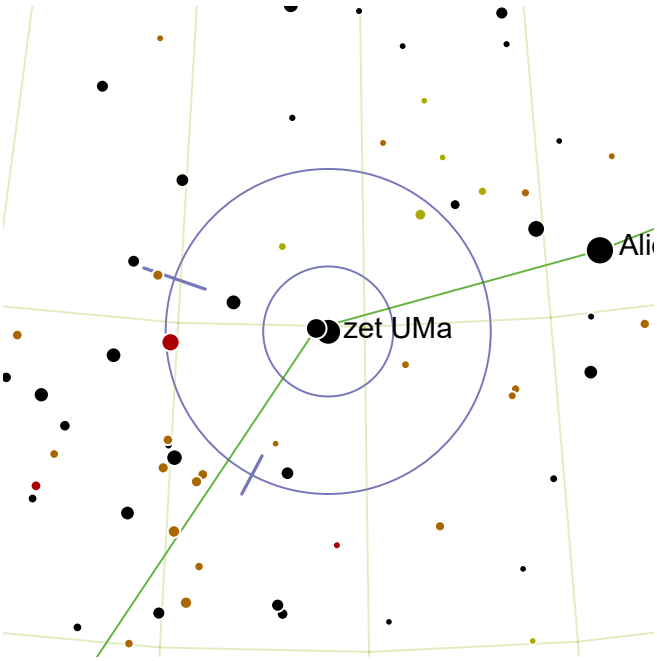
Two finder circles NNW from magnitude 3.47 Azmidiske.

With the double centered in the finder, there are three open clusters in view - M46 to the east, NGC 2423 to the north, and M47 in the center.

Early Spring - Looking North



Mizar: page 150 | Struve 1695: page 150 | Struve 1520: page 151 | 65 Uma: page 151
2 CVn: page 152 | 16/17 CVn: page 152 | Cor Caroli: page 153 | Xi UMa: page 153



Mizar

RA: 200.98° | 13h 23.89' — DEC: 54.93° | 54° 56'

Magnitude: 2.3 | 4.0 | 4.0

Separation: 709" | 14.4"

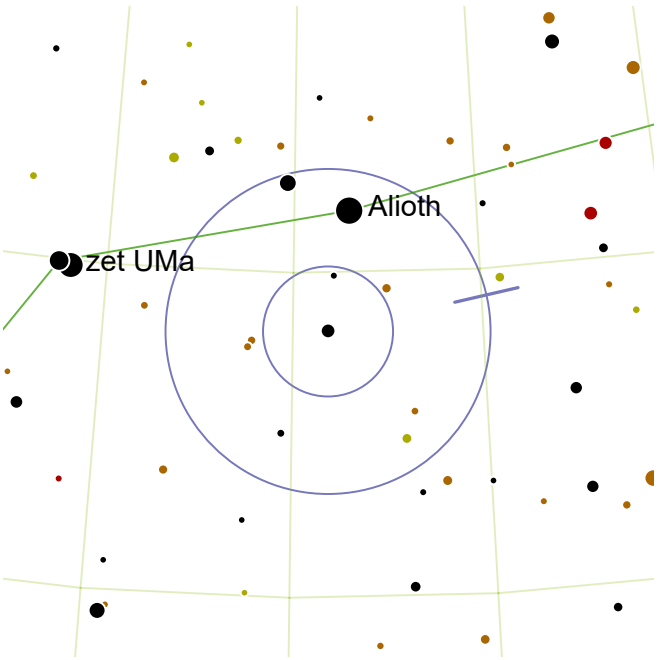
Position Angle: 71° | 152°

SAO 28737 | HIP 65378 | GDR2 79345330944

A delightful triple system of white stars easily separated in any telescope.

Mizar is the middle star of the handle of the Plough.

Those with good eyesight can see the star is double with the naked eye, but a telescope reveals a delightful triple system composed of fierce white stars. This system is unusual as the outlying member has its own official name, Alcor.



Struve 1695

RA: 194.08° | 12h 56.29' — DEC: 54.1° | 54° 6'

Magnitude: 6.0 | 7.9

Separation: 3.7"

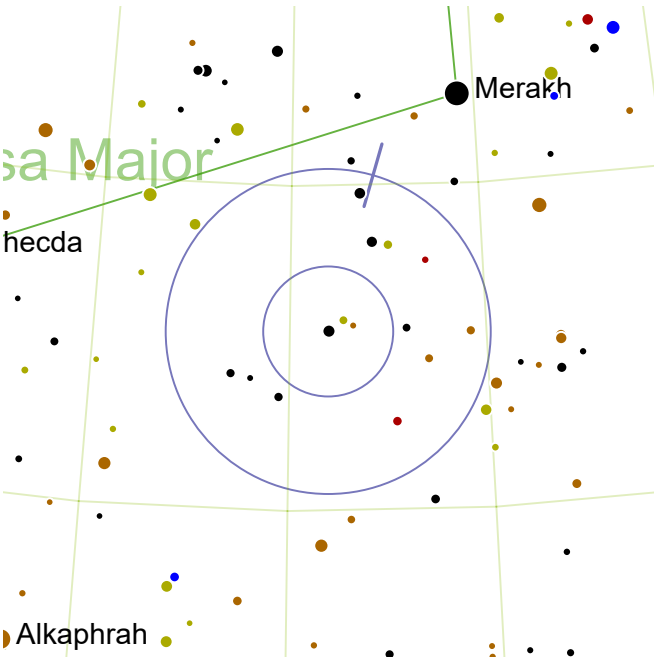
Position Angle: 283°

SAO 28572 | HIP 63143 | GDR2 72198878848

A bright yellow primary tightly separated from a fainter blue companion.

Struve 1695 lies one finder circle west of Mizar. Bright Alioth should be in the same finder circle as this double, roughly two degrees to the north.

The spectacular triple system of Mizar and Alcor lies one finder circle to the east.



Struve 1520

RA: 169.03° | 11h 16.1' — DEC: 52.77° | 52° 46'

Magnitude: 6.6 | 7.9

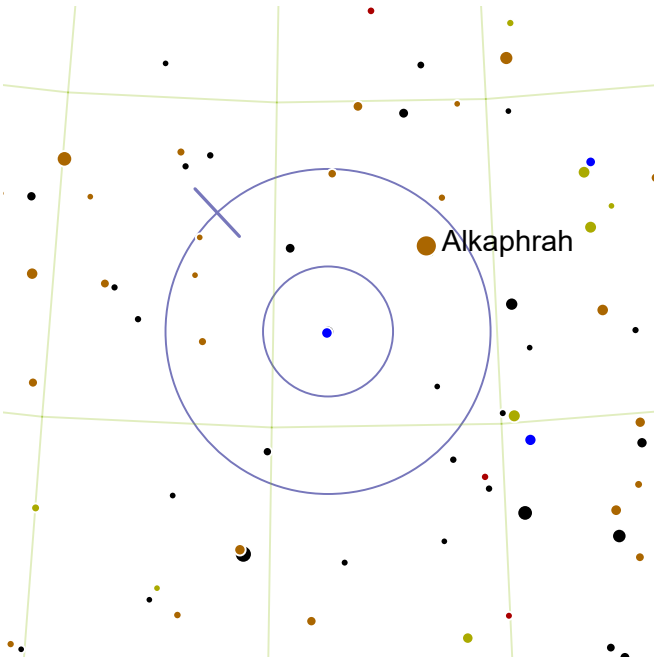
Separation: 12.7"

Position Angle: 344°

SAO 27970 | HIP 55044 | GDR2 5463337728

An easily separated pairing of two yellowish stars.

Two finder circles west of Phecda, and one and a half finder circles south east of Merakh.



65 Uma

RA: 178.78° | 11h 55.1' — DEC: 46.48° | 46° 29'

Magnitude: 6.5 | 8.3

Separation: 3.9"

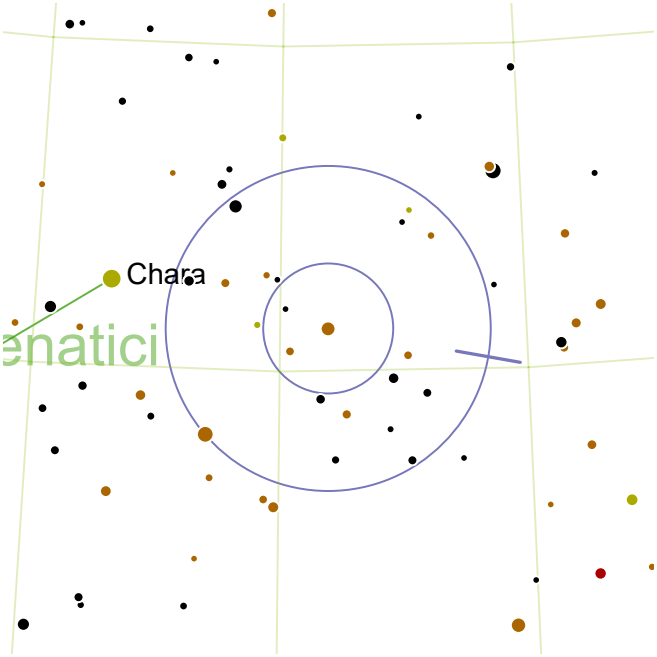
Position Angle: 43°

SAO 43945 | HIP 58112 | GDR2 2546451840

A white primary with a tightly bound secondary.

One and a half degrees SE from magnitude 3.85 Alkaphrah.

The Primary is itself an extreme double, with a magnitude 9.0 companion with a separation of 0.3" at position angle 358°.



2 CVn

RA: 184.03° | 12h 16.1' — DEC: 40.67° | 40° 40'

Magnitude: 5.8 | 8.1

Separation: 11.4"

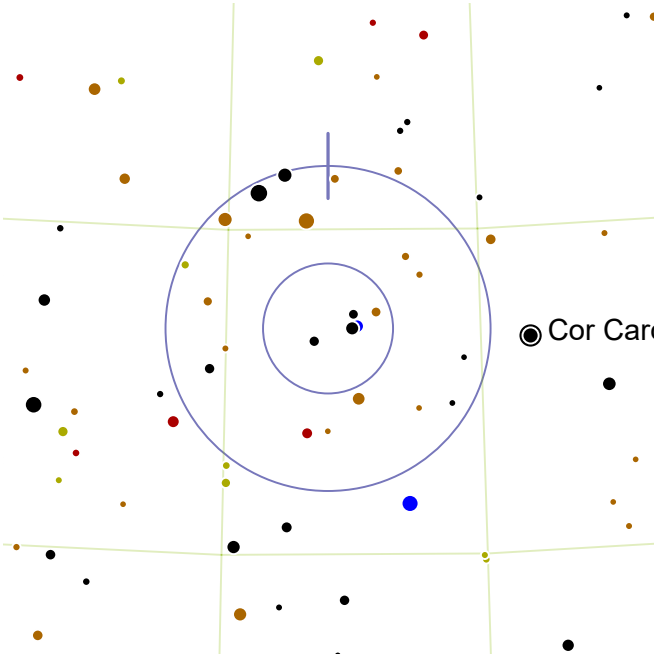
Position Angle: 260°

SAO 44097 | HIP 59831 | GDR2 25675920512

A yellow-blue pairing with easy separation.

This is two finder circles west of Cor Caroli. It forms the western corner of a two-degree square with four similarly bright stars.

Three galaxies lie close to this double. Find NGC 4151 two degrees to the south-west, while NGC 4369 two degrees to the south-east. Three degrees to the north east is NGC 4490.



16/17 CVn

RA: 198.0° | 13h 12.0' — DEC: 38.5° | 38° 30'

Magnitude: 6.0 | 6.3

Separation: 277.5"

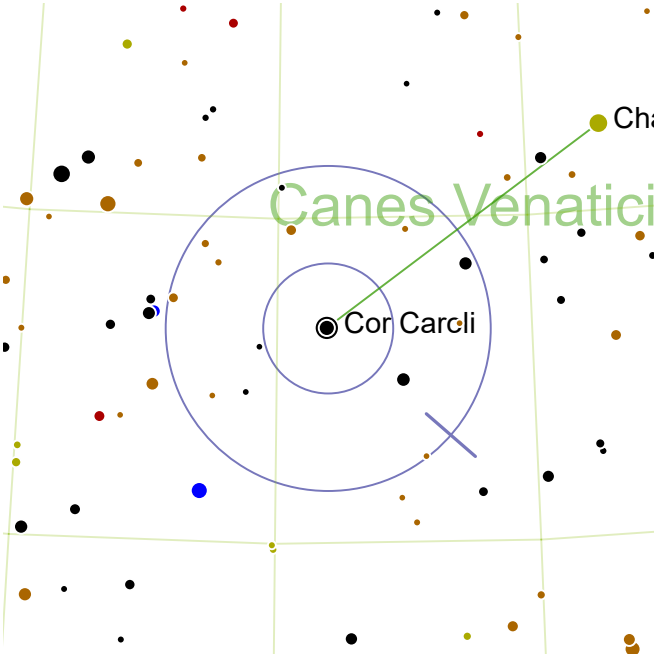
Position Angle: 0°

SAO 63380 | HIP 64246 | GDR2 17316419712

A distantly separated pair of bright white stars.

Half a finder circle E from magnitude 2.9 Cor Caroli. Two and a half finder circles SW from magnitude 1.91 Alkaid.

A good binocular or finderscope pair.



Cor Caroli

RA: 194.0° | 12h 56.0' — DEC: 38.32° | 38° 19'

Magnitude: 2.9 | 5.5

Separation: 19.4"

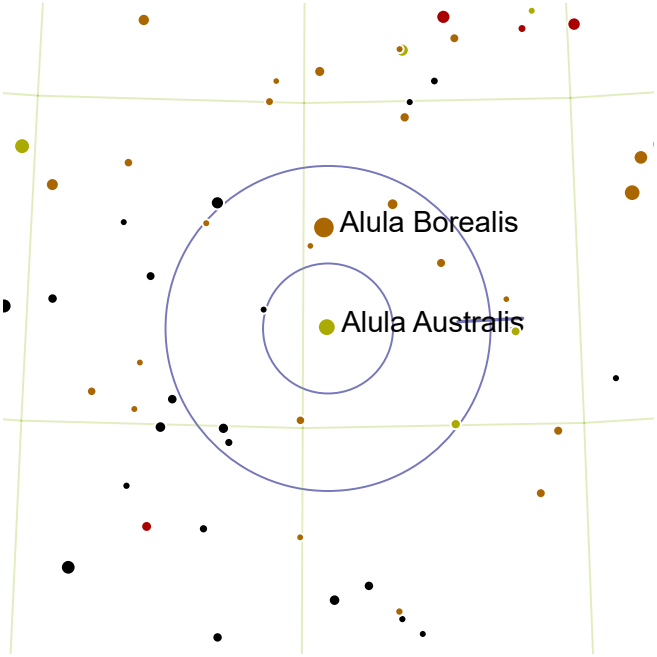
Position Angle: 229°

SAO 63257 | HIP 63125 | GDR2 16348324992

A brilliant white primary star with a more orange secondary, easily separated.

The handle of the Plough forms an arc with Cor Caroli at its focus point.

The name means "Charles' Heart" and was given the name by King Charles II of England's physician, who claimed the star shone especially bright on the night the king was restored to power following a period of revolution.



Xi UMa

RA: 169.55° | 11h 18.2' — DEC: 31.53° | 31° 32'

Magnitude: 4.3 | 4.8

Separation: 1.8"

Position Angle: 273°

SAO 62484 | HIP 55203

A bright white-yellow pair separated by anything between 1.6 and 3.0 arc seconds.

Two and a half finder circles north of Zosma.

Also known as Alula Australis, this was the first binary to have its 60-year orbit calculated in 1828. This is one to watch over the years as the separation evolves and the position angle rotates.

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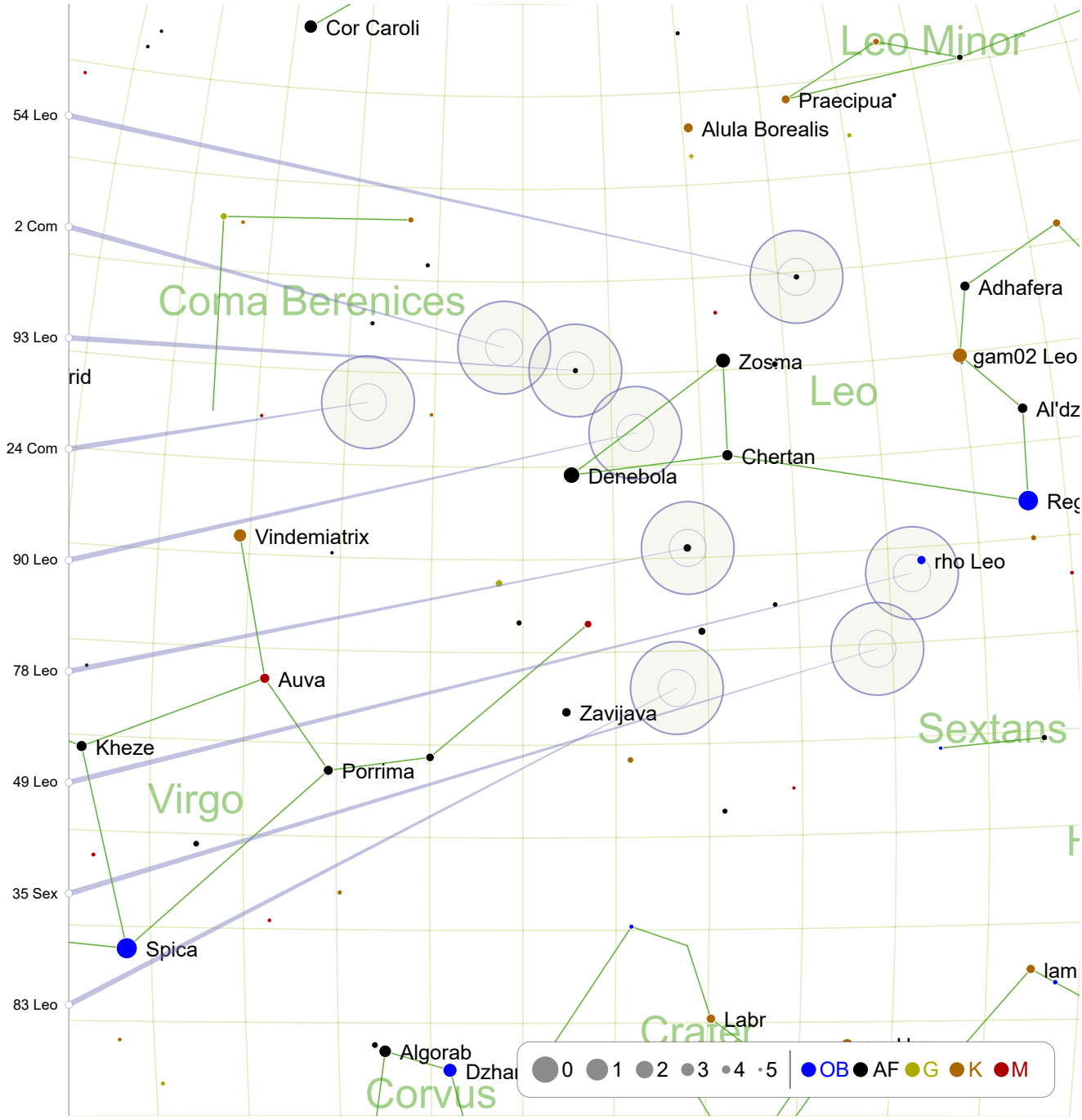
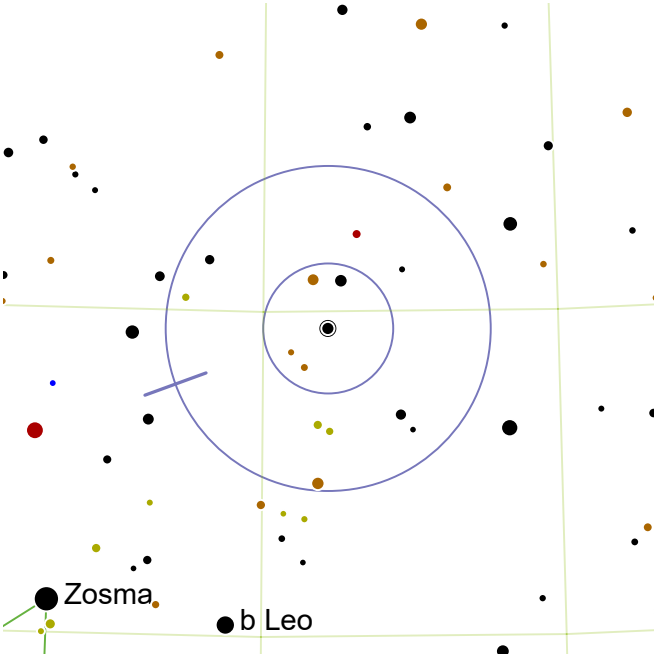
Early Spring - Looking South



54 Leo: page 156
2 Com: page 156
93 Leo: page 157
24 Com: page 157
90 Leo: page 158
78 Leo: page 158
49 Leo: page 159
35 Sex: page 159
83 Leo: page 160



54 Leo

RA: 163.9° | 10h 55.6' — DEC: 24.75° | 24° 45'

Magnitude: 4.5 | 6.3

Separation: 6.5"

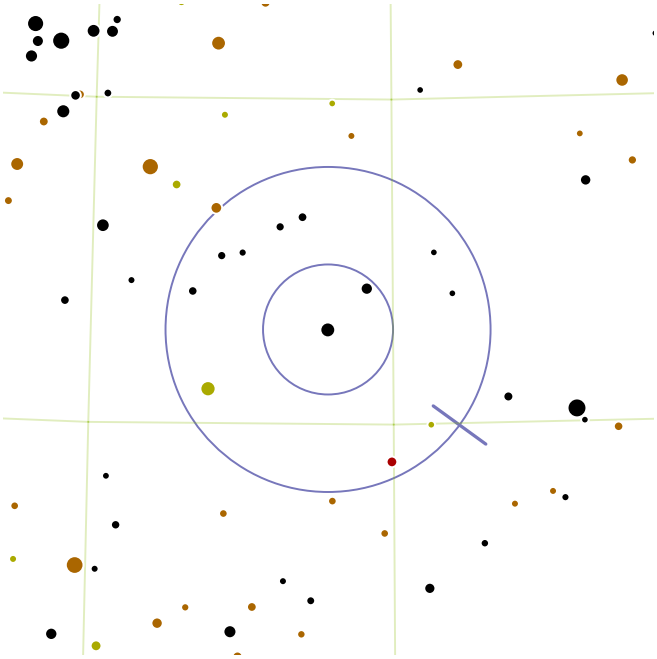
Position Angle: 110°

SAO 81583 | HIP 53417 | GDR2 10033740160

A bright white primary which shines very close to a fairly bright white companion.

Two finders north west of Zosma.

Two galaxies are nearby, both faint. NGC 3437 lies 2 degrees SSE, and NGC 3344 is 3 degrees east.



2 Com

RA: 181.08° | 12h 4.29' — DEC: 21.47° | 21° 28'

Magnitude: 6.2 | 7.5

Separation: 3.4"

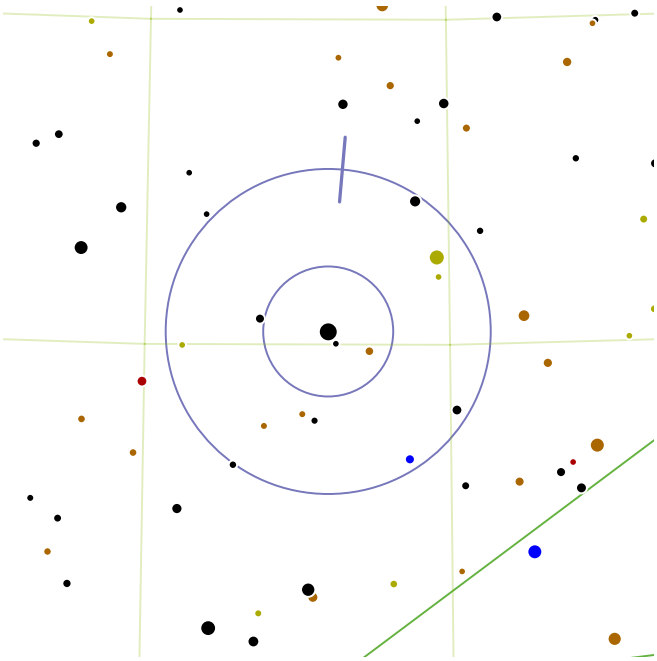
Position Angle: 234°

SAO 82123 | HIP 58858 | GDR2 73730936448

A white primary with a tightly bound and fairly apparent secondary.

One and a half finder circles NNE from magnitude 2.23 Denebola.

The bright Coma Berenices open cluster (Melotte 111) is one finder circle to the north east.



93 Leo

RA: 177.0° | 11h 47.98' — DEC: 20.22° | 20° 13'

Magnitude: 4.59 | 9.03

Separation: 74.9"

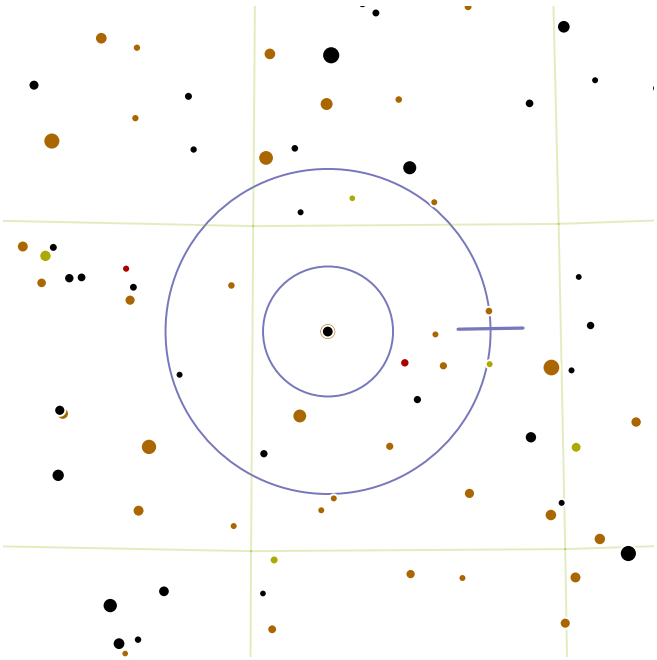
Position Angle: 355°

SAO 81998 | HIP 57565 | GDR2 11362055168

A bright white primary very widely separated from a faint companion.

One and a half finder circles directly north of Denebola.

There is a small galaxy one degree west of 93 Leonis.



24 Com

RA: 188.78° | 12h 35.1' — DEC: 18.38° | 18° 23'

Magnitude: 5.2 | 6.7

Separation: 20.3"

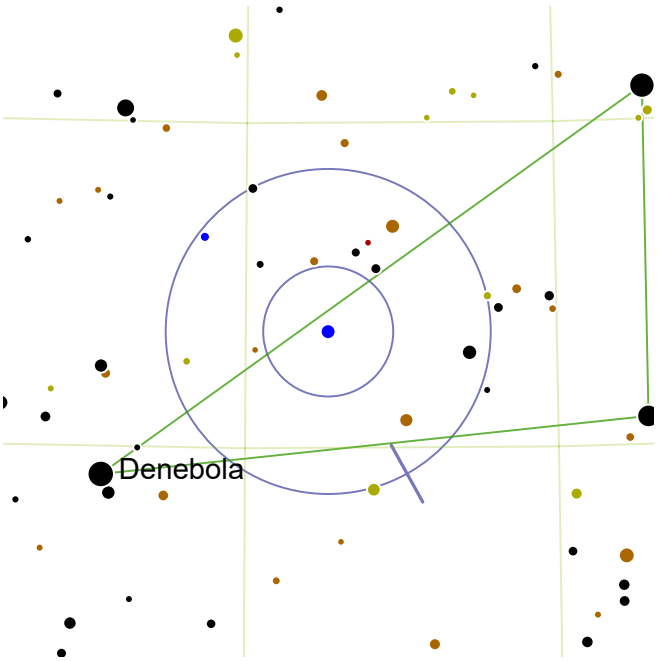
Position Angle: 271°

SAO 100160 | HIP 61418 | GDR2 69267207296

An orange-blue pair, with a reasonable bright secondary and easy separation.

Draw a line from Regulus to Chertan (the star of Leo's hind triangle closest to Regulus), and double it out to the east. This puts you in the neighborhood of 24 Com.

Track just over one finder south and your finder should be full of galaxies, light pollution permitting. Track two finders further East and your finder should show the globular clusters Messier 53 and NGC 5053.



90 Leo

RA: 173.68° | 11h 34.7' — DEC: 16.8° | 16° 48'

Magnitude: 6.3 | 7.3

Separation: 3.1"

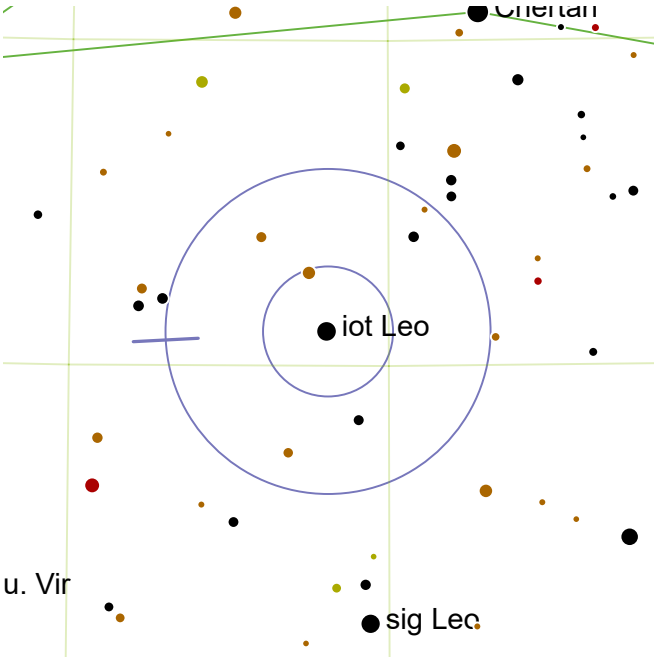
Position Angle: 209°

SAO 99673 | HIP 56473

A balanced pair of fairly bright bluish stars, very closely separated.

Half a finder circle NWW from magnitude 2.23 Denebola.

Three faint galaxies lie toward the western edge of the finder circle: NGC 3686, NGC 3684 and NGC 3681. This system is 1897 light-years from Earth.



78 Leo

RA: 170.95° | 11h 23.79' — DEC: 10.53° | 10° 32'

Magnitude: 4.06 | 6.71

Separation: 2.22"

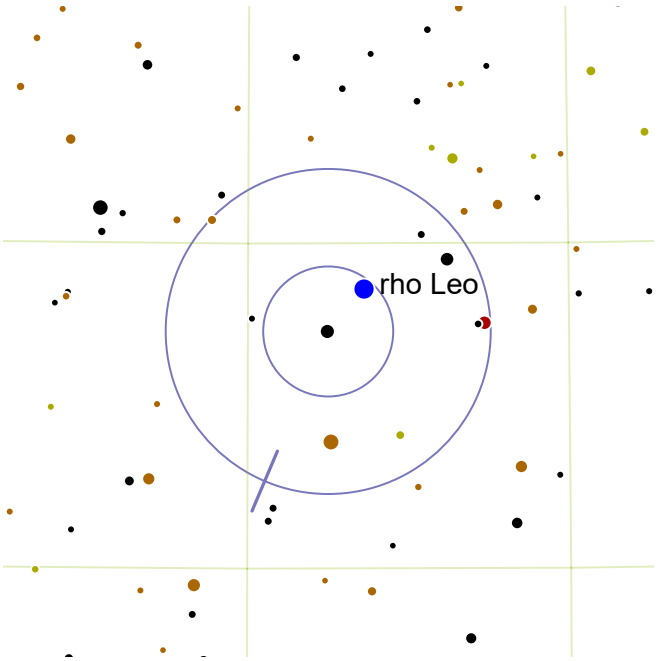
Position Angle: 93°

SAO 99587 | HIP 55642 | GDR2 30249291008

A tight white-yellow pair. The secondary is not too faint, but the primary shines brilliantly.

One and a half finder circles south west of bright Denebola (magnitude 2.10) at the rear of Leo.

The system lies only 78 light-years away. The yellow companion star is very similar to the Sun, with a mass approximately 8% greater. If you place 78 Leonis nn the south eastern edge of a finder, the famous Leo Triplet of galaxies fills the opposite quadrant.



49 Leo

RA: 158.75° | 10h 35.0' — DEC: 8.65° | 8° 39'

Magnitude: 5.8 | 7.9

Separation: 2.0"

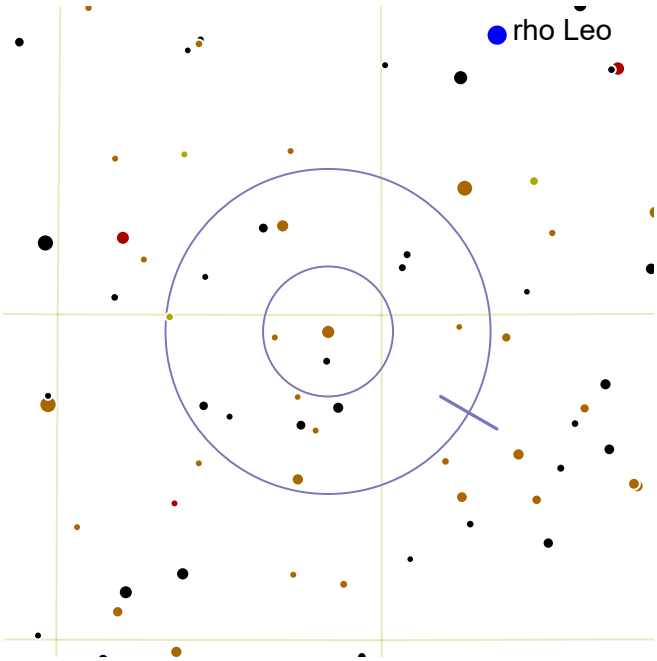
Position Angle: 157°

SAO 118380 | HIP 51802 | GDR2 97365638528

A bright white primary with an extremely close, reasonably apparent companion.

Half a degree SE from magnitude 3.85 rho Leo.

One finder circle to the north east, the finder view is full of galaxies, including M95, M96, M105, NGC 3384, NGC 3412, NGC 3377, and NGC 3367. The brightest is M96 at magnitude 9.25.



35 Sex

RA: 160.82° | 10h 43.29' — DEC: 4.75° | 4° 45'

Magnitude: 6.3 | 7.4

Separation: 6.8"

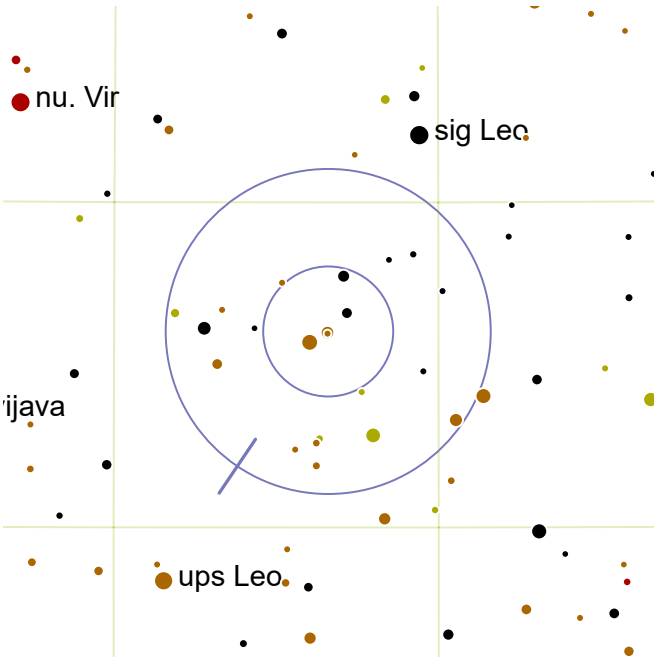
Position Angle: 240°

SAO 118449 | HIP 52452 | GDR2 36489909632

An unusual orange-yellow pairing, reasonably balanced and closely separated.

35 Sextantis is two finder circles south east of 47 Leonis.

A difficult double to locate far south east of Regulus. South east of Regulus lies 47 Leonis (magnitude 3.8), a very interesting pulsating variable star and also a spectroscopic binary. 47 Leonis is very massive, around 21 times the mass of the Sun and nearly 300,000 brighter than the Sun.



83 Leo

RA: 171.7° | 11h 26.79' — DEC: 3.02° | 3° 1'

Magnitude: 6.6 | 7.5

Separation: 28.6"

Position Angle: 146°

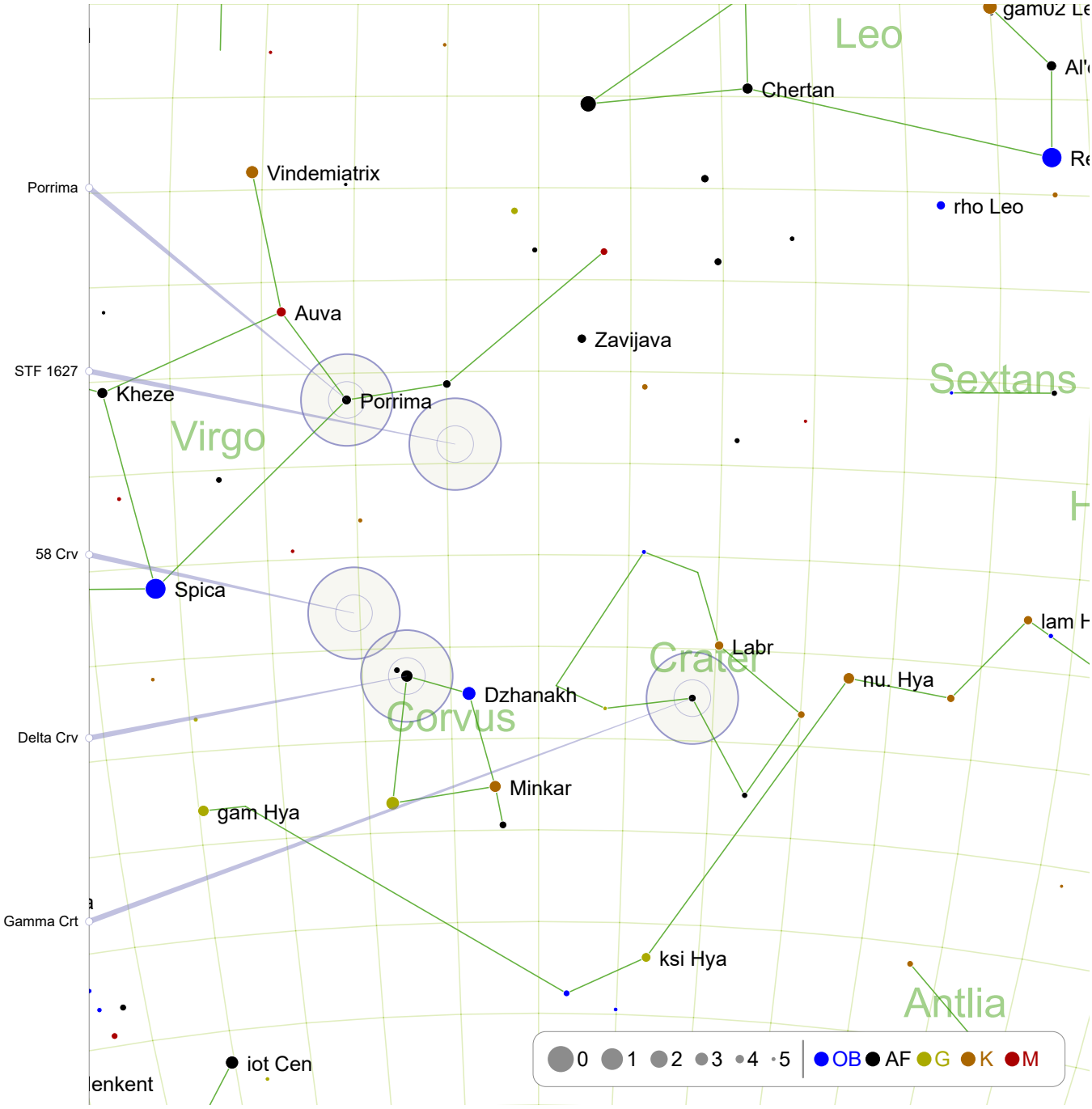
SAO 118864 | HIP 55846

A fairly bright yellow primary with an easily apparent orange secondary, widely separated.

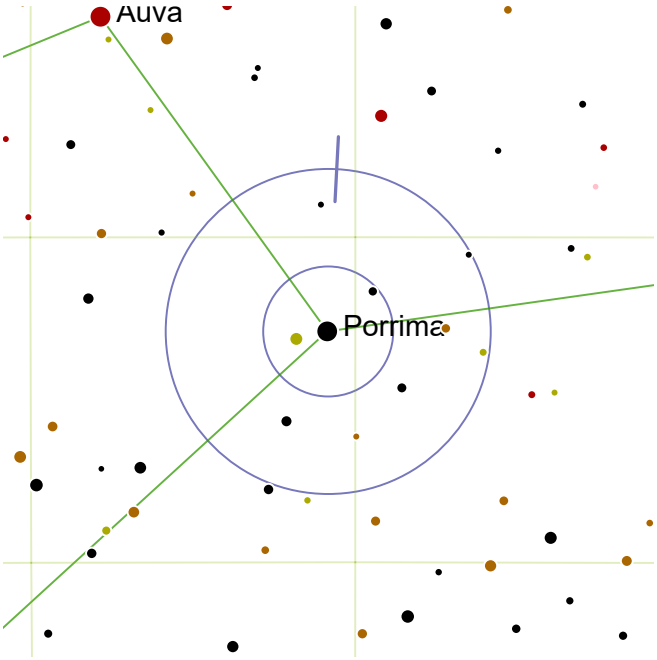
One finder circle NWW from magnitude 3.8 Zavijava.

The galaxy NGC 3640 (mag. 10.4) lies toward the eastern edge of the finder view.

Early Spring - Southern Horizon



Porrima: page 162 STF 1627: page 162 58 Crv: page 163 Delta Crv: page 163
Gamma Crt: page 164



Porrima

RA: 190.42° | 12h 41.66' — DEC: -1.45° | -1° 26'

Magnitude: 3.48 | 3.53

Separation: 2.93"

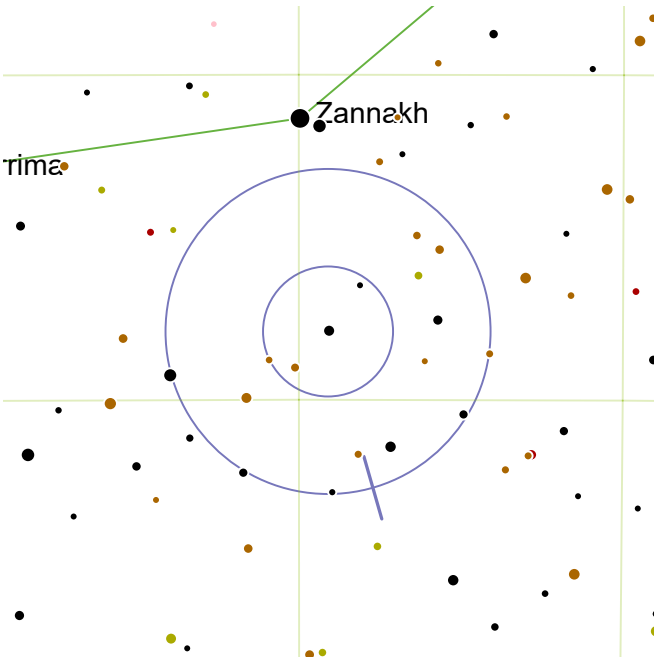
Position Angle: 357°

SAO 138917 | HIP 61941

An almost perfectly equal and very close pair of brilliant yellowish stars.

The bottom star of the "cup" of Virgo, Porrima lies on line between magnitude 0.95 Spica and magnitude 2.55 Zosma in Leo.

The galaxy NGC 4753 lies just beyond the eastern edge of the finder circle when this double is centered.



STF 1627

RA: 184.55° | 12h 18.2' — DEC: -3.95° | -3° 56'

Magnitude: 6.6 | 6.9

Separation: 20.1"

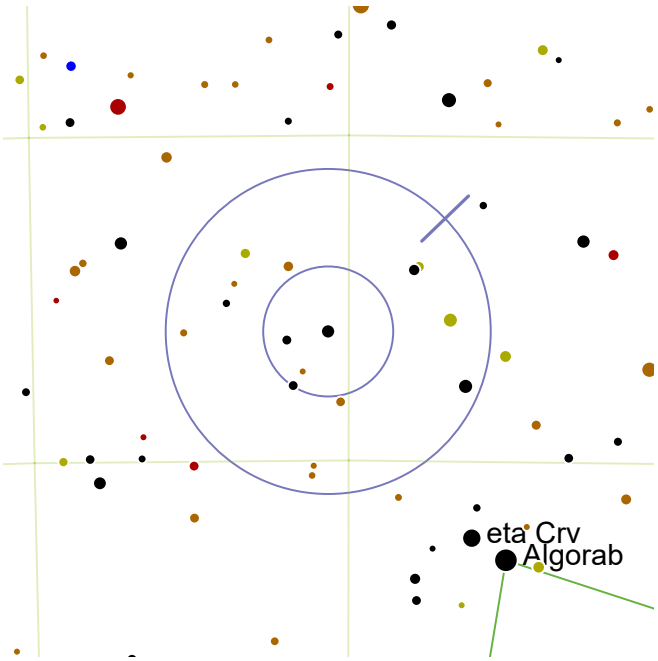
Position Angle: 196°

SAO 138704 | HIP 59984 | GDR2 78922038528

An equal and easily separated pair of fairly bright white stars.

One finder circle SWW from magnitude 3.68 gam Vir. One finder circle SWW from magnitude 3.65 Porrima.

This pair of F-class main sequence stars is only 172 light-years from Earth.



58 Crv

RA: 190.33° | 12h 41.29' — DEC: -13.02° | -13° 0'

Magnitude: 5.9 | 5.9

Separation: 5.3"

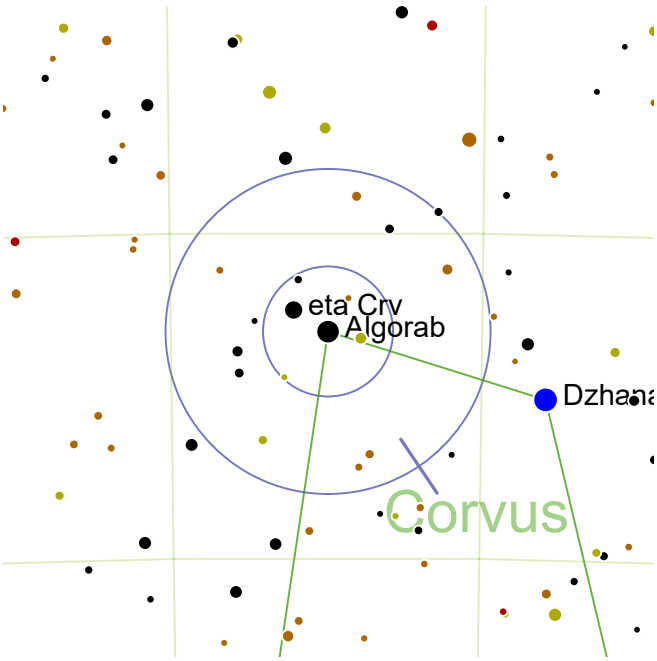
Position Angle: 314°

SAO 157448 | HIP 61910 | GDR2 41368899712

A close pair of bright, yellowish stars, with a third faint, widely separated component.

Half a finder circle NE from magnitude 3.11 Algorab. One and a half finder circles NE from magnitude 2.78 Dzhanakh.

With this double centered in the finder, the famous Sombrero Galaxy (M104, magnitude 8.0) is in the northern quarter of the finder circle.



Delta Crv

RA: 187.48° | 12h 29.89' — DEC: -16.52° | -16° 30'

Magnitude: 3 | 9.2

Separation: 24.2"

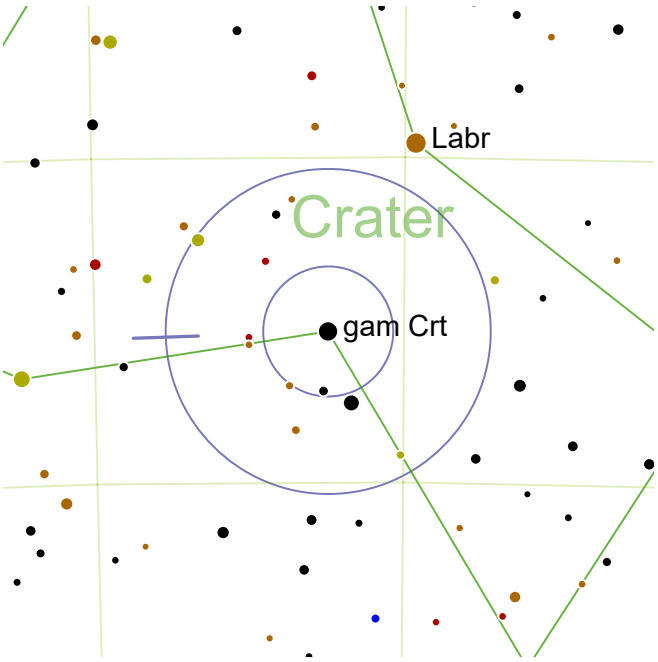
Position Angle: 214°

SAO 157323 | HIP 60965 | GDR2 71216143488

A brilliant bluish primary widely separated from a moderately faint companion.

Delta Crv is a bright star in Corvus. Half a finder circle NEE from magnitude 2.78 Dzhanakh.

This bright star, also known as Algorab, is a mere 87 light-years from Earth.



Gamma Crt

RA: 171.23° | 11h 24.89' — DEC: -17.68° | -17° 40'

Magnitude: 4.1 | 7.9

Separation: 4.4"

Position Angle: 92°

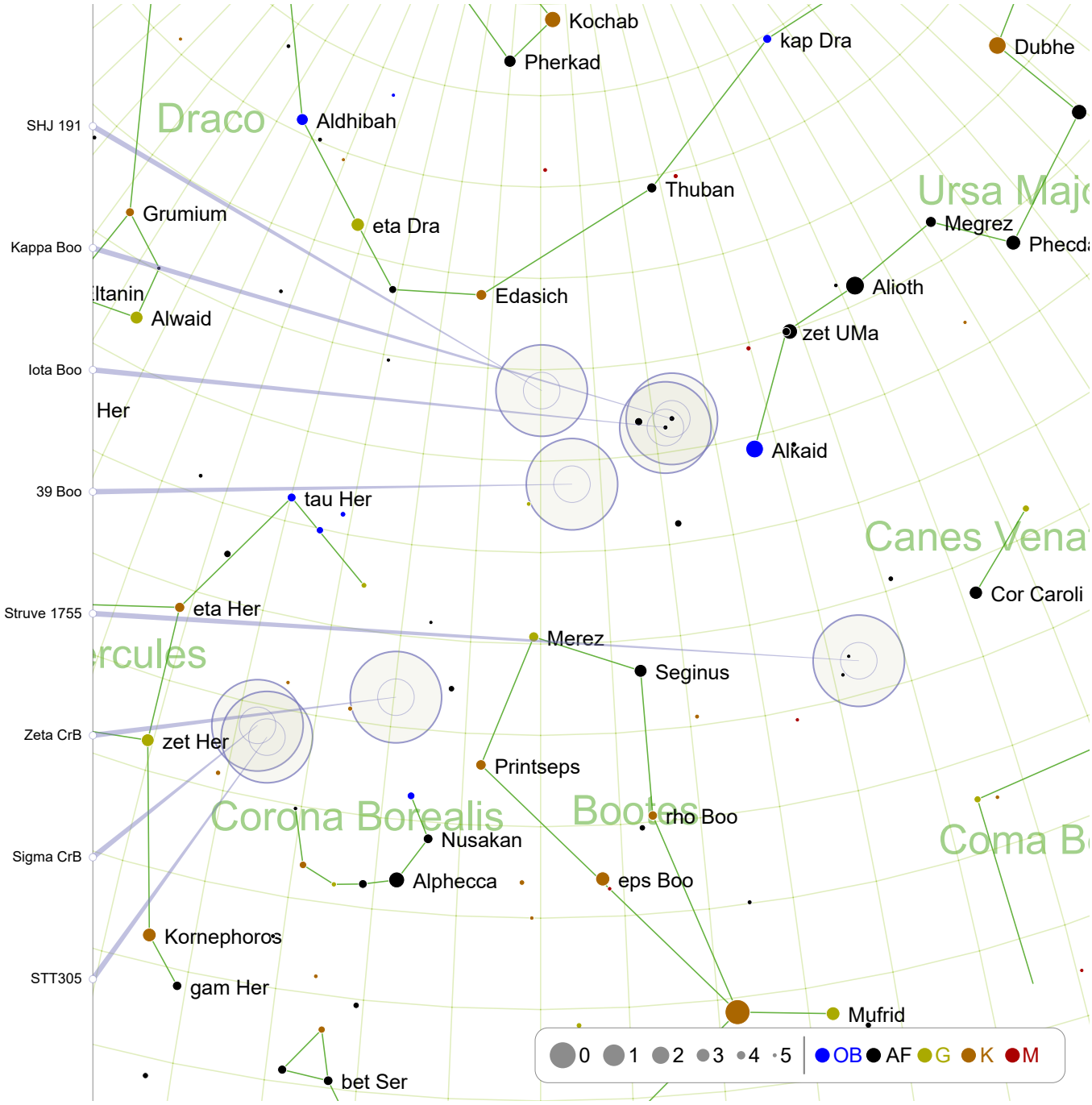
SAO 156661 | HIP 55705 | GDR2 85853638912

A close pair with a brilliant white primary somewhat fainter secondary.

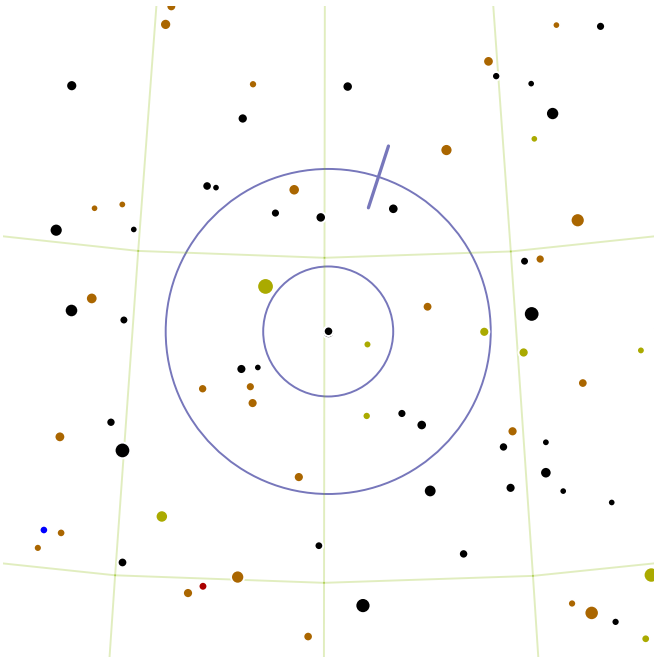
Half a finder circle SSE from magnitude 3.82 Labr. One and a half finder circles SEE from magnitude 3.32 nu. Hya.

Only 82 light-years away, the primary is an A-type main sequence dwarf.

Late Spring - Looking North



SHJ 191: page 166
Kappa Boo: page 166
Iota Boo: page 167
39 Boo: page 167
Struve 1755: page 168
Zeta CrB: page 168
Sigma CrB: page 169
STT305: page 169



SHJ 191

RA: 224.9° | 14h 59.6' — DEC: 53.87° | 53° 52'

Magnitude: 6.8 | 7.4

Separation: 40.5"

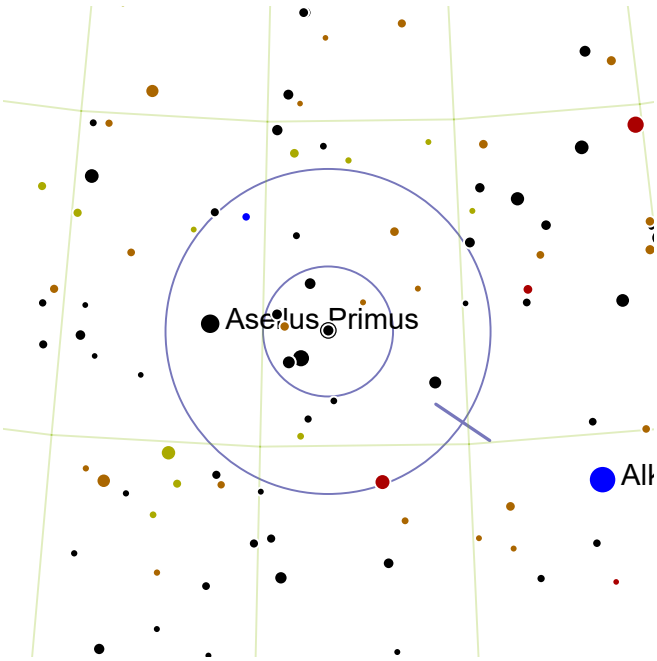
Position Angle: 342°

SAO 29372 | HIP 73366 | GDR2 28192378752

A balanced (but somewhat less bright) pair of yellow stars with very wide separation.

First locate the triangle of fourth-magnitude Asellus Primus, Secundus and Tertius one and a half finders east of Alkaid. Go a further finder and a half NEE to SHJ 191.

Best at very low magnification. "Asellus" means "donkey colt". Asellus Primus has an 11th magnitude red dwarf companion (separation: 70").



Kappa Boo

RA: 213.38° | 14h 13.5' — DEC: 51.78° | 51° 47'

Magnitude: 4.6 | 6.6

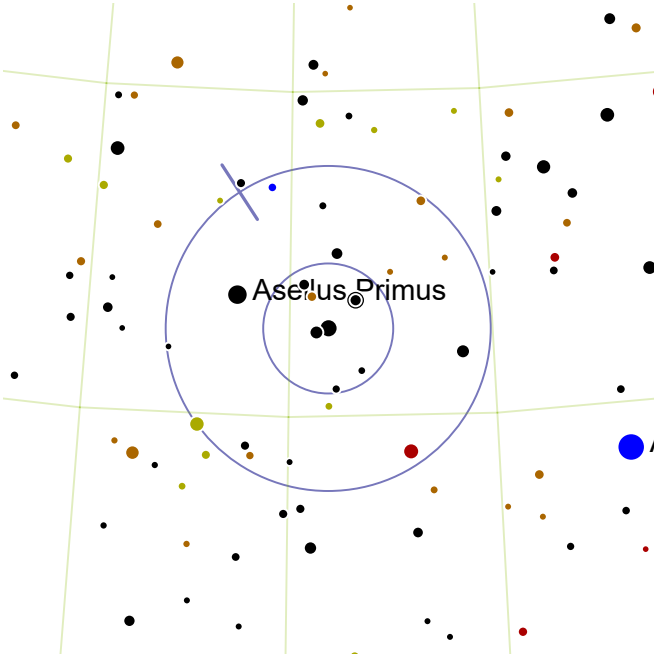
Separation: 13.4"

Position Angle: 236°

SAO 29046 | HIP 69483 | GDR2 67598402944

A very bright white primary component nicely separated from a reasonably bright blue secondary.

Surprisingly part of Bootes not the much nearer Ursa Major, Kappa Boo is one and a half finder circles north east of Alkaid at the end of the handle of the Plough. It is within a degree of Iota Bootis, and two degrees to the east lies the slightly brighter Theta Bootis (Asellus Primus).



Iota Boo

RA: 214.05° | 14h 16.2' — DEC: 51.37° | 51° 22'

Magnitude: 4.9 | 7.5

Separation: 38"

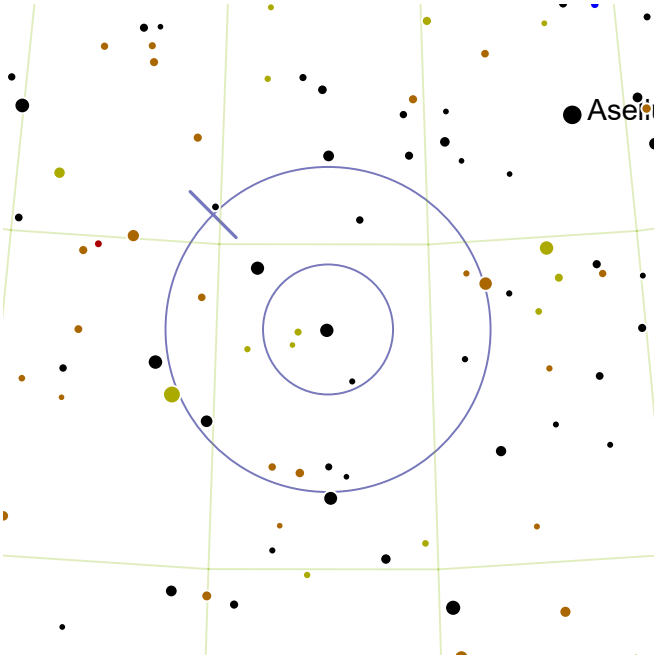
Position Angle: 33°

SAO 29071 | HIP 69713 | GDR2 33122255744

A very wide pairing of a bright yellow primary and a blue companion.

Like Kappa Bootis, find Iota one and a half finder circles north east of Alkaid.

Two degrees to the east lies slightly brighter Asellus Primus ("the first donkey"). This star has a dim magnitude 11.46 companion (an M2.5 red dwarf a third of the mass of the sun) separated by 70" at a position angle of 182°.



39 Boo

RA: 222.4° | 14h 49.6' — DEC: 48.72° | 48° 43'

Magnitude: 6.2 | 6.9

Separation: 2.9"

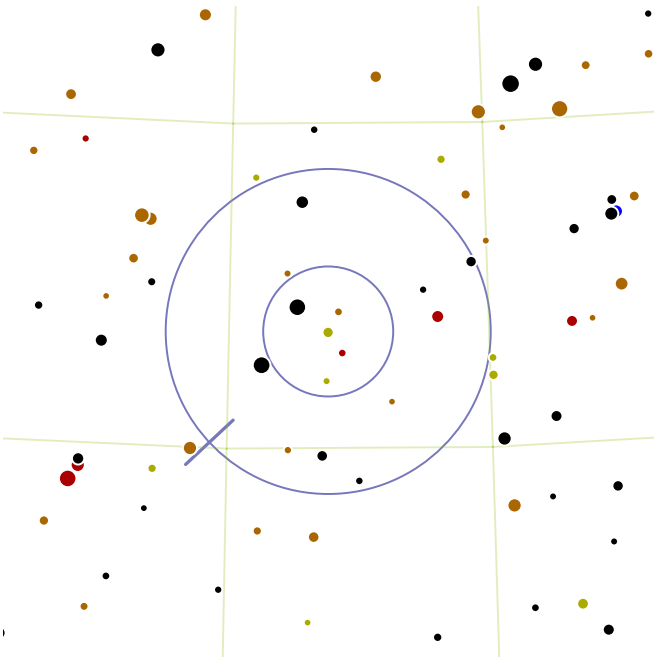
Position Angle: 45°

SAO 45231 | HIP 72524 | GDR2 42798813824

A balanced tightly bound pair of yellow stars.

First locate the triangle of fourth-magnitude Asellus Primus, Secundus and Tertius one and a half finders east of Alkaid. Go a further finder and a half south-east from Asellus Primus to 39 Boo.

This system is charging towards the Sun at 31 km/s, but as it is a mere 224 light-years away there is no immediate cause for concern. The brighter star is actually a spectroscopic binary so this is a triple star system.



Struve 1755

RA: 203.09° | 13h 32.37' — DEC: 36.82° | 36° 49'

Magnitude: 7.3 | 8.1

Separation: 4.1"

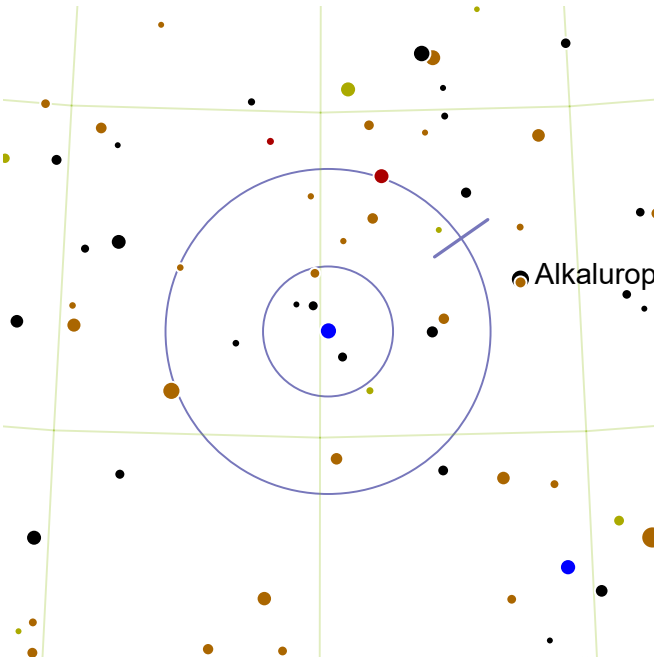
Position Angle: 133°

SAO 63593 | HIP 66042 | GDR2 57146586240

A fairly equal and very close pairing; the primary is yellow.

One finder circle E from magnitude 2.9 Cor Caroli. Two and a half finder circles SSW from magnitude 1.91 Alkaid.

The is only an optical double - the components are not part of the same system.



Zeta CrB

RA: 234.85° | 15h 39.39' — DEC: 36.63° | 36° 38'

Magnitude: 5.1 | 6.0

Separation: 6.3"

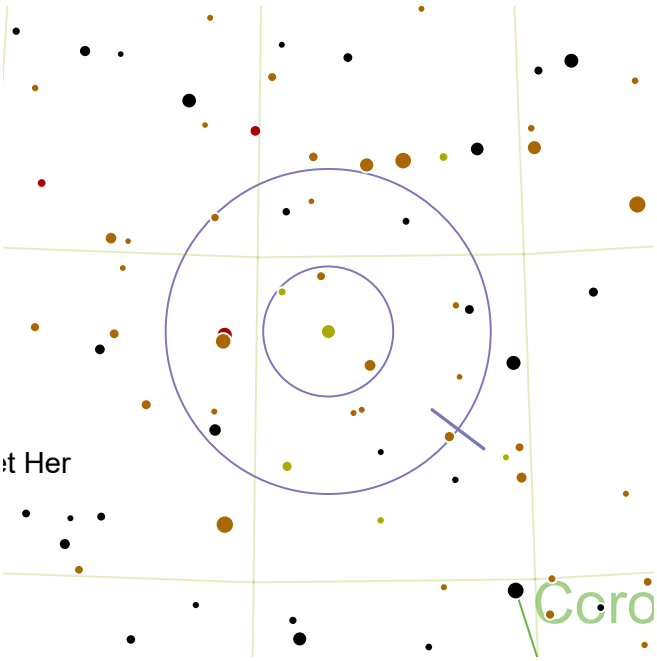
Position Angle: 305°

SAO 64834 | HIP 76669 | GDR2 06328813568

A well-matched pair of bright bluish stars, closely separated. The pair are both blue, but some observers report seeing the fainter companion as greenish.

Follow a line through Arcturus, Izar and Thiba and continue for a little more than one finder circle.

This system is formed by two hot B-class main sequence stars, 473 light-years from the Sun.



Sigma CrB

RA: 243.68° | 16h 14.7' — DEC: 33.87° | 33° 52'

Magnitude: 5.6 | 6.6

Separation: 6.2"

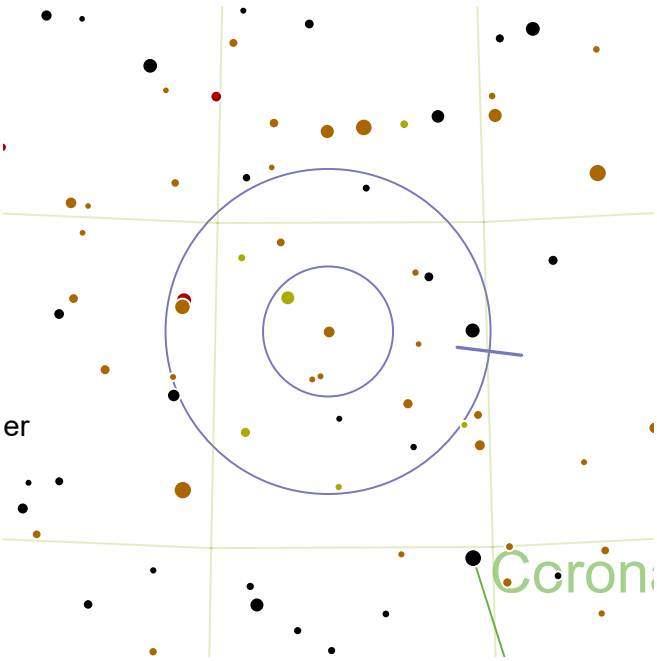
Position Angle: 233°

SAO 65165 | HIP 79607 | GDR2 62170960512

A well balanced yellow pair with quite close separation.

Located 1 degree to the north east of O. Struve 305.

Don't forget to slide one and quarter finder circles to the north east to view Messier 13, the Great Globular Cluster.



STT305

RA: 242.93° | 16h 11.7' — DEC: 33.35° | 33° 21'

Magnitude: 6.4 | 10.2

Separation: 5.4"

Position Angle: 263°

SAO 65129 | HIP 79350 | GDR2 14413070464

A close orange-blue pair, but the secondary is quite faint.

Starting from Zeta Herculis (the southernmost star of the Hercules keystone asterism) and track one and a half finder circles west.

Sigma CrB lies one degree to the north east.

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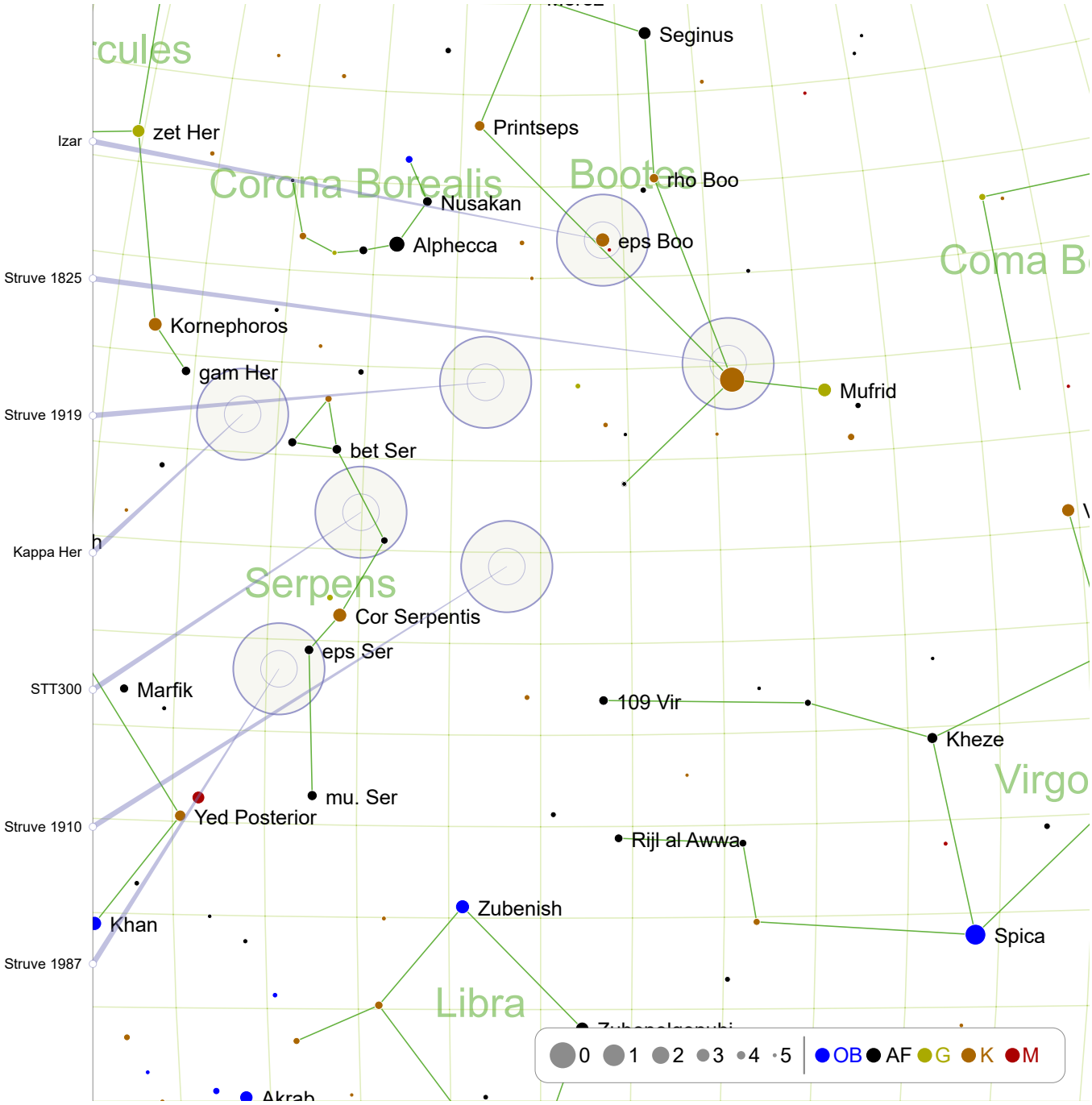
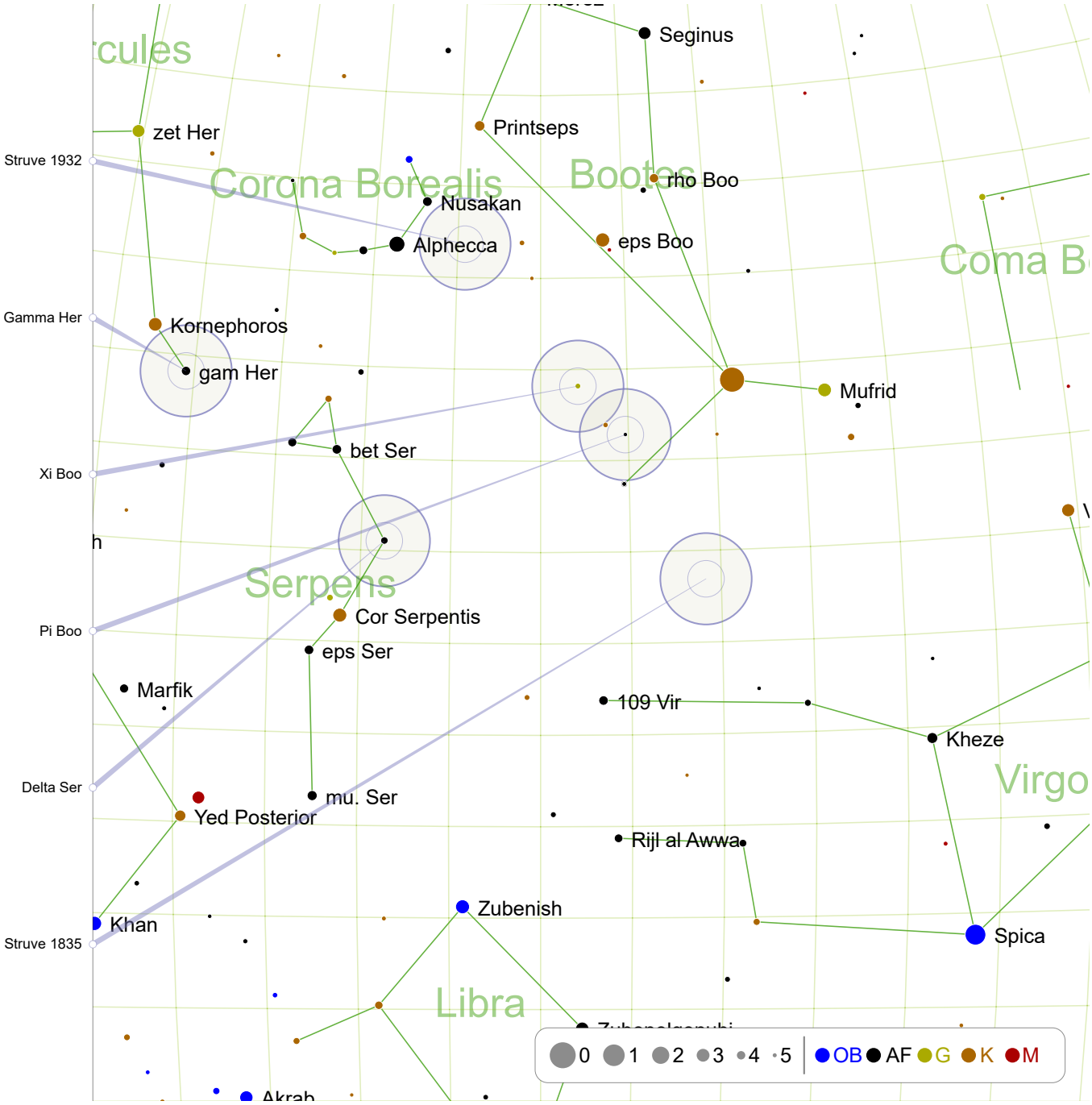
Late Spring - Looking South (1)

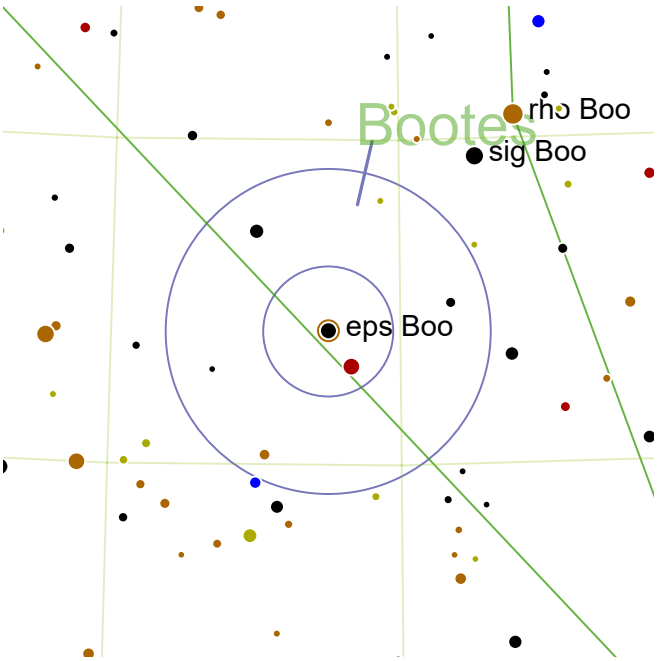


Izar: page 173
Struve 1825: page 173
Struve 1919: page 174
Kappa Her: page 174
STT300: page 175
Struve 1910: page 175
Struve 1987: page 176

Late Spring - Looking South (2)



Struve 1932: page 176 Gamma Her: page 177 Xi Boo: page 177 Pi Boo: page 178
Delta Ser: page 178 Struve 1835: page 179



Izar

RA: 221.25° | 14h 44.99' — DEC: 27.07° | 27° 4'

Magnitude: 2.58 | 4.51

Separation: 2.80"

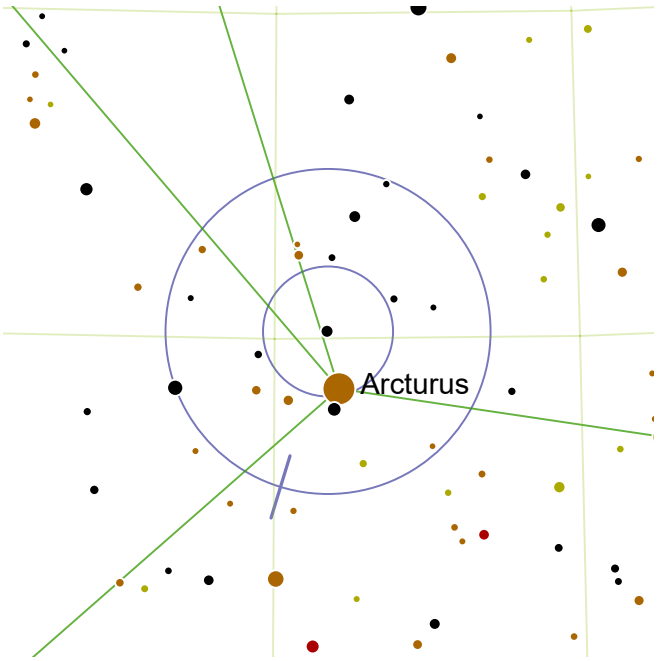
Position Angle: 347°

SAO 83500 | HIP 72105 | GDR2 89901591168

A fine and very narrowly separated orange-yellow pair. Both components shine brilliantly.

As a magnitude 2.5 star it stands out prominently in the sky, 20 degrees to the north east of Arcturus.

Izar is also known as Epsilon Bootis or Pulcherrima. This last name, meaning "loveliest", was awarded by Friedrich Georg Wilhelm von Struve, perhaps the most renowned of all double star observers.



Struve 1825

RA: 214.13° | 14h 16.5' — DEC: 20.12° | 20° 7'

Magnitude: 6.5 | 8.2

Separation: 4.4"

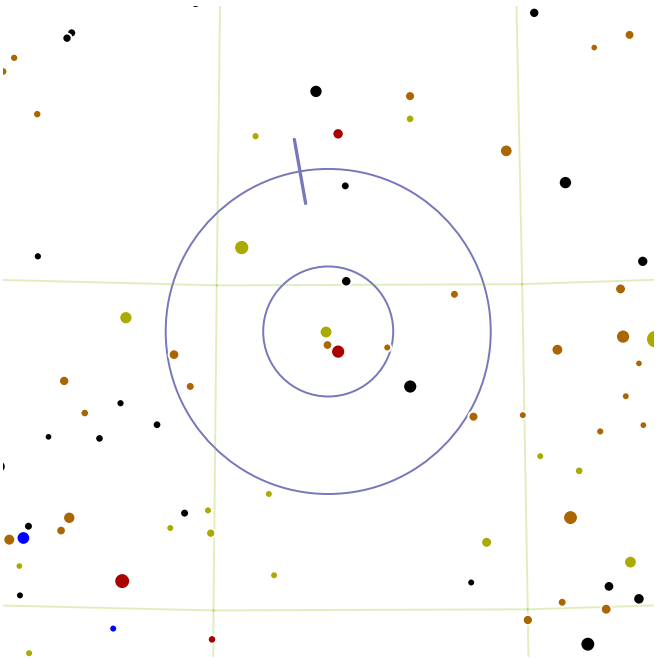
Position Angle: 163°

SAO 83259 | HIP 69751

A very close yellow-orange pairing.

An easy spot, just one degree north of brilliant Arcturus.

The system is 106 light-years away.



Struve 1919

RA: 228.18° | 15h 12.7' — DEC: 19.3° | 19° 18'

Magnitude: 6.7 | 7.6

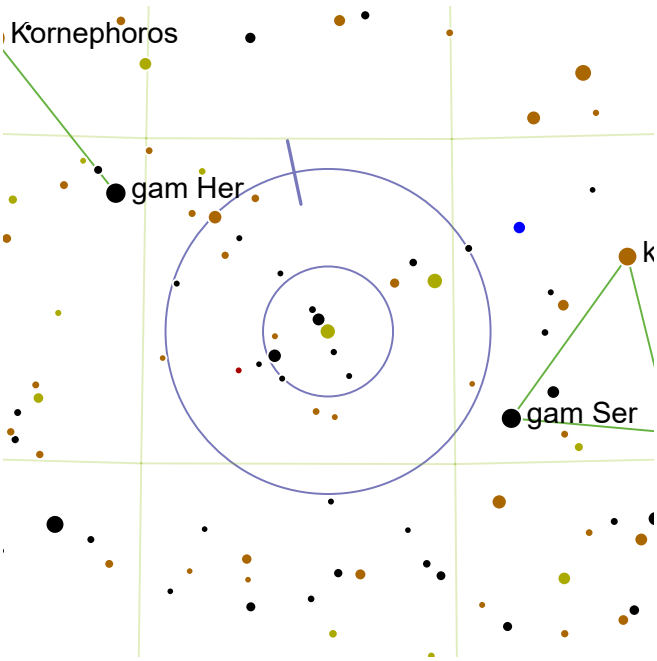
Separation: 23.9"

Position Angle: 10°

SAO 101437 | HIP 74432

A less bright and quite wide yellow-blue pairing.

Three finder circles east of Arcturus, so quite far out in the inky void. But if you can first locate the brighter Xi Bootis, then it is a short one-finder hop east to Struve 1919.



Kappa Her

RA: 242.03° | 16h 8.1' — DEC: 17.05° | 17° 3'

Magnitude: 5.3 | 6.5

Separation: 28"

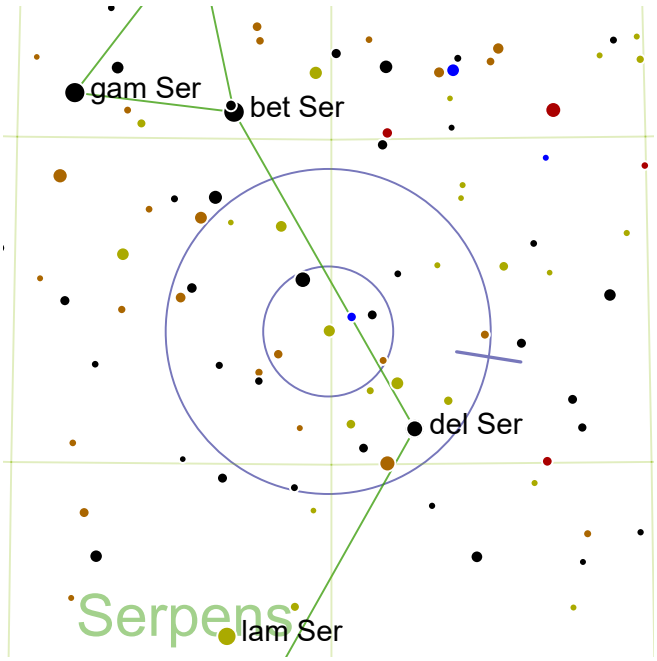
Position Angle: 12°

SAO 101951 | HIP 79043 | GDR2 34296727296

A reasonably balanced and bright, but widely separated, pair of yellow stars.

Midway between Gamma Herculis and Gamma Serpentis, perhaps the best way to find this double is to fill the finder view with the three stars of Serpens' head, and then track east one finder circle.

The planetary nebula IC 4593 is one finder circle south and very slightly east of this double.



STT300

RA: 235.05° | 15h 40.2' — DEC: 12.05° | 12° 3'

Magnitude: 6.4 | 9.5

Separation: 15.3"

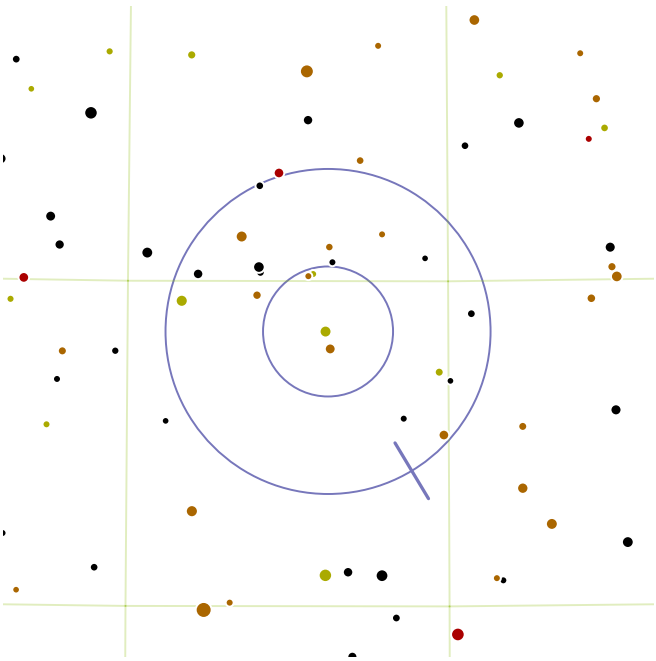
Position Angle: 261°

SAO 101673 | HIP 76733 | GDR2 34460189824

An easily separated yellow-blue pair, although the B component is quite dim.

Center Delta Serpentis in your finder; Struve 300 lies on the north-eastern edge of the field.

The primary is a luminous G-class giant star shining from a distance of nearly 1000 light-years.



Struve 1910

RA: 226.88° | 15h 7.5' — DEC: 9.23° | 9° 14'

Magnitude: 7.5 | 7.5

Separation: 4.3"

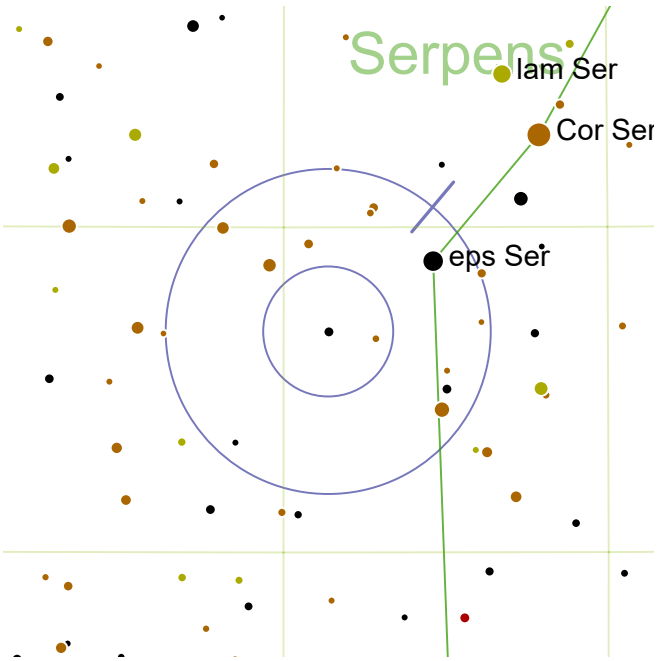
Position Angle: 211°

HIP 74016 | GDR2 49194619264

A close pair of perfectly balanced yellow stars.

Starting at Alpha Serpentis or Unukalhai (magnitude 2.6), move two finder circles west and slightly north.

Consisting of two stars almost identical to the Sun, these stars are in our backyard at only 103 light-years distance.



Struve 1987

RA: 239.31° | 15h 57.25' — DEC: 3.4° | 3° 24'

Magnitude: 7.3 | 8.7

Separation: 10.4"

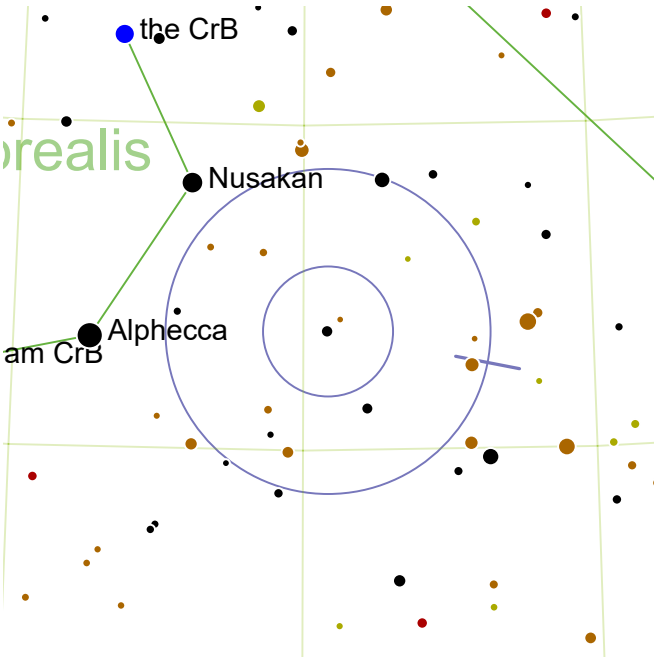
Position Angle: 320°

SAO 121277 | HIP 78134 | GDR2 4425002520426044032

A white primary with a somewhat fainter blue companion, easily separated.

One degree SEE from magnitude 3.75 eps Ser. Half a finder circle SE from magnitude 2.75 Cor Serpentis.

This is a physical binary system. The stars are about 585 light-years from Earth.



Struve 1932

RA: 229.58° | 15h 18.29' — DEC: 26.83° | 26° 50'

Magnitude: 7.3 | 7.4

Separation: 1.6"

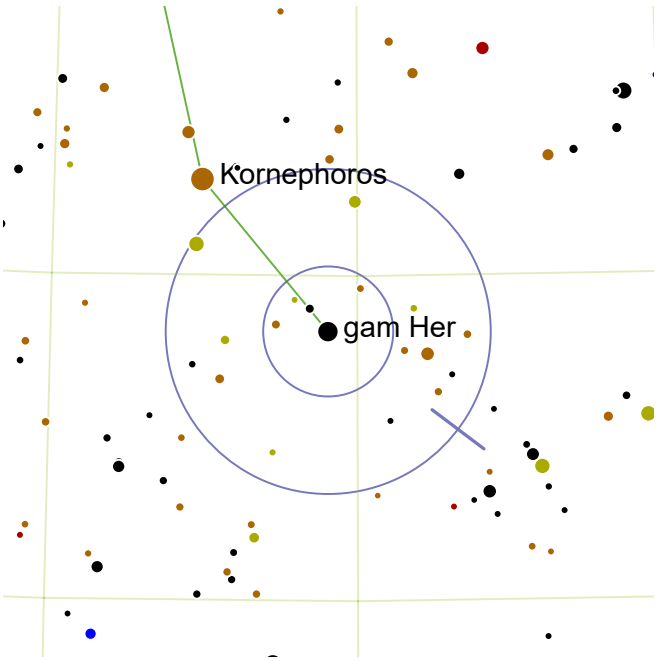
Position Angle: 259°

SAO 83756 | HIP 74893 | GDR2 15518148736

A perfectly balanced pair of yellow stars, but extremely close.

Shares the same finder circles as the brightest star of on Corona Borealis, Alphecca (magnitude 2.2). Position Alphecca in the eastern quadrant of the finder; Struve 1932 is the brightest star in the western quadrant.

Alphecca is a nearby (75 light-years) eclipsing binary, with an orbital period of 17.36 days but an amplitude of only 0.11 magnitudes.



Gamma Her

RA: 245.48° | 16h 21.89' — DEC: 19.15° | 19° 9'

Magnitude: 3.8 | 9.8

Separation: 41.6"

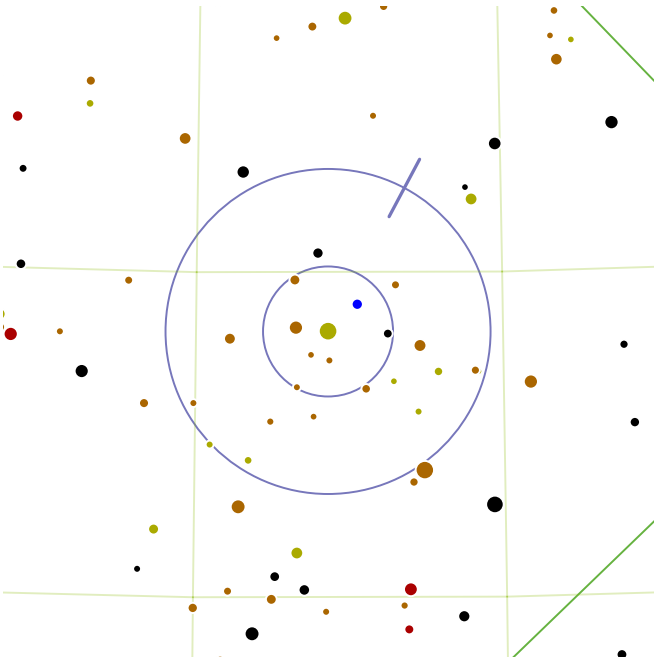
Position Angle: 233°

SAO 102107 | HIP 80170 | GDR2 39456872704

A yellow-yellow pairing with a brilliant primary and dim secondary. Distantly separated.

Find magnitude 2.75 Kornephoros south west of the Keystone asterism of Hercules. Track west by a degree and Gamma Herculis will appear on the western edge of the finder.

One and a half finder circles north east is the dim planetary nebula NGC 6210. An equal distance in the opposite direction to the SSW, lies another planetary nebula, IC 4593.



Xi Boo

RA: 222.85° | 14h 51.39' — DEC: 19.1° | 19° 6'

Magnitude: 4.7 | 7.0

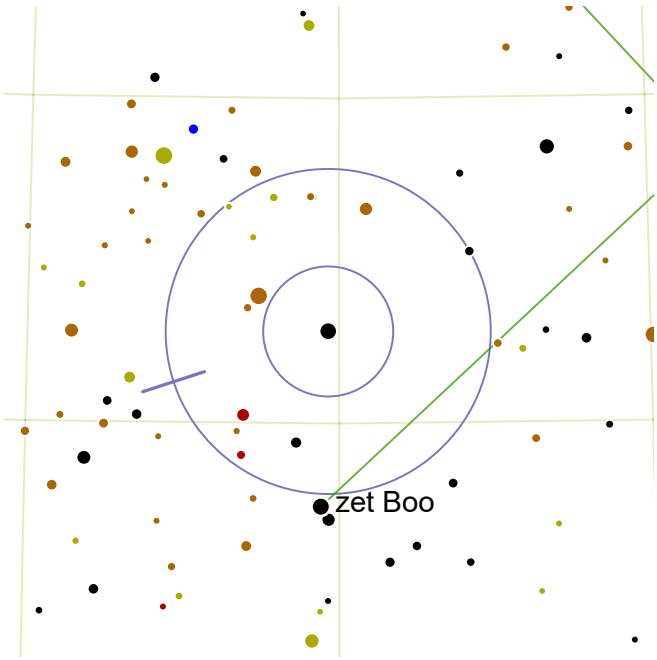
Separation: 6.9"

Position Angle: 332°

SAO 101250 | HIP 72659 | GDR2 38916392704

A close yellow-orange duo, with a bright primary and brightish secondary.

Two finder circles due east of Arcturus. Xi and Pi Bootis just fit in a finder, on the outer edges of the north-east and south-west quadrants.



Pi Boo

RA: 220.18° | 14h 40.7' — DEC: 16.42° | 16° 25'

Magnitude: 4.9 | 5.8

Separation: 5.6"

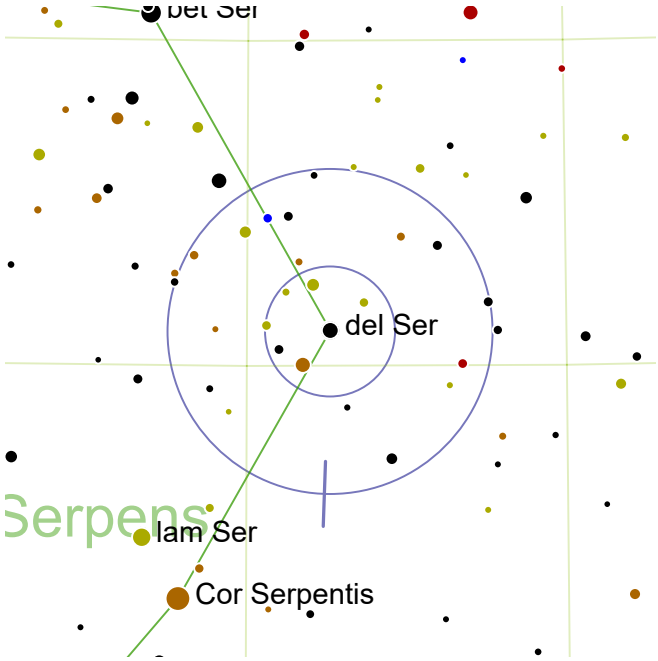
Position Angle: 108°

SAO 101138 | HIP 71762 | GDR2 87617291520

A close and reasonably balanced pair of white stars.

One and a half finder circles east of south-east of Arcturus.

Pi Bootis is 305 light-years from the Sun.



Delta Ser

RA: 233.7° | 15h 34.79' — DEC: 10.53° | 10° 32'

Magnitude: 4.2 | 5.2

Separation: 3.9"

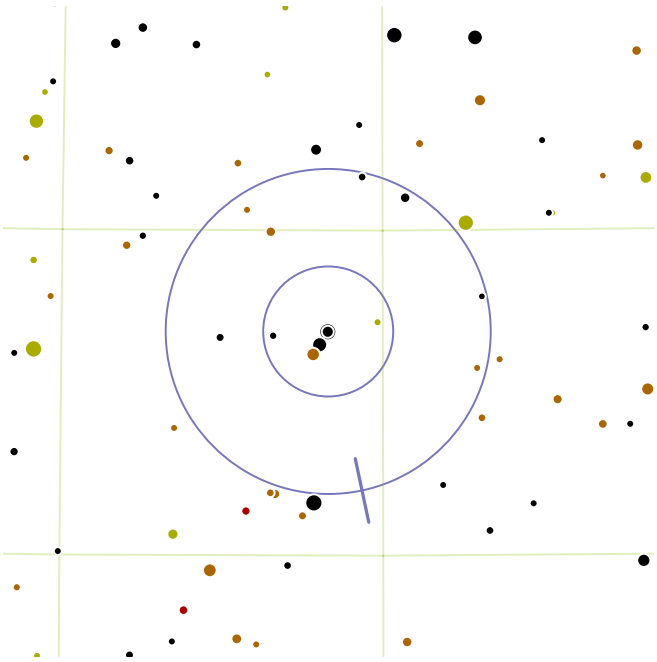
Position Angle: 178°

SAO 101623 | HIP 76276 | GDR2 58411028096

A reasonably balanced and very tight yellow-yellow pair.

Bright enough to be picked out in strong light pollution, you can find find this star five degrees north-west of Cor Serpentis.

The orbit of these two F-type stars has been calculated at 3200 years with a separation of 375 astronomical units (nearly ten times the distance between Pluto and the Sun).



Struve 1835

RA: 215.85° | 14h 23.39' — DEC: 8.45° | 8° 27'

Magnitude: 5.1 | 7.6

Separation: 6.2"

Position Angle: 192°

SAO 120426 | HIP 70327 | HIP 16168739456

A bright white primary close to a yellow secondary.

Struve 1835 is located just over two finder circles due south and slightly east of Arcturus. Struve 1835 is the northernmost of a one-degree line of three stars.

The system is 216 light-years away.

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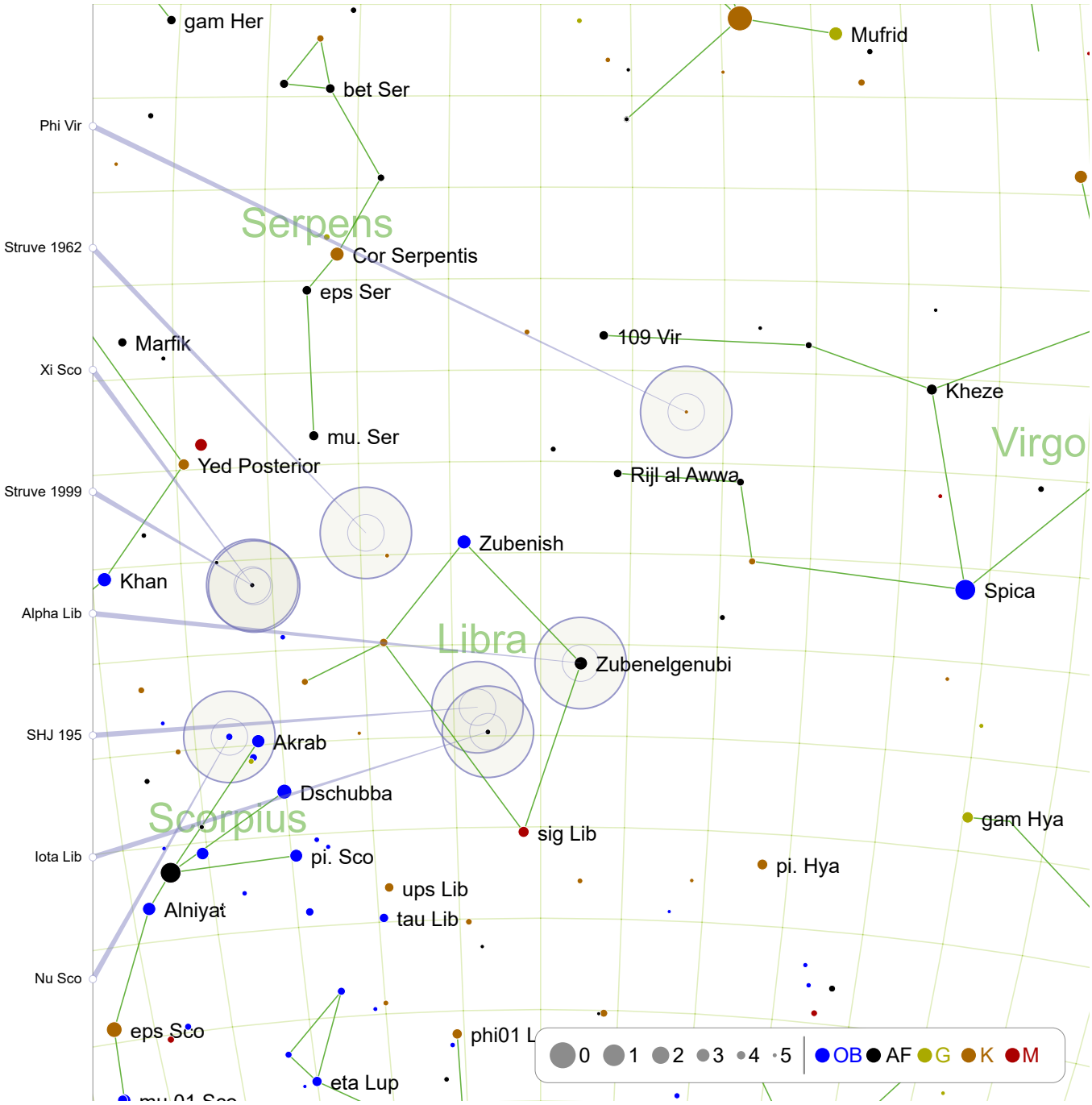
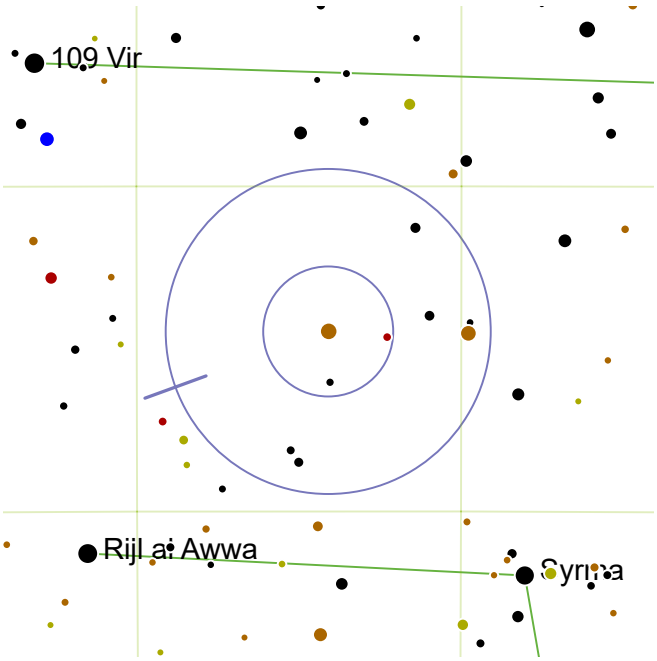
Late Spring - Southern Horizon



Phi Vir: page 182 | Struve 1962: page 182 | Xi Sco: page 183 | Struve 1999: page 183
Alpha Lib: page 184 | SHJ 195: page 184 | Iota Lib: page 185 | Nu Sco: page 185



Phi Vir

RA: 217.05° | 14h 28.2' — DEC: -2.23° | -2° 13'

Magnitude: 4.8 | 9.3

Separation: 4.8"

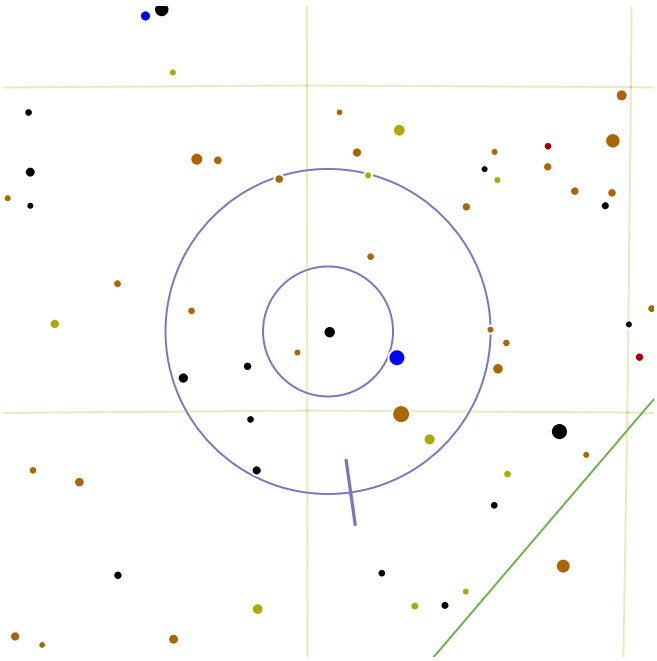
Position Angle: 110°

SAO 139951 | HIP 70755 | GDR2 95468596480

A very close and unequal yellow-blue pair.

One finder circle NW from magnitude 3.95 Rijl al Awwa.

The system is only 118 light-years from Earth.



Struve 1962

RA: 234.68° | 15h 38.7' — DEC: -8.78° | -8° 46'

Magnitude: 6.5 | 6.6

Separation: 11.9"

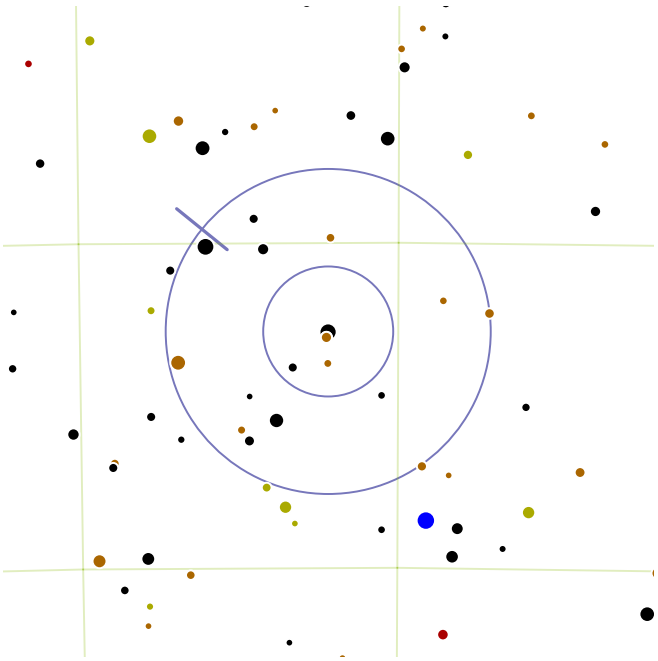
Position Angle: 188°

SAO 140672 | HIP 76603 | GDR2 01723597440

An easily separated equal pair of yellow stars.

This southerly double is located just over two finder circles dues east of the gloriously named Zubeneschamali, which at magnitude 2.61 is a good signpost.

Zubeneschamali means the "northern claw" of Scorpius, although now the star is classified as the brightest star of Libra.



Xi Sco

RA: 241.1° | 16h 4.39' — DEC: -11.37° | -11° 21'

Magnitude: 4.8 | 7.3

Separation: 7.6"

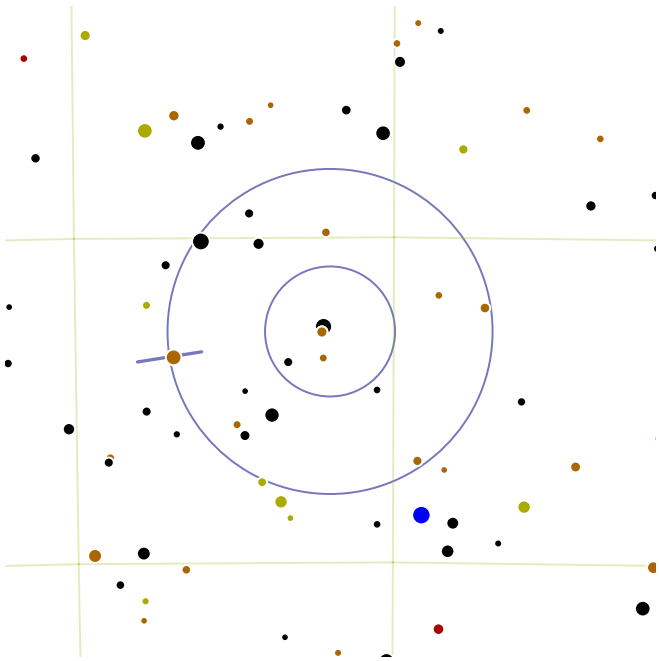
Position Angle: 51°

SAO 159665 | HIP 78727 | GDR2 92367555200

Xi Sco (Grafias) is a triple star system. The yellow primary can be split by larger telescopes into a an equal pale yellow pair with a separation of 1.1". Lesser telescopes show a single yellow point distantly separated from a fairly apparent blue companion.

This double lies one and a half finder circles north of the arc of three stars marking Scorpius' head.

While in the region of Scorpius, turn your telescope to Antares and try to resolve its blue companion (or is it green?).



Struve 1999

RA: 241.0° | 16h 4.0' — DEC: -11.45° | -11° 26'

Magnitude: 7.4 | 8.1

Separation: 11.6"

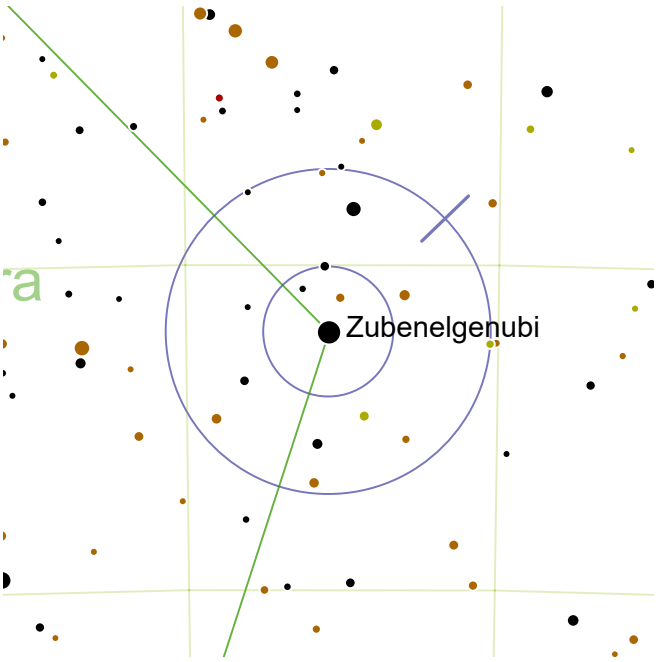
Position Angle: 99°

SAO 159668 | HIP 78738 | GDR2 77465522816

An easily separated and well balanced pair of deep yellow stars.

Two and a half finder circles south east of Arcturus.

Only 82 light-years distant, this double is a pair of cool yellow (slightly orange) main sequence dwarfs, smaller and cooler than our Sun.



Alpha Lib

RA: 222.73° | 14h 50.89' — DEC: -16.03° | -16° 1'

Magnitude: 2.8 | 5.2

Separation: 231"

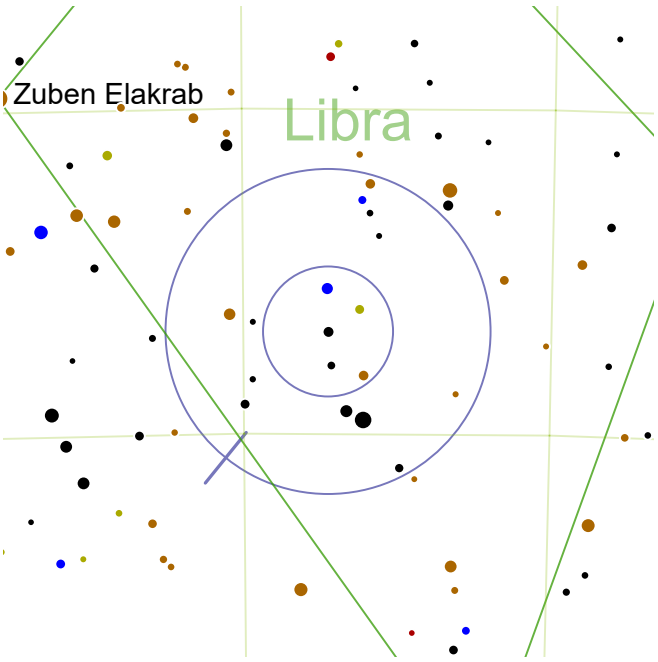
Position Angle: 314°

SAO 158840 | HIP 72622 | GDR2 07860824832

A brilliant white primary with distant bright, white companion.

Alpha Lib is a bright star in Libra. Two finder circles S from magnitude 3.95 Rijl al Awwa.

This system of F-class main sequence stars (with the delicious proper name of Zubenelgenubi) is 76 light-years from Earth.



SHJ 195

RA: 228.63° | 15h 14.5' — DEC: -18.43° | -18° 25'

Magnitude: 6.8 | 8.3

Separation: 47.5"

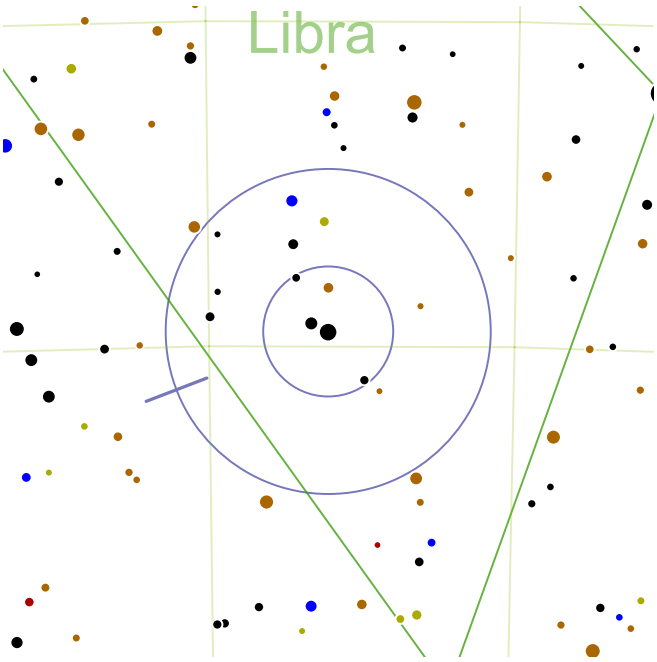
Position Angle: 141°

SAO 159118 | HIP 74593 | GDR2 95725037696

A widely separated, fairly balanced pair of yellowish stars.

One finder circle SEE from magnitude 2.9 Zubenelgenubi. Two finder circles NWW from magnitude 2.54 Dschubba.

With this double centered in the finder, globular cluster NGC 5897 (magnitude 8.5) is on the southern edge of the finder circle.



Iota Lib

RA: 228.05° | 15h 12.2' — DEC: -19.78° | -19° 46'

Magnitude: 4.5 | 10.9

Separation: 57.8"

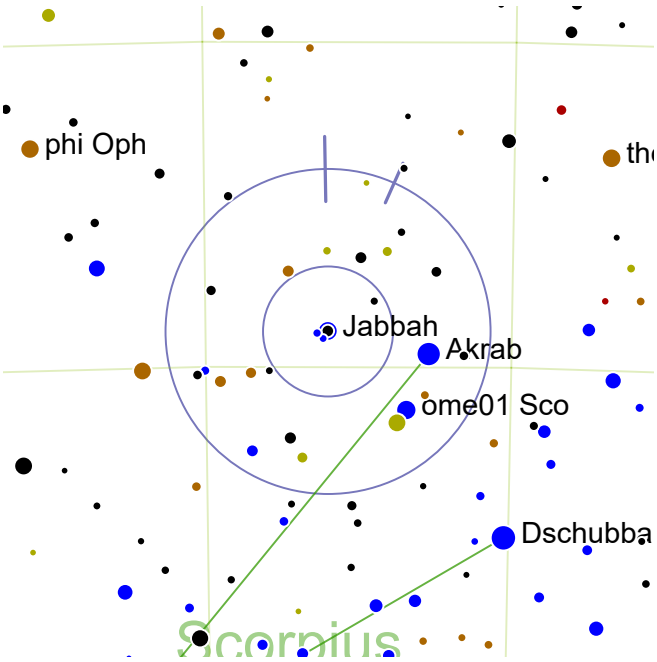
Position Angle: 111°

SAO 159090 | HIP 74392 | GDR2 84362600064

A distantly separated pair, with a brilliant white primary and tiny secondary.

One finder circle NNE from magnitude 3.41 sig Lib. One finder circle SE from magnitude 2.9 Zubenelgenubi.

This pair are gravitationally bound. The tiny secondary is a challenging, balanced double in its own right, with a separation of 1.9".



Nu Sco

RA: 243.0° | 16h 12.0' — DEC: -19.47° | -19° 27'

Magnitude: 4.35 | 5.31 | 6.60

Separation: 1.3" | 41.3"

Position Angle: 1° | 336°

SAO 159763 | HIP 79374 | GDR2 81070158080

A bright, extremely tight and balanced pair of blue stars.

One degree NEE from magnitude 2.9 Akrab. Half a finder circle NE from magnitude 2.54 Dschubba.

This double, also known as Jabbah, lies in front of of the Blue Horsehead Nebula (IC 4592).

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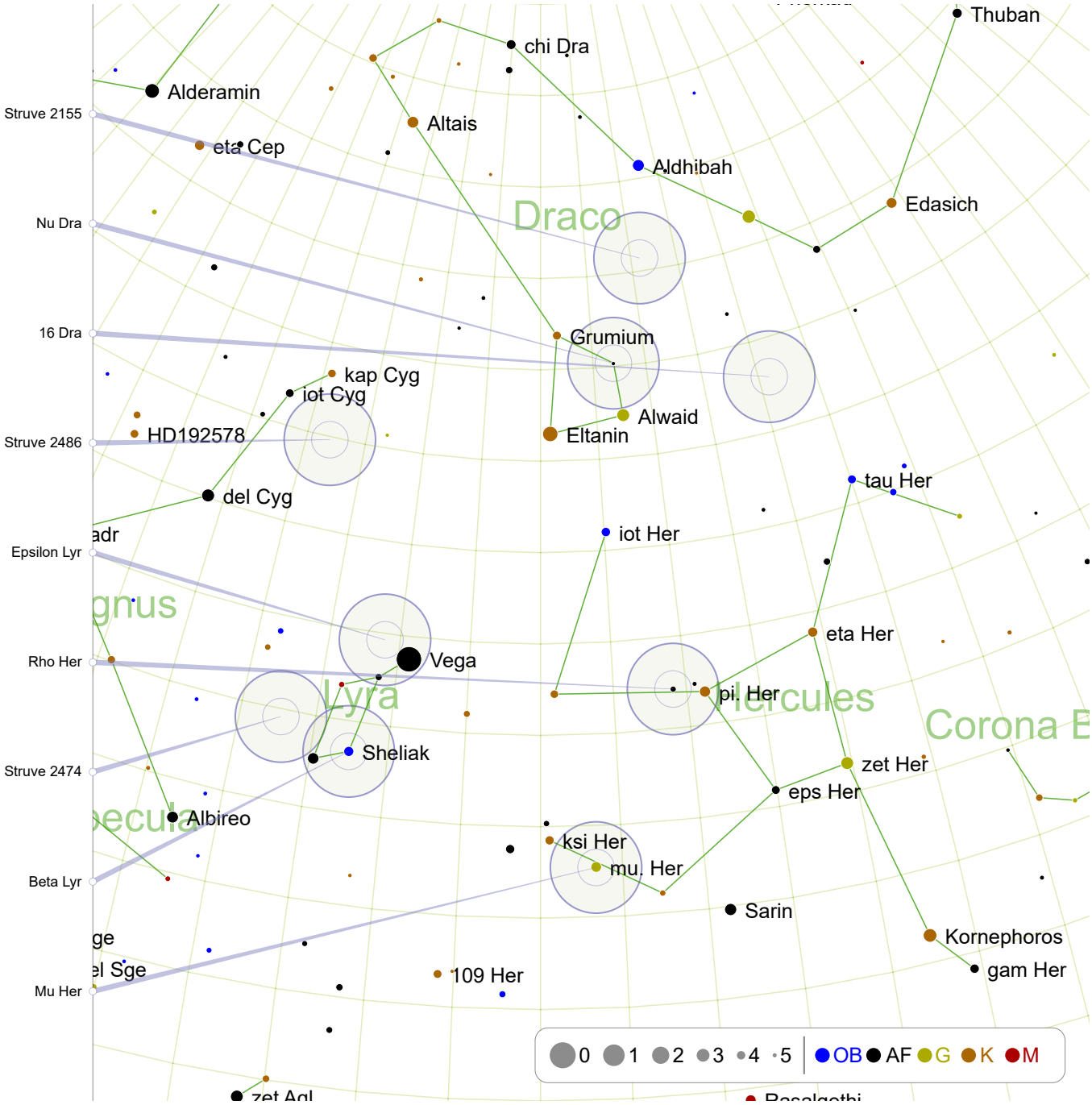
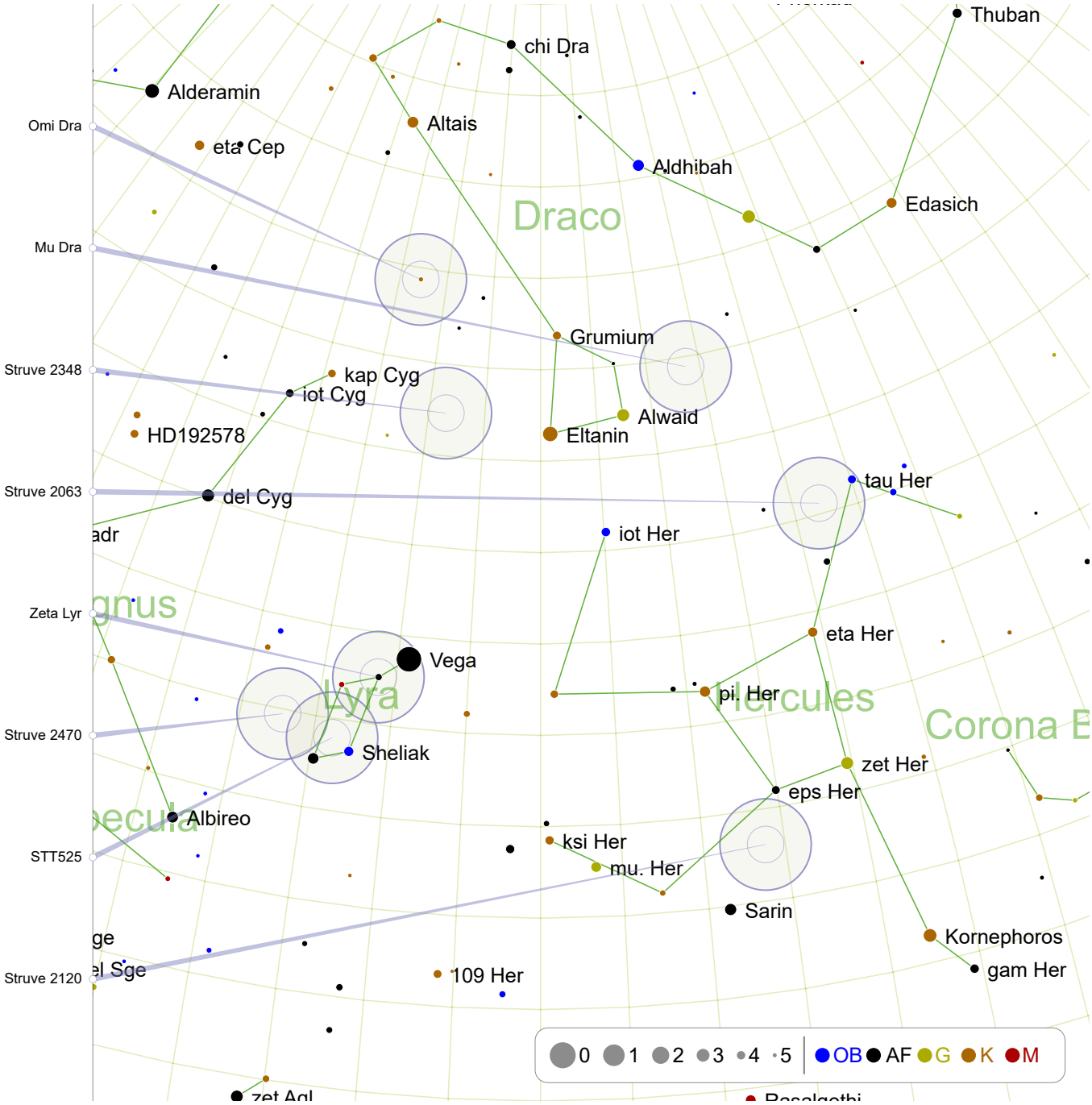
Early Summer - Looking North (1)

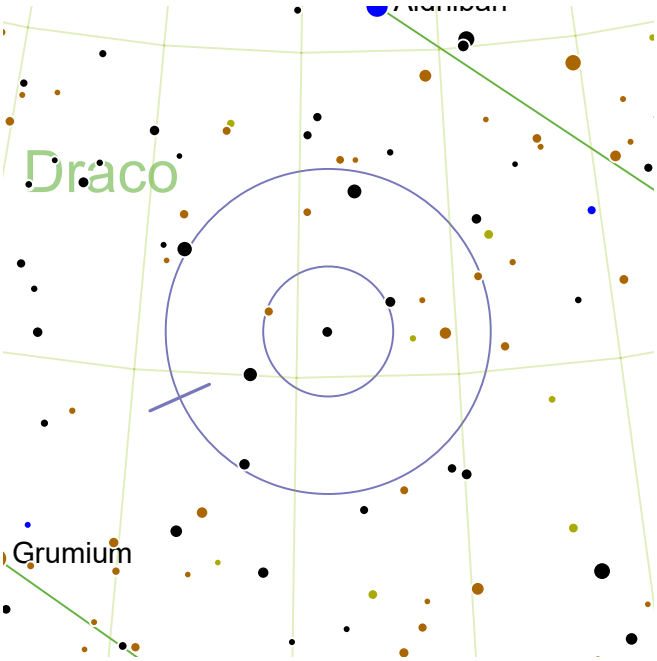


Struve 2155: page 189 | Nu Dra: page 189 | 16 Dra: page 190 | Struve 2486: page 190
Epsilon Lyr: page 191 | Rho Her: page 191 | Struve 2474: page 192 | Beta Lyr: page 192
Mu Her: page 193

Early Summer - Looking North (2)



Omi Dra: page 193 | Mu Dra: page 194 | Struve 2348: page 194 | Struve 2063: page 195
Zeta Lyr: page 195 | Struve 2470: page 196 | STT525: page 196 | Struve 2120: page 197



Struve 2155

RA: 259.02° | 17h 16.09' — DEC: 60.72° | 60° 43'

Magnitude: 6.8 | 10.1

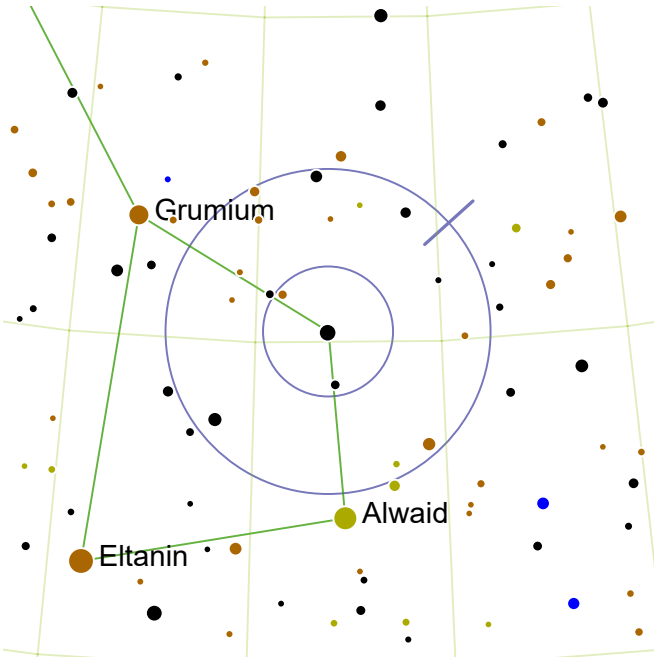
Separation: 9.8"

Position Angle: 114°

SAO 17410 | HIP 84465 | GDR2 50585937920

A yellow-blue pairing. Easily separated but the small blue component lacks brightness in smaller telescopes.

Find this star 4 finder circles NNW of magnitude 2.75 Rastaban in Draco. It forms a line-of-sight pair with variable star VW Draconis in the finder, separated by about 0.1 degrees. VW Draconis lies to the south-east of Struve 2155.



Nu Dra

RA: 263.05° | 17h 32.2' — DEC: 55.18° | 55° 11'

Magnitude: 4.9 | 4.9

Separation: 62"

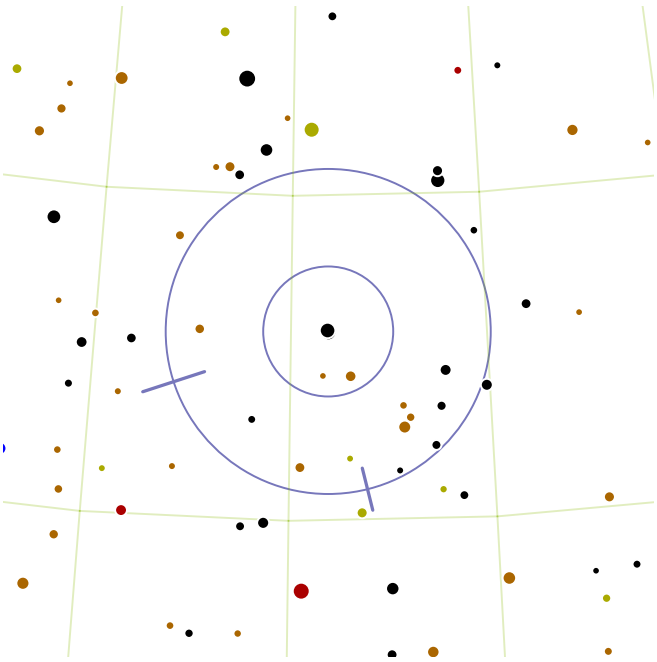
Position Angle: 312°

SAO 30450 | HIP 85829 | GDR2 48150735744

A very wide pair of balanced, very bright white stars.

Half a finder circle north of magnitude 2.79 Alwaid (also known as Rastaban).

Possibly best viewed in the finder scope!



16 Dra

RA: 249.05° | 16h 36.2' — DEC: 52.92° | 52° 55'

Magnitude: 5.4 | 6.4 | 5.5

Separation: 3.4" | 90"

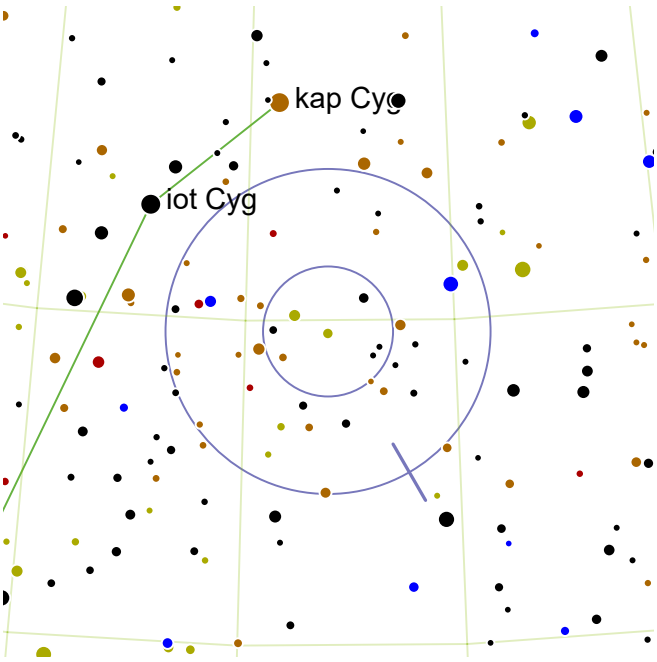
Position Angle: 108° | 194°

SAO 30012 | HIP 81290 | GDR2 66351711616

16 Draconis forms a triple with nearby 17 Draconis, which in turn is a close double.

Start at magnitude 2.2 Eltanin in the Dragon's head, and pan west past magnitude 2.75 Rastaban and continue a further two finder circles westward. 16 and 17 Draconis should appear as a double in the finder view.

16 Draconis is 427 light-years from the Sun, while 17 Draconis is 412 light-years away from the Sun.



Struve 2486

RA: 288.02° | 19h 12.09' — DEC: 49.85° | 49° 51'

Magnitude: 6.6 | 6.8

Separation: 7.9"

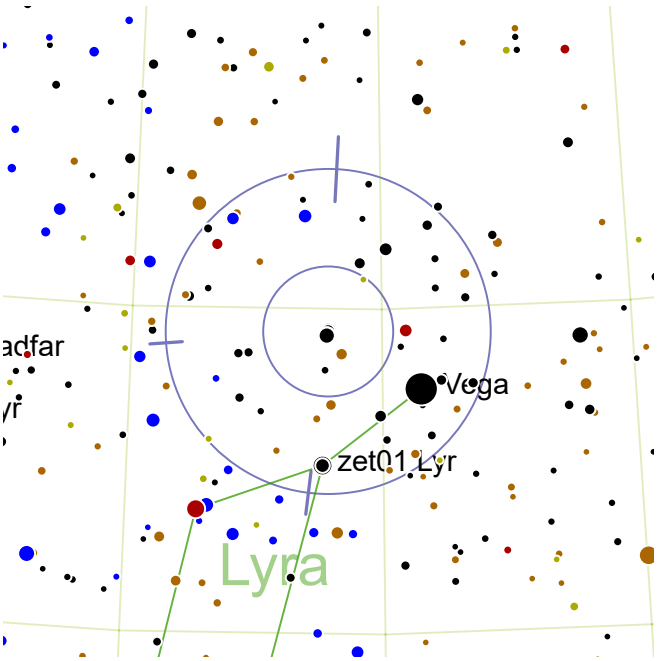
Position Angle: 210°

SAO 48192 | HIP 94336

A close and equal pair of yellow suns.

Half a finder circle SWW from magnitude 3.94 iot Cyg. Half a finder circle SSW from magnitude 3.98 kap Cyg.

Both members of this system are almost exactly the same spectral class and brightness as our Sun. The system lies only 80 light-years from us.



Epsilon Lyr

RA: 281.08° | 18h 44.29' — DEC: 39.67° | 39° 40'

Magnitude: 5.0 | 6.1 | 5.2 | 5.5

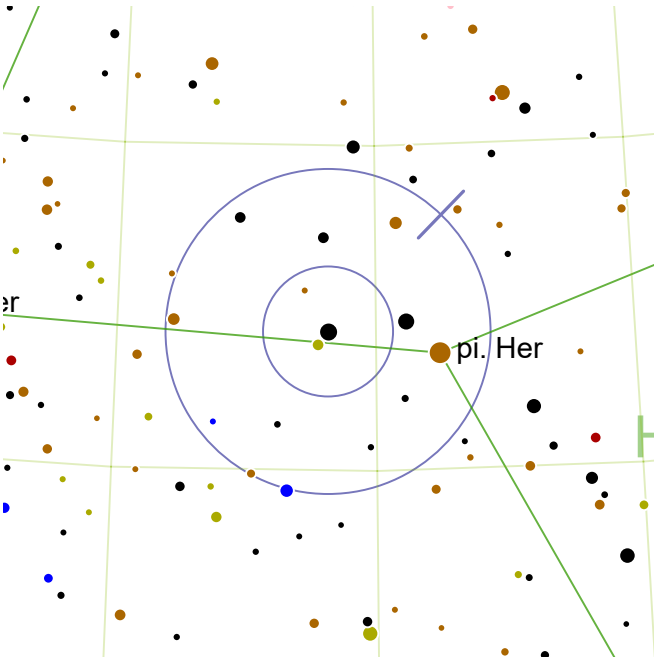
Separation: 208" | 2.6" | 2.3"

Position Angle: 357° | 173° | 94°

SAO 67310 | HIP 91919 | GDR2 60363229312

Two pairs of tightly bound and very well balanced bright white stars. The pairs are separated by over three arc minutes (one tenth of a full Moon), but each pair is split by only just over 2 arc seconds.

Among the most famous doubles, this Double Double can be found in the same finder circle as Vega, two degrees to the north east. It forms an equilateral triangle with Vega and the splendid double Zeta Lyrae to the south.



Rho Her

RA: 260.93° | 17h 23.7' — DEC: 37.15° | 37° 9'

Magnitude: 4.6 | 5.6

Separation: 4.1"

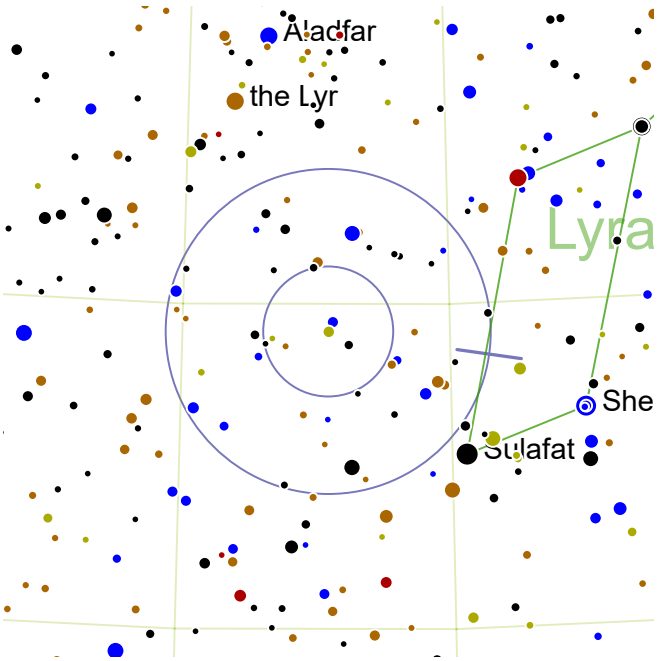
Position Angle: 316°

SAO 66000 | HIP 85112 | GDR2 27125084416

A very close equally matched pair with a brilliant white white primary and slightly fainter blue companion.

Less than two degrees east of Pi Herculis.

The primary star is itself a double with a separation of 0.252”, beyond the capabilities of amateur instruments. The components of the primary have been resolved using speckle interferometry.



Struve 2474

RA: 287.27° | 19h 9.09' — DEC: 34.6° | 34° 36'

Magnitude: 6.7 | 8.8

Separation: 16.2"

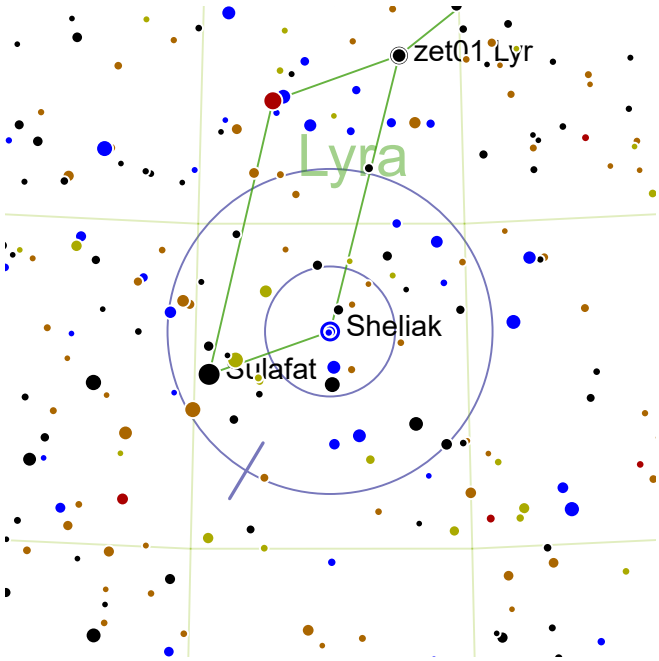
Position Angle: 262°

SAO 67879 | HIP 94076 | GDR2 77844183040

An easily split couple of yellow stars.

Position Sulafat (the south-east star of the Lyra parallelogram) in the south-west of the finder. Struve 2470 and 2474 lie three degrees NE. Struve 2470 lies to the north of Struve 2474.

Struve 2470 and Struve 2474 form the Double Double's Double, as they are easily viewed simultaneously. Together, the four stars are easier to split than the Double Double itself, and composed of many colors. However, the Double Double is brighter.



Beta Lyr

RA: 282.52° | 18h 50.09' — DEC: 33.37° | 33° 22'

Magnitude: 3.4 | 8.6

Separation: 46"

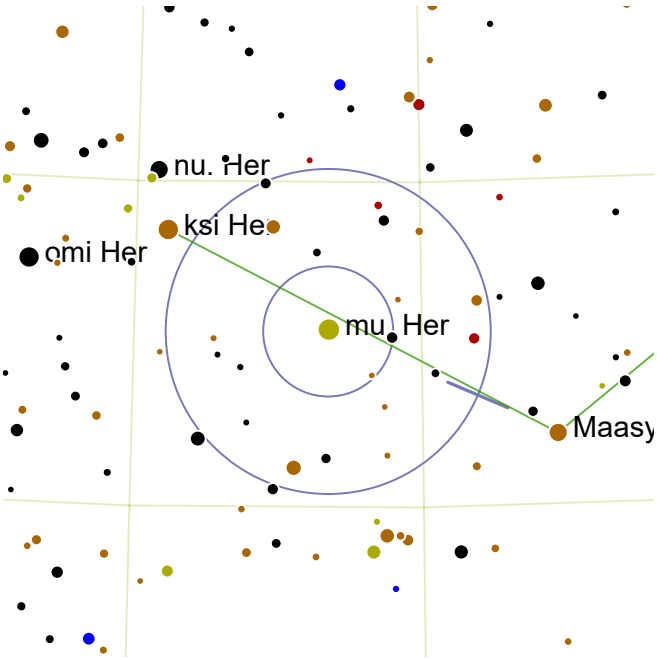
Position Angle: 149°

SAO 67451 | HIP 92420 | GDR2 95054381056

Two very widely separated white stars.

Beta Lyrae (also known as Sheliak) is the south-western star of the Lyra parallelogram.

The primary varies between magnitude 3.4 and 4.4 over a period of 13 days. Nearby Gamma Lyrae to the east is magnitude 3.2 so it acts as a yardstick. The famous Ring Nebula lies nearby, one degree to the south east.



Mu Her

RA: 266.63° | 17h 46.5' — DEC: 27.72° | 27° 43'

Magnitude: 3.4 | 10.1

Separation: 33.8"

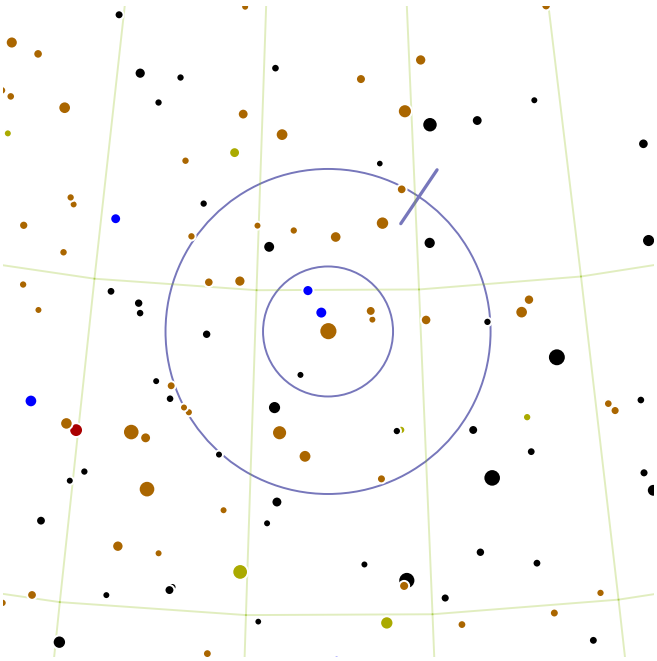
Position Angle: 247°

SAO 85397 | HIP 86974

A brilliant yellow primary widely separated from a vastly fainter red secondary.

One and a half finders east and slightly north of Sarin.

This double is an opportunity to see a red dwarf, namely the faint secondary. Red dwarfs are ubiquitous but very faint. The primary in this system is similar in mass to the Sun but much older and becoming a giant. The primary has an another M-class companion that can be detected spectroscopically. The secondary is a double with a 43 year orbit, currently separated by 1.35”.



Omi Dra

RA: 282.8° | 18h 51.2' — DEC: 59.38° | 59° 23'

Magnitude: 4.8 | 7.8

Separation: 34.2"

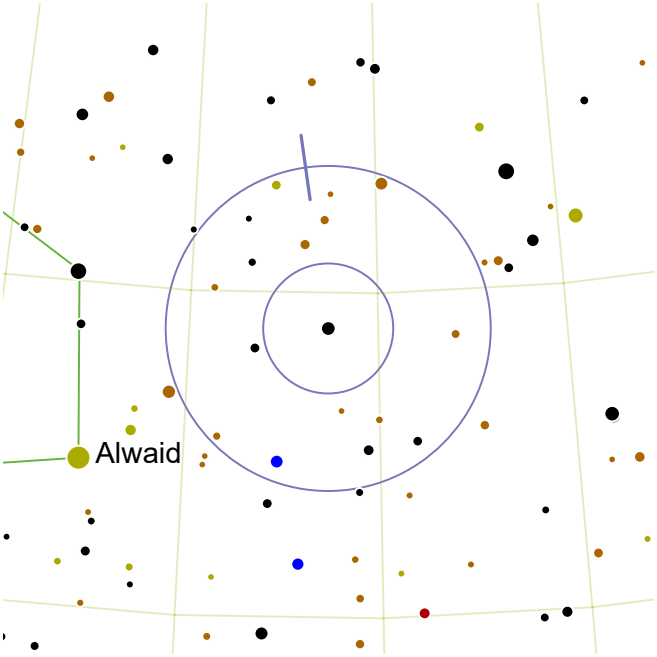
Position Angle: 326°

SAO 31218 | HIP 92512 | GDR2 53382133632

A widely separated pair. The strongly yellow primary has an adequately bright blue companion.

Located two and a half finders north east of magnitude 2.2 Eltanin, Draco's bright eye.

Some see the companion as green!



Mu Dra

RA: 256.33° | 17h 5.29' — DEC: 54.47° | 54° 28'

Magnitude: 5.6 | 5.7

Separation: 1.9"

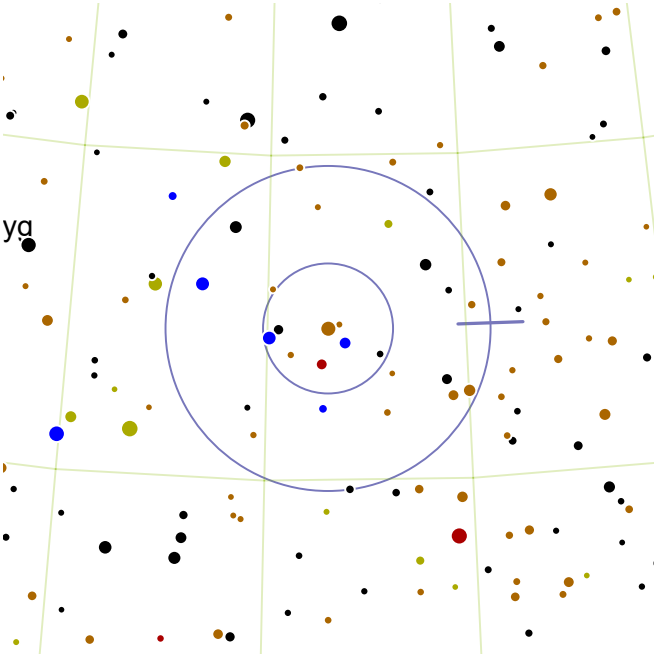
Position Angle: 8°

SAO 30239 | HIP 83608 | GDR2 96285626624

A tightly bound pair of yellow stars.

Locate magnitude 2.75 Rastaban in the Dragon's head, and then pan north west. When Rastaban reaches the south-east edge of the finder view, Mu Draconis should appear on the north-west edge.

Mu Draconis is also known as Alrakis or Arrakis, and gives its name to Frank Herbert's dessert world famous for its Spice and sandworms. Mu Dra is also part of the Arabic constellation the Mother Camels.



Struve 2348

RA: 278.48° | 18h 33.9' — DEC: 52.35° | 52° 21'

Magnitude: 6.1 | 8.8

Separation: 25.7"

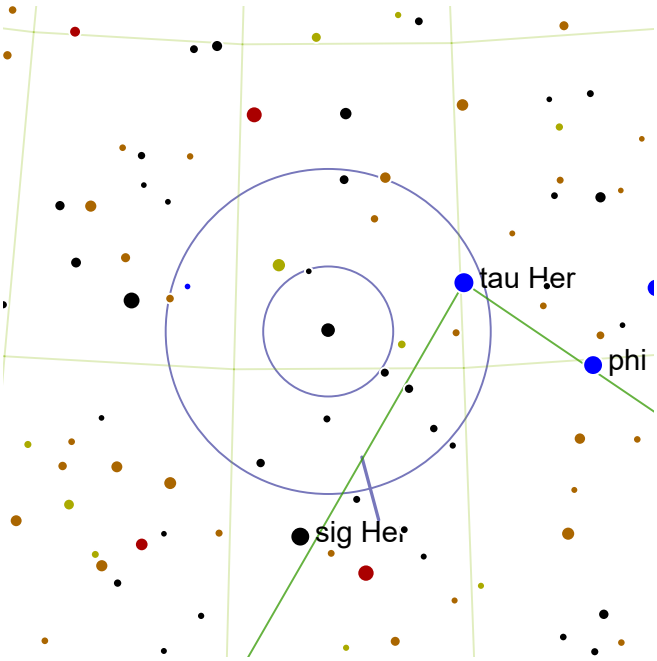
Position Angle: 272°

SAO 31051 | HIP 91013

A yellow primary widely separated from a moderately faint white secondary.

One and a half finder circles due east of Eltanin, this double is the northernmost of a one-degree triangle of stars.

The system is 638 light-years from the Sun.



Struve 2063

RA: 247.95° | 16h 31.79' — DEC: 45.6° | 45° 36'

Magnitude: 5.7 | 8.2

Separation: 16.4"

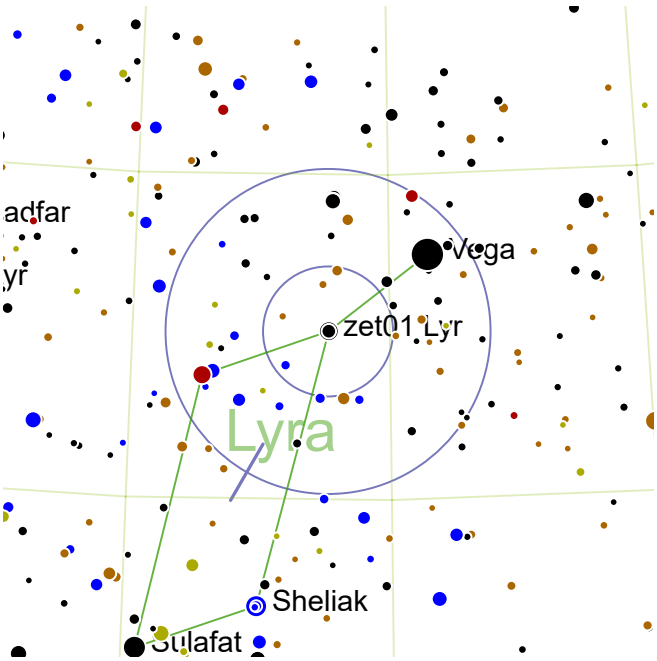
Position Angle: 195°

SAO 46147 | HIP 80953 | GDR2 77983938560

An easily separated white-yellow double.

Find Tau Herculis (it lies to the north of the Hercules keystone asterism). Struve 2063 lies 2 degrees to the south east.

Position this double in the south-western quadrant of the finder and globular cluster NGC 6229 is in the north-eastern quadrant.



Zeta Lyr

RA: 281.2° | 18h 44.79' — DEC: 37.6° | 37° 36'

Magnitude: 4.3 | 5.9

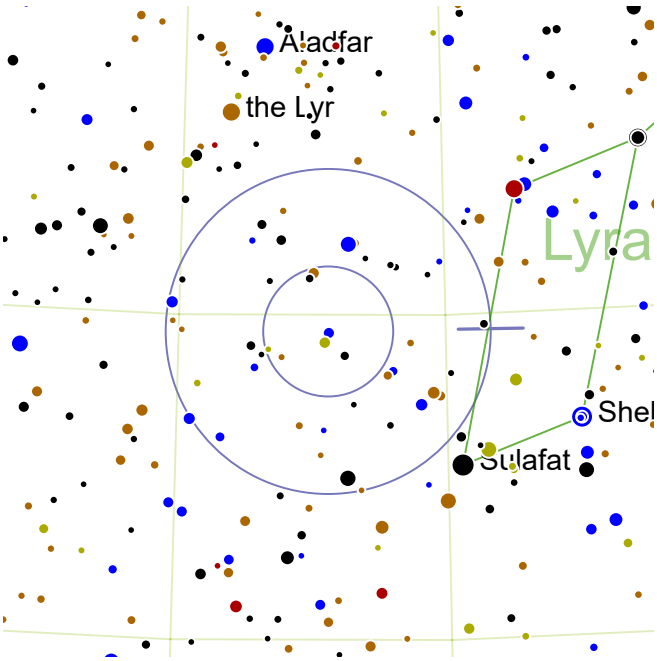
Separation: 44"

Position Angle: 150°

SAO 67321 | HIP 91971 | GDR2 99811529472

A very widely separated double that can be split in the finder scope. It has two bright yellow components differing in brightness by 1.6 magnitudes.

This double can be found in the same finder circle as Vega, two degrees to the south east. It forms an equilateral triangle with Vega and the spectacular Epsilon Lyrae to the north, which is very pleasing to view in a good finder.



Struve 2470

RA: 287.2° | 19h 8.79' — DEC: 34.77° | 34° 46'

Magnitude: 6.6 | 8.6

Separation: 13.4"

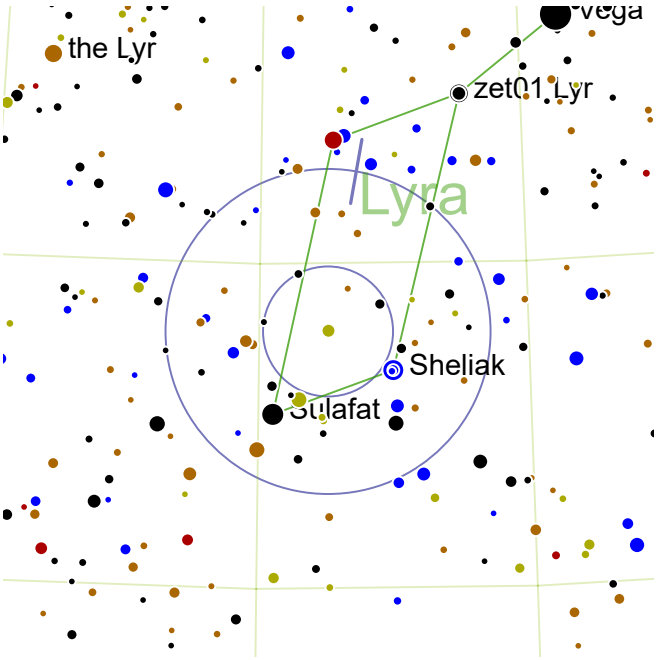
Position Angle: 271°

SAO 67870 | HIP 94043 | GDR2 28593913088

An easily split white-blue pairing.

Position Sulafat (the south-east star of the Lyra parallelogram) in the south-west of the finder. Struve 2470 and 2474 lie three degrees NE. Struve 2470 lies to the north of Struve 2474.

Struve 2470 and Struve 2474 form the Double Double's Double, as they are easily viewed simultaneously. Together, the four stars are easier to split than the Double Double itself, and composed of many colors. However, the Double Double is brighter.



STT525

RA: 283.73° | 18h 54.9' — DEC: 33.97° | 33° 58'

Magnitude: 6.0 | 7.7

Separation: 45"

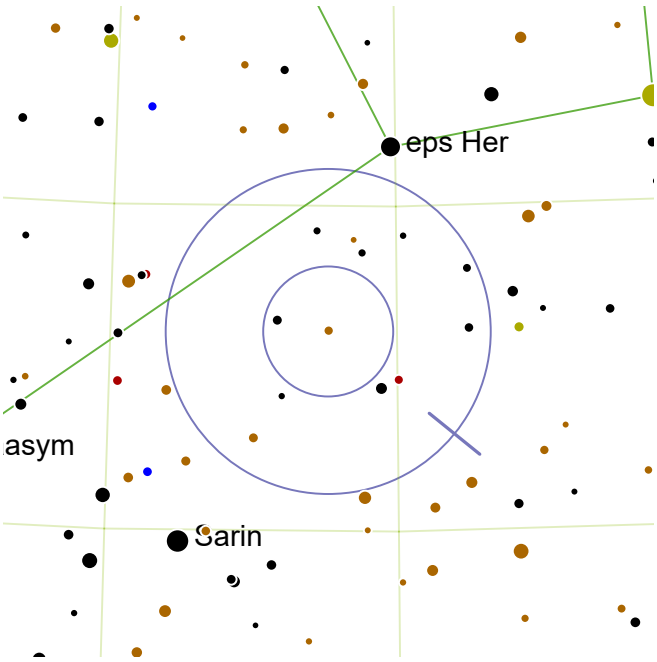
Position Angle: 350°

SAO 67566 | HIP 92833 | GDR2 39831689088

A colorless pair very widely separated. In addition to the two main components, a third faint component might be glimpsed within 2" of the primary.

O. Struve 525 is the brightish star north of the midpoint between Sheliak and Sulafat.

The fine double Beta Lyrae and the bright star Sulafat share the finder view with O. Struve 525. One degree due south of O. Struve 525 is a faint smudge - the famous Ring Nebula (Messier 57).



Struve 2120

RA: 256.2° | 17h 4.79' — DEC: 28.08° | 28° 5'

Magnitude: 7.4 | 9.3

Separation: 24.5"

Position Angle: 231°

SAO 84810 | HIP 83568 | GDR2 79062840448

A wide pair with an orange primary and somewhat fainter secondary.

Half a finder circle SSE from magnitude 3.92 eps Her.

The primary is a K class orange giant, 480 light-years from Earth.

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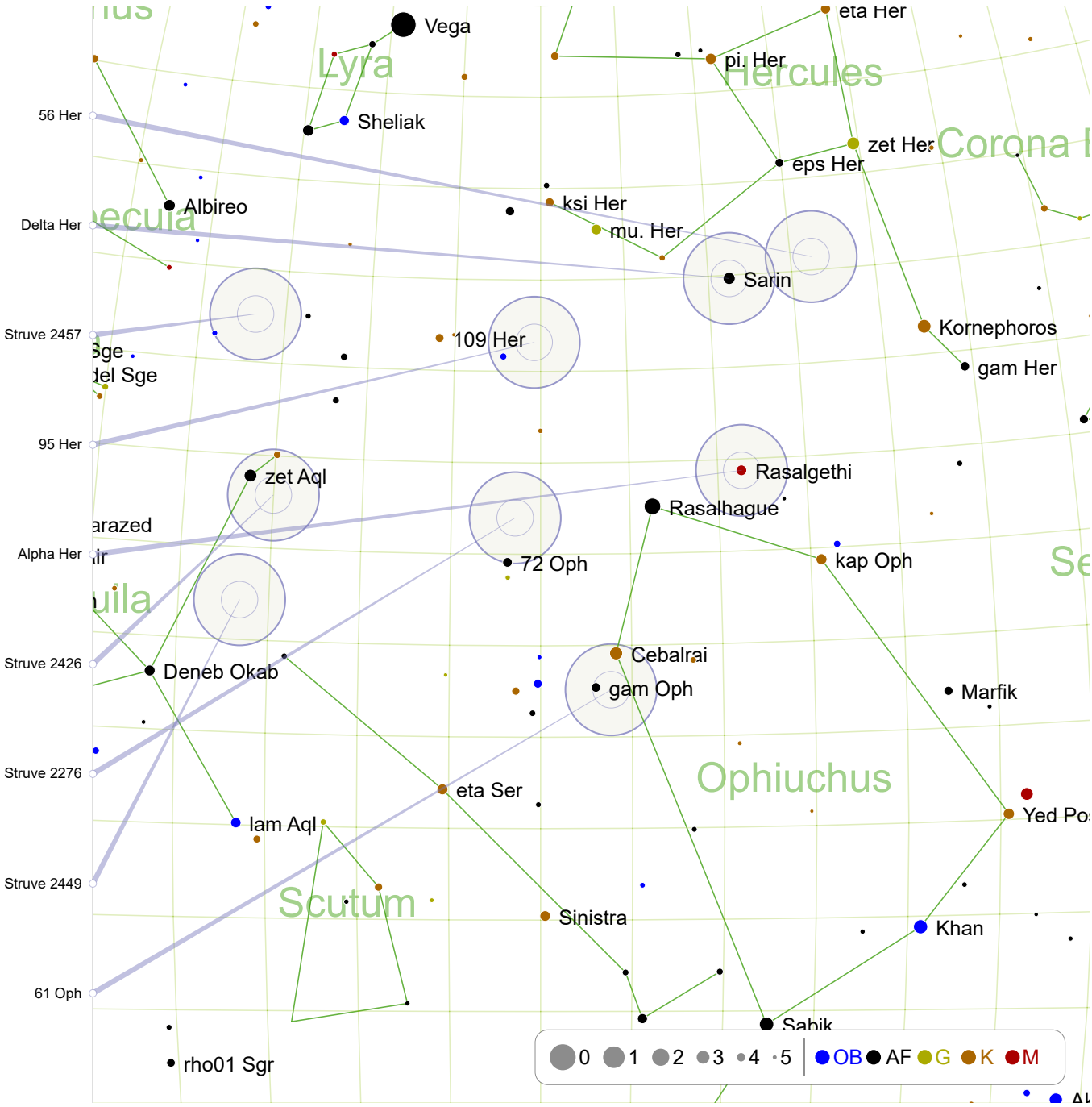
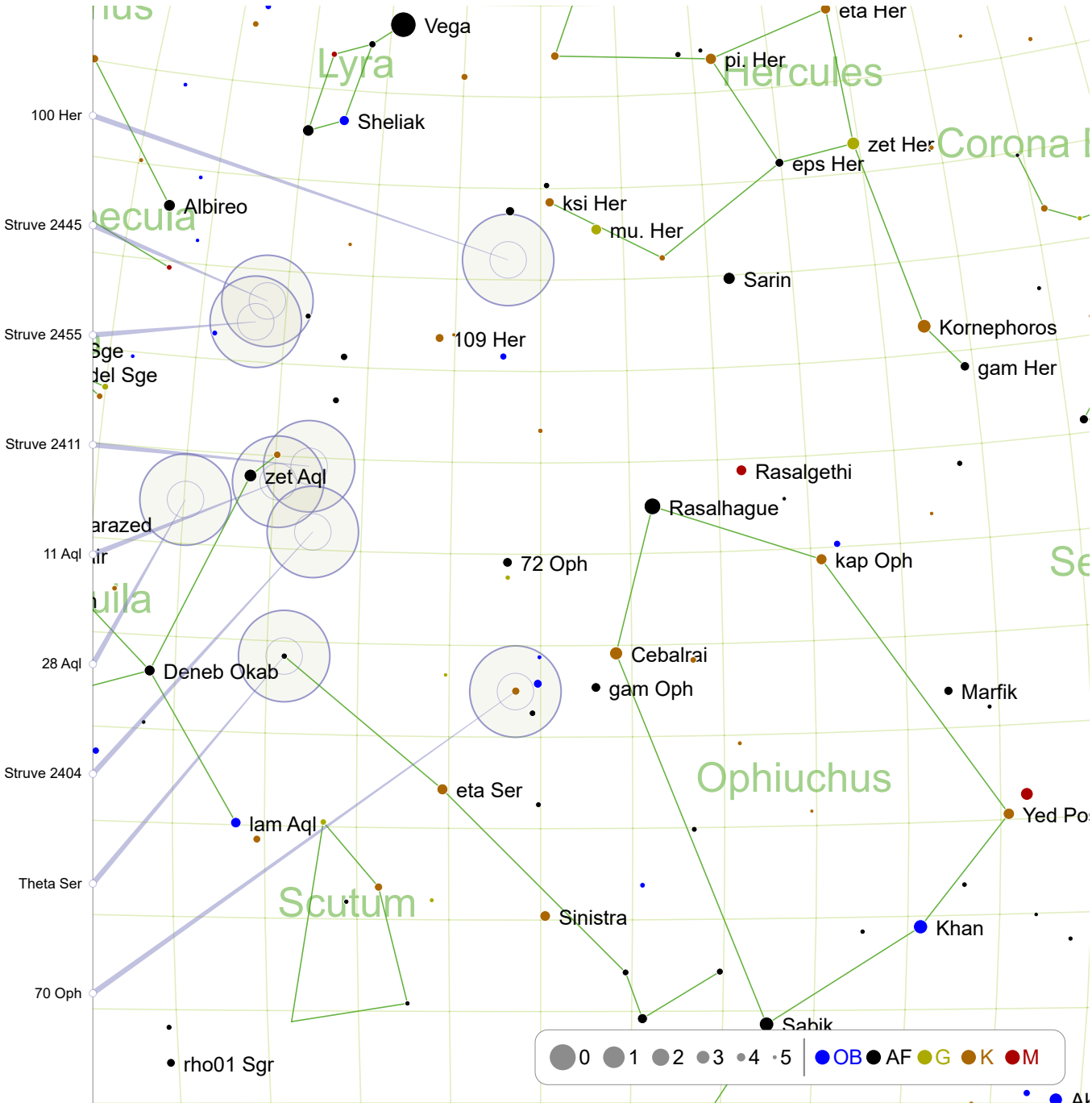
Early Summer - Looking South (1)

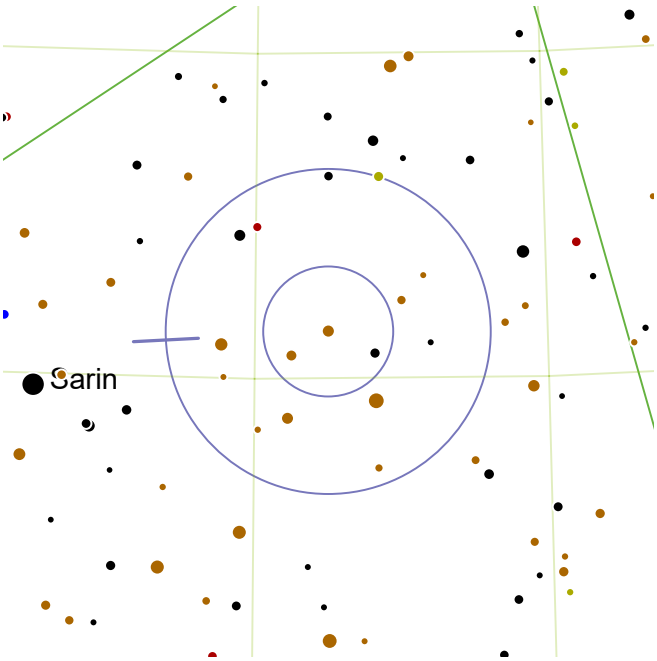


56 Her: page 201
Delta Her: page 201
Struve 2457: page 202
95 Her: page 202
Alpha Her: page 203
Struve 2426: page 203
Struve 2276: page 204
Struve 2449: page 204
61 Oph: page 205

Early Summer - Looking South (2)



100 Her: page 205
Struve 2445: page 206
Struve 2455: page 206
Struve 2411: page 207
11 Aql: page 207
28 Aql: page 208
Struve 2404: page 208
Theta Ser: page 209
70 Oph: page 209



56 Her

RA: 253.75° | 16h 55.0' — DEC: 25.73° | 25° 44'

Magnitude: 6.1 | 10.6

Separation: 18.1"

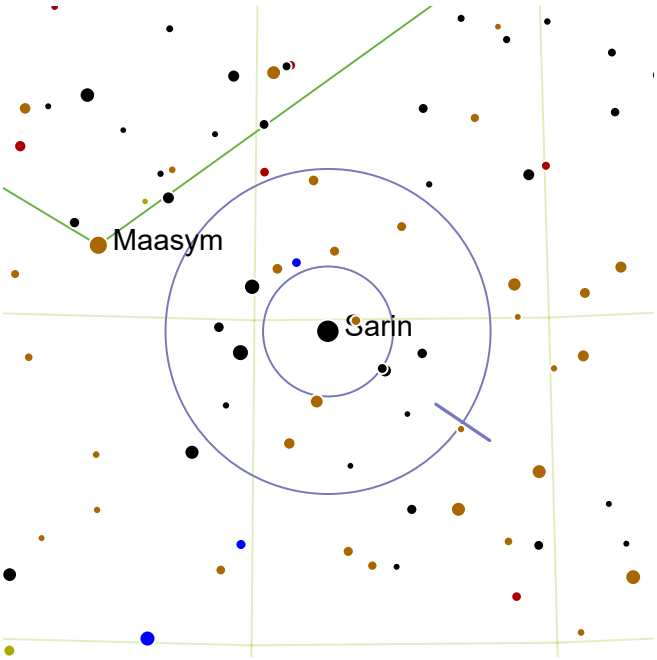
Position Angle: 93°

SAO 84692 | HIP 82780 | GDR2 57487643776

A bright yellow-orange primary comfortably separated from very faint possibly bluish secondary. The secondary can be challenging to spot in a smaller telescope, especially with light pollution.

One finder circle north west of magnitude 3.12 Delta Herculis.

The primary star is somewhat cooler than the sun but being a giant star is significantly brighter.



Delta Her

RA: 258.75° | 17h 15.0' — DEC: 24.83° | 24° 50'

Magnitude: 3.1 | 8.2

Separation: 8.9"

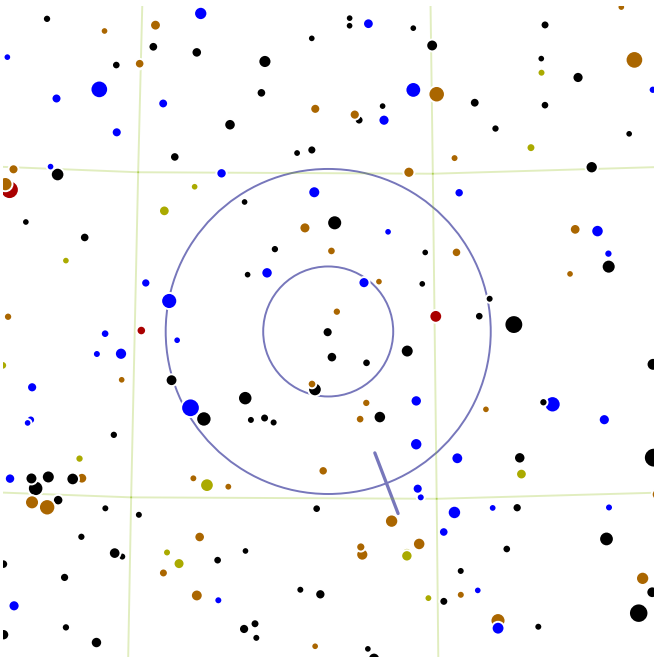
Position Angle: 236°

SAO 84951 | HIP 84379 | GDR2 35276520320

A close white-blue pairing. The primary is brilliant but the secondary is just over 5 magnitudes fainter.

Easily found as the third brightest star in Hercules, south-east of the Keystone asterism.

This system is only 75 light-years from the Sun. It bears the traditional name of Sarin.



Struve 2457

RA: 286.77° | 19h 7.09' — DEC: 22.58° | 22° 35'

Magnitude: 7.5 | 9.0

Separation: 10.3"

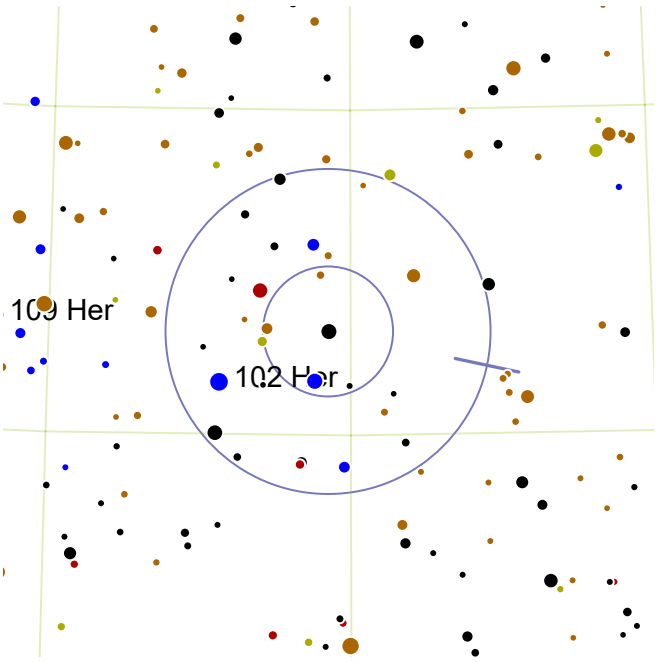
Position Angle: 201°

SAO 86828 | HIP 93885 | GDR2 26916000000

An easily separated white-blue pair.

One and a half finder circles south west of the famous double Albireo (magnitude 3.35, the head of the Swan). This unremarkable star is easily lost in its busy field.

In the same finder circle as Struve 2445 and Struve 2455. These are separated by one degree, with Struve 2455 to the south and slightly east of Struve 2445. They flank Struve 2457.



95 Her

RA: 270.38° | 18h 1.5' — DEC: 21.6° | 21° 36'

Magnitude: 5.0 | 5.1

Separation: 6.3"

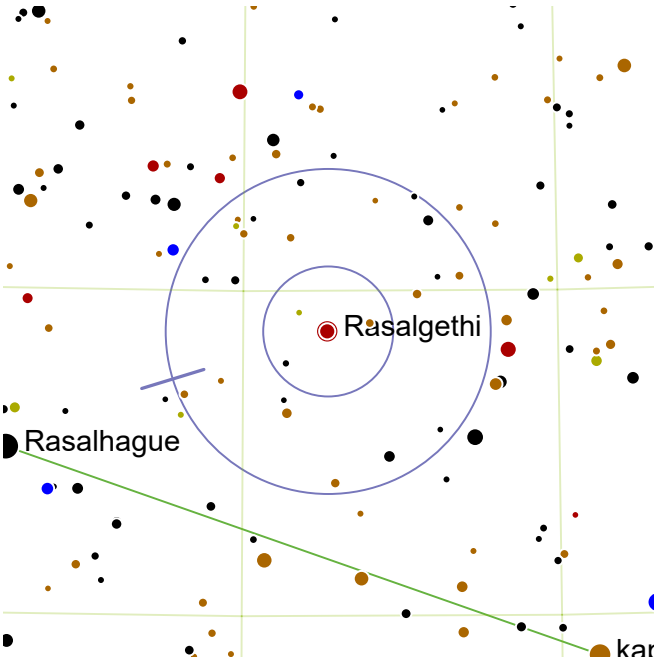
Position Angle: 258°

SAO 85648 | HIP 88267 | GDR2 44112599424

A bright white-yellow pairing with close separation.

Two and a half finder circles north east of Rasalhague. Two spans of the Keystone south east of the Keystone asterism.

About half a billion years young, this pair of large stars are separated by at least 900 astronomical units.



Alpha Her

RA: 258.65° | 17h 14.59' — DEC: 14.38° | 14° 23'

Magnitude: 3.5 | 5.4

Separation: 4.7"

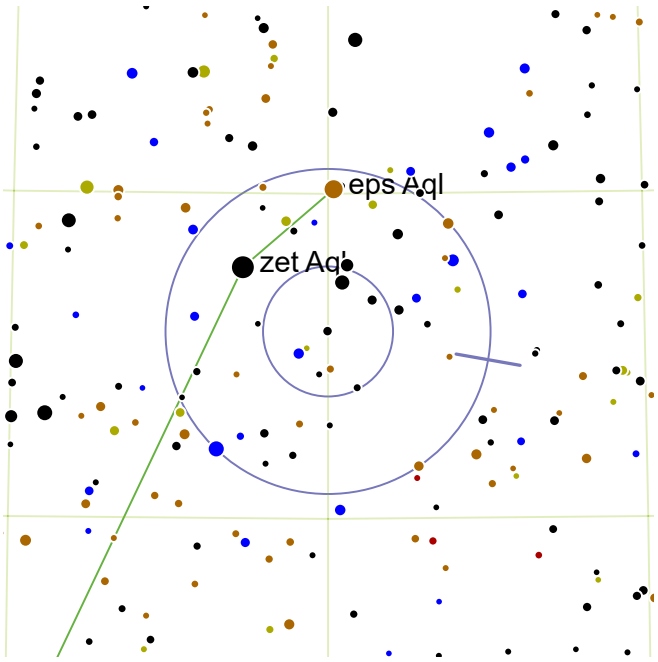
Position Angle: 107°

SAO 102680 | HIP 84345 | | GDR2 95116193408

A reasonably balanced orange-blue pair, very close with a brilliant primary and bright secondary.

Alpha Herculis is far south of the Keystone asterism and might be mistaken as a member of Ophiuchus. Starting at the Keystone asterism, go two Keystone asterism spans due south, and the magnitude 3.08 star you come to is Alpha Herculis.

Some report that through some trick of the contrast, the secondary can appear greenish.



Struve 2426

RA: 285.0° | 19h 0.0' — DEC: 12.88° | 12° 53'

Magnitude: 7.4 | 8.8

Separation: 16.9"

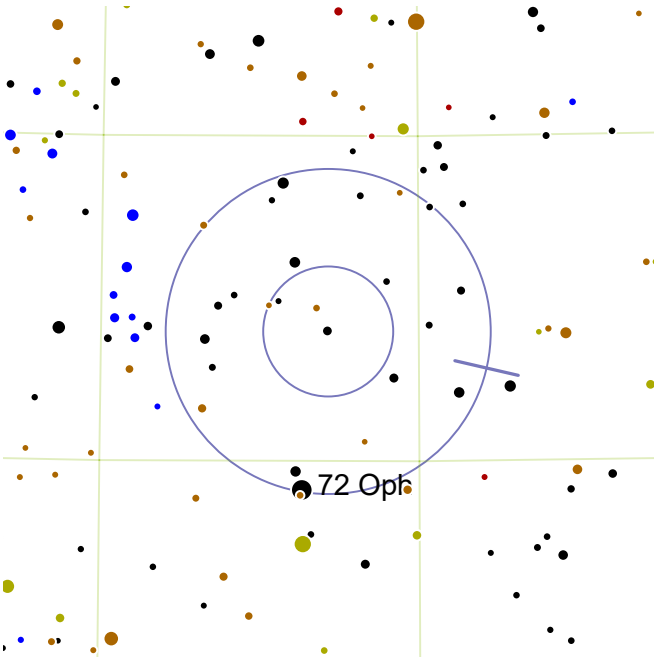
Position Angle: 260°

SAO 104332 | HIP 93273 | GDR2 61529250944

A less common white-orange pair, the two components are easily separated.

Find Okab, the magnitude 2.95 northern wingtip of Aquila amd position it in the north-eastern quadrant of the finder. Struve 2426 is in the center of the view.

With Struve 2426 centered, you will find the open star cluster NGC 6738 1.5 degrees to the south.



Struve 2276

RA: 271.43° | 18h 5.7' — DEC: 12.0° | 12° 0'

Magnitude: 7.0 | 7.4

Separation: 6.9"

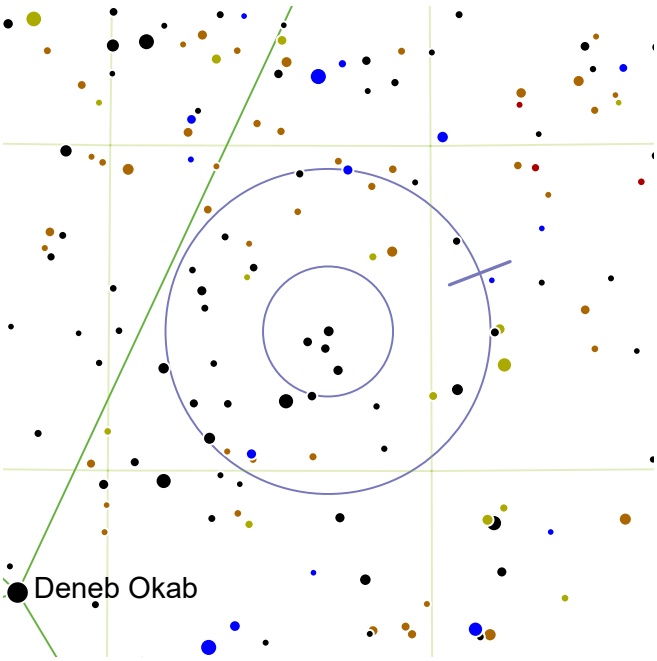
Position Angle: 257°

SAO 103373 | HIP 88627 | GDR2 47069328256

A balanced and close pair of white stars.

One and a half finder circles east of Rasalhague.

The system is 450 light-years from the Sun.



Struve 2449

RA: 286.6° | 19h 6.4' — DEC: 7.15° | 7° 9'

Magnitude: 7.2 | 7.9

Separation: 8.0"

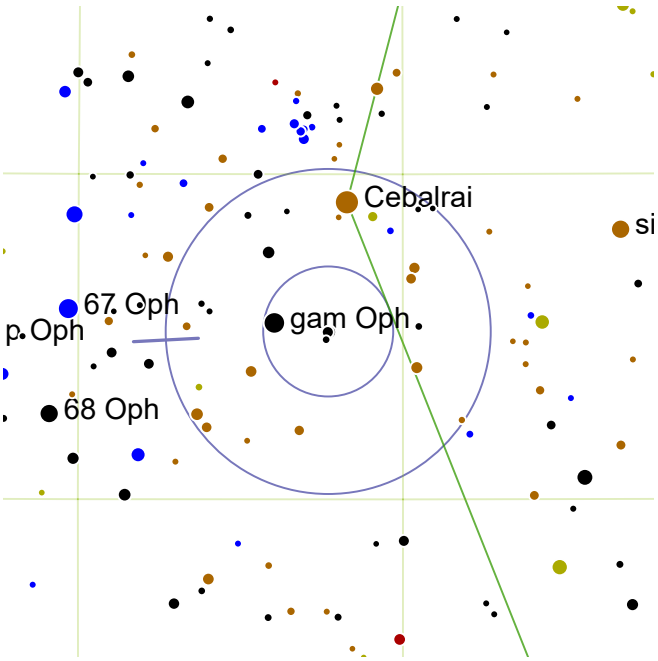
Position Angle: 291°

SAO 124265 | HIP 93822 | GDR2 41936413312

A close and well balanced yellow-blue pair.

Starting at Delta Aquilae, the heart of the Eagle, move two and a half finder circles north west.

The primary lies 344 light-years from the Sun, but it is not known if the secondary is gravitationally bound.



61 Oph

RA: 266.15° | 17h 44.59' — DEC: 2.58° | 2° 35'

Magnitude: 6.2 | 6.6

Separation: 20.6"

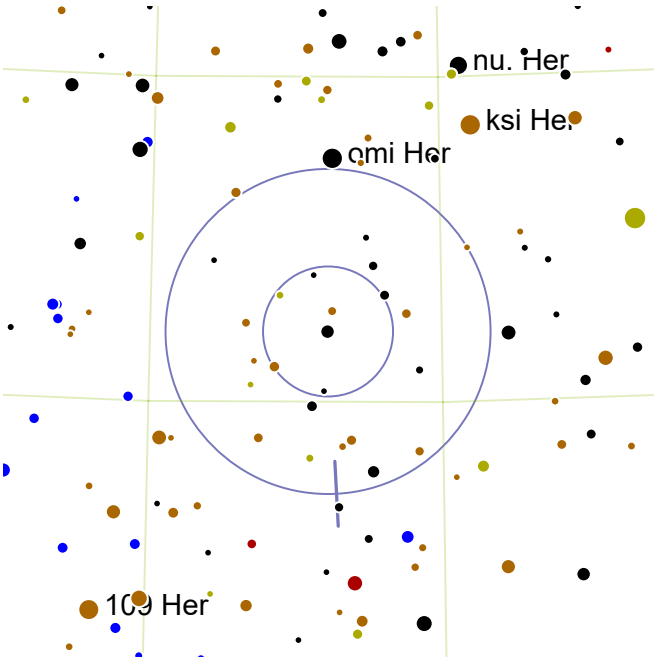
Position Angle: 93°

SAO 122690 | HIP 86831 | GDR2 89983293696

A widely separated pair of white stars. Both components are fairly bright.

Located just over 2 degrees south-east of magnitude 2.7 Cebalrai. Cebalrai is the second brightest star in Ophiuchus.

With Cebalrai centered in the finder, globular cluster NGC 6426 lies between Cebalrai and 61 Oph, while the north eastern quadrant of the finder is filled by the Summer Beehive Cluster (IC 4665).



100 Her

RA: 271.95° | 18h 7.79' — DEC: 26.1° | 26° 6'

Magnitude: 5.9 | 6.0

Separation: 14"

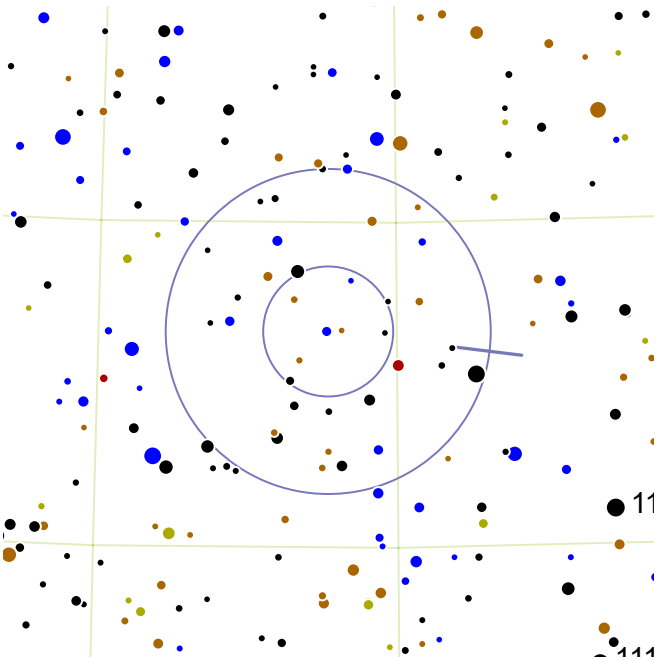
Position Angle: 183°

SAO 85753 | HIP 88818 | GDR2 75911466624

Two almost identical bright white stars, comfortably separated.

Two and a half finder circles east of Sarin.

The two components are similar to Sirius, the brightest star in our sky (aside from the Sun of course). Even though the 100 Herculis system is very close (160 light-years away) the two components are barely visible without a telescope - which gives an idea of how unimpressive Sirius is in absolute terms!



Struve 2445

RA: 286.15° | 19h 4.59' — DEC: 23.33° | 23° 20'

Magnitude: 7.2 | 8.9

Separation: 12.6"

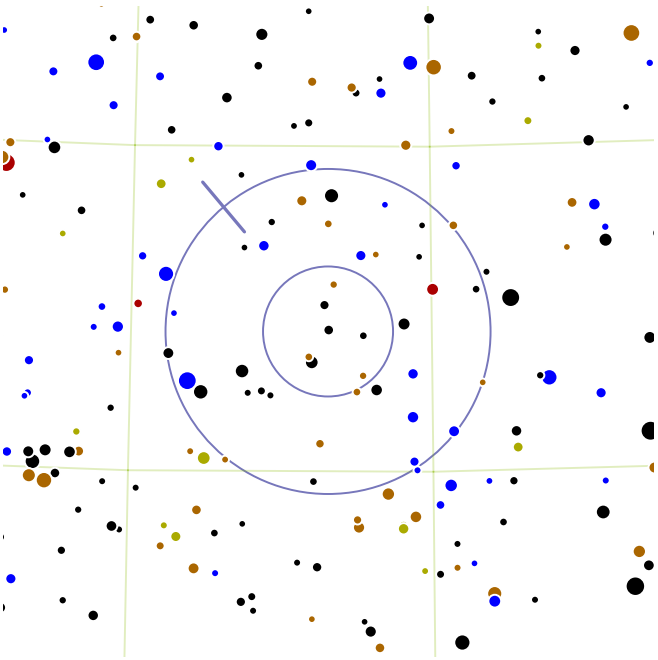
Position Angle: 263°

SAO 86774 | HIP 93680 | GDR2 77054351104

An easily separated white-blue pair.

One and a half finder circles south west of the famous double Albireo (magnitude 3.35, the head of the Swan). This unremarkable star is easily lost in its busy field.

In the same finder circle as its Tweedledee Struve 2455. Struve 2455 lies one degree to the south and slightly east of Struve 2445. They flank another double, Struve 2457.



Struve 2455

RA: 286.73° | 19h 6.9' — DEC: 22.17° | 22° 10'

Magnitude: 7.4 | 8.5

Separation: 6.6"

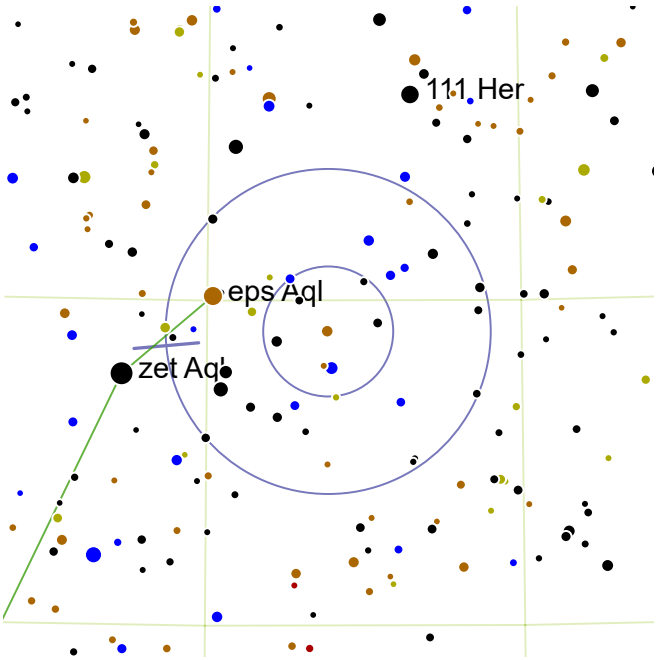
Position Angle: 40°

SAO 86821 | HIP 93859 | GDR2 52674666240

A close white-blue pair.

One and a half finder circles south west of the famous double Albireo (magnitude 3.35, the head of the Swan). This unremarkable star is easily lost in its busy field.

In the same finder circle as its Tweedledum Struve 2445. Struve 2455 lies one degree to the south and slightly east of Struve 2445. They flank another double, Struve 2457.



Struve 2411

RA: 283.08° | 18h 52.29' — DEC: 14.53° | 14° 32'

Magnitude: 6.6 | 9.4

Separation: 13.5"

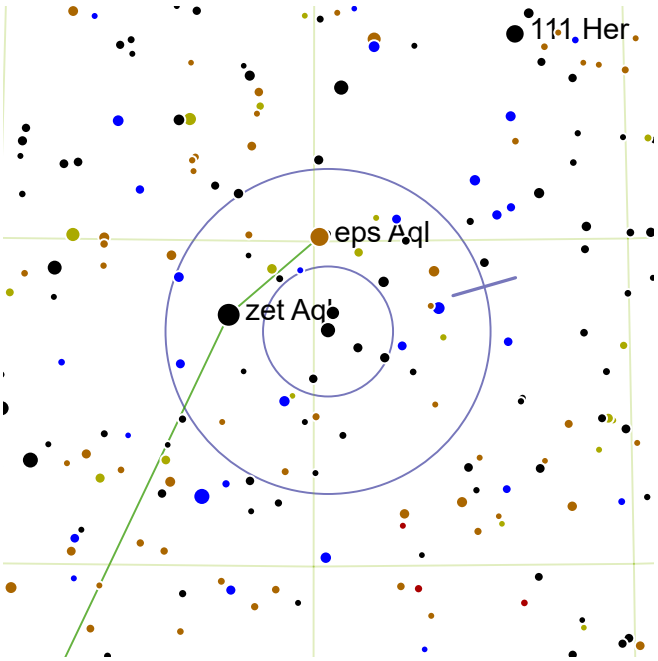
Position Angle: 95°

SAO 104203 | HIP 92620 | GDR2 62086517760

A comfortably separated pair with a yellow primary and a faint secondary.

In the same finder circle as Zeta Aquilae, 3 degrees to the west.

The yellow giant primary is only 362 light-years away. With Struve 2411 centered, open cluster NGC 6738 lies just beyond the south eastern edge of the finder circle.



11 Aql

RA: 284.77° | 18h 59.09' — DEC: 13.62° | 13° 37'

Magnitude: 5.2 | 8.7

Separation: 17"

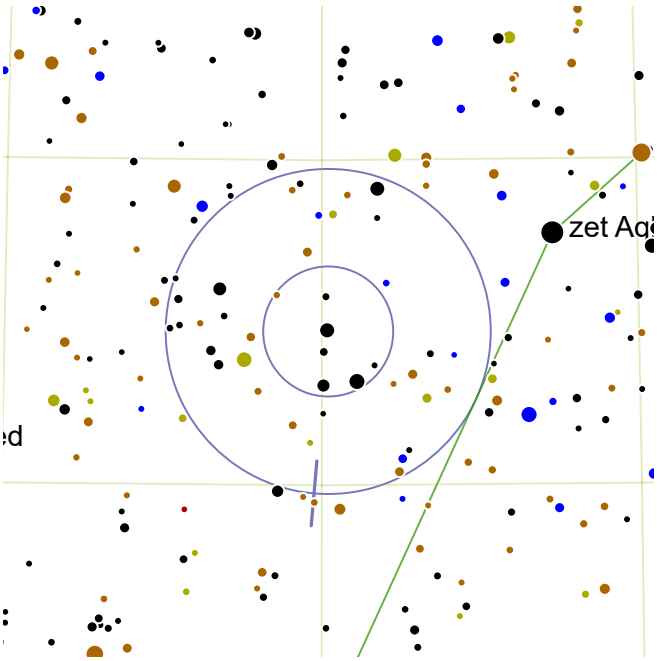
Position Angle: 286°

SAO 104308 | HIP 93203 | GDR2 21465681536

A wide pair with a white primary and a faint blue companion.

Easily found one degree due west of magnitude 2.95 Zeta Aquilae, the northernmost wingtip of the Eagle.

The two stars are not physically bound but only lie on the same line of sight. Open cluster NGC 6738 is two degrees south of this cluster.



28 Aql

RA: 289.9° | 19h 19.59' — DEC: 12.37° | 12° 22'

Magnitude: 5.6 | 9.0

Separation: 60.7"

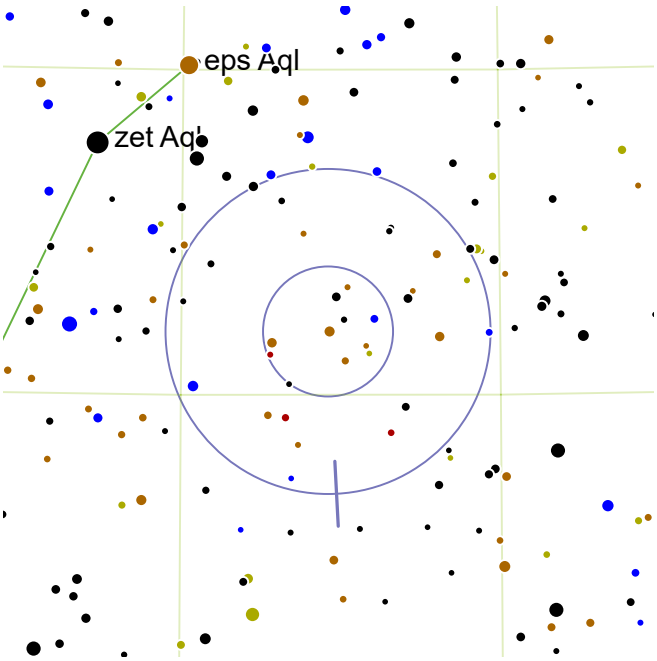
Position Angle: 175°

SAO 104722 | HIP 94982 | GDR2 89873075200

A bright yellowish primary with a distant much fainter companion.

Half a finder circle SEE from magnitude 3.02 zet Aql. One finder circle NWW from magnitude 2.8 Tarazed.

The pair are gravitationally bound. The primary is also a variable star, V1208 Aquilae.



Struve 2404

RA: 282.7° | 18h 50.79' — DEC: 10.98° | 10° 59'

Magnitude: 6.9 | 8.1

Separation: 3.6"

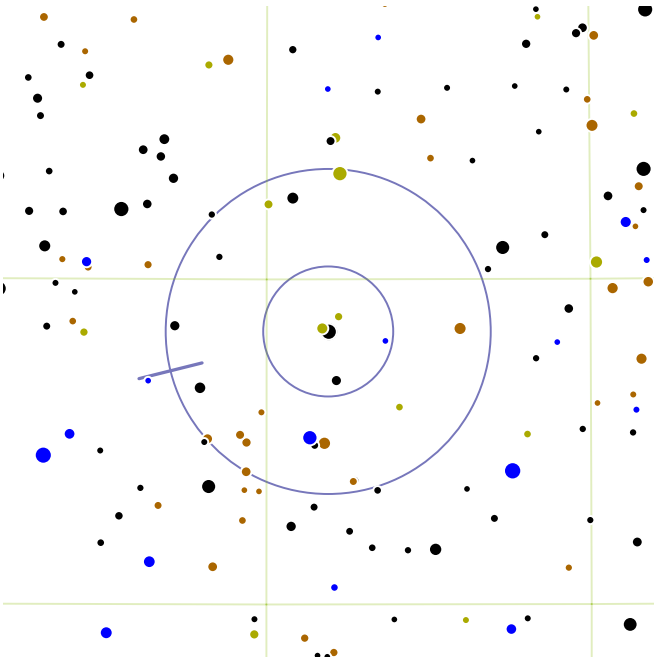
Position Angle: 183°

SAO 104170 | HIP 92475 | GDR2 61225172736

Two orange stars with very tight separation.

One finder circle south west of Zeta Aquilae. This system is 1259 light-years from the Sun.

This pair of orange giants is 1259 light-years from the Sun.



Theta Ser

RA: 284.05° | 18h 56.2' — DEC: 4.2° | 4° 12'

Magnitude: 4.5 | 5.4

Separation: 22.3"

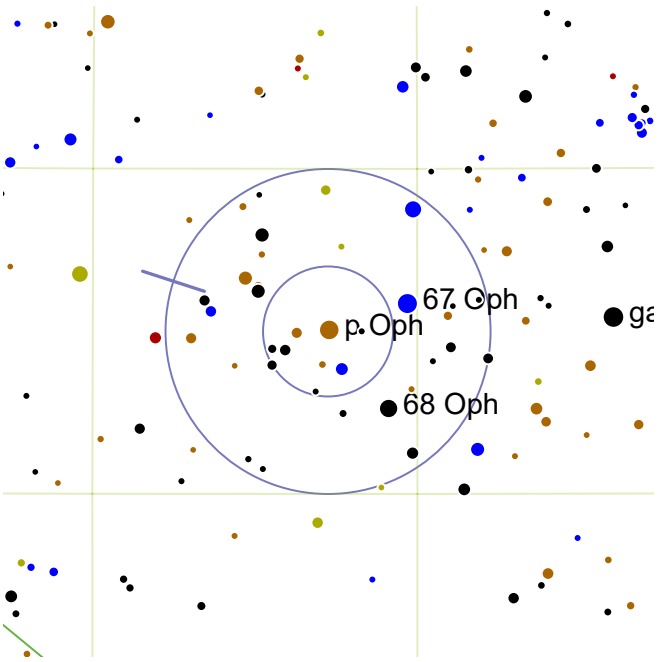
Position Angle: 104°

SAO 124068 | HIP 92946 | GDR2 84413726208

A widely separated pair of bright blue stars.

The end of the serpent's tail, nestled among the stars of Aquila. The Serpentis lies two finder circles due west from Delta Aquilae, the central star of the Eagle.

With this double centered in the finder, two open clusters lie just beyond the eastern edge of the finder circle: NGC 6755 and the much fainter NGC 6756.



70 Oph

RA: 271.38° | 18h 5.5' — DEC: 2.5° | 2° 30'

Magnitude: 4.2 | 6.0

Separation: 2.8"

Position Angle: 72°

SAO 123107 | HIP 88601 | GDR2 89937892096

A brilliant yellow star with a bright orange companion. The pair are very close, especially given their apparent magnitude. The gap is currently near the maximum.

Located in the center of a brilliant star field, 70 Ophiuchi lies one and a half finder circles east and slightly south of magnitude 2.75 Celebrai of the constellation Ophiuchus.

70 Oph is only 16.6 light-years from the Sun. William Herschel calculated its 88 year orbit proving gravity applies beyond the Solar System. Behind 70 Oph looms an enormous loose group of stars, Melotte 186.

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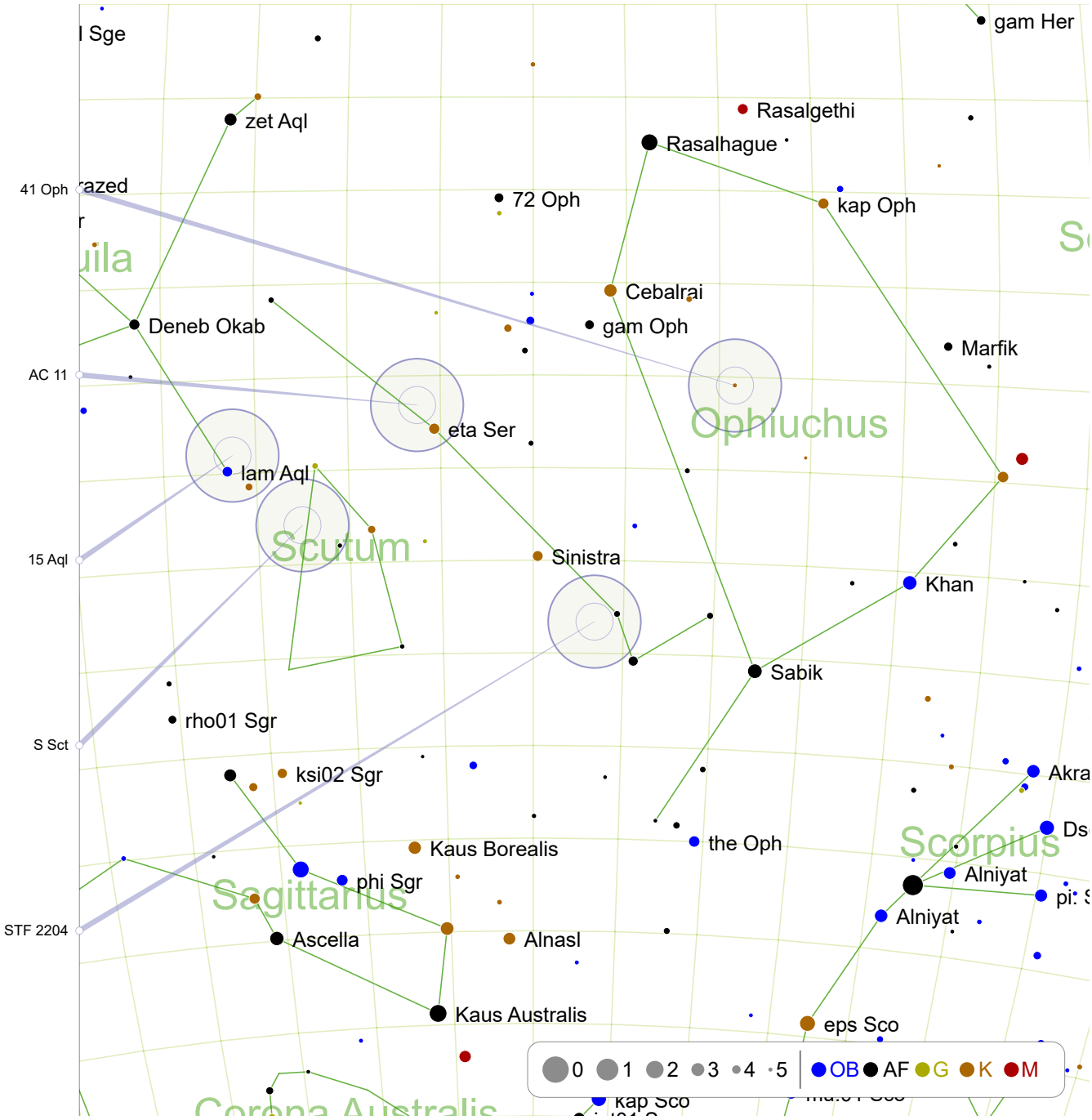
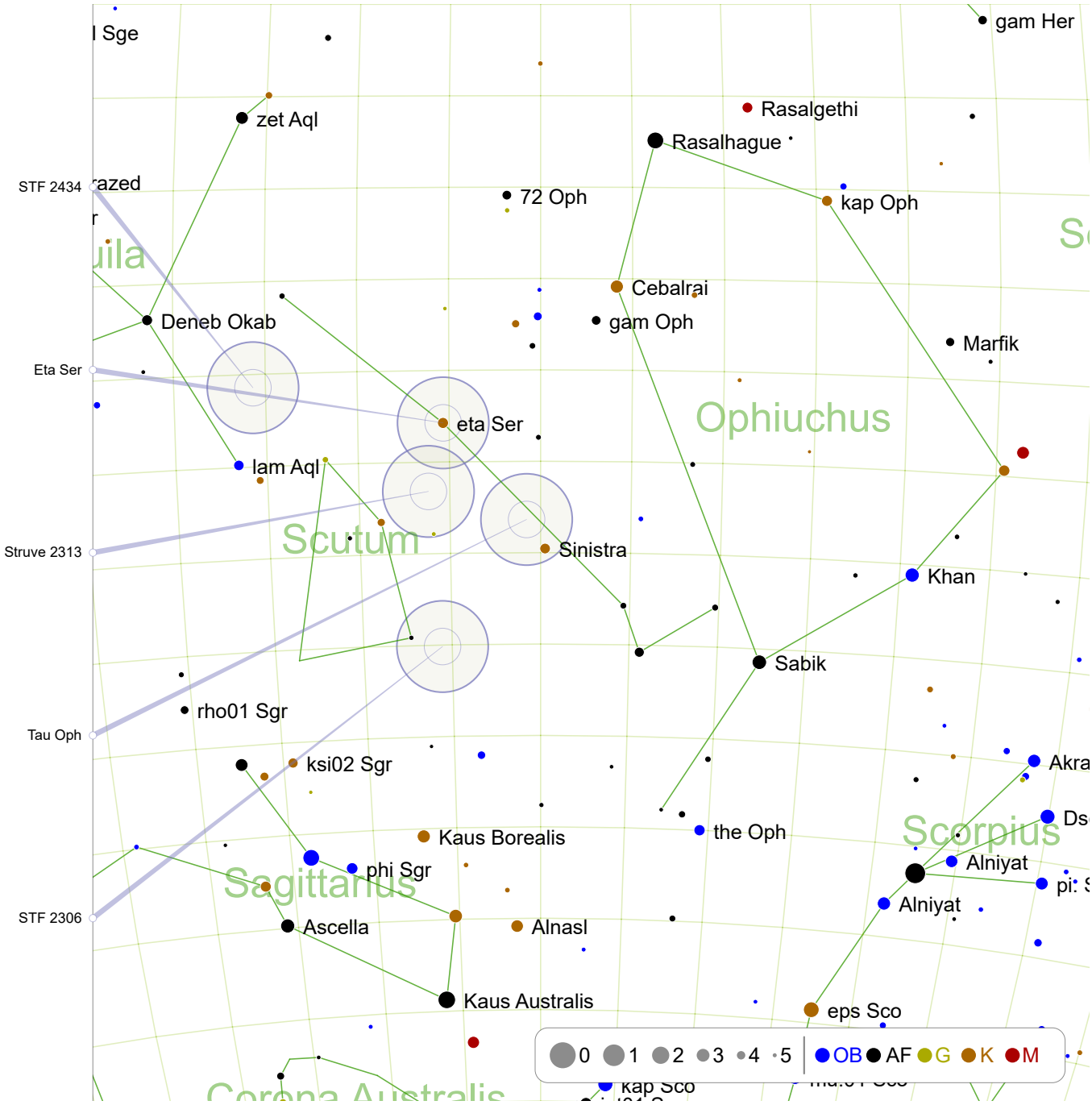
Early Summer - Southern Horizon (1)

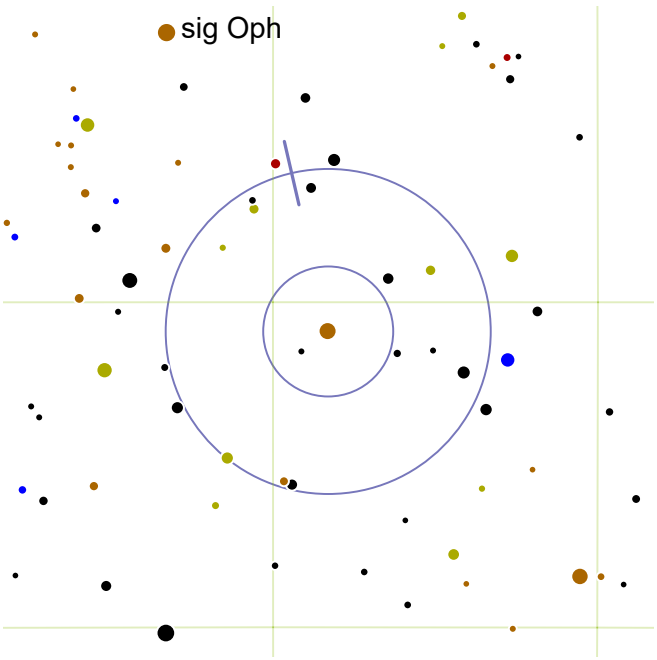


41 Oph: page 213 AC 11: page 213 15 Aql: page 214 S Sct: page 214
STF 2204: page 215

Early Summer - Southern Horizon (2)



STF 2434: page 215 Eta Ser: page 216 Struve 2313: page 216 Tau Oph: page 217
STF 2306: page 217



41 Oph

RA: 259.15° | 17h 16.59' — DEC: -0.45° | 0° 26'

Magnitude: 4.9 | 7.5

Separation: 1"

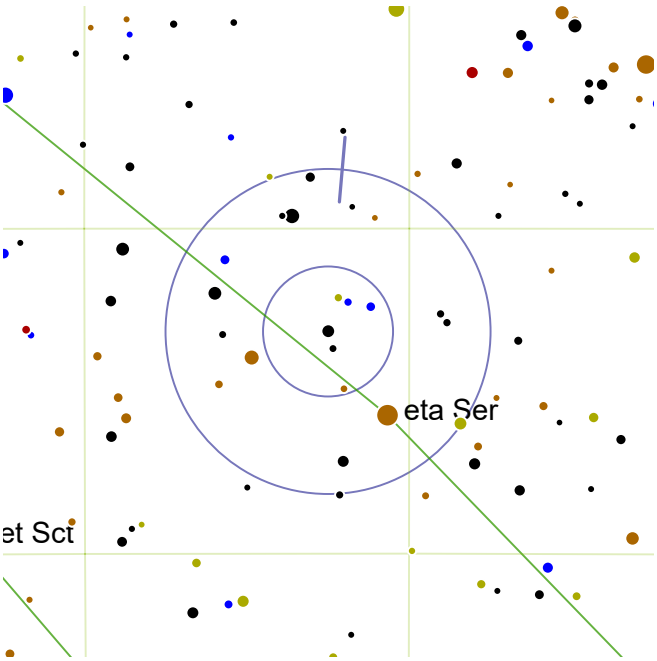
Position Angle: 13°

SAO 141586 | HIP 84514

A fantastically close unequal orange-white pairing.

One and a half finder circles SW from magnitude 2.94 Cebalrai. Two finder circles SSE from magnitude 3.42 kap Oph.

The primary is an orange K-class giant approximately 3.7 billion years old. The components orbit in 141 years.



AC 11

RA: 276.25° | 18h 25.0' — DEC: -1.58° | -1° 34'

Magnitude: 6.7 | 7.2

Separation: 0.85"

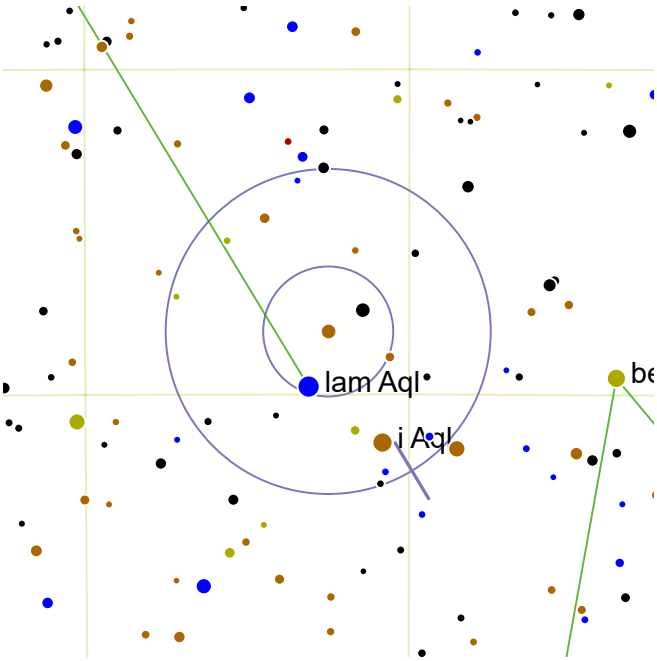
Position Angle: 355°

SAO 142294 | HIP 90253 | GDR2 01112859136

A balanced but difficult white-white double with a tiny separation.

One degree NE from magnitude 3.42 eta Ser.

The system is 435 light-years from Earth.



15 Aql

RA: 286.25° | 19h 5.0' — DEC: -4.03° | -4° 1'

Magnitude: 5.5 | 7.0

Separation: 39.6"

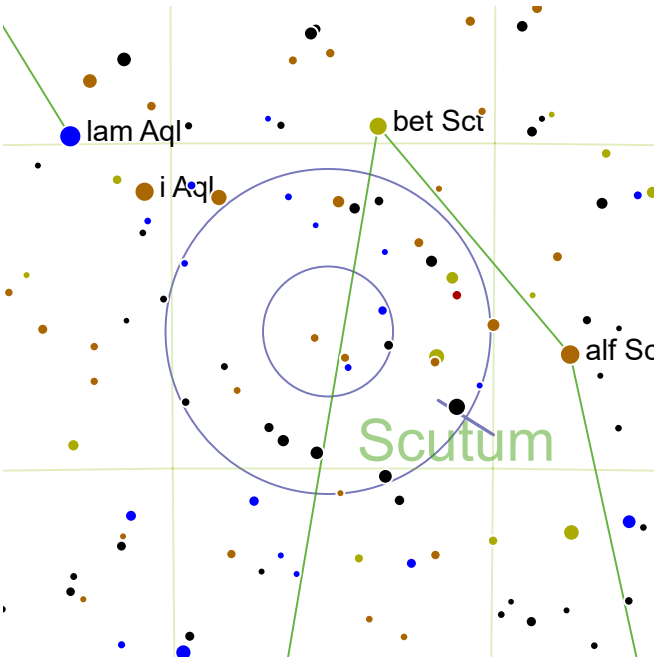
Position Angle: 211°

SAO 142996 | HIP 93717 | GDR2 92802784384

A very wide pair of yellow stars.

Located a degree to the north of Lamda Aquilae, the tail of the Eagle.

Good at low powers as the star lies in the Milky Way. The region is rich in dark nebulae - Barnard 132 and Barnard 120 lie to one to two degrees to the east and west respectively of this double.



S Sct

RA: 282.58° | 18h 50.29' — DEC: -7.9° | -7° 53'

Magnitude: 7.5 | 12

Separation: 14.4"

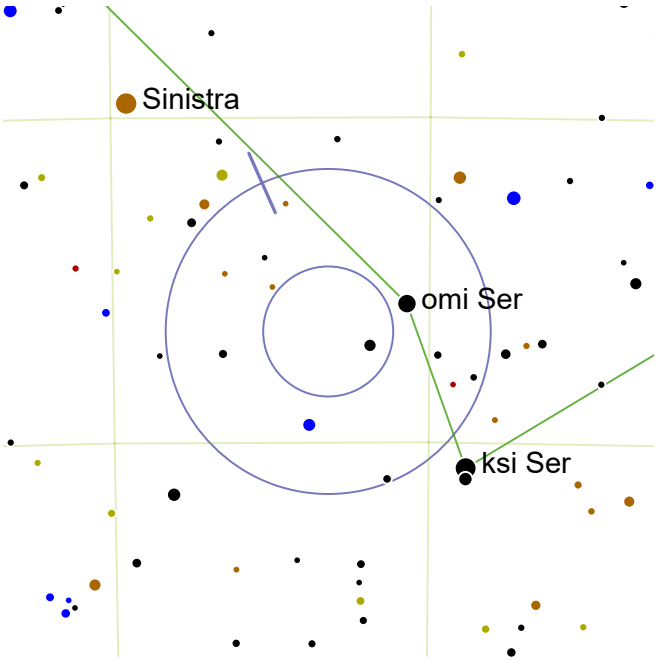
Position Angle: 238°

SAO 142674 | HIP 92442 | GDR2 71231284224

A deep red primary with an easily separated, tiny orange companion.

Half a finder circle SW from magnitude 3.55 lam Aql. One and a half finder circles SE from magnitude 3.42 eta Ser.

The primary is a carbon star, so it is deeply red and quite variable (Δ magnitude 4.0).



STF 2204

RA: 266.6° | 17h 46.4' — DEC: -13.3° | -13° 17'

Magnitude: 8.1 | 8.1

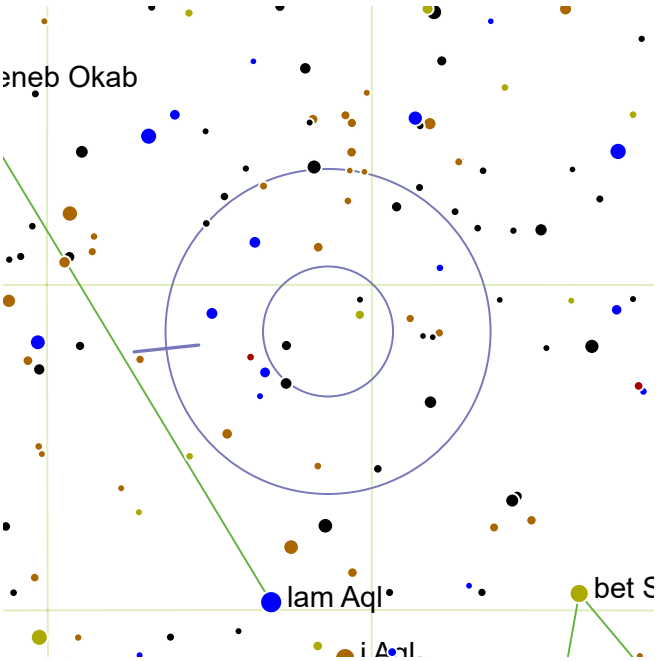
Separation: 14.4"

Position Angle: 24°

SAO 160809 | GDR2 94949053952

An equal pair of easily separated white stars.

Half a finder circle NE from magnitude 3.64 ksi Ser. One and a half finder circles NEE from magnitude 2.63 Sabik.



STF 2434

RA: 285.68° | 19h 2.7' — DEC: -0.72° | 0° 42'

Magnitude: 8.4 | 8.6

Separation: 26"

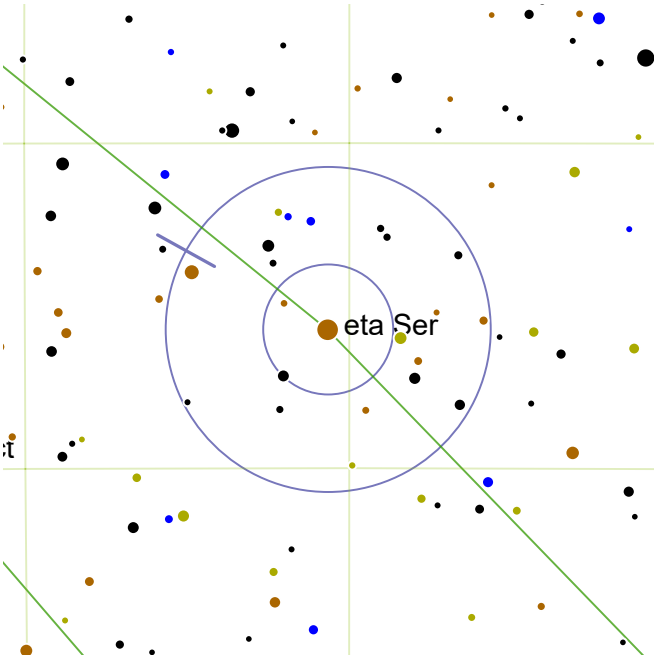
Position Angle: 96°

SAO 142955 | HIP 93518 | GDR2 4265524749785867008

A yellow-yellow pairing, widely separated.

Half a finder circle NNW from magnitude 3.55 lam Aql. One finder circle SW from magnitude 3.44 Deneb Okab.

The secondary component is also a balanced binary with a separation of 0.78".



Eta Ser

RA: 275.33° | 18h 21.29' — DEC: -2.87° | -2° 51'

Magnitude: 3.4 | 12.1

Separation: 179.7"

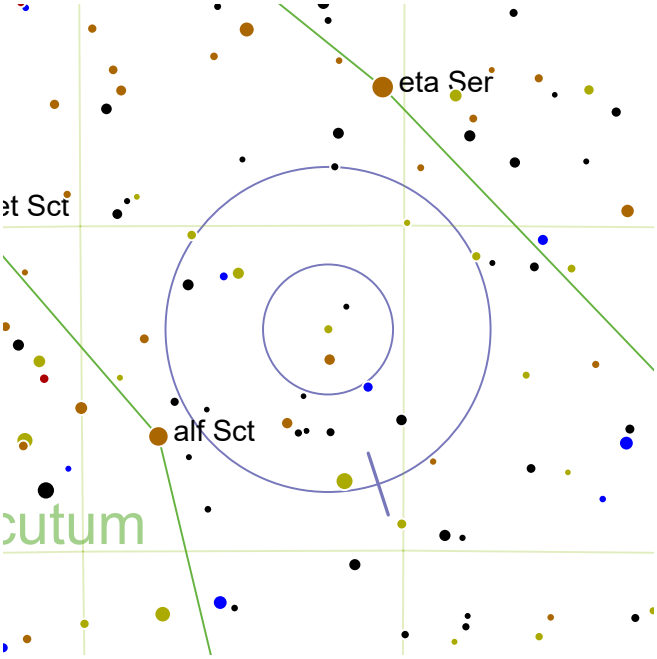
Position Angle: 61°

SAO 142241 | HIP 89962

The primary is a a brilliant orange but the companion is very faint indeed.

Eta Ser is a bright star in Serpens.

The primary is only 60 light-years from Earth, but this double is merely a line of sight coincidence.



Struve 2313

RA: 276.18° | 18h 24.7' — DEC: -6.6° | -6° 35'

Magnitude: 7.5 | 8.8

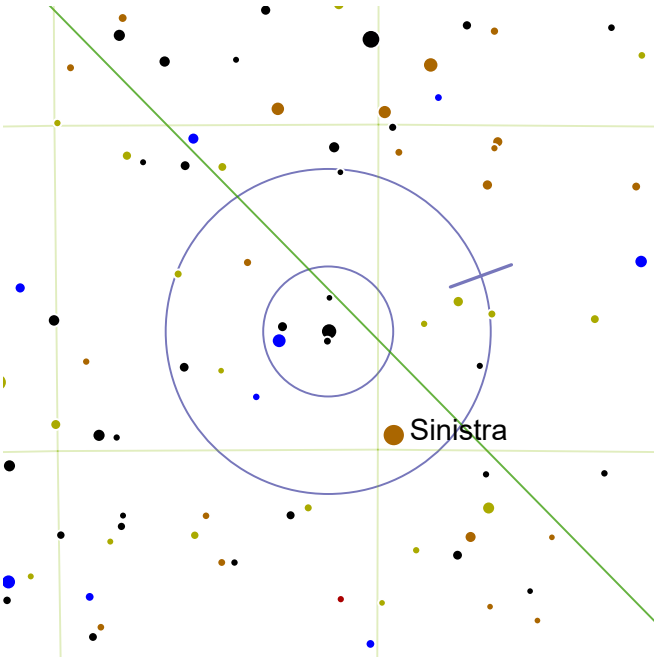
Separation: 6.1"

Position Angle: 198°

SAO 142289 | HIP 90239 | GDR2 80326713984

A close yellow and blue pair.

From magnitude 3.20 Eta Serpentis, move one finder circle south and very slightly east.



Tau Oph

RA: 270.77° | 18h 3.09' — DEC: -8.18° | -8° 10'

Magnitude: 5.2 | 5.9

Separation: 1.5"

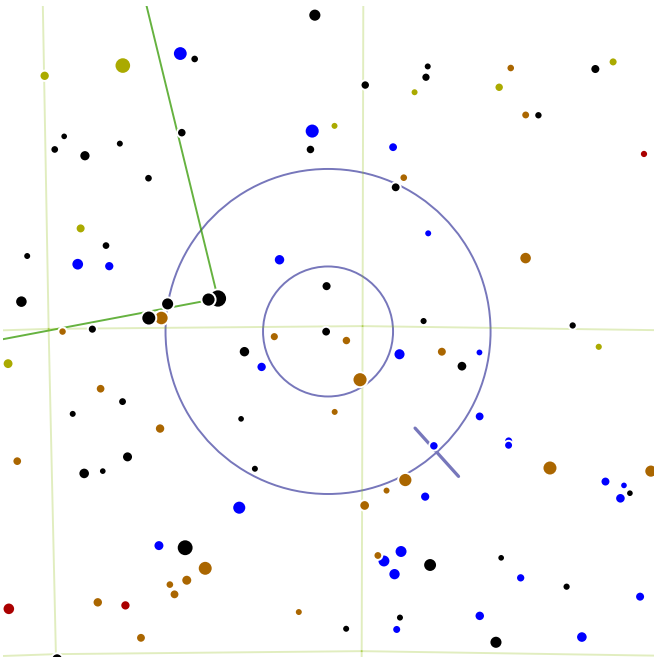
Position Angle: 290°

SAO 142050 | HIP 88404 | GDR2 76094715520

An extremely tight, balanced pair of yellowish stars.

One degree NNE from magnitude 3.5 Sinistra. One finder circle SW from magnitude 3.42 eta Ser.

The double lies between two globular clusters: NGC 6539 (mag. 8.9) lies within a degree to the north-east, and NGC 6517 (mag. 11.1) lies within a degree to the south.



STF 2306

RA: 275.55° | 18h 22.2' — DEC: -15.08° | -15° 4'

Magnitude: 8.1 | 8.6

Separation: 9.1"

Position Angle: 222°

SAO 161390 | HIP 90032 | GDR2 19300677504

A deep yellow primary with a balanced secondary, closely separated.

One and a half finder circles SE from magnitude 3.5 Sinistra. Two finder circles NW from magnitude 3.61 ksi02 Sgr.

The finder circle is rich in nebulae. M17 (mag. 6.0) lies a degree to the south, while M16 (mag.6.0) lies a degree to the north west.

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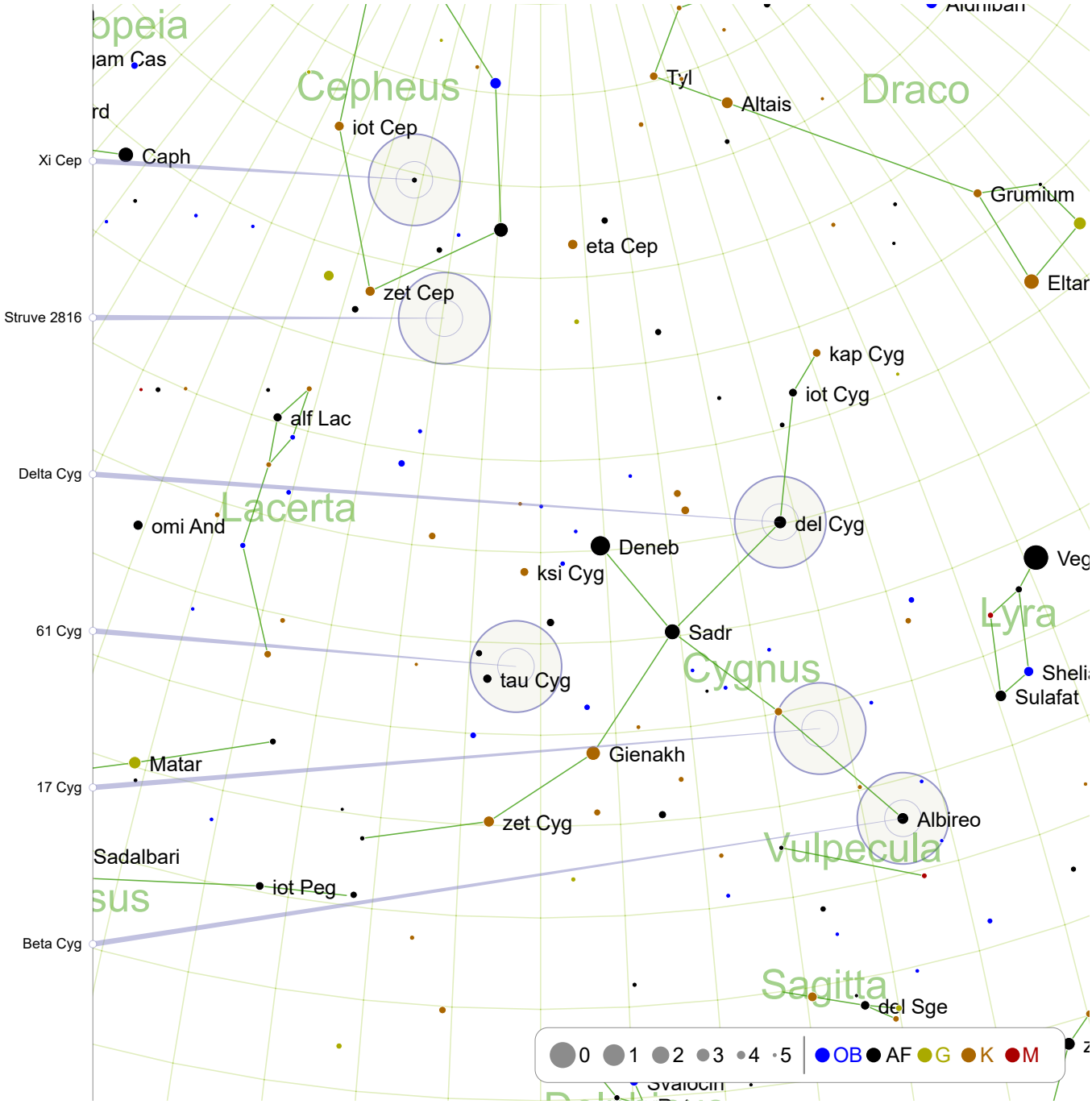
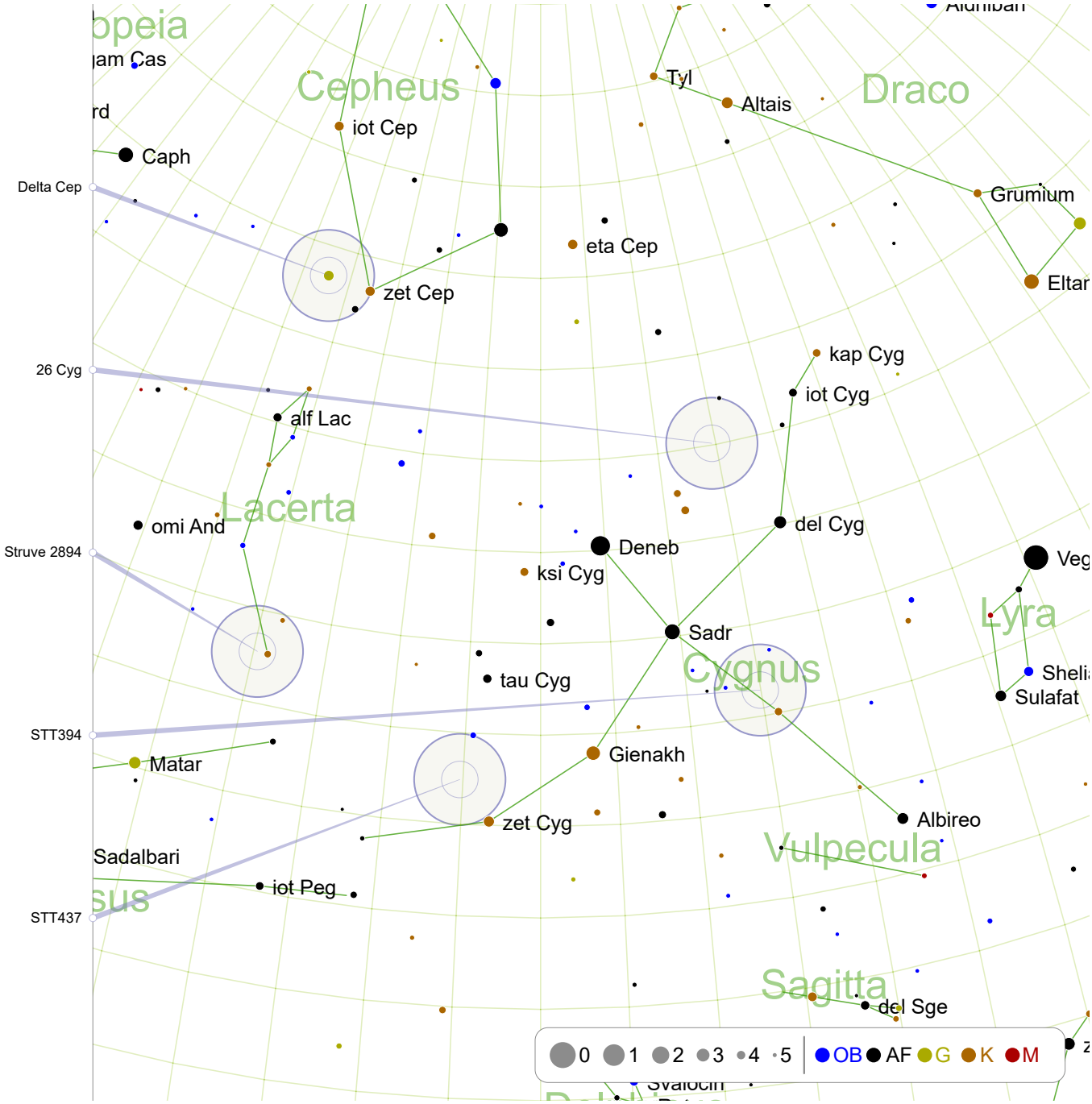
Late Summer - Looking North (1)

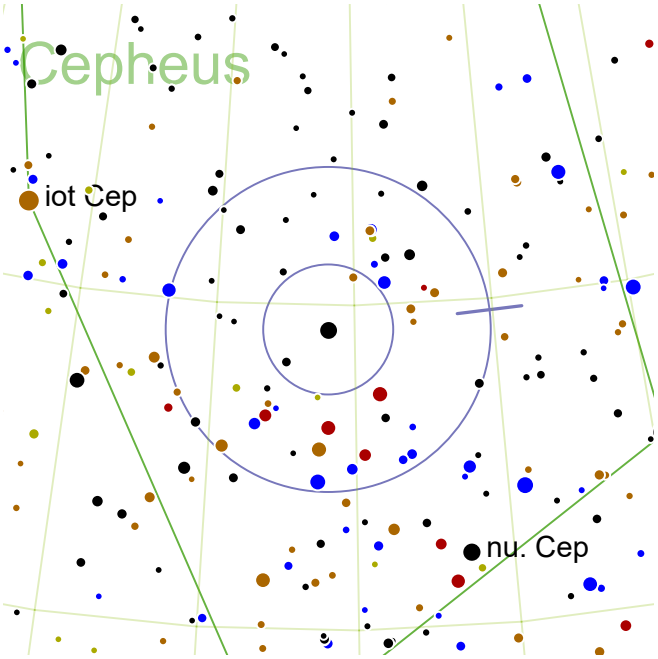


Xi Cep: page 221 Struve 2816: page 221 Delta Cyg: page 222 61 Cyg: page 222
17 Cyg: page 223 Beta Cyg: page 223

Late Summer - Looking North (2)



Delta Cep: page 224 26 Cyg: page 224 Struve 2894: page 225 STT394: page 225
STT437: page 226



Xi Cep

RA: 330.95° | 22h 3.79' — DEC: 64.63° | 64° 38'

Magnitude: 4.4 | 6.5

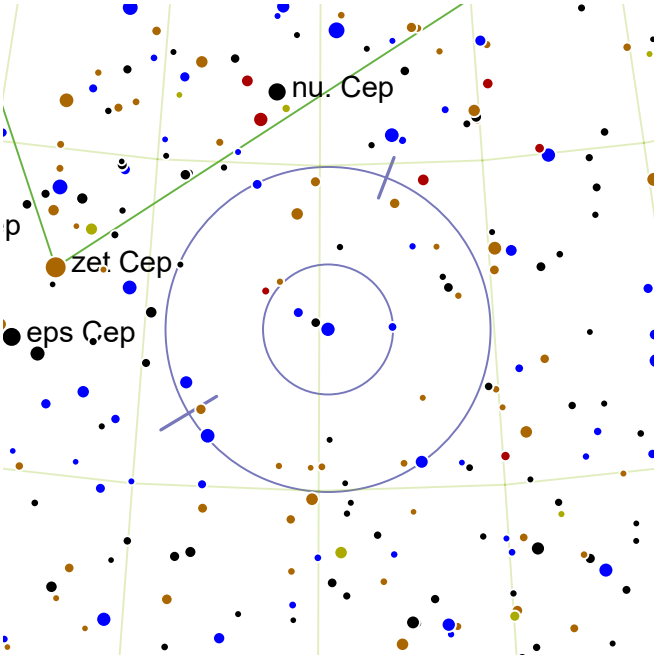
Separation: 7.7"

Position Angle: 277°

SAO 19827 | HIP 108917 | GDR2 10659419264

A bright white primary with a close moderately fainter white secondary.

The Arabic proper name Alkurhah means the “white spot on the brow of a horse”. Both visible components are also spectroscopic binaries. The system also has a widely separated 13th magnitude C component.



Struve 2816

RA: 324.75° | 21h 39.0' — DEC: 57.48° | 57° 29'

Magnitude: 5.6 | 7.7 | 7.8

Separation: 11.7" | 20"

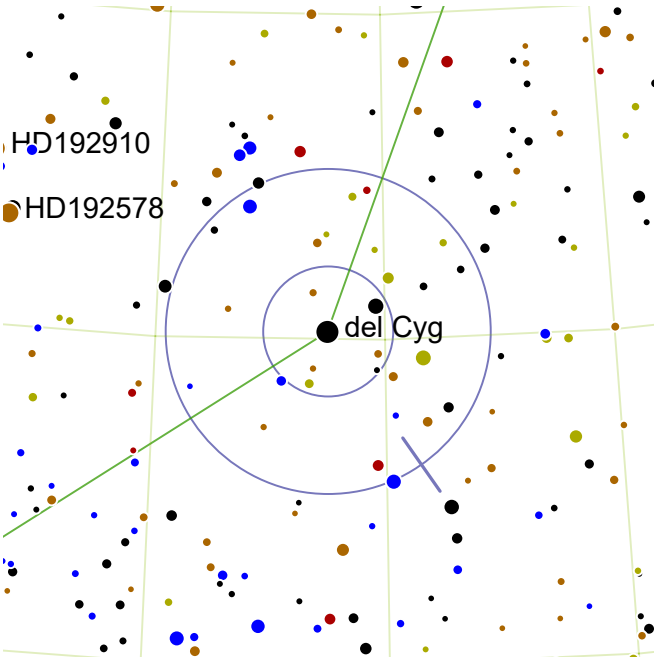
Position Angle: 121° | 339°

SAO 33626 | HIP 106886 | GDR2 37123250432

Possibly yellow and white (the yellow primary being bracketed by by two fainter white stars). Alternately, the primary might be blue.

One finder circle south and slightly east of Alderamin.

The primary holds a surprise for those with large telescopes, dark skies and preternaturally keen eyes: 1.8” from the primary lies a magnitude 13.3 star. At moderate magnification, another double appears to the north-east: Struve 2819, a pair of white stars (magnitudes 7.4 and 8.6; separation: 12.9”; position angle: 59°).



Delta Cyg

RA: 296.24° | 19h 44.95' — DEC: 45.13° | 45° 8'

Magnitude: 2.89 | 6.27

Separation: 2.77"

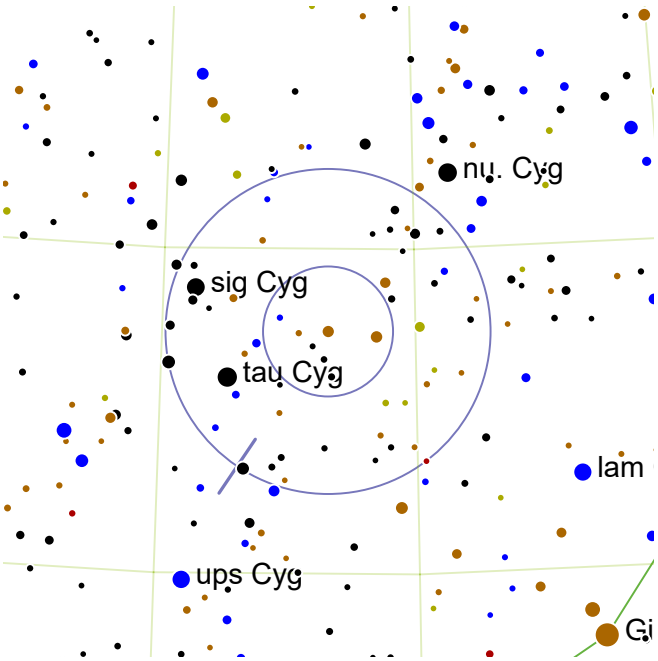
Position Angle: 215°

SAO 48796 | HIP 97165 | GDR2 87999414656

A very close and unbalanced pair with a brilliant blueish primary and reasonably bright white secondary.

Unmistakable as the bright star on Cygnus' western wing.

Delta Cygni (aka Fawaris) shares the finder circle with bright open cluster NGC 6811, which lies towards the north-western edge of the finder circle.



61 Cyg

RA: 316.73° | 21h 6.9' — DEC: 38.75° | 38° 45'

Magnitude: 5.2 | 6.0

Separation: 28"

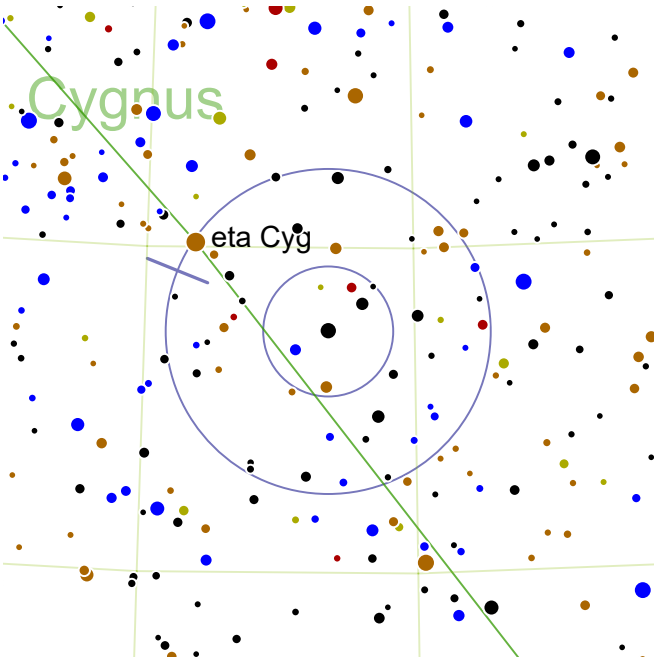
Position Angle: 146°

SAO 70919 | HIP 104214 | GDR2 27813442688

An orange-red pair with wide separation. I see both components as orange.

61 Cygni forms a parallelogram with the bright stars of Cygnus: Deneb (the tail), Sadr (the heart) and Gienakh (the brightest star of the south-eastern wing).

This double is only 11 light-years away and was the first star whose distance from Earth was measured. Astronomers had a clue it might be a close star because the system has an extremely high proper motion relative to other stars, suggesting it is nearer.



17 Cyg

RA: 296.6° | 19h 46.4' — DEC: 33.73° | 33° 44'

Magnitude: 5.1 | 9.3

Separation: 26.1"

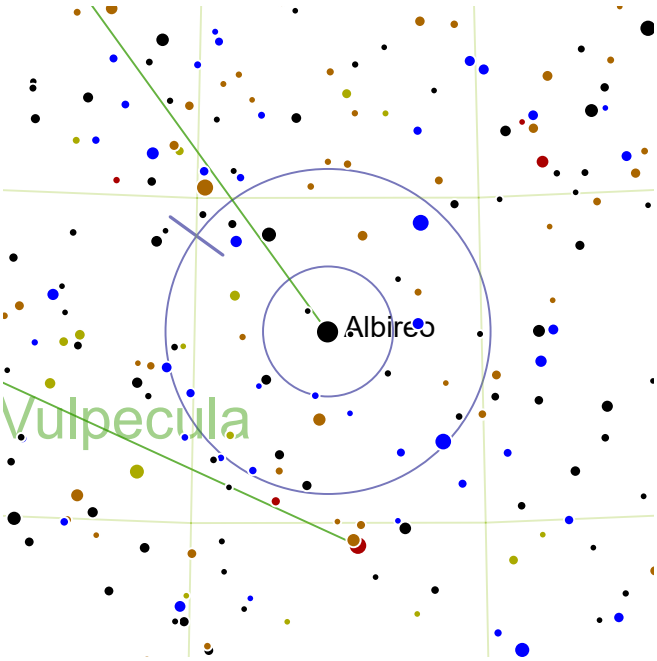
Position Angle: 68°

SAO 68827 | HIP 97295

A bright yellowish primary widely separated from a dim secondary.

One finder circle NNE from magnitude 3.24 183913. One finder circle NNE from magnitude 3.24 Albireo.

Only 69 light-years from Earth, this pair are gravitationally bound.



Beta Cyg

RA: 292.68° | 19h 30.7' — DEC: 27.97° | 27° 58'

Magnitude: 3.1 | 5.1

Separation: 34.4"

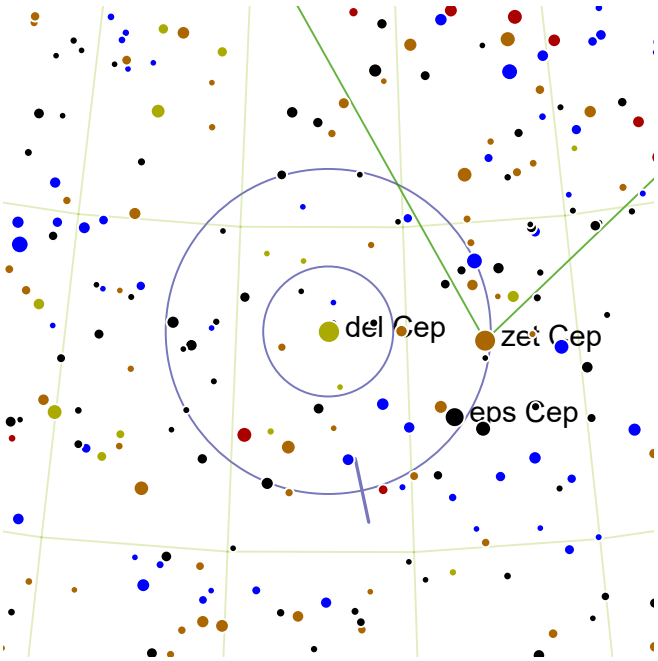
Position Angle: 54°

SAO 87301 | HIP 95947 | GDR2 60302988160

This is the renowned Albireo, a brilliant deep yellow primary with a bright and delicate blue companion.

The head of the Cygnus the Swan.

Perhaps the most famous of all doubles, Albireo stands out for its strong color, bright components and easy separation. Albireo is approaching the Sun, and in several million years this double will be the brightest star in Earth's sky. Let's hope there will still be somewhere dark and quiet to look up at it.



Delta Cep

RA: 337.3° | 22h 29.2' — DEC: 58.42° | 58° 25'

Magnitude: 3.9 | 6.3

Separation: 41"

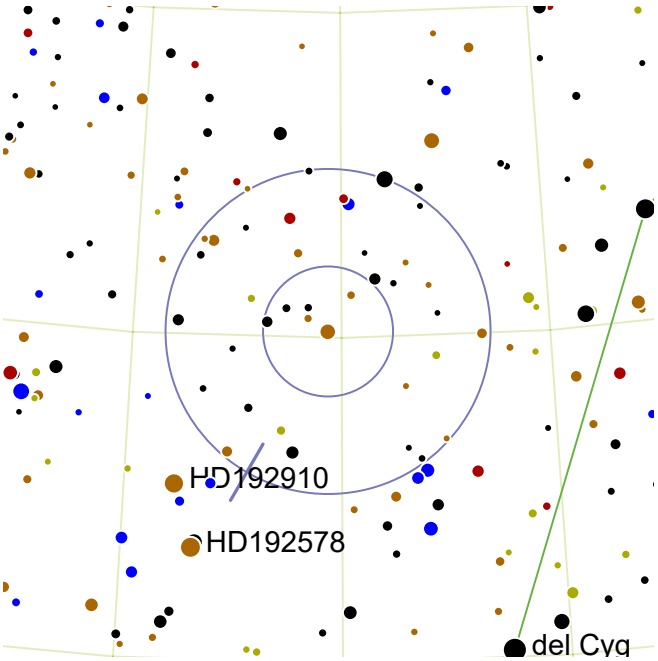
Position Angle: 192°

SAO 34508 | HIP 110991 | GDR2 54723522432

A bright, widely separated yellow and blue pair.

Half a finder east of Zeta Cephei.

The primary is the prototype of the Cepheid variables, varying strongly between magnitude 3.5 and 4.4 over 5.4 days. Cepheids proved other galaxies are island universes. Nearby Espilon Cep is roughly magnitude 4.2 and can serve as a comparison, being sometimes brighter or fainter than Delta. Another nearby star is magnitude 3.35 Zeta Cep, roughly Delta's maximum brightness.



26 Cyg

RA: 300.33° | 20h 1.29' — DEC: 50.1° | 50° 6'

Magnitude: 5.2 | 8.9

Separation: 41.8"

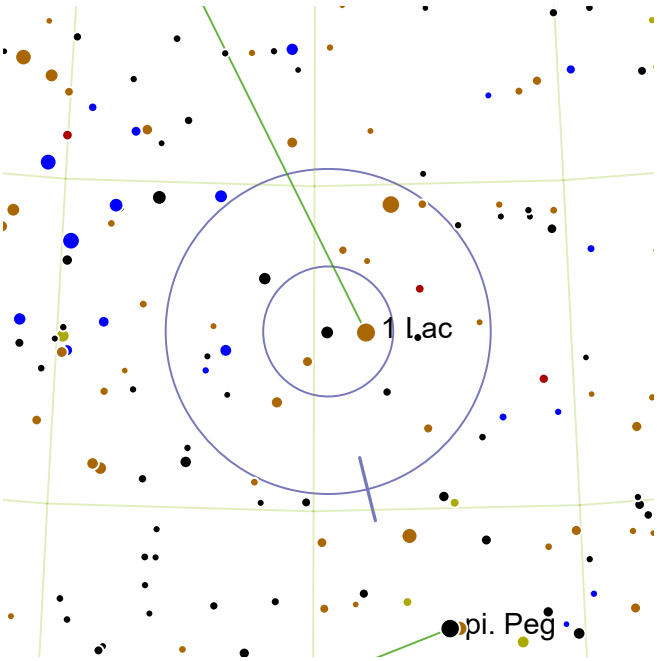
Position Angle: 150°

SAO 49098 | HIP 98571 | GDR2 61746272768

A bright orange primary very widely separated from a dim secondary.

Half a finder circle NNW from magnitude 3.95 192578. Half a finder circle NNW from magnitude 3.95 omi01 Cyg.

This is not a physical double. The primary is 434 light-years from Earth.



Struve 2894

RA: 334.73° | 22h 18.9' — DEC: 37.77° | 37° 46'

Magnitude: 6.1 | 8.3

Separation: 15.6"

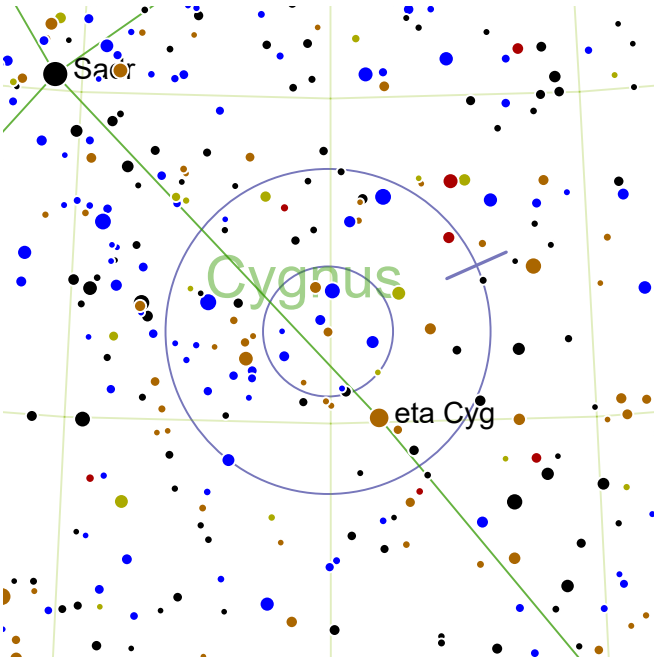
Position Angle: 194°

SAO 72228 | HIP 110171 | GDR2 11212028928

A fairly bright yellow primary comfortably separated from a faint blue secondary.

Two finder circles north and slightly west of Matar.

This is a strongly colored pair but requires a larger telescope to bring out the color of the fainter secondary.



STT394

RA: 300.05° | 20h 0.2' — DEC: 36.42° | 36° 25'

Magnitude: 7.1 | 9.9

Separation: 11"

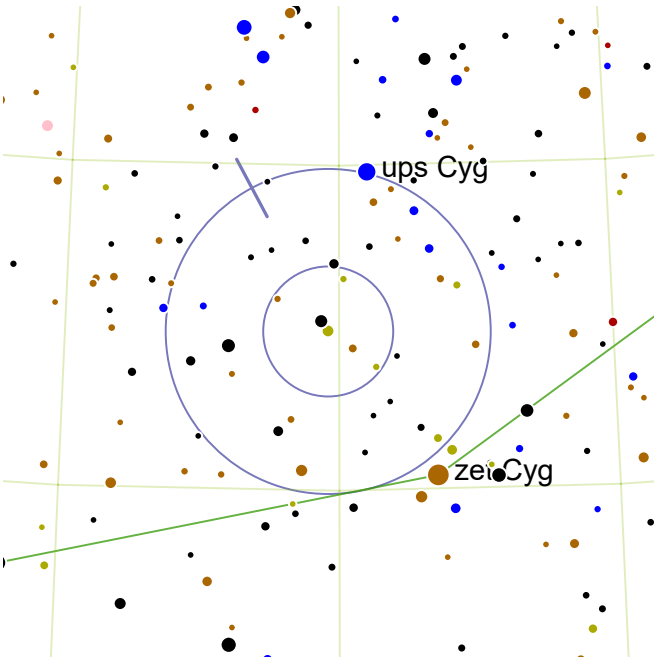
Position Angle: 294°

SAO 69238 | HIP 98448 | GDR2 46489661568

An orange primary with a faint blue secondary, easily split.

Found on the Swan's neck, one and a quarter finder circles south west of brilliant magnitude 2.2 Sadr. Three brighter stars form a one-degree right angle triangle, and this double is a little star just south of the star at the right angle.

Easily lost in a brilliant star field, this system is 497 light-years distant and is dominated by a luminous orange giant.



STT437

RA: 320.2° | 21h 20.79' — DEC: 32.45° | 32° 27'

Magnitude: 6.2 | 6.9

Separation: 2.1"

Position Angle: 28°

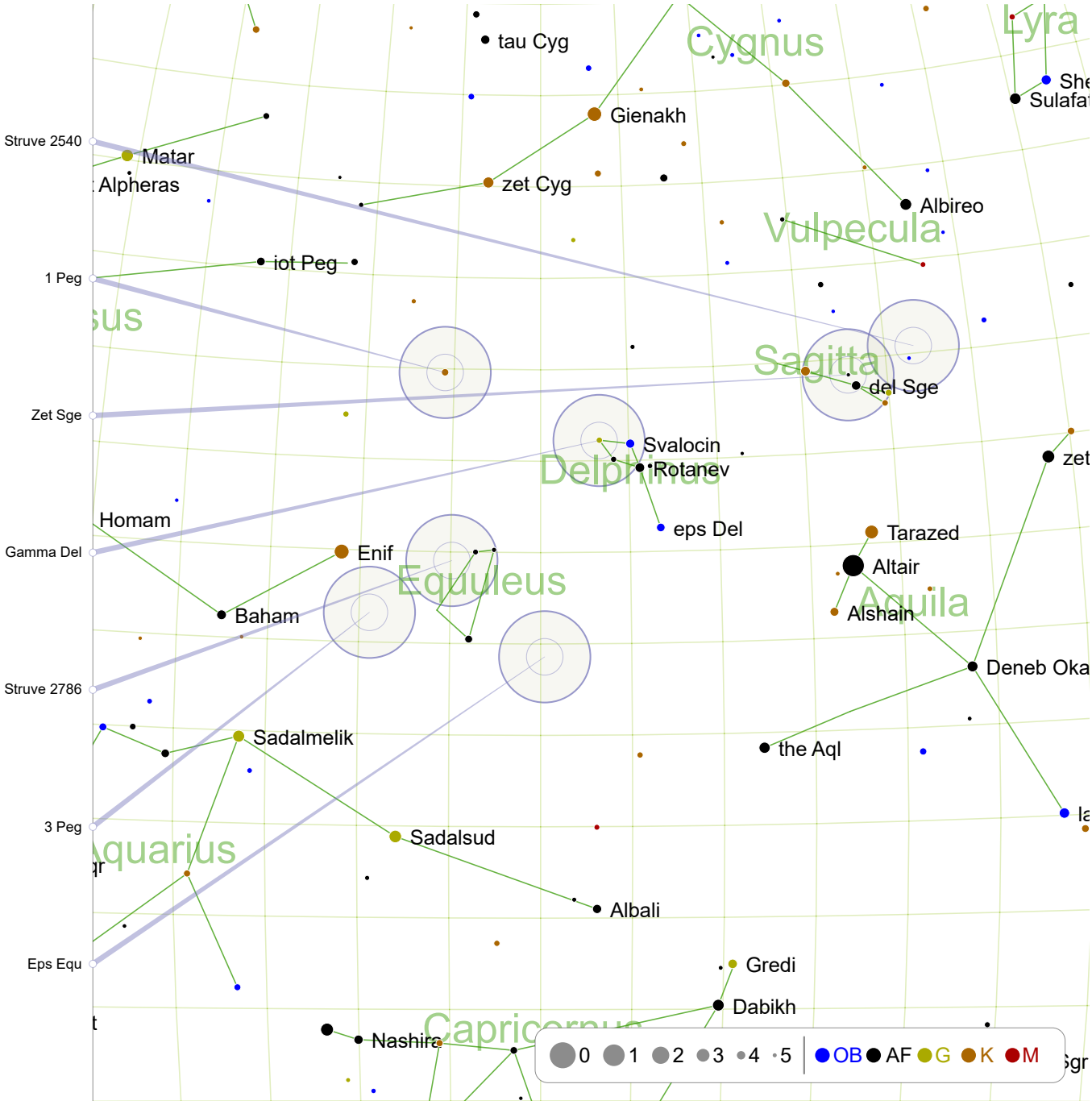
SAO 71230 | HIP 105390 | GDR2 11183471104

A balanced yellow-orange pair, very narrowly separated.

Located half a finder circle north of Zeta Cygni, which is the second star from Sadr along the south-eastern wing of Cygnus.

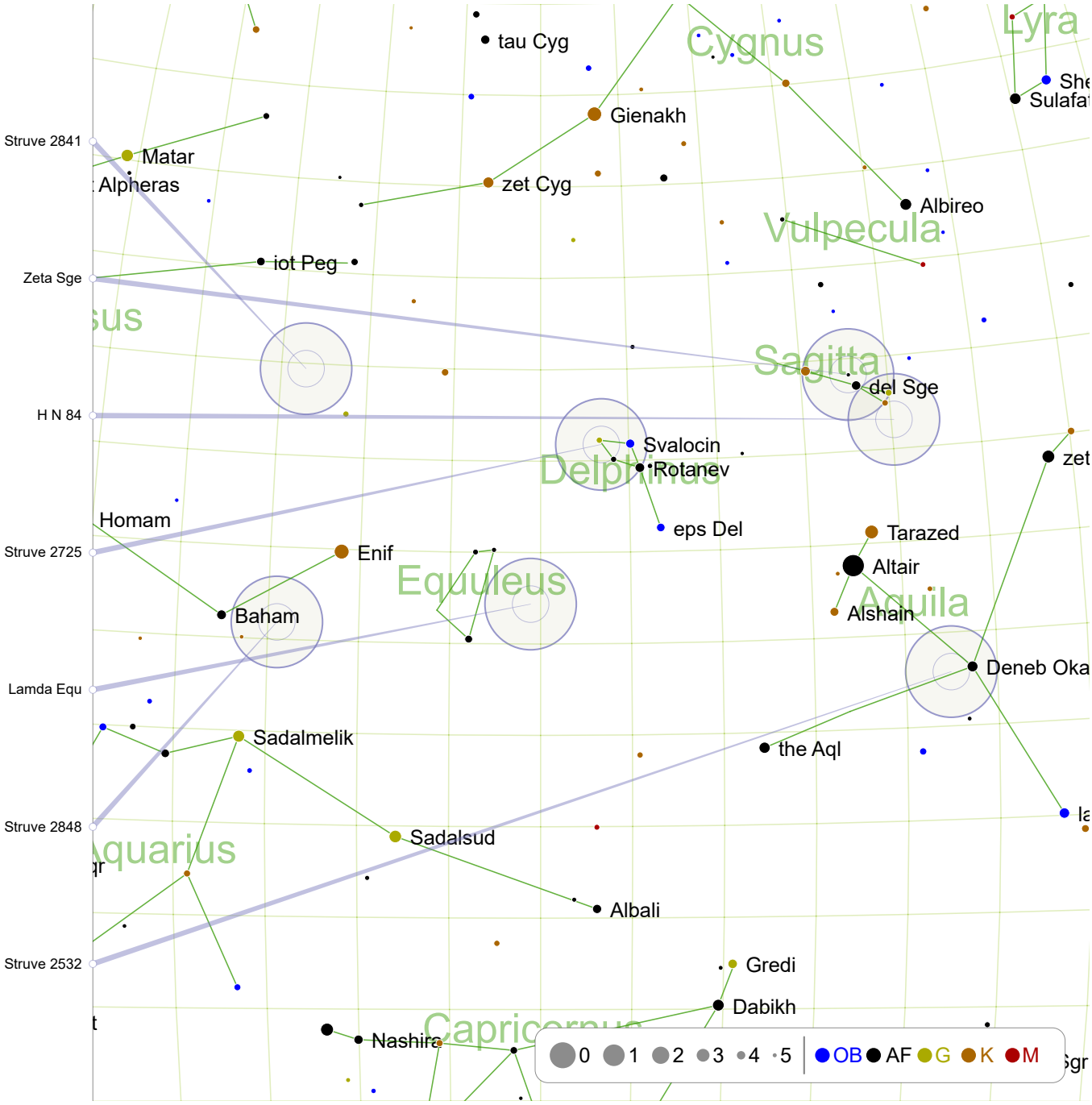
Only 214 light-years away, the stars a G-class main sequence stars similar to the Sun.

Late Summer - Looking South (1)

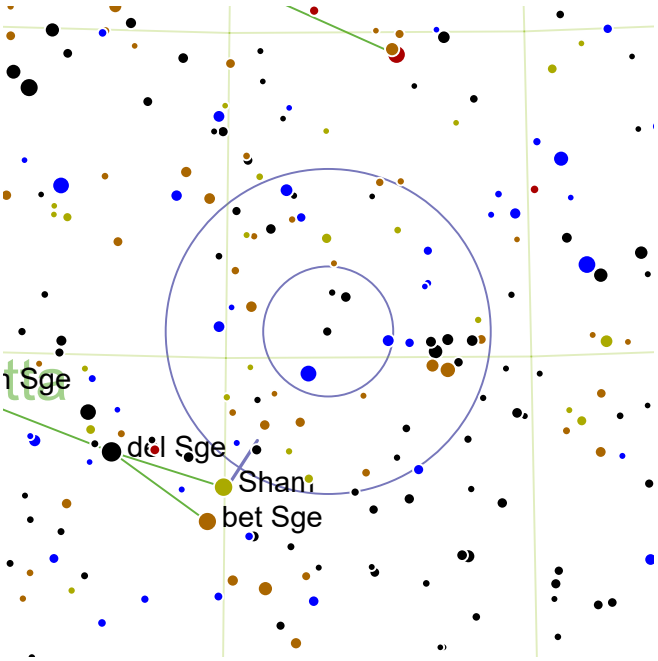


Struve 2540: page 229
1 Peg: page 229
Zet Sge: page 230
Gamma Del: page 230
Struve 2786: page 231
3 Peg: page 231
Eps Equ: page 232

Late Summer - Looking South (2)



Struve 2841: page 232 | Zeta Sge: page 233 | H N 84: page 233 | Struve 2725: page 234
Lamda Equ: page 234 | Struve 2848: page 235 | Struve 2532: page 235



Struve 2540

RA: 293.33° | 19h 33.29' — DEC: 20.42° | 20° 25'

Magnitude: 7.3 | 8.8

Separation: 5.1"

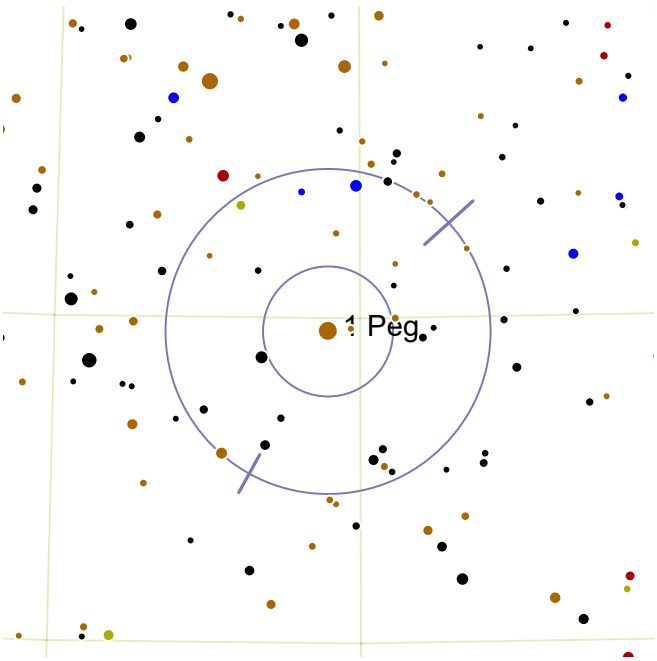
Position Angle: 147°

SAO 87342 | HIP 96171 | GDR2 93645258112

A close white-blue pair.

Two finder circles due south of Albireo (the Swan's head), a degree to the east of star cluster NGC 6802.

Immediately east of this little star cluster lies the large and impressive Coathanger asterism.



1 Peg

RA: 320.52° | 21h 22.09' — DEC: 19.8° | 19° 48'

Magnitude: 4.2 | 9.3 | 9.6

Separation: 36.1" | 5.3"

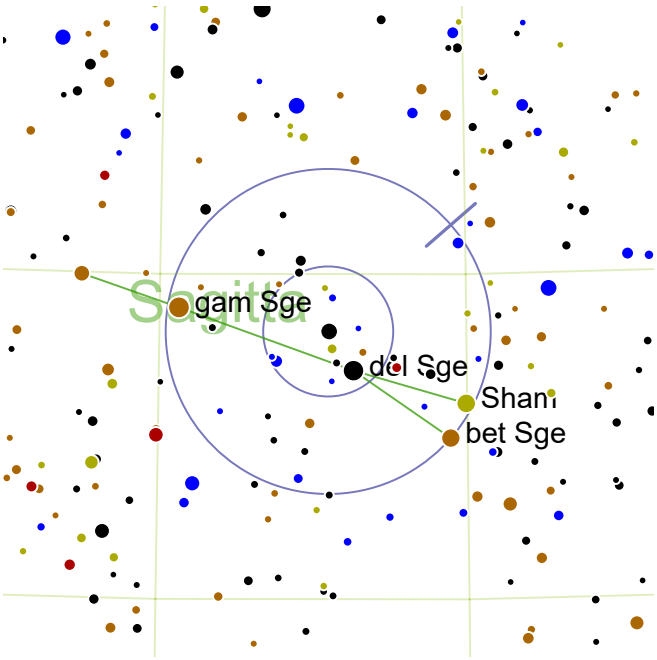
Position Angle: 312° | 151°

SAO 107073 | HIP 105502 | GDR2 65372381056

A triple system, with a brilliant orange primary with two faint companions, one very close and the other quite widely separated.

Two finder circles SSE from magnitude 3.4 zet Cyg. Two finder circles NEE from magnitude 3.86 Svalocin.

The system lies 156 light-years from the Earth.



Zet Sge

RA: 297.25° | 19h 49.0' — DEC: 19.13° | 19° 8'

Magnitude: 5.0 | 8.3

Separation: 8.3"

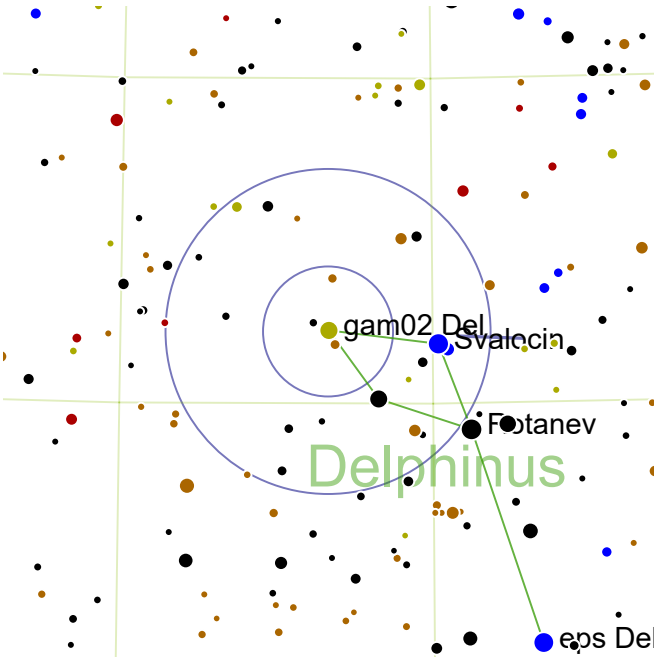
Position Angle: 311°

SAO 105298 | HIP 97496

A bright white star with a relatively dim companion, closely separated.

Less than half a degree NNE from magnitude 3.78 del Sge. Less than half a degree NNE from magnitude 3.78 del Sge.

The white primary is actually an extreme double (a balanced pair with separation 0.19", separation angle 150°).



Gamma Del

RA: 311.68° | 20h 46.7' — DEC: 16.12° | 16° 7'

Magnitude: 4.5 | 5.5

Separation: 9.6"

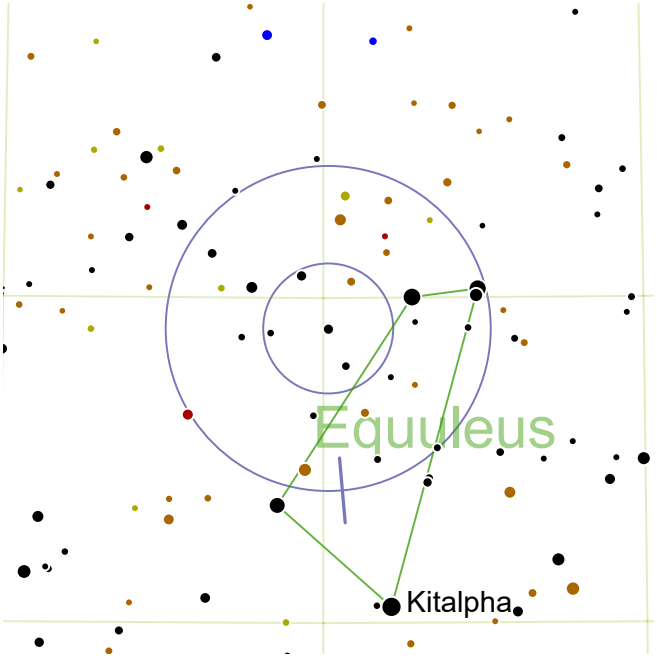
Position Angle: 268°

SAO 106476 | HIP 102532 | GDR2 13341086464

A very bright yellow primary close to a bright blue secondary.

This system is the nose of the (for me) invisible dolphin. It's also very far from any bright signposts. Either wait for a dark night, or first find Lamda Equuleus, and then track two finder circles north.

Some claim to to see a bit of green in the secondary but green is not widely accepted as a possible star color.



Struve 2786

RA: 319.93° | 21h 19.7' — DEC: 9.53° | 9° 32'

Magnitude: 7.2 | 8.3

Separation: 2.5"

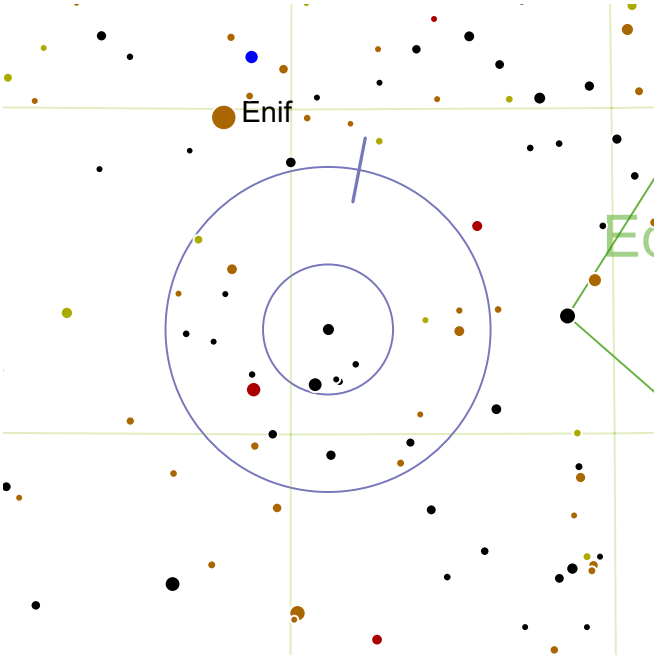
Position Angle: 185°

HIP 105295 | GDR2 99899784320

An extremely close and fairly balanced pair of white stars.

An entry point to many doubles in a dim region of the sky. From magnitude 2.35 Enif in Pegasus, track one and half finder circles west.

From Struve 2786, move one finder circle south west to Lamda Equuleus. From Lamda Equuleus, you can make more challenging hops to 12 Aqr, Epsilon Equuleus, and Gamma Delphinus.



3 Peg

RA: 324.43° | 21h 37.7' — DEC: 6.62° | 6° 37'

Magnitude: 6.2 | 7.5

Separation: 38.7"

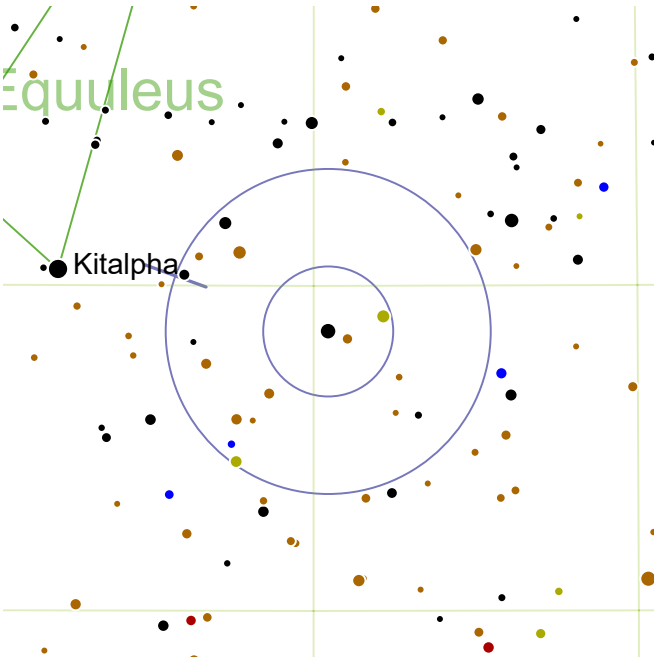
Position Angle: 349°

SAO 126940 | HIP 106783 | GDR2 61831057792

A bright white primary distantly separated from a reasonably apparent yellowish secondary.

Half a finder circle SSW from magnitude 2.54 Enif.

7 Pegasus, a very red giant, is just over a degree south east of this double.



Eps Equ

RA: 314.77° | 20h 59.09' — DEC: 4.3° | 4° 18'

Magnitude: 6.0 | 7.1

Separation: 11"

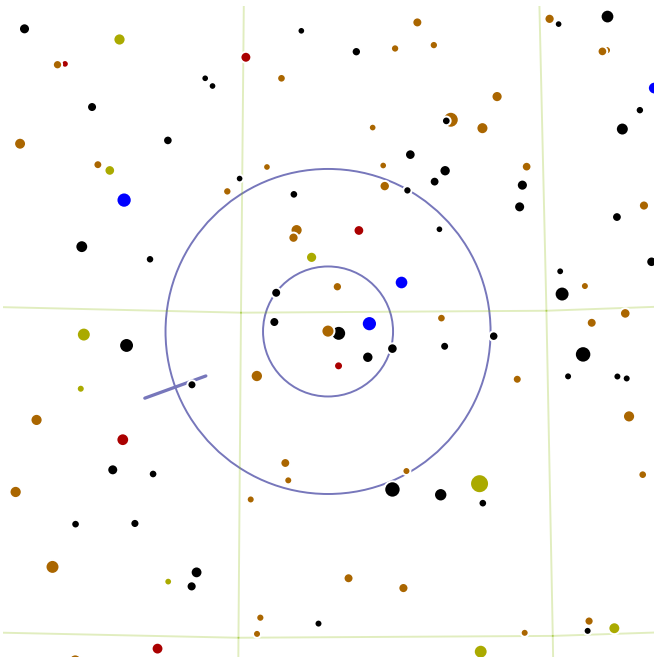
Position Angle: 70°

SAO 126428 | HIP 103569

A yellow-blue combination with a moderately bright secondary. Easy separation.

Located in a difficult region of the sky, find Lamda Equuleus and track south by half a finder circle.

10 degrees to the south-east of this double is the bright globular cluster Messier 2, while 8 degrees to the north-west is another bright globular cluster, namely Caldwell 47 (NGC 6934).



Struve 2841

RA: 328.58° | 21h 54.29' — DEC: 19.72° | 19° 43'

Magnitude: 6.4 | 7.9

Separation: 22.3"

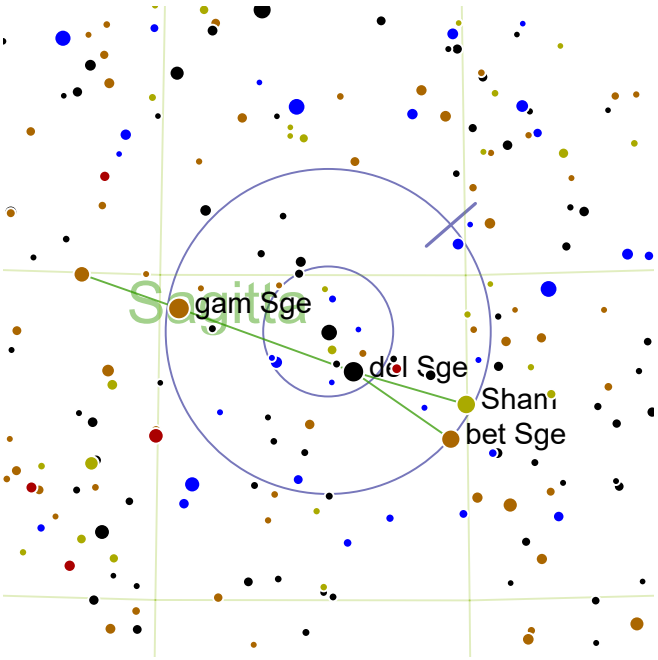
Position Angle: 110°

SAO 107489 | HIP 108119 | GDR2 05784806784

A wide yellow-blue pairing. Some see some green in the secondary.

Pan two and a half finder circles north and slightly east of magnitude 2.35 Enif in Pegasus. The finder should have many brightish stars, with Struve 2841 within 0.2 degrees east of a slightly brighter star.

The system lies 336 light-years from the Sun.



Zeta Sge

RA: 297.25° | 19h 49.0' — DEC: 19.15° | 19° 9'

Magnitude: 5.5 | 8.7

Separation: 8.6"

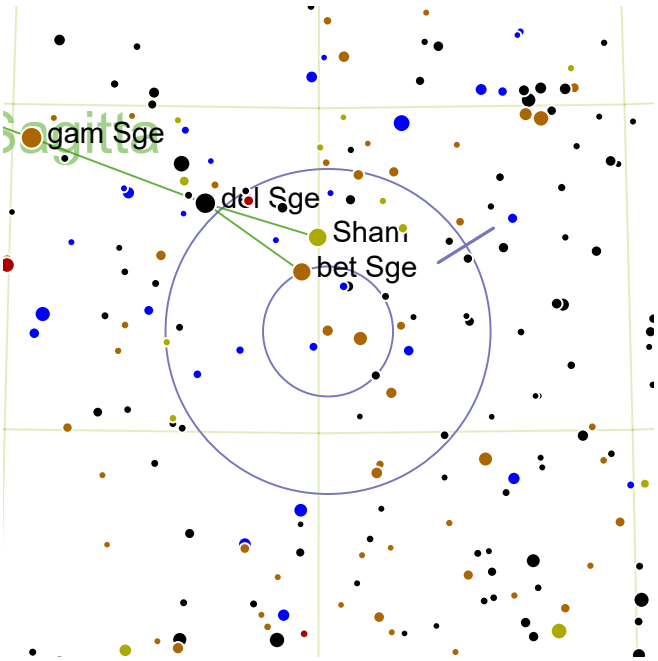
Position Angle: 311°

SAO 105298 | HIP 97496

A bright yellow primary with a much fainter blue secondary.

Located a degree north east of magnitude 3.68 Delta Sagittae. Find Delta Sagittae two finder circles north of Altair.

Globular cluster Messier 71 is in the same finder circle as Zeta Sagittae, lying 1.5 degrees SEE.



H N 84

RA: 294.85° | 19h 39.4' — DEC: 16.57° | 16° 34'

Magnitude: 6.5 | 8.9

Separation: 28.2"

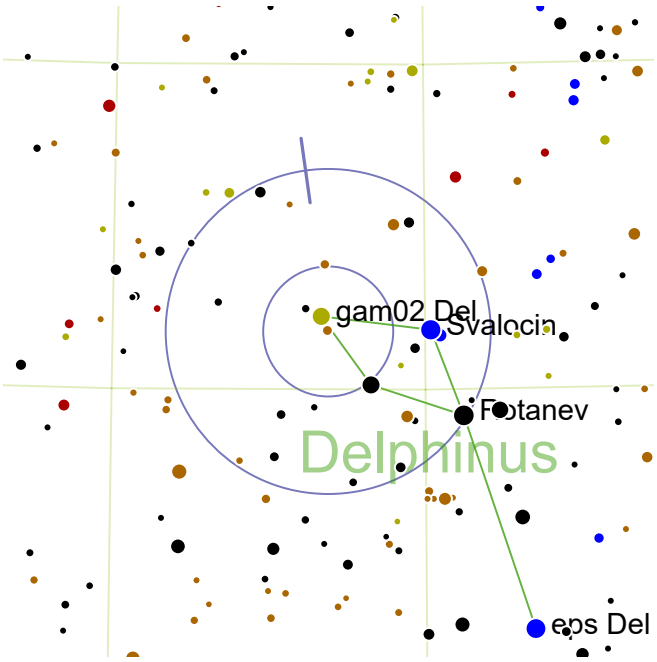
Position Angle: 302°

SAO 105104 | HIP 96688 | GDR2 51899730432

A wide pair with a strongly orange primary and fainter blue companion.

Just short of three degrees to the south west of magnitude 3.68 Delta Sagittae. If Sagitta is too faint to make out in your area, start from brilliant Altair and go two finder circles north and very slightly west.

From William Herschel's New list of doubles compiled in the 1820s, hence the "H N" nomenclature.



Struve 2725

RA: 311.55° | 20h 46.2' — DEC: 15.9° | 15° 54'

Magnitude: 7.6 | 8.4

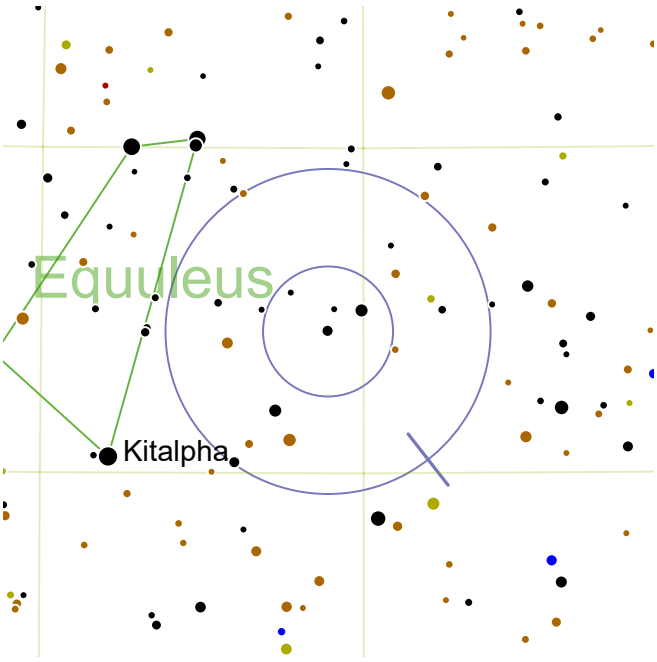
Separation: 5.8"

Position Angle: 8°

SAO 106466 | HIP 102490 | GDR2 94080694016

A close yellow and blue pair.

A quarter of a degree south west of Al Salib, the magnitude 4.25 nose of Delphinus.



Lamda Equ

RA: 315.55° | 21h 2.2' — DEC: 7.18° | 7° 11'

Magnitude: 7.4 | 7.4

Separation: 2.8"

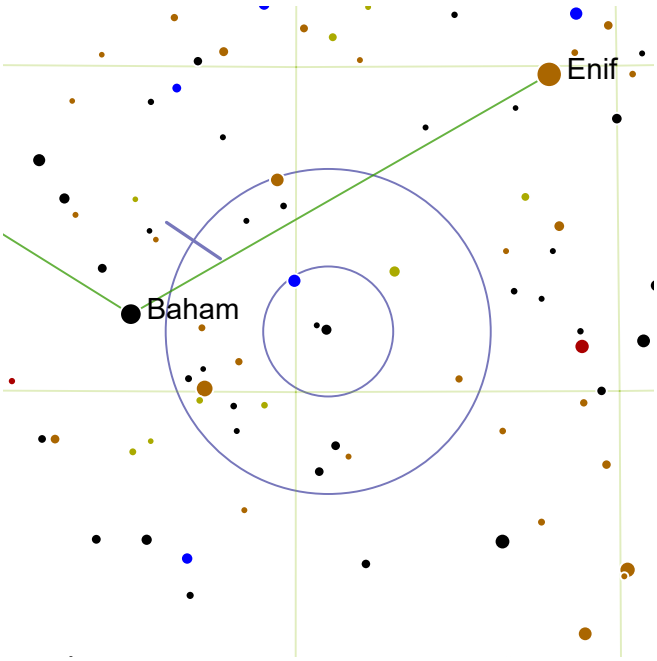
Position Angle: 218°

SAO 126482 | HIP 103813 | GDR2 58187956224

An extremely tight and exactly equal pair of yellow stars.

Find Lamda Equuleus one finder circle south west of Struve 2786.

From Lamda Equuleus, you can make more challenging hops to 12 Aqr, Epsilon Equuleus, and Gamma Delphinus.



Struve 2848

RA: 329.5° | 21h 58.0' — DEC: 5.93° | 5° 56'

Magnitude: 7.2 | 7.5

Separation: 10.7"

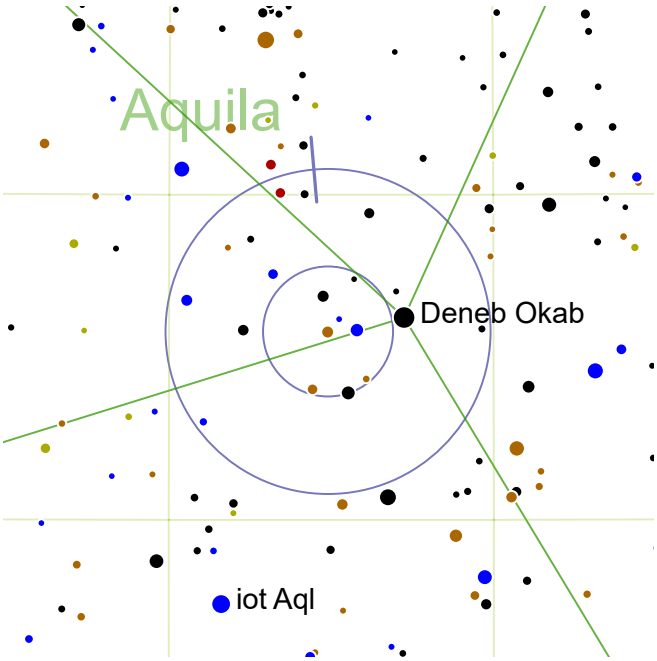
Position Angle: 56°

SAO 127196 | HIP 108439 | GDR2 2697317737667726976

An equal and easily split pair of yellow stars.

One and a half finder circles south east of magnitude 2.35 Enif, three degrees due west of magnitude 3.50 Baham (Theta Pegasi).

Enif is a fascinating orange-red supergiant, which can vary irregularly in brightness between magnitudes 0.7 and 3.5.



Struve 2532

RA: 292.55° | 19h 30.2' — DEC: 2.9° | 2° 54'

Magnitude: 6.1 | 10.3

Separation: 33.7"

Position Angle: 5°

SAO 124698 | HIP 95898 | GDR2 37626681728

A very widely separated orange-blue duo, but the blue component is very faint.

Easily found one degree due east of Delta Aquilae, the central star of the Eagle.

In the same finder circle of as Delta Aquilae and Struve 2532, you can find NGC 6790 (2 degrees south and slightly west of Delta), a small planetary nebula with high surface brightness.

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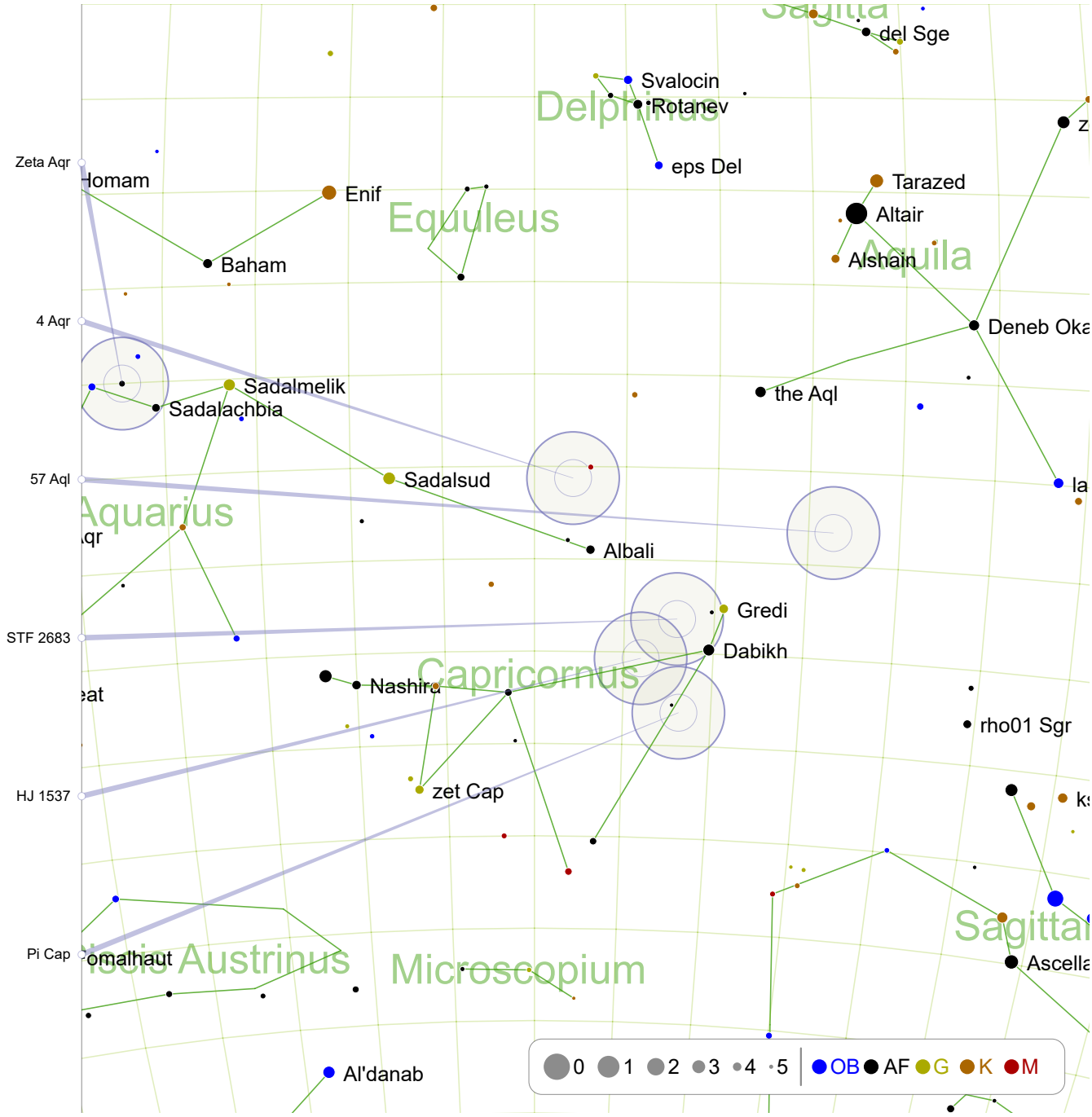
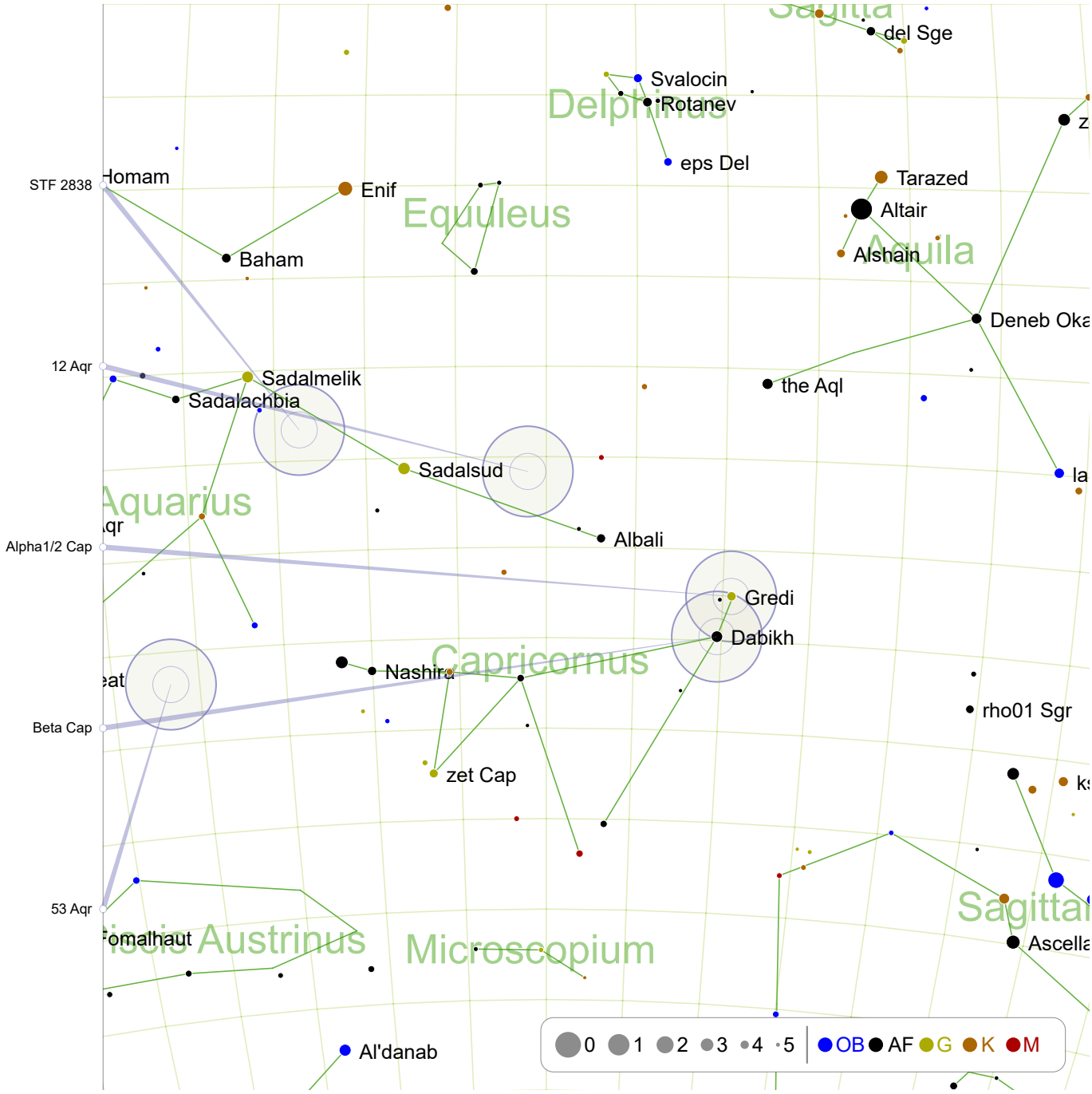
Late Summer - Southern Horizon (1)

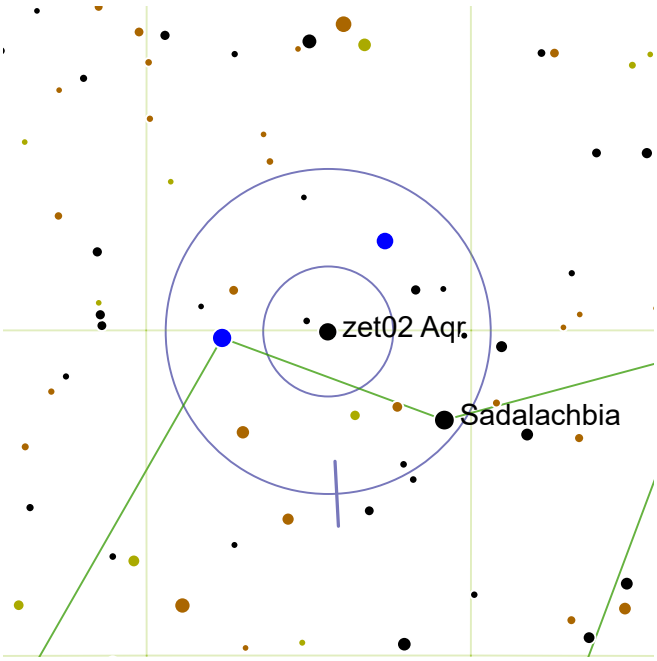


Zeta Aqr: page 239
4 Aqr: page 239
57 Aql: page 240
STF 2683: page 240
HJ 1537: page 241
Pi Cap: page 241

Late Summer - Southern Horizon (2)



STF 2838: page 242 12 Aqr: page 242 Alpha1/2 Cap: page 243 Beta Cap: page 243
53 Aqr: page 244



Zeta Aqr

RA: 337.2° | 22h 28.79' — DEC: -0.02° | 0° 0'

Magnitude: 4.3 | 4.5

Separation: 2.3"

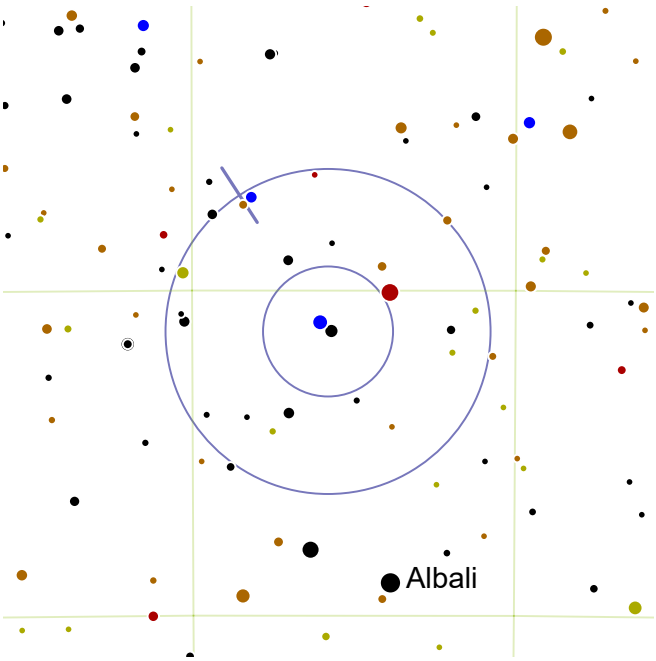
Position Angle: 183°

SAO 146107 | HIP 110960

A balanced, tight pair of white stars.

One and a half degrees NE from magnitude 3.97 Sadalachbia. One finder circle E from magnitude 3.19 Sadalmelik.

Located in the center of a a Y-shaped asterism of fourth magnitude stars that fills the finder view.



4 Aqr

RA: 312.9° | 20h 51.59' — DEC: -5.63° | -5° 37'

Magnitude: 6.4 | 7.4

Separation: 0.7"

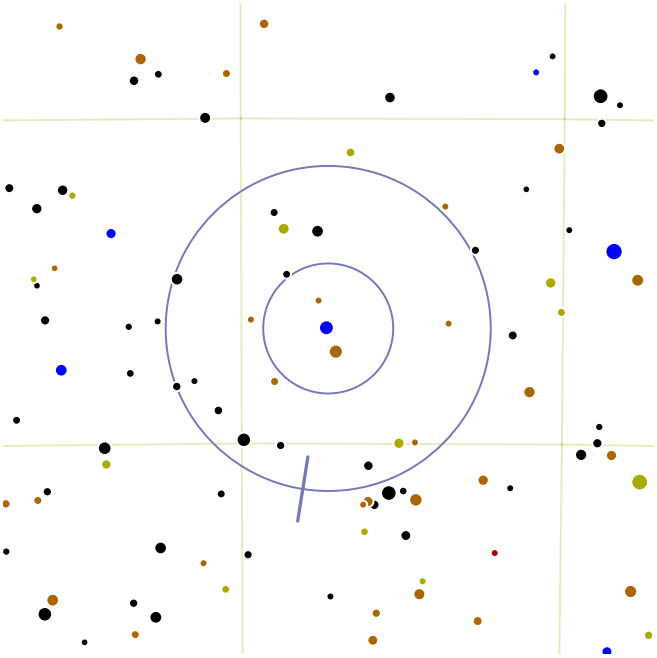
Position Angle: 33°

SAO 144877 | HIP 102945

An extremely tight pair of fairly balanced yellowish stars.

Half a finder circle NNE from magnitude 3.83 Albali. Two finder circles NE from magnitude 3.77 Gredi.

The primary has 1.6 times the mass of the Sun and 11 times the luminosity.



57 Aql

RA: 298.65° | 19h 54.59' — DEC: -8.23° | -8° 13'

Magnitude: 5.7 | 6.4

Separation: 36"

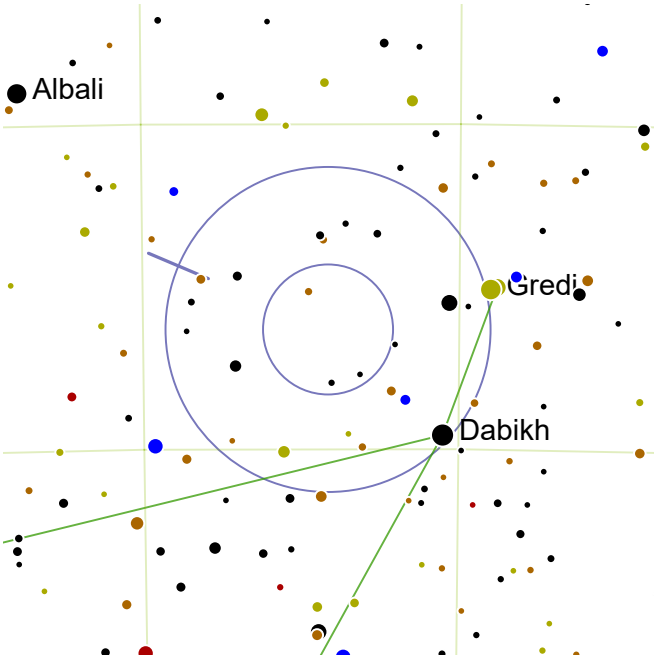
Position Angle: 171°

SAO 143898 | HIP 97966 | Struve 2594

A very wide and balanced pair of bright, bluish stars.

One finder circle NW from magnitude 3.77 Gredi.

This pair of hot B-type main sequence stars are roughly 480 light-years from Earth. As with manyB-type stars, they rotate extremely fast (the A component has a rotational velocity of 190 km/s.



STF 2683

RA: 307.08° | 20h 28.29' — DEC: -13.17° | -13° 9'

Magnitude: 8.5 | 8.9

Separation: 22.8"

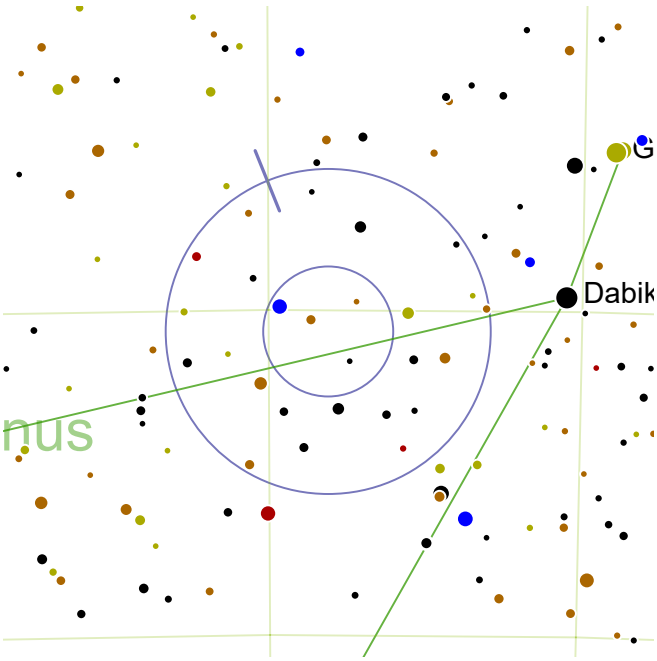
Position Angle: 67°

SAO 163606 | GDR2 68361287040

An equal pair of easily separated yellowish stars.

One and a half degrees NE from magnitude 3.25 193496. One and a half degrees NE from magnitude 3.25 Dabikh.

Globular cluster M72 (mag. 9.2) lies one finder circle east of this double. Open cluster M73 (mag. 8.9) is a further two degrees east. With M73 centered, planetary nebula C55 (mag. 8.0) lies in the middle of the north-eastern quarter of the finder.



HJ 1537

RA: 309.05° | 20h 36.2' — DEC: -15.33° | -15° 19'

Magnitude: 8.4 | 8.6

Separation: 3.6"

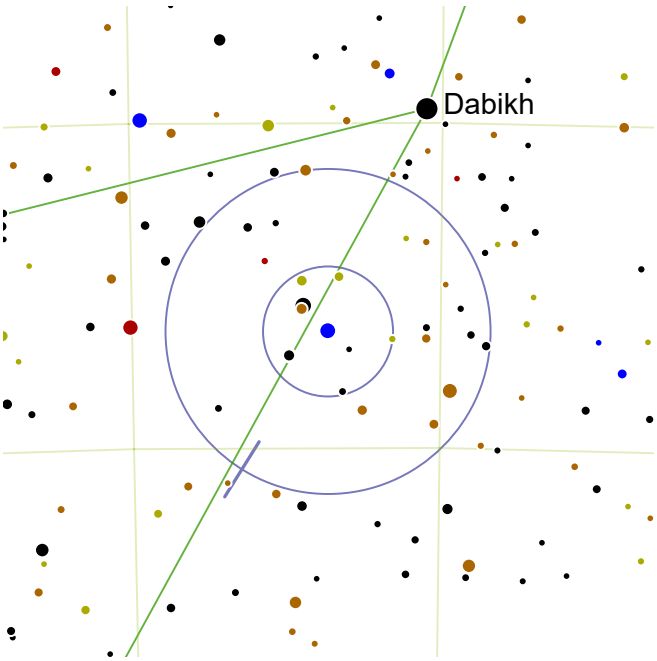
Position Angle: 22°

HIP 101649 | GDR2 64097811840

A yellow primary with a very close, faint companion.

Half a finder circle E from magnitude 3.25 193496. Half a finder circle E from magnitude 3.25 Dabikh.

The primary has a spectral class of G1V, very close to the Sun's class of G2V. The binary system lies 495 light-years from Earth.



Pi Cap

RA: 306.83° | 20h 27.29' — DEC: -18.22° | -18° 12'

Magnitude: 5.3 | 8.9

Separation: 3.2"

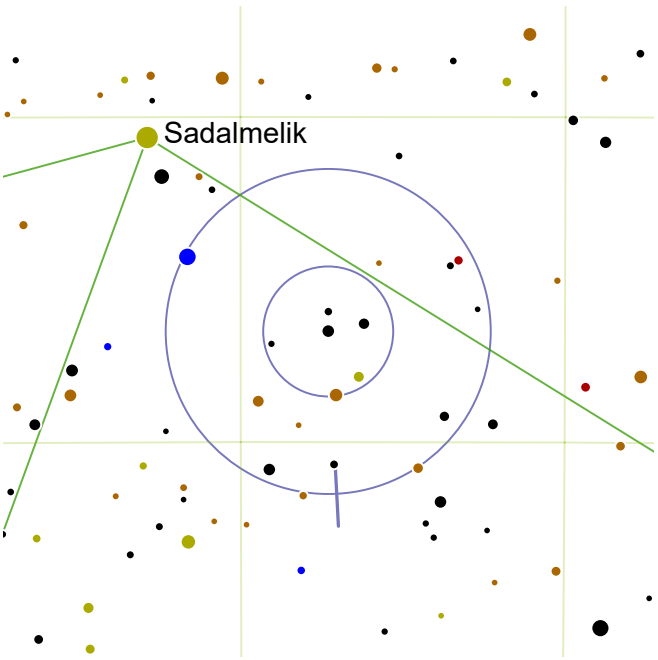
Position Angle: 148°

SAO 163592 | HIP 100881 | GDR2 73140593152

A very close pair, with a bright blue primary and fairly faint secondary.

Half a finder circle SSE from magnitude 3.25 193496. Half a finder circle SSE from magnitude 3.25 Dabikh.

The primary has six times the mass and 238 times the luminosity of the Sun.



STF 2838

RA: 328.65° | 21h 54.59' — DEC: -3.3° | -3° 17'

Magnitude: 6.3 | 9.1

Separation: 16"

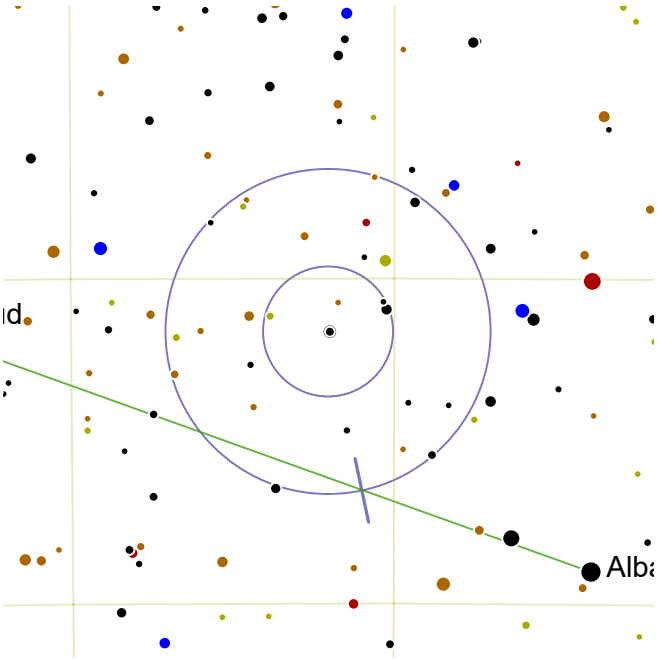
Position Angle: 183°

SAO 145735 | HIP 108144 | GDR2 75057612800

An easily separated pair of white stars with a bright primary and a faint secondary.

Half a finder circle SW from magnitude 3.19 Sadalmelik. Two and a half finder circles N from magnitude 2.98 Sheddi.

This double is a line of sight coincidence; the two components are not gravitationally bound.



12 Aqr

RA: 316.02° | 21h 4.09' — DEC: -5.82° | -5° 48'

Magnitude: 5.9 | 7.3

Separation: 2.8"

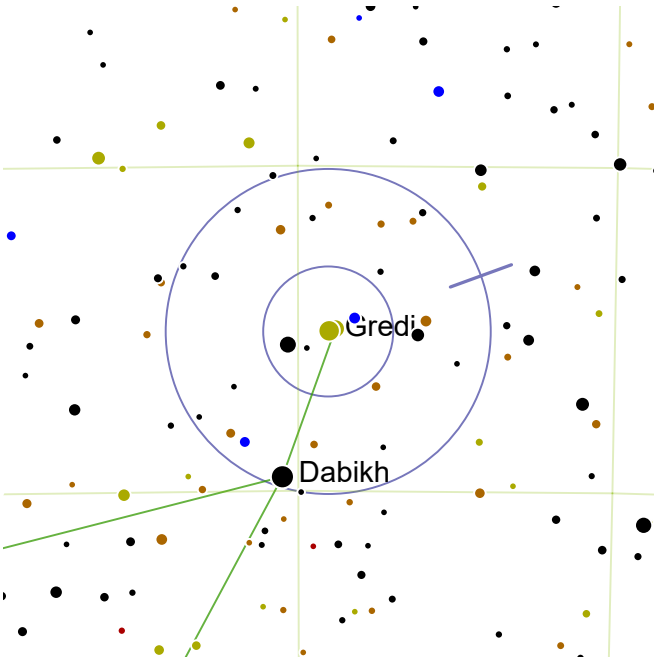
Position Angle: 192°

SAO 145065 | HIP 103981 | GDR2 42353215104

A very tight yellow-blue system, with the small blue component sufficiently bright to show some color.

With few signposts to go by, find Lamda Equuleus, and track due south for three finder circles.

Just over one finder circle south of of this double is the bright planetary nebula, Caldwell 55 (NGC 7009).



Alpha1/2 Cap

RA: 304.52° | 20h 18.09' — DEC: -12.55° | -12° 32'

Magnitude: 3.7 | 4.3

Separation: 381"

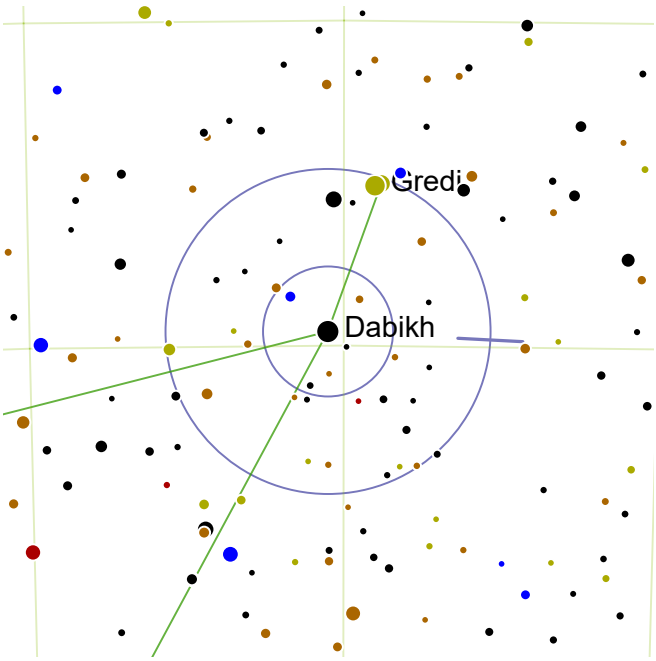
Position Angle: 290°

SAO 163422 | HIP 100027

A distantly separated pair of brilliant white stars.

Alpha1/2 Cap is a bright star in Capricornus.

Superb in the finder scope.



Beta Cap

RA: 305.25° | 20h 21.0' — DEC: -14.78° | -14° 46'

Magnitude: 3.2 | 6.1

Separation: 205"

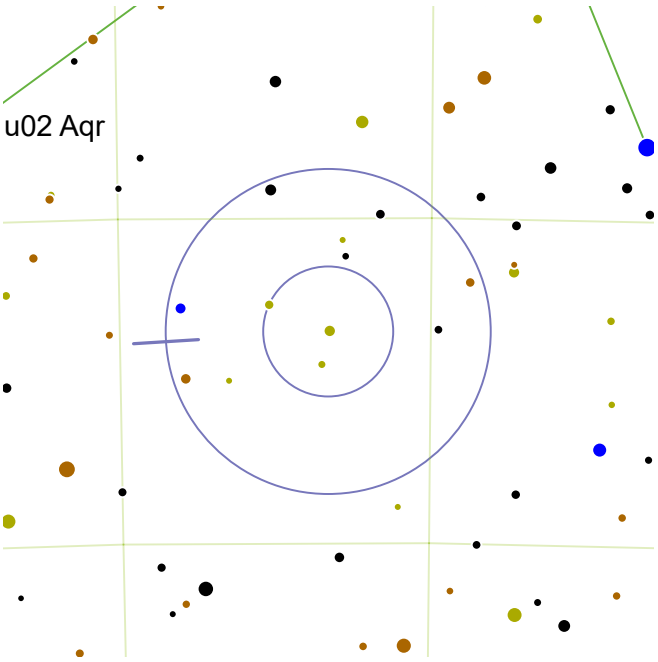
Position Angle: 267°

SAO 163481 | HIP 100345

A brilliant yellow primary distantly separated from bright white secondary.

Beta Cap is a bright star in Capricornus. Beta Cap is a bright star in Capricornus.

Also known as Dabih ("butcher"), this binary system is almost exactly 100 parsecs from us (327 light-years).



53 Aqr

RA: 336.65° | 22h 26.59' — DEC: -16.75° | -16° 44'

Magnitude: 6.3 | 6.4

Separation: 1.2"

Position Angle: 93.6°

SAO 165078 | HIP 110778

An extremely tight and exactly equal pair of yellow suns.

One finder circle W from magnitude 3.51 Scheat. One and a half finder circles E from magnitude 2.98 Sheddi.

C63, the Helix Nebula, lies one finder circle south of this double.

Acknowledgements

This book would not be possible without the prior work of many others, so I would like to offer my thanks here to a number of my main resources. Sadly there are other resources that I have used over the years to which I also owe thanks but which have become part of the furniture of my mind and have thus been overlooked on the following list.

Jim Kaler has provided rich information on many stars both in published works and also freely through the Internet:

http://stars.astro.illinois.edu/

The Washington Double Star Catalog is the prime resource for detailed data on double stars, and I referred to it via the following queryable online database:

https://www.stelledoppie.it/

Raw data for the Washington Double Star Catalog can be found here:

http://www.astro.gsu.edu/wds/

This is one of the most popular online observing lists for double stars, and got me started with serious double star observing:

http://users.compaqnet.be/doublestars/

The planetarium software Stellarium has been helpful, particularly in selecting double stars that are bright and easily locatable:

http://stellarium.org/

Wikipedia is a phenomenal resource and more trustworthy than many think - but double checking is always advisable, both for Wikipedia and any other online resource!

https://en.wikipedia.org/wiki/Main_Page

The Henry Draper catalog compiled by Annie Jump Cannon is the main resource for star positions in the charts. Some variables and high proper motion star have been manually corrected by me.

https://ui.adsabs.harvard.edu/abs/1993yCat.3135....0C/abstract

The charts would be labelled with incomprehensible Henry Draper numbers without the help of this catalog that cross references Flamsteed and Bayer designations with HD numbers.

https://cdsarc.unistra.fr/viz-bin/cat/IV/27A

In addition to the Bayer and Flamsteed designations, the IAU provides official and usually widely accepted names for a few stars:

https://www.iau.org/public/themes/naming_stars/

The Apache Software Foundation and the Apache FOP contributors provided the PDF and SVG rendering software required for this book. They said FOP 0.96 was dead, but 20 years later it is still going strong. Version 2.6 and counting!

https://xmlgraphics.apache.org/fop/

The World Wide Web Consortium developed the XSL FO and SVG standards used by Apache FOP. In this modern age of the shifting sands of "living standards", I want to give a shout out to good old fashioned standards hammered out by a committee and running to hundreds of pages. The work that went into creating these standards opened up technical publishing technology to the world.

https://www.w3.org/TR/xsl/

https://www.w3.org/TR/SVG2/

The cover image shows 11 and 12 Camelopardalis. The image was taken by David Ritter.

https://en.wikipedia.org/wiki/User:Dritter_wiki

This book received constructive input from the members of Stargazer's Lounge, which brought about many improvements, from diagram colors to indexing of information.

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