

Binocular Universe:

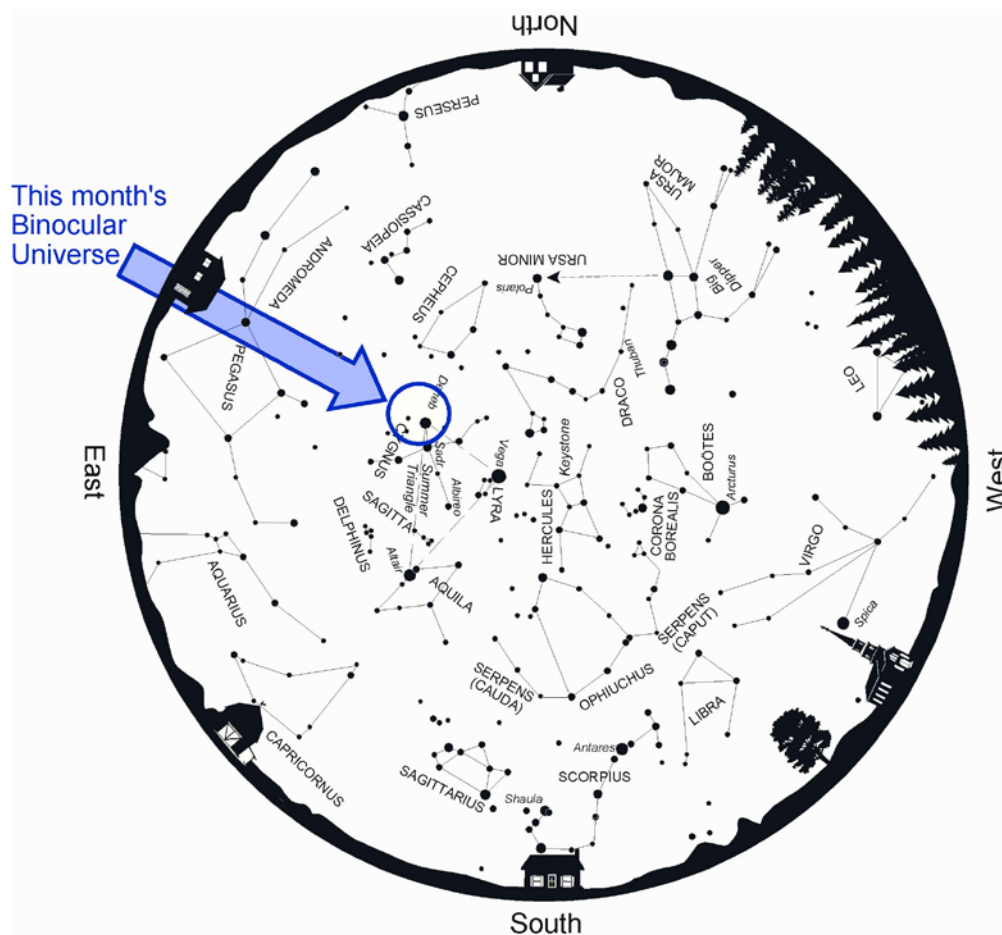
Flying High

September 2014

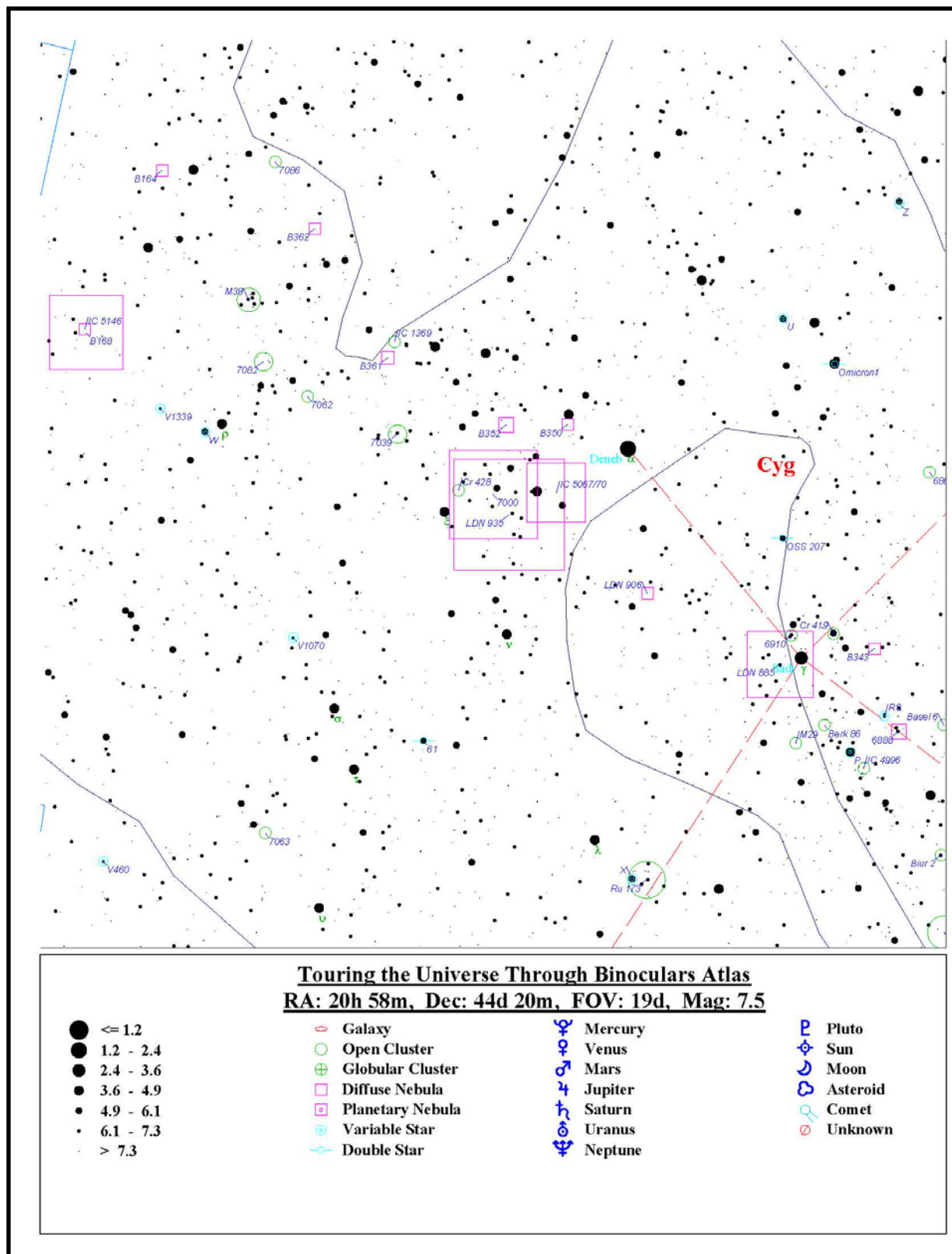
Phil Harrington



The **North America Nebula (NGC 7000)** is a large expanse of glowing hydrogen gas mixed with opaque clouds of cosmic dust just 3° east of Deneb [Alpha (α) Cygni] and 1° to the west of 4th-magnitude Xi (ξ) Cygni. Famous as one of the most luminous blue supergiants visible in the night sky, Deneb marks the tail of Cygnus the Swan, or if you prefer, the top of the Northern Cross asterism.



Above: Summer star map from [Star Watch](#) by Phil Harrington.



Above: Finder chart for this month's *Binocular Universe*.

Chart adapted from *Touring the Universe through Binoculars Atlas (TUBA)*,
www.philharrington.net/tuba.htm

The North America Nebula epitomizes how observational astronomy has evolved over the years. When he discovered it on October 24, 1786, Sir William Herschel (1738-1822) described the view through his 18.7-inch reflecting telescope as "very large diffused nebulosity, brighter in the middle." Honestly, I am surprised he could see it at all because of his instrument's very narrow field of view. That's one of the biggest challenges to seeing the North America Nebula through a telescope -- it spans an area nearly 2° in diameter. From the sounds of Herschel's notes, the thought of trying to spot it in anything less never crossed his mind.

Five score and four years later, the German astronomer Max Wolf became the first to photograph the full span of NGC 7000. Upon seeing his results, he christened it the North America Nebula for its eerie resemblance to that continent. Since then, images of this vast emission nebula have appeared in nearly every introductory astronomy textbook and coffee-table astrophoto album alike.

Before the 1970s, conventional wisdom had it that, although this huge celestial continent was prominent in photographs, it was nearly invisible to the human eye because it was too large and too red. Part of that mindset has to be attributed to the observing guides that were in print at the time. Nearly all concentrated solely on telescopic observing. They were so fixated on what could be seen through conventional long focal length instruments using the comparatively narrow field eyepieces of the day that they ignored other options. And since NGC 7000 could not squeeze into a single field of view, it was nearly impossible to isolate its clouds from their surroundings.

One of the first authors to mention the North America Nebula, though not by name, was the Reverend Thomas W. Webb. In his classic book [Celestial Objects for Common Telescopes](#), Webb described the nebula as having a "sharply defined south [edge], and containing a dark opening like a cross; visible as a glow in a field glass, but brightest part scarcely visible in 17¼-in reflector."

Still, most considered seeing the North America Nebula by eye to be futile. The winds of change began to blow, however, with the landmark work [Burnham's Celestial Handbook](#), published originally in 1966. Author Robert Burnham, Jr., advised "Binoculars show an irregular glow more than 1½° in diameter with the North American shape becoming unmistakable on a clear night. Perhaps the best view of the unusual outline is obtained with a 3 or 4-inch rich-field telescope and wide-angle eyepiece."

Another pioneer who urged amateurs to look for the North America Nebula was Walter Scott Houston (1912-1993). Throughout his nearly half century of penning the Deep-Sky Wonders column in [Sky & Telescope](#) magazine, Houston often mused about seeing this difficult object. His evolving views captured the changing attitudes over its visibility. For instance, in his September 1948 column, he wrote, "the North America nebula near Deneb cannot be observed readily without photography." But then, fast forward several decades to find Scotty advising "if observing conditions are very good, and you know what size and shape to expect, the North America Nebula can be made out easily with the naked eye."

To try this yourself whether through binoculars or with eye alone, you first need to be able to see the Cygnus Milky Way clearly. A reasonably dark suburban sky should be sufficient, but wait until Cygnus is nearest the zenith in order to isolate it from any errant clouds or light pollution. Zero in on the area between Deneb and Xi Cygni, which lies at the edge of the Northern Coalsack, a large expanse of dark nebulosity at the northern terminus of the Milky Way's Great Rift. The Great Rift slices the galactic plane in half lengthwise, extending

southward from Cygnus through Vulpecula, Sagitta, and Aquila on its way toward Sagittarius.

The brightest part of the North America Nebula, marking "Mexico" and "Florida," juts into the Northern Coalsack in much the same way as their earthly counterparts mark the Gulf of Mexico's shoreline. The nebula's hook-shaped glow appears slightly brighter than the Milky Way immediately surrounding it, but be forewarned that, by eye alone, it is deceptively small. If you cannot see it by eye alone, try using a narrowband filter. It might be best to try the filter test with a friend who owns the same filter as you, since viewing through a pair of filters is best. Otherwise, you will lose the two-eyed advantage discussed in chapter 1 by squinting through only one eye.

If you can see the North America Nebula easily, see how you do with the **Pelican Nebula**. In reality, the Pelican and the North America Nebulae are both part of the same huge complex of glowing hydrogen gas. An opaque cloud of interstellar dust that slices in front of the background emission nebula gives the illusion that we are looking at two different entities. That absorption cloud is cataloged separately as Lynds 935, or LDN 935, its listing in the catalog of dark nebulae compiled by the astronomer Beverly T. Lynds and published in the *Astrophysical Journal Supplement* (vol. 7, p.1) in 1962.

The Pelican carries two catalog designations -- **IC 5067** and **IC 5070** -- that point to two portions of the nebula. The eastern edge of Lynds 935 carves out the outline of the North America Nebula's (terrestrial) east coast, while its western edge forms the long beak and pointy head of the celestial pelican, listed as IC 5070. Photographs of the region reveal two small, circular dark dust clouds marking the bird's eyes, while a brighter tuft to their northwest, IC 5067, suggests the curved shape of its head and neck.

The Pelican's ionized hydrogen is easy to record in photographs, but seeing any hint of it by eye is usually frustrated by its deep-red emission. Conditions have to be nearly perfect to see even the slightest hint. A good rule of thumb is set by the North America Nebula itself. If it is *easily* visible by eye, then the sky might be clear enough to see the Pelican through binoculars.

The most prominent part of the Pelican is its east-facing silhouette against Lynds 935. Use the star 57 Cygni as a further guide, as it is positioned just east of the "bill." From here, the bill slices diagonally southeastward toward the fainter field star HD 199373. The back of the Pelican's head curves westward toward the star 56 Cygni.

Interestingly, the North America/Pelican complex lies an estimated 2,000 light years away, which is only a few hundred light years farther than the Orion Nebula. But while the Orion Nebula is an easy target to spot even under less than ideal conditions, this similar stellar nursery is far more difficult to study even under superior skies. My best view of the Pelican through binoculars came several summers ago while visiting New York's Catskill Mountains. There, with a naked-eye limiting magnitude of better than 6.5, the Pelican's profile was distinct through my 10x50 binoculars.

Talk about an overcrowded area! Take a look at all the other binocular targets within this month's Binocular Universe. That should be enough keep all of us busy for the month to come.

Object	Con	Type	R.A.	Dec	Mag	Size/Sep/ Period	Notes
			(2000)				
Z	Cyg	Vr	20 1.4	+50 3	7.4-14.7	263.69 days	Long Period Variable
6866	Cyg	OC	20 3.7	+44 0	7.6	7'	
Basel 6	Cyg	OC	20 6.8	+38 21	7.7	14'	
Biur 2	Cyg	OC	20 9.2	+35 29	6.3	13'	
Roslund 5	Cyg	OC	20 10	+33 46		45'	*TUB page 140*
6888	Cyg	DN	20 12	+38 21		20'x10'	Crescent Nebula
RS	Cyg	Vr	20 13.4	+38 44	6.5-9.3	417.39 days	Semi-Regular
B343	Cyg	Dk	20 13.5	+40 16		10'x5'	
Omicron1	Cyg	**	20 13.6	+46 44	4,7,5	107",338"	173°,338°(1926);13554
IC 4996	Cyg	OC	20 16.5	+37 38	7.3	6'	
P	Cyg	Vr	20 17.8	+38 2	3.0-6.0	--	S Dor type
Cr 419	Cyg	OC	20 18.1	+40 43	5.4p	5'	
U	Cyg	Vr	20 19.6	+47 54	5.9-12.1	462.40 days	Long Period Variable
Berk 86	Cyg	OC	20 20.4	+38 42	7.9	8'	
OSS 207	Cyg	**	20 22.9	+42 59	6.6,8.5	93"	63°(1920);13786
6910	Cyg	OC	20 23.1	+40 47	7.4	8'	
M29	Cyg	OC	20 23.9	+38 22	6.6	7'	*TUB page 140* NGC 6913
LDN 885	Cyg	Dk	20 24.8	+40 10		90'x20'	
LDN 906	Cyg	Dk	20 40	+42 0			*TUB page 140* Northern Coalsack
Ru 173	Cyg	OC	20 41.8	+35 33		50'	*TUB page 140*
X	Cyg	Vr	20 43.4	+35 35	5.9-6.9	16.39 days	Cepheid
B350	Cyg	Dk	20 49.1	+45 53		3'	
IC 5067/70	Cyg	DN	20 50.8	+44 21		80'x70'	*TUB page 141* Pelican Nebula
LDN 935	Cyg	Dk	20 56.8	+43 52		150'x40'	*TUB page 141* Between N.A. & Pelican Neb
B352	Cyg	Dk	20 57.1	+45 54		20'x10'	
7000	Cyg	DN	20 58.8	+44 20		120'x100'	*TUB page 141* North America Nebula
Cr 428	Cyg	OC	21 3.2	+44 25	8.7p	14'	
61	Cyg	**	21 6.9	+38 45	5.2,6.0	321"	*TUB page 141,143* 195°(1976);14636;large
7039	Cyg	OC	21 11.2	+45 39	7.6	25'	*TUB page 143*
IC 1369	Cyg	OC	21 12.1	+47 44	6.8	4'	
B361	Cyg	Dk	21 12.9	+47 22		17'	
V1070	Cyg	Vr	21 22.8	+40 56	6.7-7.7		Semi-Regular
7062	Cyg	OC	21 23.2	+46 23	8.3	7'	
B362	Cyg	Dk	21 24	+50 10		15'x8'	
7063	Cyg	OC	21 24.4	+36 30	7.0	8'	
7082	Cyg	OC	21 29.4	+47 5	7.2	25'	
7086	Cyg	OC	21 30.5	+51 35	8.4	9'	
M39	Cyg	OC	21 32.2	+48 26	4.6	32'	*TUB page 143-144* NGC 7092
W	Cyg	Vr	21 36	+45 22	6.8-8.9	126.26 days	Semi-Regular
V460	Cyg	Vr	21 42	+35 31	5.6-7.0		Irregular
V1339	Cyg	Vr	21 42.1	+45 46	5.9-7.1	35 days	Semi-Regular
B164	Cyg	Dk	21 46.5	+51 4		12'x6'	
B168	Cyg	Dk	21 53.2	+47 12		100'x10'	*TUB page 144* Cocoon Nebula at east end
IC 5146	Cyg	DN	21 53.5	+47 16		12'x12'	*TUB page 144* Cocoon Nebula

Until next month, when autumn brings new sights for us to enjoy, remember that when it comes to stargazing, two eyes are better than one!



About the Author:

Phil Harrington is the author of nine books on astronomy, including [Touring the Universe through Binoculars](#). Visit his web site at www.philharrington.net to learn more about each.

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