

THE BACKYARD ASTRONOMER'S GUIDE

A Deep-Sky Sampler—I

Presenting 110 of the northern sky's finest double stars, red stars, star clusters, nebulas and galaxies for mid-latitude observers (all objects lie north of -50° declination).

Double Star Sampler—A Top 20 List						
Star	ADS #	RA (2000)	Dec.	Magnitudes	Separation (arcsec)	Comments
Gamma (γ) Ari	1507	01h 53.5m	+19° 18'	4.8, 4.8	7.8"	Mesarthim, a.k.a. Cat's Eyes; a perfect equal pair
Alpha (α) Psc	1615	02h 02.0m	+02° 46'	4.2, 5.1	1.8"	Al Rischa; tight green-white and pale blue pair
Gamma (γ) And	1630	02h 03.9m	+42° 20'	2.3, 5.5	9.8"	Almach; orange/gold and fainter blue/emerald pair
Sigma (σ) Ori	4241	05h 38.7m	-02° 36'	4.0, 10.3, 7.5, 6.5	11", 13", 43"	quadruple star with triple star Σ 761 210" west
Beta (β) Mon	5107	06h 28.8m	-07° 02'	4.7, 5.2, 6.1	7.3" and 2.8"	Herschel's Wonder Star; superb blue-white triple
Alpha (α) Gem	6175	07h 34.6m	+31° 53'	1.9, 2.9	3.9"	Castor; close pair w/ mag 8.8 distant third member
Iota (ι) Cnc	6988	08h 46.7m	+28° 46'	4.2, 6.6	30.5"	wide Albireo-like pair of orange and blue stars
Gamma (γ) Leo	7724	10h 20.0m	+19° 51'	2.2, 3.5	4.4"	Algieba; orange and pale yellow; one of the best
Gamma (γ) Vir	8630	12h 41.7m	-01° 27'	3.5, 3.5	1.8"	Porrima; classic headlight pair; now closing in sep.
Alpha (α) CVn	8706	12h 56.0m	+38° 19'	2.9, 5.5	19.4"	Cor Caroli; wide bright pair; "yellow and lilac"
Zeta (ζ) UMa	8891	13h 23.9m	+54° 56'	2.3, 4.0, 4.0	14.4" and 709"	Mizar & Alcor; naked eye double; Mizar also double

Epsilon (ε) Boo	9372	14h 45.0m	+27° 04'	2.5, 4.9	2.8"	Izar, a.k.a. Pulcherrima; close yellow-green pair
Alpha (α) Sco	10074	16h 29.4m	-26° 26'	0.9v, 5.4	2.6"	Antares, paired w/ faint, green companion; tough!
Alpha (α) Her	10418	17h 14.6m	+14° 23'	3.1v, 5.4	4.6"	Rasalgethi; yellow/orange (variable) & faint aqua
Nu (ν) Dra	10628	17h 32.2m	+55° 11'	4.9, 4.9	61.9"	perfectly matched white "headlight" pair for binos
Epsilon (ε) Lyr	11635	18h 44.3m	+39° 40'	5.0, 6.1 5.2, 5.5	2.6" 2.3"	Double-Double; two tight pairs 208" apart; superb
Beta (β) Cyg	12540	19h 30.7m	+27° 58'	3.1, 5.1	34.4"	Albireo; classic gold/blue pair; a showpiece object
Gamma (γ) Del	14279	20h 46.7m	+16° 07'	4.5, 5.5	9.6"	subtle yellow-gold and pale green-turquoise tints
Zeta (ζ) Aqr	15971	22h 28.8m	-00° 01'	4.4, 4.5	2"	bright, nearly equal, but tight green-white pair
Delta (δ) Cep	15987	22h 29.2m	+58° 25'	var, 7.5	41.0"	yellow Cepheid variable w/ fainter blue star; nice

Red "Carbon Star" Sampler—A Top 5 List

Star	SAO #	RA (2000)	Dec.	Magnitude Range	Period (days)	Comments
R Lep	150058	04h 59.6m	-14° 48'	5.5 to 11.7 (often faint)	432	Hind's Crimson Star; colour index = 5.74 (very red!)
X Cnc	98230	08h 55.4m	+17° 14'	5.6 to 7.5	195	one of the reddest stars known; colour index = 3.36
YCVn	44317	12h 45.1m	+45° 26'	7.4 to 10.0	157	La Superba; called "fiery coal; blood red;" CI = 2.54
Mu(μ) Cep	33693	21h 43.5m	+58° 47'	3.4 to 5.1	Irr	Herschel's Garnet Star; one of the largest stars; CI = 2.35
19 (TX) Psc	128374	23h 46.4m	+03° 29'	5.5 to 7.7	Irr	in Pisces Circlet; brightest of type N stars; CI = 2.6

Stars with Planets Sampler—A Top 5 List

Star	SAO #	RA (2000)	Dec.	Magnitude	Comments
Upsilon (υ) And	37362	01h 36.8m	41° 25'	4.6	3 planets, with at least 0.7, 2.1 and 4.6 Jupiter masses; 43.9 light years away
47 Ursae Majoris	43557	10h 59.5m	40° 25'	5.1	planet with >2.4 Jupiter masses with 3 year period; 45.6 light years away
70 Virginis	100582	13h 28.5m	13° 46'	5.0	planet with >6.6 Jupiter masses with 116 day period; 59 light years away
16 Cygni B	31898	19h 41.8m	50° 32'	6.2	16 Cygni is a wide double star in same field as NGC 6826; B is fainter of pair
51 Pegasi	90896	22h 57.5m	20° 46'	5.5	First planet found around sun-like star (>0.47 Jupiter mass; 4.2-day period)

Open Cluster Sampler—A Top 10 List

Cluster	Constell.	RA (2000)	Dec.	Magnitude	Size (arcmin)	Comments
NGC 457	Cas	01h 19.1m	+58° 20'	6.4	13'	ET or Owl Cluster; sparse but striking arrangement
NGC 869 +NGC 884	Per	02h 19.0m 02h 22.4m	+57° 09' +57° 07'	5.3 6.1	29' 29'	Double Cluster; two superb clusters in the same field
M45	Tau	03h 47.0m	+24° 07'	1.2	110'	Pleiades; best at low power; look for Merope nebulosity
M37 (NGC 2099)	Aur	05h 52.4m	+32° 33'	5.6	20'	best of the 3 Auriga clusters (M36, M37, M38)
M35 (NGC 2168)	Gem	06h 08.9m	+24 20'	5.1	28'	look for small cluster NGC 2158 just 1/4° South
M46 (NGC 2437)	Pup	07h 41.8m	-14° 49'	6.1	27'	paired w/ M47; planetary NGC 2438 inside cluster
M44 (NGC 2362)	Cnc	08h 40.1m	+19° 59'	3.1	95'	Beehive Cluster; easily naked eye in a dark sky
M7 (NGC 6475)	Sco	17h 53.9m	-34° 49'	3.3	80'	embedded in a rich Milky Way field; bright M6 nearby
M11 (NGC 6705)	Sct	18h 51.1m	-06° 16'	5.8	13'	Wild Duck Cluster; in the rich Scutum starcloud
NGC 7789	Cas	23h 57.0m	+56° 44'	6.7	15'	300 stars; very rich uniform cluster; well worth the hunt

Globular Cluster Sampler—A Top 10 List

Cluster	Constell.	RA (2000)	Dec.	Magnitude	Size (arcmin)	Comments
NGC 5139 (Ω Centauri) M3 (NGC 5272)	Cen	13h 26.8m	-47° 29'	3.5	36.3' ($>1/2^\circ$)	the sky's finest globular; not visible north of latitude 40°
	CVn	13h 42.2m	+28° 23'	5.9	16.2'	fine spring globular between Cor Coroli and Arcturus
NGC 5466	Boo	14h 05.5m	+28° 32'	9.0	11'	faint Class XII globular; resembles rich open cluster
M5 (NGC 5904)	Ser	15h 18.6m	+02° 05'	5.7	17.4'	one of the best northern sky globulars; slightly oval
M4 (NGC 6121)	Sco	16h 23.6m	-26° 32'	5.8	26.3'	easy to find near bright star Antares; easy to resolve
M13 (NGC 6205)	Her	16h 41.7m	+36° 28'	5.7	16.6'	Great Hercules Cluster; the best in the northern sky
M10 (NGC 6254)	Oph	16h 57.1m	-04° 06'	6.6	15.1'	best of six Messier globulars in constellation Ophiuchus
M22 (NGC 6656)	Sgr	18h 36.4m	-23° 54'	5.1	24'	better than M13 when seen from a southern latitude
M71 (NGC 6838)	Sge	19h 53.8m	+18° 47'	8.0	7.2'	bright, loose globular that resembles an open cluster
M15 (NGC 7078)	Peg	21h 30.0m	+12° 10'	6.0	12.3'	best fall globular; star chains radiate from bright core

Bright Nebula Sampler—A Top 10 List

Nebula	Constell.	RA (2000)	Dec.	Size (arcmin)	Type	Comments
NGC 281	Cas	00h 52.8m	+56° 37'	35x30'	EN	once called the Pacman Nebula; neb. filter essential
NGC 1435 and IC 349	Tau	03h 46.1m 03h 46.3m	+23° 47' +23° 56'	30' 26'	RN RN	Tempel's & Barnard's Neb.; RN around Merope in M45
M42 (NGC 1976)	Ori	05h 35.4m	-05° 27'	65x60'	E/RN	Orion Nebula; the finest in northern sky; with M43
NGC 2024	Ori	05h 41.9m	-01° 51'	30x30'	EN	Flame Nebula; masked by glow from Zeta Orionis
M78 (NGC 2068)	Ori	05h 46.7m	+00 03'	8x6'	RN	one of the sky's brightest reflection nebulas
NGC 2237- 9, 46	Mon	06h 32.3m	+05° 03'	80x60'	EN	Rosette Nebula; use a filter on a wide-field telescope
M20 (NGC 6514)	Sgr	18h 02.3m	-23° 02'	20x20'	E/RN	Trifid Nebula; look for dark lanes trisecting nebula
M8 (NGC 6523)	Sgr	18h 03.8m	-24° 23'	45x30'	EN	Lagoon Nebula; surrounds open cluster NGC 6530
M17 (NGC 6618)	Sgr	18h 20.8m	-16° 11'	20x15'	EN	Swan or Omega Nebula; one of the sky's best
NGC 7000	Cyg	20h 58.8m	+44° 20'	120x100'	EN	North America Nebula; use filter on a wide-field scope

Dark Nebula Sampler—A Top 10 List

Nebula	Constell.	RA (2000)	Dec.	Size (arcmin)	SkyAtlas 2000 #	Comments
B 33	Ori	05h 40.9m	-02° 28'	6x4'	11 & B2	Horsehead Nebula; tough!; set against emis. neb. IC434
B 72 (LDN 66)	Oph	17h 23.5m	-23° 38'	4'	22	Barnard's S-Nebula or The Snake; small; very opaque
B 59,65-7, 77-78	Oph	17h 33m	-26°	6° x 4°	22	Pipe Nebula complex; huge naked eye or binocular obj.
B 86 (LDN 93)	Sgr	18h 02.7m	-27° 50'	4'	22	dark hole next to star cluster NGC 6520 in Sgr Starcloud
B 87 (LDN 1771)	Sgr	18h 04.3m	-32° 30'	12'	22	Parrot's Head Nebula; 3° NE of M7 star cluster
B 92 (LDN 323)	Sgr	18h 15.5m	-18° 11'	12x6'	15 & 22	dense hole on edge of M24, small Sagittarius starcloud
B 110, 111, 113	Sct	18h 51m	-5°	120x120'	16	dark regions N. of M11 star cluster in Scutum starcloud
B 142 and B 143	Aql	19h 40.7m	+10° 57'	80x50'	16	Barnard's E; easy in binos or finderscope; NW of Altair
LDN 935	Cyg	20h 56.8m	+43° 52'	150x40'	9	dark lane forming "Atlantic coast" of North America neb
B 168	Cyg	21h 53.2m	+47° 12'	100x10'	9	easy in finderscope; Cocoon Nebula (IC 5146) at one end

Planetary Nebula Sampler—A Top 8 List

Nebula	Constell.	RA (2000)	Dec.	Magnitude	Size (arcsec)	Comments
M97 (NGC 3587)	UMa	11h 14.8m	+55° 01'	9.9	194"	Owl Nebula; paired with galaxy M108 in same field
NGC 6302	Sco	17h 13.7m	-37° 06'	9.6	50"	Bug Nebula; bright core with faint extensions
M57 (NGC 6720)	Lyr	18h 53.6m	+33° 02'	8.8	>71"	Ring Nebula; the sky's best; an easy grey smoke ring
NGC 6826	Cyg	19h 44.8m	+50° 31'	8.8	>25"	Blinking Planetary; nebula appears with averted vision
M27 (NGC 6853)	Vul	19h 59.6m	+22° 43'	7.3	>348"	Dumbbell Nebula; bright and large; a showpiece
NGC 7009	Aqr	21h 04.2m	-11° 22'	8.3p	>25"	Saturn Nebula; small but bright with faint extensions
NGC 7293	Aqr	22h 29.6m	-20° 48'	7.3	>769"	Helix Nebula; nearest planetary? large but diffuse
NGC 7662	And	23h 25.9m	+42° 33'	8.3	>12"	Blue Snowball; bluish and ring-like at high power

Supernova Remnant Sampler—The Sky's 2 Best

Nebula	Constell.	RA (2000)	Dec.	Size (arcmin)	Comments
M1 (NGC 1952)	Tau	05h 34.5m	+22° 01'	6x4'	Crab Nebula; bright but amorphous patch in a small scope; needs aperture for details
NGC 6960 NGC 6992/5	Cyg	20h 45.7m 20h 56.4m	+30° 43' +31° 43'	70x6' 60x8'	Veil Nebula components; two arcs East and West; superb with nebula or OIII filter

Galaxy Sampler—A Top 20 List

Galaxy	Constell.	RA (2000)	Dec.	Mag	Size (arcmin)	Type	Comments
NGC 55	Scl	00h 14.9m	-39° 11'	8.1	30x6.3	SB	member of Sculptor group; large uneven sliver of light
M31 (NGC 224)	And	00h 42.7m	+41° 16'	3.5	178x63	Sb	Andromeda Galaxy; bright and big; suitable for all apertures and magnifications
NGC 253	Scl	00h 47.6m	-25° 17'	7.6	30x6.9	SAB	large dusty elongated spiral; NGC 247 just 5° N also fine
M33 (NGC 598)	Tri	01h 33.9m	+30° 39'	5.7	62x39	Sc	Triangulum Galaxy; large but diffuse; fine in dark sky
NGC 1365	For	03h 33.6m	-36° 08'	9.3	8.9x6.5	SB	perhaps the sky's best and brightest barred spiral
NGC 1399	For	03h 38.5m	-35° 27'	8.8	8.1x7.6	E1	brightest in Fornax cluster of galaxies; 9 in 1° field
NGC 2403	Cam	07h 36.9m	+65° 36'	8.5	25.5x13	SAB	large tilted spiral with arms visible in large apertures
M81+82 (NGC 331/34)	UMa	09h 55.6m 09h 55.8m	+69° 04' +69° 41'	6.9 8.4	26x14 11x4.6	S Irr	bright tilted spiral paired with cigar-shaped irregular
NGC 3115	Sex	10h 05.2m	-07° 43'	8.9	8.1x2.8	S0	Spindle Galaxy; the sky's finest S0 transition type
M65+66 (NGC 363/27)	Leo	11h 18.9m 11h 20.2m	+13° 05' +12° 59'	9.3 8.9	8.7x2.2 8.2x3.9	SAB SAB	two bright spirals with large edge-on NGC 3628 in field
NGC 4038 and 4039	Crv	12h 01.9m 12h 01.9m	-18° 52' -18° 53'	10.5 10.3	5.4x3.9 5.4x2.5	SB Irr	Antennae; pair of colliding galaxies; small and faint
M106 (NGC 4258)	CVn	12h 19.0m	+47° 18'	8.4	20x8.4	SAB	large bright dusty spiral; many small galaxies nearby
M84+86 (4374+4406)	Vir	12h 25.1m 12h 26.2m	+12° 53' +12° 57'	9.1 8.9	5.1x4.1 12x9.3	E1 E3	bright ellipticals in superb Markarian Chain of galaxies
NGC 4565	Com	12h 36.3m	+25° 59'	9.6	14x1.8	SA	the sky's finest edge-on spiral ; look for dust lane

M104 (NGC 4594)	Vir	12h 40.0m	-11° 37'	8.0	7.1x4.4	SA	Sombrero Galaxy; bright core crossed w/ dust lane
NGC 4631	CVn	12h 42.1m	+32° 32'	9.2	15x3.3	SB	large edge-on; NGC 4656/7, the Hockey Stick, in field
M64 (NGC 4826)	Com	12h 56.7m	+21° 41'	8.5	9.2x4.6	SA	Blackeye Galaxy; dark patch on core needs large aperture
NGC 5128	Cen	13h 25.5m	-43° 01'	6.7	31x23	S0	Centaurus A; large elliptical crossed by wide dark lane
M51 (NGC 5194)	CVn	13h 29.9m	+47° 12'	8.4	8.2x6.9	SA	Whirlpool Galaxy; sky's best face-on spiral; superb
NGC 6822	Sgr	19h 44.9m	-14° 48'	8.8	19x15	Irr	Barnard's Galaxy; diffuse, faint Local Group member

Galaxy Group Sampler—A Top 5 List
(requires a large aperture telescope)

Group	Constell.	RA (2000)	Dec.	Magnitude (brightest galaxy)	Number of galaxies	Uranometria Chart #	Name
NGC 3190 (Hickson 44)	Leo	10h 18.1m	+21° 48'	11.2	4	144	Arp 316
NGC 3753 (Hickson 57)	Leo	11h 37.9m	+22° 00'	13.6	7	147	Copeland's Septet
NGC 5353 (Hickson 68)	CVn	13h 53.4m	+40° 18'	11.0	5	76	—
NGC 6027 (Hickson 79)	Ser	15h 59.2m	+20° 48'	13.4	6	155	Seyfert's Sextet
NGC 7317-20 (Hickson 92)	Peg	22h 36.1m	+33° 59'	12.6	5	123	Stephan's Quintet

Galaxy Cluster Sampler—A Top 5 List
(requires a large aperture telescope)

Cluster	Constell.	RA (2000)	Dec.	Uranometria Chart #	Comments
Abell 347	And	02h 23.3m	+41° 57'	62	15th-magnitude galaxies 1/2° SE of the fine edge-on NGC 891
Abell 426	Per	03h 19.8m	+41° 31'	63	chain of galaxies west of exploding galaxy and radio source NGC 1275
Abell 1367	Leo	11h 44.0m	+19° 57'	147	rich collection of faint distant galaxies in Leo centred on NGC 3842
Abell 1656	Com	12h 59.6m	+27° 58'	108 & 149	Coma Berenices Cluster; very rich; centred on NGCs 4874 and 4889
Abell 2151	Her	16h 04.4m	+17° 45'	155	Hercules Cluster; brightest member is mag. 13.5; centred on NGC 6045

A Deep-Sky Sampler—II

Presenting 20 of the finest deep-sky objects below -50° declination, suitable for viewing from tropical northern latitudes or from the southern hemisphere.

Southern Sky Sampler—A Top 20 List						
Object	Constell.	RA (2000)	Dec.	Magnitude	Size	Comments
NGC 104	Tuc	00h 24.1m	$-72^\circ 05'$	3.8	30.9'	47 Tucanae; sky's second best globular, near SMC but not a part of it
Small Magellanic Cloud	Tuc	00h 52.6m	$-72^\circ 48'$	2.2	5.8° x 5.8°	SMC; not as richly endowed as LMC; globular NGC 362 worth a closeup look
Large Magellanic Cloud	Dor	05h 23.6m	$-69^\circ 45'$	0.4	11° x 9°	LMC; Local Group galaxy; companion to Milky Way; filled with nebulas and clusters
NGC 2070	Dor	05h 38.6m	$-69^\circ 05'$	—	30x20'	Tarantula Nebula; massive nebula in the LMC; bright
NGC 2516	Car	07h 58.3m	$-60^\circ 52'$	3.8	29'	naked eye open cluster south of False Cross
NGC 3293	Car	10h 35.8m	$-58^\circ 14'$	4.7	5'	Gem Cluster; beautifully colored stars amid nebulosity
IC 2602	Car	10h 43.2m	$-64^\circ 24'$	1.9	50'	Southern Pleiades; bright loose naked-eye open cluster
NGC 3372	Car	10h 43.8m	$-59^\circ 52'$	—	80'	Eta Carinae Nebula; sky's best; superb in any optics
Homunculus Nebula	Car	10h 45.1m	$-59^\circ 41'$	—	—	bright tiny golden yellow nebula around star η Car in centre of larger NGC 3372
NGC 3532	Car	11h 06.4m	$-58^\circ 40'$	3.0	55'	the sky's best open cluster?; rich elliptical mass of stars
NGC 3766	Cen	11h 36.1m	$-61^\circ 37'$	5.3	12'	small, tight open cluster north of Lambda Cen. neb.
IC 2948	Cen	11h 37.3m	$-63^\circ 11'$	—	75x50'	nebulosity around Lambda Cen; w/ open cluster IC2944

Alpha (α) Cru	Cru	12h 26.6m	-63° 06'	1.3, 1.7	4.4" sep	Acrux; bright double star at bottom of Southern Cross
Coal Sack	Cru	12h 53m	-63° 00'	—	6.6° x 5°	the sky's best naked-eye dark nebula; east of Crux
NGC 4755	Cru	12h 53.6m	-60° 20'	4.2	10'	Jewel Box; tight open cluster of multicolored stars
Alpha (α) Cen	Cen	14h 39.6m	-60° 50'	0.0, 1.3	14.1" sep	the sky's brightest double star? closest stars to our Sun
NGC 6067	Nor	16h 13.2m	-54° 13'	5.6	12'	rich open cluster embedded in bright Norma starcloud
NGC 6397	Ara	17h 40.7m	-53° 40'	5.8	25.7'	large loose globular; easy to resolve; closest globular?
NGC 6744	Pav	19h 09.8m	-63° 51'	8.6	15x10'	bright face-on spiral 4° S. of large globular NGC 6752
NGC 6752	Pav	19h 10.9m	-59° 59'	5.5	20.4'	one of southern sky's great globulars; not well known

END