

OBSERVER



The Heart Nebula (IC 1805, IC 1795, and NGC 896) in Cassiopeia. Image © Jon Martin

MAY SKIES

Jupiter, which was at opposition in February, is now high in the west at evening twilight, a natural starting point for an observing session. The warmer mid-spring skies make the planet a more convenient target now, but it's

starting to sink toward the sunset, and will disappear into it in the coming months—grab it while you can! Saturn is now a presence in the south-southeastern sky at midnight, as it approaches opposition in early June.

by Dennis Cochran

The Eta Aquarid meteors, made of dust from comet Halley, typically start on April 19th and go through most of May, peaking on the 6th. They were strong in 2013, but are not expected to be this year—this time, moonlight will present a challenge. If you want to give it a try though, the radiant point is about 25° up in the east-southeast around 4 a.m.

On a better note, May presents galaxies—lots of them—at a convenient time and position. Mid-month, they're high in the south around 10 p.m. The Sombrero Galaxy, M104, a spectacular edge-on spiral, is nicknamed for the pronounced central bulge and dust lanes that cause it to resemble a Mexican hat. The galaxy should be visible in moderate scopes—but it will take a larger one (10 or 12 inches) to see the details at their best. To find M104 at our

Sky Calendar

- 3 Full Moon
- 6 Peak of Eta Aquarid Meteors (See Story in "May Skies")
- 11 Last-Quarter Moon
- 17 New Moon
- 25 First-Quarter Moon

suggested time, start at Delta Corvi, the star at the northeast ("top-left") corner of the constellation Corvus the Crow. Once there, align the westernmost (rightmost) edge of your telrad's rings with the star, and point upward (relative to the ground) until the center of the telrad is about the same height as Spica (the very bright star just to the northeast); the Sombrero Galaxy should be in your finderscope. It's worth mentioning that the starting point for this, Delta Corvi (aka Algorab on some maps), is itself a beautiful binary star, and worth checking out while you're in the neighborhood.

About 25° north of the Sombrero, at about the same height as Denebola (the easternmost

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PRESIDENT'S MESSAGE

by Ron Hranac

One of the first questions that someone new to the hobby of amateur astronomy asks is, "What kind of telescope should I buy?" Numerous magazine articles and books have been written over the years in an attempt to answer that question, but there is an option that is often overlooked: binoculars.

Binoculars have several advantages when it comes to optically assisted observing. First on my list is a wide field of view, which is great for open star clusters, some of the night sky's asterisms, neighboring galaxies, and our own as well—the Milky Way looks spectacular in binoculars. Second is that many binoculars are less costly than a telescope and its accessories. While one can certainly spend a significant chunk of change on high-end binoculars, there are many low-to-moderately priced binoculars that offer decent quality and good views. For that matter, even if they hadn't thought of using them for astronomy, many people already own binoculars.

Compared to telescopes, binoculars are compact and lightweight, and require no setup. Grab 'em and start observing. Using both eyes for observing is said to improve perceived detail and overall image quality, so if you've never looked at the night sky with binoculars, you might be surprised at what can be seen.

Binoculars are also good for beginners learning their way around the constellations. Unlike telescopes and finderscopes, the view in conventional binoculars isn't flipped or reversed, so it's easier to match up the stars with what your eyes see, or with the patterns on a star chart. Their wide field of view makes them easy to point at your target, too.

Downsides? One's arms can get tired holding binoculars up, and it's difficult to hold them steady. To improve handheld steadiness, try

grasping the binoculars at the large end rather than close to the eyepieces. Even then, they can be challenging to hold still, especially after a few minutes. Image-stabilized binoculars do a surprisingly good job of steadying the view, but they are on the pricey side. (Canon and Fujinon are two manufacturers I'm aware of that make image-stabilized versions.) Some binoculars can be attached to a camera tripod or parallelogram mount with an L-bracket (\$10-20).

Another downside, at least with conventional binoculars, is that the view is a low-power one. (Quick side note: Binoculars are usually designated using two numbers, such as 10x50. The first number is the magnification – 10 power in this example – and the second number is the diameter of the objective, or front lens, in millimeters.) Don't expect to see a lot of detail on the Moon or much more than a smudge of light when looking at deep sky objects. Planets will typically still be starlike, but Jupiter's Galilean moons can be seen with most binoculars.

Several manufacturers offer so-called giant binoculars, which are designed primarily for astronomy. I own a pair of 10x70 "big" binoculars, which definitely benefit from some kind of external support. Large binoculars like these are fairly heavy and difficult to hold steady for more than a minute or two. But the view is very impressive.

It is possible to get telescope-like views with specialized giant binoculars. A handful of very large astro binoculars have objective diameters in the 85mm to 125mm range, and some even accommodate interchangeable eyepieces. Lunt Engineering, for example, makes a 100mm ED APO version that uses standard 1.25-inch eyepieces. On the very high end, Fujinon still manufactures their gigantic 40x150 binoculars, but last time I checked, they were special-order and very expen-

Continued on Page 4

DAS SCHEDULE

MAY

- | | |
|--------|---|
| 1 | General Meeting at DU's Olin Hall, 7:30 p.m., with <i>Daniel Bisque</i> —See p. 3 for details |
| 8 | E-Board Meeting - At DU's Historic Chamberlin Observatory, 7:30 p.m. |
| 10 -17 | Texas Star Party |
| 15-17 | Dark Sky Weekend - EGK Dark Site & Brooks Observatory |
| 23 | Open House - DU's Historic Chamberlin Observatory - Starts at 8:00 p.m. |
| 31 | Space Day at Denver Museum of Nature and Science, 10 a.m. - 4 p.m. |

Open House costs (non-members): If the skies are clear, \$2/person (\$5/family), \$1/person in inclement weather. DU students with ID free.

Public Nights are held at Chamberlin Observatory on Tuesday and Thursday evenings (except holidays), beginning at the following times:

March 10 - September 30 at 8:30 P.M.

October 1 - March 9 at 7:30 P.M.

Public Night costs (non-members): \$4/adult, \$3/child and students with ID.

Please make reservations via our website (www.denverastro.org) or call (303) 871-5172.

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The Executive Board conducts the business of the DAS at 7:30 p.m., at Chamberlin Observatory.

Please see the Schedule of Events for meeting dates. All members are welcome.
<http://www.denverastro.org>

Volunteer Opportunities

May 9, 9am-3pm: Scout Day at Dinosaur Ridge in Morrison. Cub Scouts and Webelos will be working on obtaining their astronomy badges, and they have asked DAS to coordinate an activity to fulfill one of the requirements. I will send more details, including badge requirements, to those who sign up, and volunteers can brainstorm together on an appropriate activity.

May 31, 10am-4pm: Space Day at the Denver Museum of Nature and Science. We will be conducting solar observing on the West Patio and hosting a table with an interactive activity inside the Space Odyssey exhibit. This event will be on a Free

Sunday, so it will be packed (they are expecting 11,000 visitors!!) and therefore a tremendous outreach opportunity. To avoid parking fiascoes, it is suggested that you arrive no later than 8:30am. When RSVPing, please inform me on whether you are participating in solar observing or manning the table. I will work with those choosing to man the table on devising an appropriate interactive activity. It has been suggested to set up some scopes next to the table and explain to visitors how they work and/or also showing and explaining astrophotography. More details will be sent later to those who RSVP.

Calling all DAS Student Members!

Are you a graduating high school senior or college undergrad majoring in astronomy or a physical science? (If you know a science student in DAS or the Denver area that might qualify, please pass this along.) Did you know that since 1973, DAS has awarded many merit-based scholarships to support top qualified science students?

Our scholarship program is known as the Van Nattan-Hansen Scholarship, after the two DAS members whose families established it. Several past scholarship winners have gone on to professional careers in astronomy or the sciences.

We typically award two \$1,000 scholarships per academic year—this can vary depending on the num-

ber of applicants and their qualifications. You must be enrolled at least half-time in a four-year college or university and majoring in astronomy or a physical science (or if you are a graduating high school senior, intend to declare such a major).

The app deadline is coming up—it's June 15th—and all application materials must be received by mail at the fund's P.O. box by that date. (The June 15th deadline should allow graduating high school seniors to have their school send their final official transcript.) Other information and requirements for applying can be found on our webpage: <http://www.denverastro.org/vannattan.html>. Read the requirements and apply soon!

DAS General Meeting

Friday, May 1st, 7:30pm: Daniel Bisque will be speaking to us about the capabilities of *TheSkyX Professional Edition Astronomy Software* for observatory control, deep space imaging and scientific discovery.

He will also update us on the new additions to the Paramount line of telescope mounts and discuss future product development directions.

The meeting will be held at **DU's Olin Hall, Room 105**, and all present will be invited to a reception following the meeting at DU's Historic Chamberlin Observatory. Coffee and light refreshments will be served.

Thanks to Our Interim Editor

On the behalf of the Denver Astronomical Society, I would like to thank **Bernd Christensen** for all the hard work he put into getting our newsletter's engines running up at speed again, after *The Observer's* long hiatus. It was indeed a formidable effort, especially considering that English is not Bernd's first language.

For myself, the opportunity Bernd gave me to sit in on last month's edition provided the chance to get *my own* engines running up before starting on this issue—and his help after I became editor made my transition much easier. I am in his debt.

—Zachary Singer, *Editor*

DAS Needs Your XP Laptop Computer!

Wanted: A Windows XP laptop to replace the Chamberlin Observatory's telescope computer.

The laptop needs to be good condition, low usage, all components functional. Desirable, but not required, is the presence of a serial port. No software needed, except for an installed, valid copy of Windows XP. (We will clear out any personal data before the computer is put into use.) Note that this can be claimed on your taxes as a donation to a non-profit organization!

Please contact: David Shouldice at davidspixx@yahoo.com

ABOUT THE DAS

Membership in the Denver Astronomical Society is open to anyone wishing to join. The DAS provides trained volunteers who host educational and public outreach events at the University of Denver's Historic Chamberlin Observatory, which the DAS helped place on the National Register of Historic Places. First light at Chamberlin in 1894 was a public night of viewing, a tradition the DAS has helped maintain since its founding in 1952.

The DAS is a long-time member in good standing of the Astronomical League and the International Dark Sky Association. The

DAS's mission is to provide its members a forum for increasing and sharing their knowledge of astronomy, to promote astronomical education to the public, and to preserve Historic Chamberlin Observatory and its telescope in cooperation with the University of Denver.

The DAS is a 501 (c)(3) tax-exempt corporation and has established three tax-deductible funds: the Van Nattan-Hansen Scholarship Fund, the DAS General Fund, and the Edmund G. Kline Dark Site Fund.

More information about DAS activities and

membership benefits is available on the DAS website at www.denverastro.org.



President's Message Continued from Page 2

sive.

If you're interested in learning more about astronomy using binoculars, the following books are good references:

Astronomy with Binoculars, by James Muirden, © 1963, 1976, 1979, 1984; Arco Publishing, ISBN 0-668-05832-3

Touring the Universe Through Binoculars, by Philip S. Harrington, © 1990, John Wiley & Sons, ISBN 0-471-51337-7

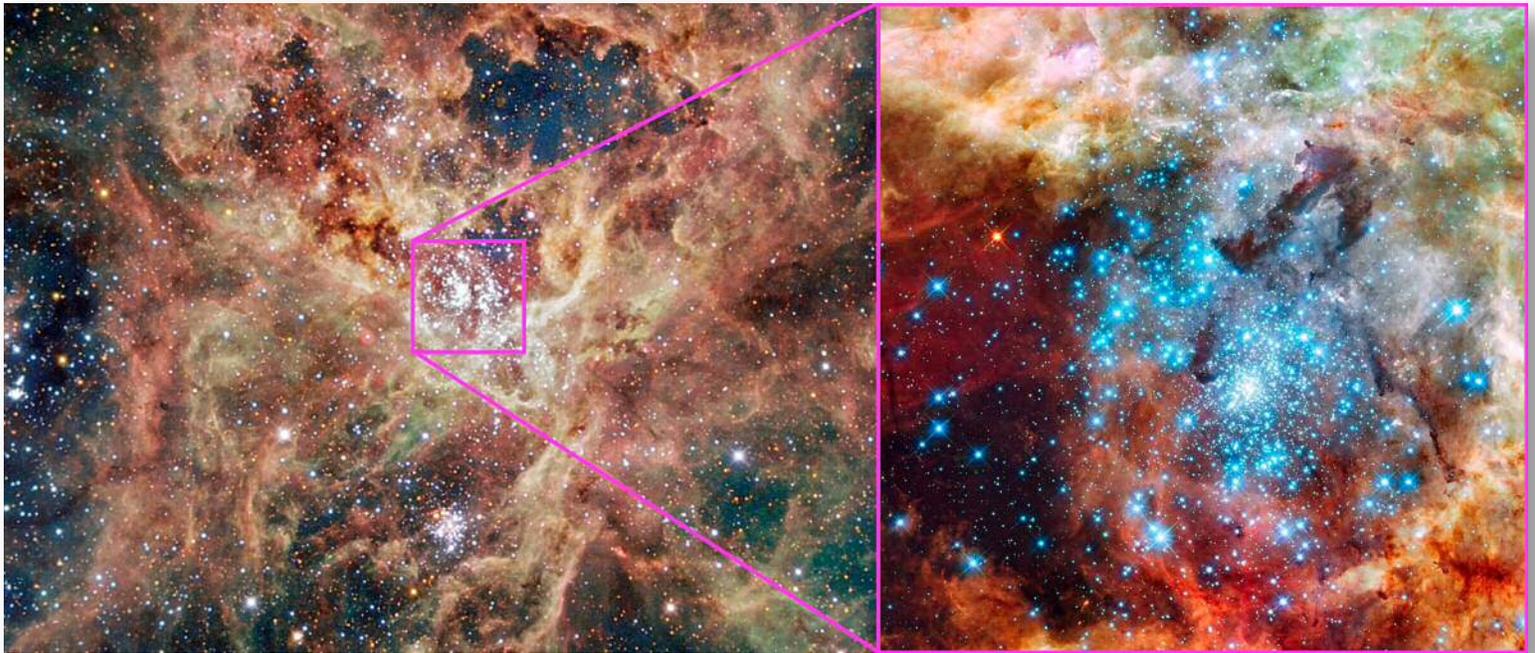
Binocular Astronomy, by Craig Crossen & Wil Tirion, © 1992, Willmann-Bell, Inc., ISBN 0-943396-36-0

Sky & Telescope magazine includes a column each month by Gary Seronik titled "Binocular Highlight." The column can be found in the middle of the magazine, on the same page with the monthly sky map. A few years ago, Seronik wrote a book featuring 99 binocular favorites. I have a copy, and definitely recommend it to those who are interested in binocular astronomy: *Binocular Highlights* by Gary Seronik, © 2006, New Track Media LLC, Sky Publishing, ISBN-13: 978-1-931559-43-0.

The bottom line? If you're new to the hobby, don't rule out binoculars. If you're a veteran amateur astronomer and have not yet taken advantage of binocular observing, give it a try. I think you'll like what you see.

*NASA's Space Place***Is the Most Massive Star Still Alive?**

By Ethan Siegel

A Space Place Partners' article

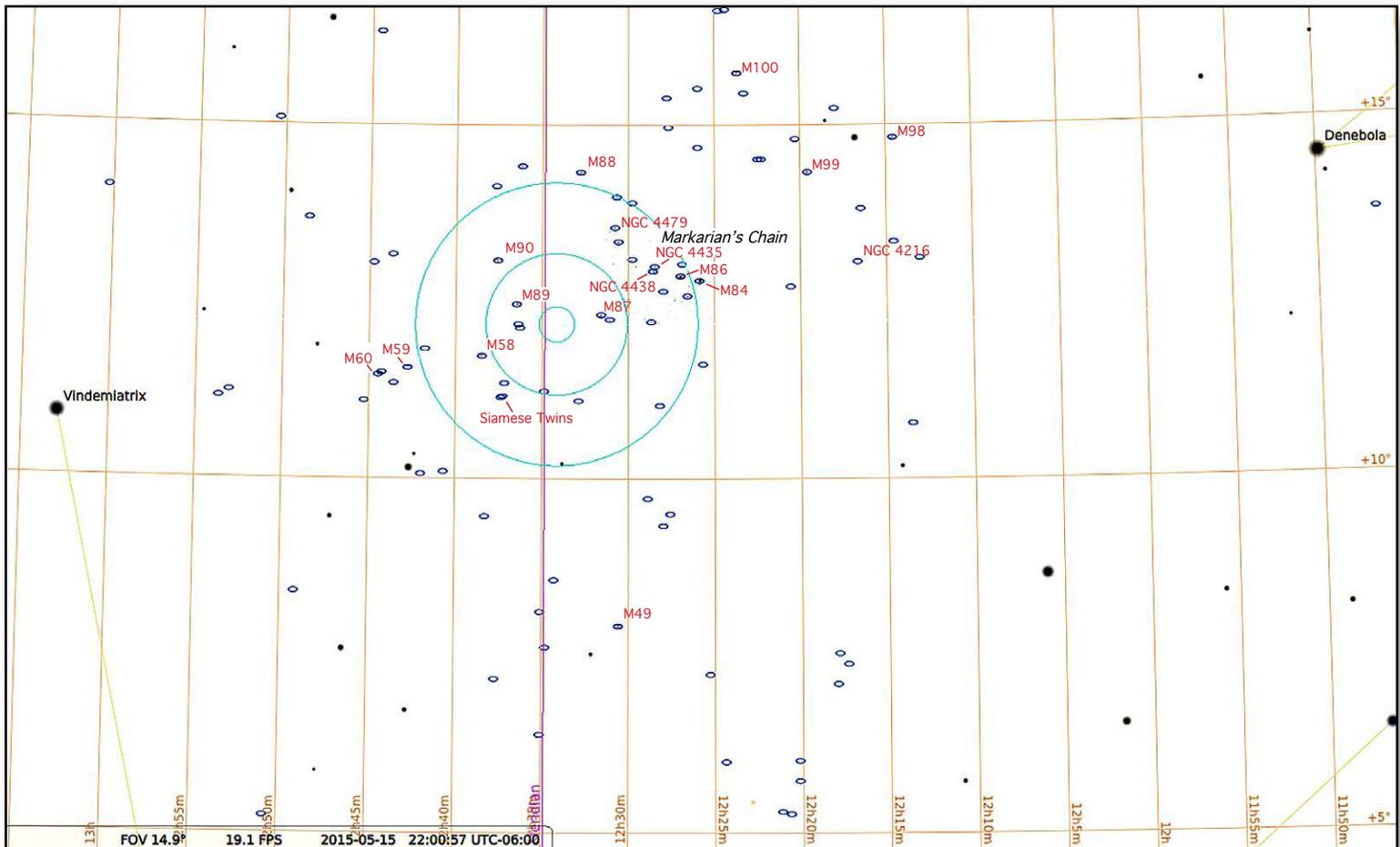
Images credit: ESO/IDA/Danish 1.5 m/R. Gendler, C. C. Thöne, C. Féron, and J.-E. Ovaldsen (L), of the giant star-forming Tarantula Nebula in the Large Magellanic Cloud; NASA, ESA, and E. Sabbi (ESA/STScI), with acknowledgment to R. O'Connell (University of Virginia) and the Wide Field Camera 3 Science Oversight Committee (R), of the central merging star cluster NGC 2070, containing the enormous R136a1 at the center.

The brilliant specks of light twinkling in the night sky, with more and more visible under darker skies and with larger telescope apertures, each have their own story to tell. In general, a star's color correlates very well with its mass and its total lifetime, with the bluest stars representing the hottest, most massive and shortest-lived stars in the universe. Even though they contain the most fuel overall, their cores achieve incredibly high temperatures, meaning they burn through their fuel the fastest, in only a few million years instead of roughly ten billion like our sun.

Because of this, it's only the youngest of all star clusters that contain the hottest, bluest stars, and so if we want to find the most massive stars in the universe, we have to look to the largest regions of space that are actively forming them right now. In our local group of galaxies, that region doesn't belong to the giants, the Milky Way or Andromeda, but to the Large Magellanic Cloud (LMC), a small, satellite galaxy (and fourth-largest in the local group) located 170,000 light years distant.

Despite containing only one percent of the mass of our galaxy, the LMC contains the Tarantula Nebula (30 Doradus), a star-forming nebula approximately 1,000 light years in size, or roughly seven percent of the galaxy itself. You'll have to be south of the Tropic of Cancer to observe it, but if you can locate it, its center contains the super star cluster NGC 2070, holding more than 500,000 unique stars, including many hundreds of spectacular, bright blue ones. With a maximum age of two million years, the stars in this cluster are some of the youngest and most massive ever found.

At the center of NGC 2070 is a very compact concentration of stars known as R136, which is responsible for most of the light illuminating the entire Tarantula Nebula. Consisting of no less than 72 O-class and Wolf-Rayet stars within just 20 arc seconds of one another, the most massive is R136a1, with 260 times the sun's mass and a luminosity that outshines us by a factor of seven million. Since the light has to travel 170,000 light years to reach us, it's quite possible that this star has already died in a spectacular supernova, and might not even exist any longer! The next time you get a good glimpse of the southern skies, look for the most massive star in the universe, and ponder that it might not even still be alive.

MAY SKIES *Continued from Page 1*

Map of the Virgo Cluster: Note Denebola (Beta Leonis) at top right, Vindematrix (Epsilon Virginis) at left. This view will be *due south* and about 60° up, at 11 p.m. on May 1st, and 10 p.m. mid-month. By May 31st, it will be about 15° farther west at 10 p.m., but still in the last glow of astronomical twilight. The circles near the chart's center show a telrad's coverage, with 1/2°, 2°, and 4° circles. Chart produced with Stellarium software under GNU license and then optimized in Photoshop.

bright star in the triangle of Leo the Lion's haunches), is the Virgo Cluster of galaxies. This vast horde is lorded over by the M84, 86 and 87 trio of elliptical galaxies, but there are many, many more in the area and a good star chart will be a great help here. If you have a *Peterson Field Guide to the Stars and Planets* (Menzel and Pasachoff), look on p. 262 for a detailed map of the Virgo Cluster, centering around those ellipticals at 12h 20-30m, +13°. If you don't have it, there are other charts—and nowadays, excellent sky-charting software is available for your smartphone, too.

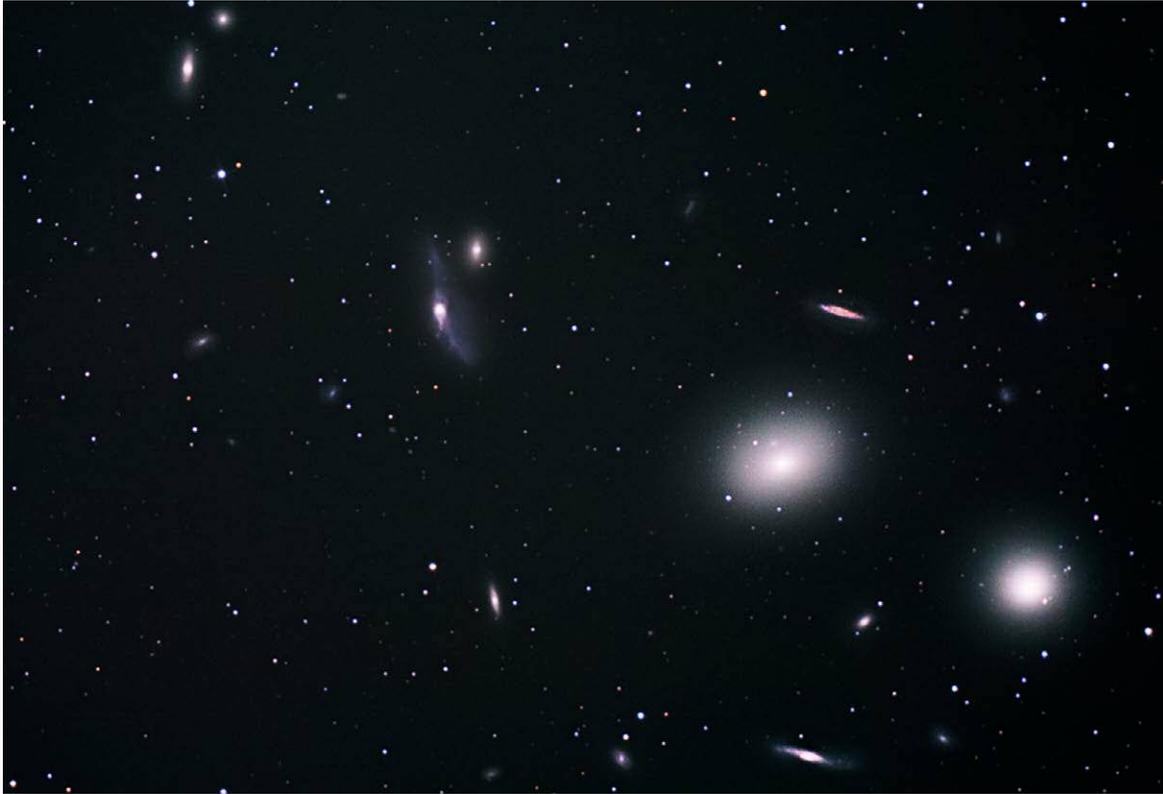
M84 and 86 can be seen together within a moderate-power telescope field, being less than 1/3-degree apart, but the beauty of the view is that they're not alone—another Virgo Cluster galaxy lies just south, as well as a dimmer fourth companion in the middle. If you have a wider field of view, though, the party really begins; M84 and 86 are joined by bright galaxies to the east—like M84 and 86, they're part of Markarian's Chain, a grouping of galaxies within the Virgo Cluster (seven of which are thought to be related). Within a 1° field, you can see M84, M86, NGC 4435, NGC 4438—all members of the chain. An eastward hop moves M84 out of view and brings in new galaxies; after that, a hop northeast brings you out of the chain at M88.

From here, you can move straight south ("downward," towards the ground) a short distance, until the giant elliptical galaxy M87 comes into view. It's a fascinating object to learn about on its own (a Google search for "M87 galaxy" will bring you quick rewards), and it serves as

a gateway to hopping to other parts of the Virgo Cluster.

Here's something for advanced observers—a relatively bright asteroid (magnitude 9.1) moving through the skies fast enough that one might notice a position shift in a few hours. This is Herculina, number 532, cutting across the constellation Serpens. The *May Astronomy*, p. 43, suggests looking on the 4th, 10th, and 21st, when Herculina is near enough to a star to notice the relative motion. At 10 p.m. on these nights (a good time to start), you'll find the asteroid at 16h 8m, +1° 55' on the 4th; 16h 3m, +1° 55' on the 10th; and 15h 53m, +1° 34' on the 21st (coordinates from SkySafari software).

Because most surrounding stars will be dim, navigation may be difficult, but there will be a little help: On the 10th, look for IC 1518, a magnitude 12.6 galaxy, under dark skies. If you can see it, placing the galaxy in the southwest corner of a 1/2-degree field will then include our asteroid and a slightly dimmer 9.72-mag reference star at the opposite, or northeast, edge of the view. On the 21st, Herculina will be 3/4° southeast of 5.2-mag Omega Serpentis (34 Ser on some maps). This star is visible in a 6x30 finderscope, and when placed about 1/3 of the way from the finder's central crosshair to the northwestern edge, it should roughly locate Herculina in a low-power telescope view. If you don't have computerized gear, you can star-hop from Alpha Serpentis (a bright star also known as "α Ser" or "Unukalhai") southeast to Epsilon Serpentis (aka "ε Ser"), and from there south, straight to Omega. Good luck!



Markarian's Chain, a part of the Virgo Cluster (see "May Skies"). Image exposed with Canon 450D through AstroTech AT8IN f/4 imaging Newtonian; 90 minutes of RGB, processed with Nebulosity 3.1 and Photoshop CS5.

Image © Darrell Dodge



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