

The Heart of the Scorpion

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“Two eyes are better than one!”

That's been my astronomical mantra ever since I got hooked into this hobby 41 years ago because of a homework assignment.

Back on April 11, 1968, my 6th-grade science teacher, Mr. Clark, told us that a total lunar eclipse was going to take place the next night. April 12 was Good Friday that year, and we had the day off. But against his policy of not assigning homework on weekends, he wanted us to watch the eclipse and write up a report, which would be due the following Monday. We were all praying for clouds, but wouldn't you know it! It was clear.

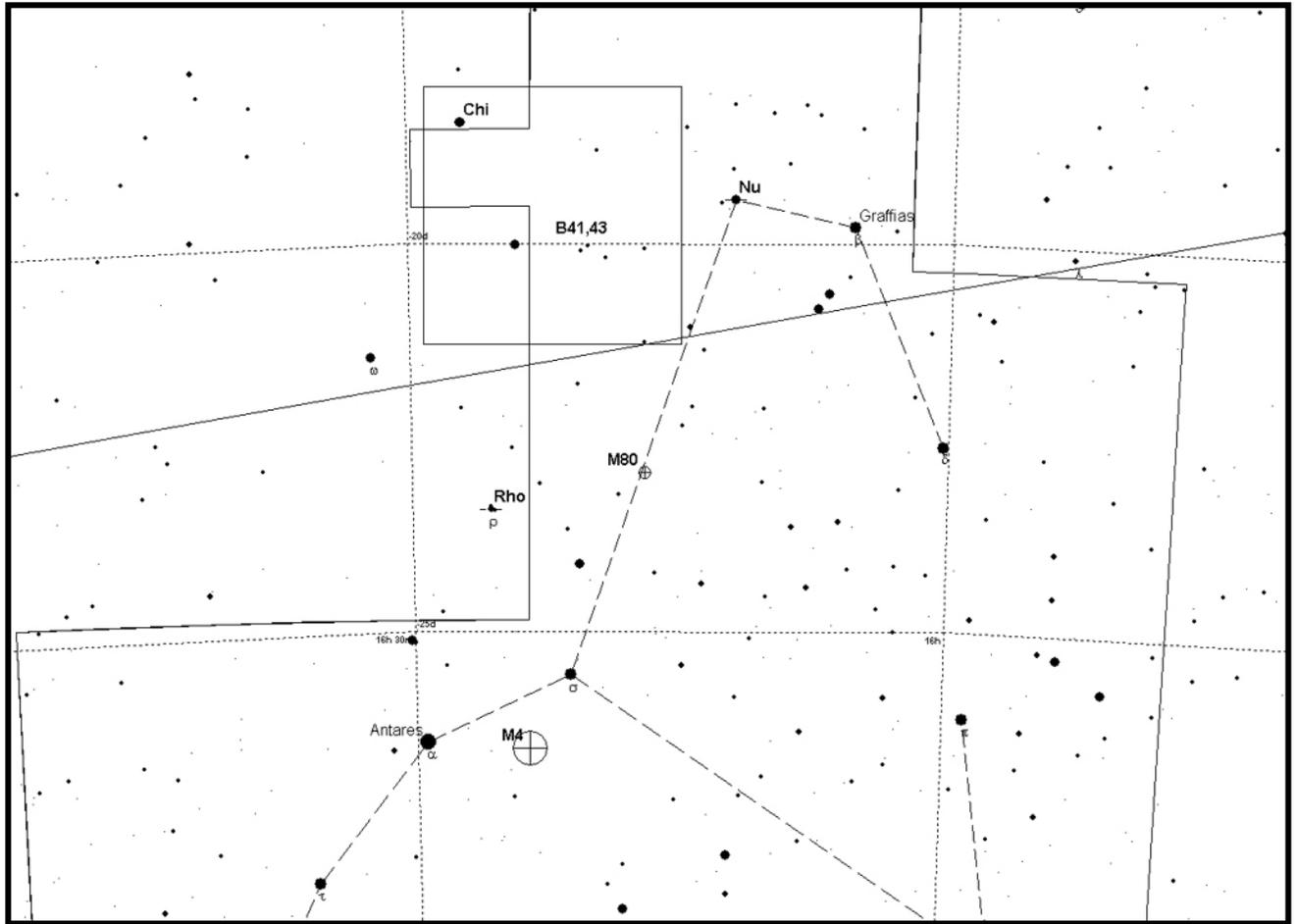
I watched the eclipse unfold through a pair of 7x35 binoculars and was transfixed by what I saw. The eclipse may have lasted only a couple of hours, but it struck a cord deep within me that has lasted for the past 41 years. Those 7x35s helped to introduce me to observational astronomy. Along the way, they showed me 85 of the Messier objects, qualifying me for the Astronomical League's Messier Club long before they had a separate binocular list.

Although those binoculars are long gone, my enjoyment for binocular astronomy has never waned. The binocular universe is a very personal one to me. I never head out to view through any telescope without a pair of binoculars flung over my shoulder.

And that brings us to this column. "Binocular Universe" began four years ago in *Astronomy* magazine and now, continues here on Cloudynights. Starting this month, you and I will tour that universe together through our binoculars. Some of the sights we visit may be old friends; others may be brand new. You just might be surprised how much of the universe your binoculars will show you.

With all that said, let's kick things off with a visit to one of my favorite regions in the entire sky, the head of Scorpius, the Scorpion.





We begin at the brilliant red supergiant Antares, at the Scorpion's heart. Depending on how high it is in your sky and just how steady the atmosphere over your head is, Antares may look like a steady orangish-red beacon; or it may be gyrating wildly, flashing through nearly every color in the rainbow. Not too long ago, I was admiring Antares through my 10x50 binoculars just as it was rising, and watched it flash from red to yellow to green and blue, then back to red again. It almost looked it was trying to signal me, like a sailor using semaphores to send code. The effect was quite striking.

Look just to the west of Antares for the faint smudge of globular cluster M4. Discovered by Philippe Loys de Cheseaux in 1746, M4 is "only" 7,200 light years away. That makes it one of the closest globular clusters to Earth. In all, more than 100,000 stars crammed within about a 100-light-year diameter call this distant swarm home.

M4 is easy to locate, since it lies just over 1° to the west of Antares. You'll find it forming a triangle with Antares to its east and 3rd-magnitude Sigma (σ) Scorpii to its northwest.

Even small binoculars will show M4 as a tiny, undefined smudge of grayish light just to the west of Antares. My 10x50s add in a slightly brighter core at its center. Increase magnification and aperture, and all of a sudden the core appears bisected by a brighter column of light. Large telescopes show this to be a chain of 11th-magnitude stars that just happen to line up in a straight row. I can't make it out through my 10x50s, but can through my 16x70s and 20x80s. I wonder what the smallest binocular is that will show this unusual feature. Give it a try for yourself and let me know how you make out.



From M4, wind northward, past Sigma, to 5th-magnitude Omicron (\omicron) Scorpii. If you center on Omicron, Sigma will still be in view, about $1\frac{1}{2}^\circ$ south of center. Look an equal distance to the northeast of Omicron, and you'll spot a small triangle formed by Rho (ρ) Ophiuchi and two fainter attendants.

Rho Ophiuchi, a blue giant, is engulfed in faint wisps of nebulosity. Although they are too faint to be seen through our binoculars, the clouds immediately surrounding Rho show off a beautiful, deep blue glow in long-exposure photos of the region. The nebula's countless dust particles are illuminated by Rho, reflecting the blue end of the spectrum more efficiently than the red end, to produce a blue reflection nebula. The Rho Ophiuchi cloud complex, lying some 400 light-years away, is a stellar nursery where more than 300 emerging and newly formed stars are just beginning their lives. Eventually, they will clear away the clouds to reveal a striking open star cluster.

Focus back on Sigma Scorpii, and then glance $1\frac{1}{2}^\circ$ to the northwest to find the dim glow of another globular cluster, M80. History is not clear on who discovered M80. Both Charles Messier and Pierre Méchain both spotted it for the first time in January 1781.

At first glance through binoculars, M80 might look like just another point of light set in a dense star field. But concentrate on it and its small, softly glowing round disk should become clear. My 16x70 binoculars begin to reveal its more intense center, but given that M80 is one of the densest of the Messier globulars, even an 8-inch (20-cm) has trouble resolving any of its faint stars.

While you are in the area, be sure to check on the variable star **U Scorpii**, about a degree northwest of Chi (χ) Ophiuchi. Normally, this recurring nova hovers around magnitude 17.6, but every now and then, it blasts to 8th or 9th magnitude in a matter of only five hours. It then begins to simmer back down within three days.

Studies show that U Scorpii is a close binary system made up a white dwarf that is, quite literally, getting dumped on by a companion star. As the stream of hydrogen is pulled from the companion onto the surface of the white dwarf, the white dwarf's mass increases to the point that it explodes outward in a burst of nuclear fusion.

This odd star seems to pop once every 9 to 11 years, having done so in 1979, 1987, and most recently, in 1999. Do the math. Bradley Schaeffer, an astronomer at Louisiana State University, feels that the time could be ripe for the curtain to rise on the next act in the show, as he wrote in an article <<http://tinyurl.com/ozpw3q>> that recently appeared on Sky & Telescope's web site. Based on historical records, Schaeffer feels that U Scorpii will likely erupt again sometime in the next 12 months.

Even at its brightest, however, it will only be barely visible through giant binoculars, and then only with a detailed map of the region. Visit the American Association of Variable Star Observers (AAVSO) web site's chart generator <<http://tinyurl.com/oejjvl>> to create a custom chart for your binoculars. Be sure to choose the right scale for your chart -- either an A- or a B-scale chart will be best for most.

There are many other fine binocular sights in and around the heart of the Scorpion. Pull out a chaise lounge, spray on that insect repellent, sit back, and enjoy this amazing region of the early summer sky. See something interesting or have a comment? Drop me a line at star_ware@hotmail.com and tell me about it.



Meanwhile, until next month when we commemorate the historic landing of Apollo 11 exactly forty years ago, remember that now, as always, two eyes are better than one.

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