

billion light-years away, respectively. The middle galaxy is lensed into a nearly complete arc, 310 degrees long, with the distant galaxy split into three circumferential arcs, one longer and two shorter, fainter than the inner ring. On the POSS II red plate this system appeared stellar, with a hint on the POSS II blue plate of a ring arc. I was able to spot this 18.6-magnitude object from my home in April 2011, and in the eyepiece of my 32-inch reflector it appeared stellar.

For the last fifteen years I have been searching the professional literature in regard to gravitationally lensed arcs possibly visible in my equipment. Almost all the arcs (except AGC 2667, below) noted in professional instruments, and nicely



RCS2 032727-132623

presented in journal images, were not visible at all on the POSS I or II plates. Then in 2010 along came RCS2 032727-132623, a galaxy cluster studied by Eva Wuyts of the University of Chicago, showing a very blue, 90-degree arc that appeared to me to be the brightest arc yet discovered. It is invisible on the POSS II red plate. But, Cheshire-cat-like, its inverted smile appears clearly when examining the blue companion image. Though rather low in my Minnesota sky, I still felt I had a shot from my driveway, as I rolled my 32-inch behemoth down

the rippled tar, sacrificing collimation to optimize culmination. On each of three cold mornings I spent nearly an hour at the eyepiece, hand guiding to no avail, as this prey eluded all tricks to view it. My friend Jimi Lowrey had a similar result from the more southerly and temperate climes of West Texas, even using his 48-inch telescope at over a mile of elevation. Its invisibility must stem from its wavelength. I have a plan to recruit a colleague, post cataract surgery, whose implants allow perception well into the deep blue, as I noted during the transit of Venus when he was the only one seeing well through the calcium solar instrument.

Though not a complete Einstein Ring, the bright arc



AGC 2667

surrounding AGC 2667 in northern Sculptor is one of the brightest lensed structures in the sky. It is bluer than the cluster galaxies of Abell 2667, but has elements of red and yellow and, unlike the RCS2 object, appears on both the red and blue POSS II plates. Though distinctly brighter in the blue, this wavelength difference is what I think

made the arc visible to me after ninety minutes of searching with my 32-inch scope at the 2008 Okie-Tex Star Party. Einstein was often spectacularly right,

but in this case we recall his prediction in regard to the visibility of gravitationally lensed light: "of course, there is no hope of observing this phenomenon directly." As did the mountains of Mordor, the sky forges rings from powerful forces offering untiring adventure and rounded memory. ☀

*...Forge of darkness  
O'pen the deep*

**Data:**

Necklace Nebula: 19h 43m 59.5s, +17° 9m 1s; APOD 11-3-10  
First Complete Einstein Ring, B1938+666: 19h 38m 25.29s, +66° 48m 52.9s  
Double Einstein Ring: 9h 46m 56.6s, +10° 6m 52.6s  
Albert Einstein quote, *Science*, vol. 84, p. 506, 1936.  
Dave Tosteson, Chisago City, Minnesota; [djtost1@gmail.com](mailto:djtost1@gmail.com)

## Set Some New Observing Goals this Year

By Mike Hotka

Years ago, I learned of an amateur's goal of observing 5,000 unique objects in the Universe. I thought this was a commendable goal, so I adopted it for myself. To date, I have observed 3,432 unique objects towards my goal.

This single goal drives my thirst to find new objects each time I go out observing. I never tire of old Messier favorites, but am always looking for objects off the beaten path. While completing 37 of the Astronomical League's observing programs, I was provided with list after list of objects I had never seen. There are generally more objects on an observing program list to observe than are required for the certificate. After looking at the required number for the certificate, I will continue to observe the remaining

objects on the list. All these new objects contribute to my 5000 unique objects observed goal.

When looking for observing programs to try, I look for programs that interest me. Recently, two new programs were added that caught my eye: the Hydrogen Alpha Solar Observing Program and the Bright Nebulae Observing Program.

Hydrogen alpha solar observing was something I had wanted to do for years. When I found this new program, I started looking for a H-alpha solar telescope. I really did not want to spend almost \$500 for a Coronado PST telescope. I made a couple of inquiries and learned my local astronomy club had a PST I could check out. I was then ready to complete this program.

I have always liked looking

at bright nebulae. The Bright Nebulae Observing Program gave me the push I needed to start observing more of these beautiful objects. I used my 8-inch f/6 Newtonian for this program. With eyepieces giving magnifications of 51x, 81x, and 122x, along with my ultra-high contrast and O-III filters, I was able to complete the required 100 observations. I found the objects on the list easy to find and observe.

When not working on observing programs, I observe double stars on Dave Mitsky's Double Star list. I am also looking at all the Herschel objects that William Herschel looked at. After reading the article "The Herschel Project" by Robert Naeye in the June 2012 *Sky & Telescope* magazine, I was hooked on observing these objects. I have read books about William and Caroline Herschel, which adds to my

viewing enjoyment. All these Herschel objects will add to my 5,000 unique objects observed goal.

I really appreciate the Astronomical League and all that it does for us amateur astronomers. Their observing programs are a great resource, for not only do they take you off the beaten Messier path, but you learn new observing techniques with every program you complete. These techniques allow you to see fainter objects with a telescope, introduce you useful astronomical resources that you can use in the field, teach you to *study* the object you just found in the eyepiece, and have you observe a breadth of different kinds of objects, just to name a few.

Set your first 2014 goal to complete the Messier Observing Program. Once you complete it, you will have a good command of the sky and be able to navigate amongst the constellations. While

looking at the Messier objects, note which ones you like the best. Your next goal should be to see more of these kinds of objects. The League has an observing program that will help you achieve this next goal. For example, if you liked galaxies, choose the Herschel 400 and Herschel II Programs. Similar observing programs exist for every other kind of object in the Messier list: bright nebulae, planetary nebulae, globular clusters, and open clusters.

Start out 2014 by setting some personal observing goals. Then look to the Astronomical League's observing programs to help you achieve these goals. ☀

*Mike Hotka has been an Astronomical League member since 1986. He has completed 37 of the League's observing programs. His website, [mikehotka.com](http://mikehotka.com), contains a wealth of observing information. Contact Mike at [astroleague.org/roster/contact/383](mailto:astroleague.org/roster/contact/383).*

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