# 19

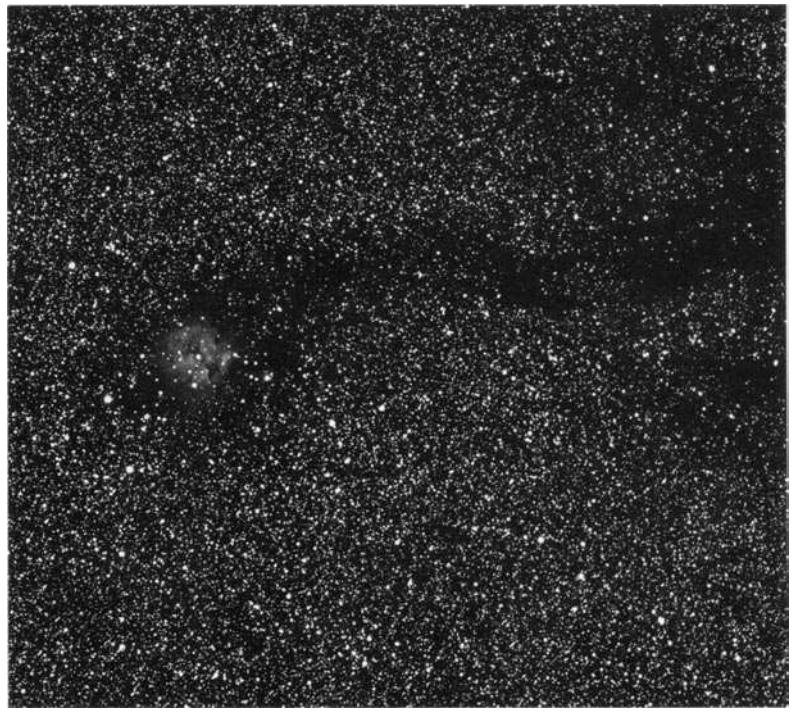
***Cocoon Nebula***
**IC 5146 (nebula)**
**Collinder 470 (associated cluster)**
**Type: Emission Nebula**
**Con: Cygnus**

RA:21$^{h}$53.4$^{m}$
Dec: +47° 16'
Mag: 7.2, cluster
Mag: 9.3, nebula (O'Meara)
Diam: 20', cluster
Dim: 10' x10', nebula
Dist: ~3,300 light-years
Disc: Thomas E. Espin, 1899

HERSCHEL: None.

GC/NGC: None.

IC: Pretty bright, very large, irregularly faint, magnitude 9.5 star in the middle.



CALDWELL 19 SHOULD BE A PARADOX FOR visual observers, especially for those using small-aperture telescopes. Normally one would expect a bright nebula to be more conspicuous than a dark one, but this is not the case with the Cocoon and its neighboring field of dark nebulosity. Had I made the Caldwell Catalog, I would have mentioned IC 5146 in passing while showcasing the region's pool of dark nebulae about 1½° to the northwest. Under a dark sky the dark pool and its associated stream — which flows toward, then ponds around, IC 5146 — is one of the northern sky's most visually stunning dark nebulae, whether for the naked eye, binoculars, or low-power telescopes. (Known as Barnard 168, or B168, this dark nebula is outlined nicely in the *Millennium Star Atlas* and in *Sky Atlas 2000.0* second edition, as well as on the finder chart on page 81.)

In 1899 the British clergyman and noted double-star observer Thomas E. Espin, whose observatory at Tow Law had 18- and 24-inch telescopes, first recorded the existence of the Cocoon Nebula on August 13th; he made a follow-up observation two nights later. In *Astronomische Nachrichten* for March 31, 1900, he refers to the nebula as a "faint glow about 8', well seen each night." That same year Max Wolf took the first photographs of the Cocoon. In a 1904 installment of *Monthly Notices* of the Royal Astronomical Society, Wolf wrote extensively about this "Remarkable Nebula in Cygnus connected with Starless Regions." He described the Cocoon as being somewhat round and having a complicated

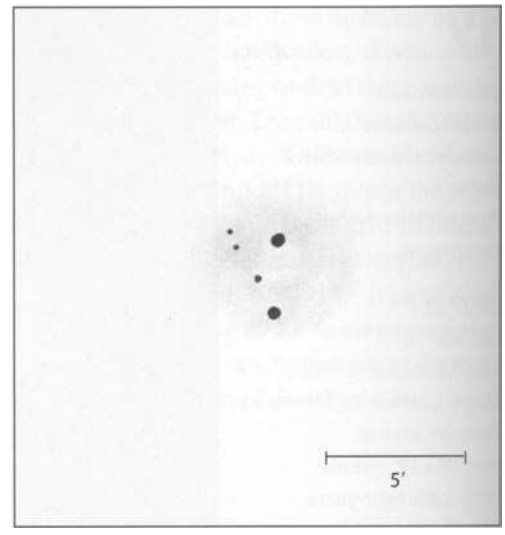
structure resembling that of the Trifid Nebula (M20) in Sagittarius:

> It is placed centrally in a very fine lacuna, void of faint stars, which surrounds the luminous cloud like a trench. The most striking feature with regard to this object is that the star-void halo encircling the nebula forms the end of a long channel, running eastward from the western nebulous clouds and their lacunae to a length of more than two degrees.

Like William Herschel before him, Wolf believed in the possibility that the location within these stellar "voids" of the Cocoon and other extended nebulae — such as the Rho Ophiuchi and Eta Carinae nebulae — was not coincidental:

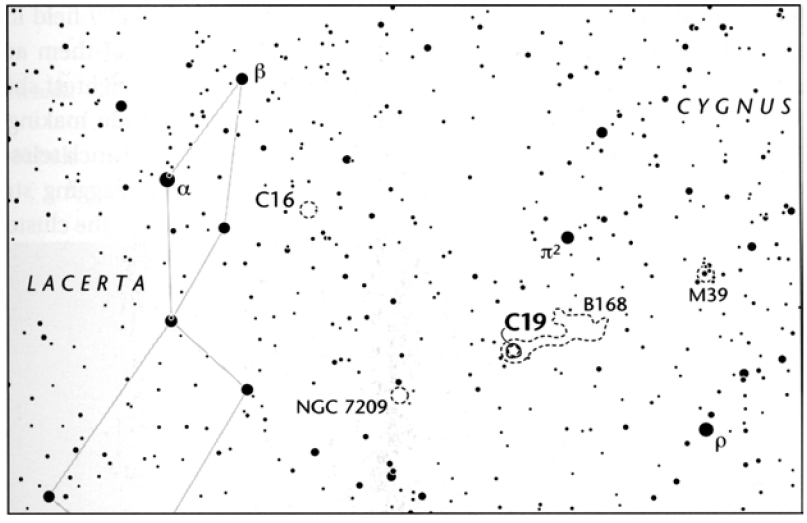
> . . . though partially or wholly surrounded by void zones, the nebulae are generally placed at the end of a longer extended lacuna, so that we are led to the impression that we here see the result of some cosmic movement, the end of the lacuna showing the place where this unknown event began.
>
> In regarding this nebula we are led to speculation. We might suppose the nebula were detached from the great western nebulous cloud, and as if it, or the cosmic process connected with its origin, had swept the long channel through the star-crowds of the Milky Way. Or is there a dark mass following the path of the nebula, absorbing the light of the fainter stars? We are far from knowing enough to settle these questions.

Wolf also noticed the existence of some brighter suns within the confines of the Cocoon. Today we know of some 110 stars as faint as 17th magnitude inside the nebula. These constitute a very young cluster, as do the stars at the heart of the great Orion Nebula (M42), and many authorities have equated IC




5146 with this young cluster. But Brent Archinal of the U.S. Naval Observatory notes that the Cocoon is "another case where the Caldwell Catalog has it right and everyone else has it wrong. IC 5146 (the Cocoon Nebula) is the nebula, while Collinder 470 (not IC 5146) is the correct name of the cluster. Espin and Wolf independently discovered the nebula and are credited in the *Index Catalogues*. I've looked at the discovery references and they make no report of a cluster here. Collinder was apparently the first to notice the cluster."

To track down the Cocoon, first locate the 4th-magnitude star Pi$^2$ ($\pi^2$) Cygni some 2½° east-northeast of the stunning open cluster M39. Now simply cast your gaze south of that star until the brightly glowing star clouds of the Cygnus Milky Way gradually fade into a vortex of dark material. The dark vortex is but a concentrated section of a larger, slightly elliptical web of dark concentric veins draping the region. The entire web measures about 2° in diameter; its westernmost edge (not plotted here) nearly abuts M39, while its eastern edge stops just shy of IC 5146. It is out of this black cobweb that a dark, narrow stream emerges to




trickle into the pool surrounding the Cocoon. It's a challenge to see this 1°-long stream with the naked eye, but try sweeping your gaze up and down and left to right for a few minutes and see if you don't catch glimpses of it. (The darkest of skies are required for this exercise, of course.)

Through binoculars, a 7th-magnitude star shines at the heart of the dark web, and it appears to be the brightest star trapped there. The dark stream is stunning in binoculars, where it appears sharp and needlelike. At 23x in the 4-inch the stream meanders out of the large pool to its northwest, then straightens toward the Cocoon. Rivulets of dark nebulosity parallel it on either side. Follow the stream eastward from the large pool until it rounds out near an obvious pair of 7th-magnitude stars, then stop. Here is where you can start looking for the Cocoon in earnest.

As noted above, in long-exposure photographs the Cocoon, with its round form and dark lanes, resembles the Trifid Nebula (M20). Unfortunately large telescopes are required for an observer to see these features at the eyepiece. Through the 4-inch Genesis at 23x the Cocoon is a 9th-magnitude circular glow, easily overpowered by the pair of roughly 9.5-magnitude stars within it. Higher magnifications only diminish the view. This makes me wonder about amateurs' claims to have seen the nebula with binoculars. As most comet hunters will attest, close pairs of stars often look fuzzy when seen at low magnifications. In fact, history offers a striking parallel. In 1660 Johannes Hevelius cataloged a nebula in Ursa Major, which Charles Messier later discovered was only a pair of 9th-magnitude stars (the double star since dubbed Winnecke 4). Although he was not fooled by the double, Messier still deemed it worth including in his catalog, perhaps to alert other comet hunters to the double's deceitful nature. Today we know Winnecke 4 by its more popular designation, M40.

While on the subject of popular designations: just who named IC 5146 the Cocoon? Neither Espin nor Wolf makes specific references to a cocoon in their original discovery notes. One could infer that its origin is rooted in Wolf's theorem — namely, that the nebulosity could have been woven out of the faint stellar fabric of the Milky Way through which it moved at the time of its creation.

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Before moving on to the next Caldwell object, be sure to check out the large, scattered open cluster NGC 7209 in Lacerta. (Be careful not to confuse NGC 7209 with NGC 7092, which is M39.) NGC 7209 lies 2° east-southeast of the Cocoon, shines at magnitude 6.7, and spans 25' — nearly a full Moon diameter.

Although the NGC 7209 field looks rich with stars, only about 25 of them are true cluster members, with the brightest shining between 9th and 10th magnitude, making the cluster an impressive view in a 4-inch telescope. Look for a loose and lazy zigzagging stream of stars, most of which lie near the cluster's center.