FLINT RIVER OBSERVER

NEWSLETTER OF THE FLINT RIVER ASTRONOMY CLUB

An Affiliate of the Astronomical League

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Please notify **Bill Warren** promptly if you have a change of home address, telephone no. or e-mail address, or if you fail to receive your monthly *Observer* or quarterly *Reflector* from the A. L.

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Club Calendar. Fri.-Sat., Mar. 24-25: JKWMA observings (at dark); **Thurs., Apr. 13:** FRAC meeting (7:30 p.m. at The Garden in Griffin, with lunar & planetary observing before and afterward); **Fri., Apr. 14:** Rock Springs Christian Academy observing (Milner, Ga., 8:30 p.m.); **Fri.-Sat., Apr. 28-29:** JKWMA observings (at dark).

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President's Message. I joined FRAC in Oct., 2007. I thought I knew a little about astronomy, and it didn't take long for me to find out how right I was. Here are some things I've learned since then:

*You can learn more by listening than by talking. You can't be around our members at meetings and observings without learning more about astronomy.

*When I joined FRAC, they said that no matter what problems I was having with my telescope, equipment or observing, there were members who wanted to help me. It was true then, and it's true now, ten years later. Help is available when I need it. All I have to do is ask for it.

*Getting involved in public observings was an important step for me.

As a beginner, I didn't have much confidence in showing people the sky or talking about astronomy, but in those peoples' eyes I was an expert. Members told me what to show, how to find it and what to say about it. **Larry Higgins** said, *All you need to tell them is a couple of things, because that's all they can understand.* And he was right.

I remember coming home after one observing and telling **Betty,** "That was fun! I'm getting pretty good at this. I guess I really *am* an expert astronomer!" She said, "That's nice, dear. The garbage needs taking out."

To me, public observing isn't so much about teaching as it is seeing people get excited about things in the sky that they never knew were there and will never see that way again.

Joining FRAC was one of the best decisions I ever made. I've enjoyed meeting people, making new friends and talking with them about astronomy. I'm constantly amazed at how much pleasure that $15 a year brings me.

I hope you feel the same way.

In closing, here's a **Welcome to FRAC!** to our newest FRAC family: **Sean, Chelsea, Isabella & Gianna Neckel** of Fayetteville, GA.

-Dwight Harness

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Last Month's Meeting/Activities. We had 13 attendees at our February JKWMA observings: **Steve Hollander, yr. editor** and visitor **Sean Neckel** (both nights); **Dwight Harness** (Fri. night);

and **Carlos Flores, Felix Luciano, Alan Pryor, Erik Erikson,** and **Alan Rutter** and his guest **Tony Gonzales** on Sat. night. Except for a 30-min. stretch on Fri., both nights were as clear as a parson's conscience and we took full advantage of it. We socialized, of course; that's an inevitable outcome of FRAC members getting together. But it was heartening to see so many people actively involved in photographic or observing projects.

We had 22 members (including **Sean & Gianna Neckel**, who joined that night) and one visitor – **Mark Grizzaffi** --at our March meeting. Members present included: **Dwight Harness; Steve Benton; Carlos Flores; Joe Auriemma; Tom Moore; David Haire; Alan Pryor; Dan Pillatzki; Jeremy, Sarah, Emily & Delilah Milligan; Felix Luciano; Kenneth & Marjorie Olson; Alan Rutter; Erik Erikson; Steve Hollander; Cindy Barton;** and **Aaron Calhoun.** Our speaker, **Bill Warren** was under the weather and couldn't attend the meeting, so we watched a dvd, "The Sombrero Galaxy – An Island Universe."

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This 'n That. The March (Spring) issue of the *Reflector* has arrived. Let **Bill Warren** know if you haven't received your copy by the time you're reading this. (Incidentally, you can receive the *Reflector* via e-mail rather than hard copy; if you'd like to receive it that way, let Bill know. Or, you can contact **Mitch Glaze** at www.astroleague.org. Be sure to mention that you're a member of the Flint River Astronomy Club.

Also, our 2017 A. L. dues are up for repayment in May, so if you haven't already paid and want to continue receiving the *Observer*, please send your $15 check (payable to FRAC) to: **Bill Warren, 1212 Everee Inn Rd., Griffin, GA 30224.**

*****Oxymorons are terms that have contradictory meanings, like jumbo shrimp, working vacation and science fiction. As editor **Peter Tyson** notes in the March issue of *Sky & Telescope* (p. 4), astronomy has its share of oxymorons, too. (The comments in parentheses are ours, not his.)

Dwarf galaxy. (How can a galaxy that is thousands of light-years wide and contains millions or billions of stars be a "dwarf"?);

Binary star. ((Doesn't binary mean "two"?);

Star cloud. (Does **M24,** the **Sagittarius Star Cloud,** contain just one star?);

Geostationary orbit. (Geostationary satellites move at the same speed at which Earth is rotating; are they orbiting our planet if they're always in the same place?);

Planisphere. (The roots of this word mean "plane" and "sphere." Can a flat plane figure be a sphere?); and finally,

Heavy elements. (How can elements that comprise atoms be "heavy"?)

Tyson's final thoughts regarding such astronomical oxymorons: "Awfully good, aren't they?...At least, that's my unbiased opinion." (Can an opinion be anything other than biased?)

Come to think of it, FRAC has a few oxymorons, too: **Tom Moore, Dan Pillatzki & Bill Warren** breathe *oxy*gen, and the rest of the word describes them perfectly. (We'd have added **Dwight Harness** to that list, but Dwight is holding his breath to show everyone that he's no oxygen-breathing moron.)

***Why do lunar eclipses last longer than solar eclipses?** Although the **Moon** and the **Sun** are roughly the same size from our perspective, the **Earth** is much larger than the Moon. So while a total solar eclipse can last a maximum of 7-1/2 minutes before the Moon begins to move out from in front of the Sun, Earth's shadow in a total lunar eclipse can block sunlight from the Moon's surface for as long as 1 hour and 47 minutes.

***What is the brightest comet in the past 25 years?** In terms of naked-eye longevity, **Comet Hale-Bopp** takes the prize. Shining brightly at mag. 0, it was visible to the unaided eye for 18 months, from May, 1996 through Dec., 1997. Until Hale-Bopp's arrival, the longest that any comet in recorded history remained visible to naked-eye viewing was nine months (**The Great Comet of 1811**). In both cases, their remarkable periods of naked-eye visibility were due to their unique angles of approach to and departure from the **Sun** as seen from Earth.

Hale-Bopp was the 3rd-brightest comet in the 20th century, surpassed only by **Comet Ikeya-Seki** (1996) and **Comet West** (1975). It has been estimated that 1/6th of all humans on earth saw Comet Hale-Bopp.

In March, 1997, 39 members of Heaven's Gate, a religious cult in California, committed mass suicide because they believed that an alien spacecraft was hiding behind the comet. The cult's leader, **Marshall Applewhite**, convinced his followers that, after their deaths, their souls would be transported to heaven by the UFO.

***How thick are Saturn's rings?** The ring system is 170,000 mi. in diameter, but just 30 yards thick. (A few of the moonlets in the rings are larger than that.)

***What object in the solar system reflects the highest percentage of sunlight that reaches it? Saturn's** icy moon **Enceladus** reflects 90% of the sunlight it receives. (The term for an object's reflectivity is *albedo*.) The darker an object is, the less sunlight its surface will reflect and the lower its albedo will be. **Earth's** surface, which is 71% dark oceans, reflects 29% of the sunlight it receives.

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Upcoming Meetings/Activities. We'll have JKWMA observings on **Fri.-Sat., Mar. 24th-25th**. The gate will be locked when the first member arrives. If you don't know the combination, call **Dwight** at 770-227-9321. Then close (but don't lock) the gate behind you.

Later, when you leave, close the gate behind you. The last person to leave should lock the combination lock to the other lock, not the chain.

Our club meeting will be at The Garden in Griffin at 7:30 p.m. on **Thurs., Apr. 13th**, with public lunar & planetary observing before the meeting (7:00 p.m.) and afterward. Our proram will be **Bill Warren's** powerpoint presentation, "Finding the Virgo-Coma Messiers," postponed from the March meeting.

The next evening, on **Fri., Apr. 14th**, we'll show the sky to students at Rock Springs Christian Academy in Milner, Ga. The observing will begin at 8:30 p.m. (The rainout date is **Tues., May 9th**, same time, same place.)

To get to the school from Griffin, start at KFC at the intersection of Hill St. and Taylor St./Ga. 16. Go E (toward Jackson, Ga.) on Hwy. 16 for 6.2 mi., and turn right at the stoplight at High Falls Rd. Go 1.4 mi., and bear right to stay on High Falls Rd. Go 2.7 mi., and turn left to follow High Falls Rd. Then go 0.4 mi. and turn right onto Rock Springs Rd. The school will be on the right, 0.6 mi. ahead at the far end of Rock Springs Church.

To return to Griffin, go left out of the parking lot. Go 0.6 mi., and turn left at the dead end stop sign. Go 0.4 mi., and turn right. Go 2.7 mi., and go left at the stop sign. Go 1.4 mi., and turn left onto Ga. 16W (A. K. Bolton Pkwy.) to Griffin.

The G.P.S. coordinates for Rock Springs Christian Academy are: 33^o 11' 30.33N, 84^o 6' 18.68W; or, 33.191722, 84.10517. (Thanks to **Tom Moore** for that information.)

Our April JKWMA observings will be on **Fri.-Sat., Apr. 28th-29th.** The gate rules will still apply.

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The Sky in April. Bright **Mercury** (mag. -0.2) will be about an outspread thumb-to-pinky-width held against the sky above the W horizon 90 min. after sunset on April 1st. A week later, it will be less than a fist-width above the horizon 45 min. after sundown. Mercury will drop below the horizon a few days later, and will reappear in the E morning sky in May.

Also in the W sky, **Mars** (mag. 1.5) will be an average of an extended index finger-to-pinky-width above the horizon at sunset throughout the month. Between Apr. 18th-22nd, Mars will be less than 4^o from the **Pleiades**.

Jupiter (mag. -2.5) will be up all night in April. **Saturn** (mag. 0.3) and **Venus** (mag. -4.2) will be visible in the eastern pre-dawn sky.

There is good news and bad news about virtually everything in astronomy. Here's an example:

The Good News is that **Comet 41P/Tuttle-Giacobini-Kresak** will be up all night in April, its brightness possibly approaching naked-eye visibility at JKWMA during the last half of the month when the **Moon** will not interfere. Even if 41P doesn't reach naked-eye brightness, it certainly will be 7th-mag. or brighter, offering spectacular views in binoculars or a telescope.

The Bad News: 41P will be located near the head of *Draco the Dragon*, a faint constellation high in the northern sky above the sky glow of Atlanta. But you absolutely *don't* want to miss such a potentially bright comet, so here's an observing tip: *Stand on the S side of trees or a building that*

blocks Atlanta's sky glow. (Your house should do nicely.)

41P will be a small – but bright – green, tailless comet. It returns approximately every 6.5 years. For finder charts, Google "Comet 41P in April 2017."

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Calhoun's Corner: The Virgo Supercluster

article by Aaron Calhoun

In the Dec., 2015 issue of *Astronomy* (p. 15), **Sarah Scoles** described in just 13 words how gravity affects stars: "Stars cluster in galaxies, galaxies cluster in clusters, and clusters cluster in superclusters." Our **Sun** is part of the **Milky Way** galaxy, which is part of the **Local Group** galaxy cluster. The Local Group is a tiny part of the **Virgo Supercluster**. All of the stars and galaxies in each group are traveling through space together at the same speed, like passengers on Amtrak. The Virgo Supercluster is the train, racing through space like – well, like a runaway passenger train. The galaxy clusters are its cars, and the individual galaxies are the passengers. The cells in the passengers' bodies are the stars. (On that scale, you and I would be smaller than the electrons in the atoms that comprise the cells.)

The Milky Way is 150,000 light-years in diameter, and contains 400 billion stars.

The Local Group contains about 85 galaxies, most of them dwarf galaxies. It is 10 million light-years wide, and its largest members are **Andromeda Galaxy (M31),** the **Milky Way** and **Pinwheel Galaxy (M33).**

At 110 million light-years in diameter, the Virgo Supercluster is as large 733 Milky Way galaxies placed side-by-side. It contains 100,000 galaxies with a total mass of 10 quintillion Suns. (That's a 10 with eighteen zeros after it.) It is called the Virgo Supercluster because from where we are located, its center is in the constellation *Virgo*.

The Milky Way is located 60 million light-years from the center of the Virgo Supercluster, a little more than halfway between the center and the outer edge.

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Collimating Your Primary Mirror

tech article by Bill Warren

Few tasks are more daunting to beginning stargazers than collimating their telescopes. Why? Because the instructions that come with a new telescope, or the directions you find by Googling "collimation," are invariably – and unnecessarily – complicated. Few "experts" can resist the temptation to show off how much they know. The quick and easy way to learn how to collimate your telescope is to have an experienced observer guide you through the process.

Collimation refers to aligning the 'scope's optics – mirrors and eyepieces – to assure that light travels along its intended path through the tube without losing any light in the process. It's not difficult to do – but it *is* important.

The first good news here is, *If you have a refractor, or a Schmidt-Cassegrain or Maksutov telescope, you won't have to collimate it at all.* The optics were aligned and sealed in place at the factory, so no adjustments will be necessary.

It's a different story with reflecting telescopes, however. Reflectors contain a concave *primary mirror* at the closed end that reflects incoming light back to a smaller, flat *secondary mirror* located near the open end. The secondary mirror is angled to divert the light from the primary mirror out the side of the tube to the eyepiece.

The primary mirror cell is not sealed: it is held in place by spring-loaded knobs, bolts or screws. As a result, the mirror cell can be jostled out of alignment through rough treatment or even traveling over a bumpy road. When that happens, the light is diverted away from its intended path. Objects will not be located where your Telrad or finder shows them to be, double stars will blur into single stars, and stars along the outer perimeter of your field of view (FOV) may appear as elongated hyphens, not points of light. The solution is to adjust the primary mirror by tightening or loosening the collimation knobs on the mirror cell to send the light where it's supposed to be going. (They are *not* the same bolts that anchor the mirror to the tube!)

With an exception that will be discussed later, collimating the primary mirror of a large reflector is easier if two people do it – one at the eyepiece to monitor and direct the adjustments, and one to turn the collimating knobs.

Primary mirrors are far more prone to becoming misaligned than secondary mirrors are. But the second good news is, collimation is an infinitely easier task than the instruction booklets make it out to be.

Question: *How do you know if your primary mirror needs collimation?* Pick a bright star that is high overhead. Center it in your finderscope or Telrad. Then look in the eyepiece. If the star isn't there – or if it's not centered in the FOV -- either your telescope or your finder is out of collimation. Find the star, center it in your eyepiece FOV, and use the adjustment knobs on the finder to center the star in the finder. (They are the same type of adjustments you'll make with the primary mirror cell.)

Then select a bright star that is lower in the sky. Your finder is collimated now, so if the star isn't in your eyepiece, your primary mirror is out of collimation.

In my case, I always assume that my 'scope and Telrad are out of collimation, so I check their collimation and make the necessary corrections as soon as I finish setting up the telescope.

You need two things in order to collimate your primary mirror. First, you need a small dot or circle on the primary mirror that marks the center. If it's there, you'll see it when you look at the mirror through the open end of your 'scope. Most reflectors come with the center marked; mine has a little triangle. If yours doesn't have the center marked, we can tell you how to add one yourself.

Some observers whose 'scopes didn't come with the center point marked put a little notebook reinforcement circle on their primary mirror. Call it a doughnut. For our purposes, from here on I'll refer to the dot marking the center point as a doughnut. That way, it won't be confused with the dot produced by the hole in the collimation cap. (See below.)

The other thing you need is a collimation cap. It fits snugly into the focuser and has a tiny peephole in the center. A collimation cap usually comes with the other accessories you get with a new reflecting telescope, but if you don't have one you can order a Telescope Alignment Eyepiece from Rigel Systems for $5.99 + shipping & handling. (Back in the old days, **Larry Higgins** and I punched little holes in film canisters.)

When you insert the collimation cap in the focuser, you'll see several things reflected in the primary mirror, including the central hub that houses the secondary mirror, the four thin spider vanes that hold the hub in place, and the underside of the collimation cap with its hole appearing as a black dot on the mirror. You'll also see the doughnut that marks the center of the mirror. Your goal is to adjust the tilt of the primary mirror (if necessary) by turning the collimation knobs at the back end of the telescope, until the dot is centered in the doughnut.

Pick one of the knobs; which one doesn't matter. Turn it, and note which way the dot moves across the mirror. If it moves closer to the doughnut, keep turning that way. If it moves farther away, turn the knob in the other direction. And if the dot moves diagonally relative to the doughnut, move it as close as you can to the doughnut and go to another knob. (Again, which one doesn't matter.) Repeat the process with that knob until you can't get the dot any closer to the doughnut, then go either to the third knob or back to the first one. Trial-and-error will tell you which knob(s) will move the dot inside the doughnut. When it's there, your primary mirror is collimated. (Use the same procedure to collimate your finderscope or Telrad.)

There are two alternatives to a collimation cap. First, there is the *laser collimator*. Truth is, though, you don't need one unless you're fascinated by laser beams. Your collimation cap will do the job just as well. (The Orion LaserMate Deluxe II Laser Collimator I bought for $69.95 was a thorn in my side. It features a beveled "rear view" port that permitted me to collimate my 'scope from behind the telescope -- which was nice. But it doesn't fit snugly into the focuser the way eyepieces do, so I had to maneuver the laser beam into position on the doughnut and lock it into place before I began the collimation process.)

The other alternative is the Cheshire collimating eyepiece – a 5-in. tube that fits snugly into the focuser, with a peephole at one end and crosshairs at the other end. Move the crosshairs around in the manner previously described until the doughnut is centered in the crosshairs, and the primary mirror is collimated. You can buy a Cheshire at amazon.com

for about $20, but a collimation cap is less expensive and works just as well.

I don't know whether Orion's Cheshire-type Collimating Eyepiece has the built-in defect that its laser collimator has – but I wouldn't pay $49.95 to find out.

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The Professor Exercises His Tech Skills

As long-time readers know, **Prof. Theophilus** (pronounced: The Awfulest) **Stargazer** is a shady character whose pockets usually are filled with the contents of other people's pockets. Nevertheless, Prof. Stargazer is also the world's greatest living authority on astronomy, cosmology, astrophysics and interior decoration. (The walls of his den are papered with Wanted posters and unpaid traffic tickets.) His latest book, *I.O.U.'s for Fun and Profit*, was released the same day he was from the county jail.

When a group of FRACsters talked with the professor recently, his face took on the kind of woeful expression that he normally reserves for occasions when the judge sentences him to thirty days. We had asked him if he had done any stargazing lately.

"I was planning to do a bit of observing at home about a month and a half ago," he said, "but something came up." His frown deepened. "Actually, you might say that something went down."

"What do you mean?," **Sean Neckel** asked.

"I hadn't collimated my Newtonian reflector in sixteen years," the professor replied, "so I decided that the primary mirror might need a tweak or two. I loosened one of the bolts. Nothing happened, so I loosened another one. Nothing. I tried the third bolt, and the mirror fell out! It landed on my foot – *ouch!* -- then toppled over face-down and shattered on the concrete floor of my garage.

"No bones were broken, but I can't say the same for the mirror.

"My wife came running when she heard me scream. I had just bought a new life insurance policy, and she seemed disappointed that I wasn't having a heart attack. But she was sympathetic, encouraging and positive. She said, 'Look at the bright side: at least it didn't fall on the cat!'"

"What did you do when the mirror broke?," **Steve Bentley** asked.

"I did what any sane person would have done: I cried like a baby. Finally, I wiped away the tears and decided to find out what went wrong. I looked at the back of the 'scope and saw three other bolts. I wondered if those were the ones I should have turned.

"Next, I applied my massive intellectual and tech skills to fixing the 'scope.

"I gathered the pieces of the mirror and painstakingly assembled them into a circle on the garage floor. It was like putting a 2,000-piece jigsaw puzzle together, and it took me a month to do it. Then I bought about a gallon of Super Glue and carefully transferred the pieces to the mirror cell and glued them into place."

"How did that work out?," **Jim Roberts** asked.

"Surprisingly well," the kindly old gentleman replied. "I got Super Glue all over my fingers and the pieces of the mirror. But I finally managed to get my fingers separated, and the Super Glue gives objects a lovely, nebulous look.

"Of course, not everything fit together precisely, and when I was finished there were several hundred little pieces left over. By and large, though, I think I did a good job under the circumstances. There are a lot of gaps in the mirror, but I like to think of the large gaps as dark nebulas and the small gaps as black holes.

"So my hard work paid off, after all. In fact, you might say that I've invented a new type of telescope: the *kaleidotelescope*."

Alan Rutter fidgeted around nervously before asking, "Pardon me, Professor, but wouldn't it have been easier to buy a new mirror?"

"Hmmmm," the professor mused, scratching his chin. "I hadn't thought of that."

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Next Page, Upper Left Corner: M8 (Lagoon Nebula), an emission nebula and open cluster in *Sagittarius*. Photo by **Vencislav Krumov**. **Lagoon Nebula** is a universal favorite that ranks high on every observer's list of objects to return to time and again. It is large, and bright enough to be seen naked-eye on a clear evening as a hazy smudge about 6^{o} N of the Teapot's spout.

Telescopically, **M8** is a delightful combination of bright and dark nebulosities. (Re the latter: it contains three dark nebulas cataloged by **E. E. Barnard: B88, B89** and **B296.** B88, the largest of the three, forms the "lagoon" that bisects the nebula N-S into two lobes.)

Lagoon Nebula contains a brightly compact open cluster of about 30 stars, **NGC 6530**, that would be lovely even without the nebulosity.

Another well-known Messier object, **M8 (Trifid Nebula),** lies about 2^{o} NW of the Lagoon. It resembles a 3-lobed piece of popcorn, but does not appear in Venci's photo.

(Venci submitted his photo last summer but **yr. bumbling, stumbling, fumbling editor** misplaced it, forgot about it and then found it eight months later.)

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Above: Tarantula Nebula in *Dorado*. Remote image by **Alan Pryor**, using a 20-in. 'scope in Australia.

Discovered by **Nicolas de Lacaille** during a trip to South Africa around 1751, this large and lovely emission nebula is located in the **Large Magellanic Cloud**, a dwarf galaxy in the Local Group. *(Another oxymoron?: a "large" dwarf galaxy?)* It cannot be seen from the northern hemisphere.

At mag. 8, **Tarantula Nebula** is extremely bright, considering that it lies 160,000 light-years away. If it were as close as **Orion Nebula** (which is 100 times nearer to us), the Tarantula would be bright enough to cast shadows.

Open cluster **NGC 2070** lies at the center of the nebula. As Alan's incredible photo shows, several other star clusters are located in the nebulosity.

On Feb. 23, 1987, observers at the Las Campanas Observatory in Chile witnessed a supernova explosion taking place on the outskirts of Tarantula Nebula. **Supernova 1987A** was the closest supernova observed since the invention of the telescope. It reached mag. 3 in brightness, and remained visible naked-eye at night to observers in the southern hemisphere for several months.

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Above: Horsehead Nebula (Barnard 33) in *Orion*. Photo by **Vencislav Krumov**. This well-known but elusive little dark nebula is located about $½^{o}$ S of **Alnitak (Zeta Orion)**, the easternmost of the three bright stars that comprise **Orion's Belt**. **Horsehead Nebula** appears in Venci's lovely photo as a small, very dark notch in the pink thread of nebulosity known as **IC 434**.

Although the Horsehead photographs well, it cannot be seen visually except in 12-in. 'scopes or larger with an h-Beta filter under excellent sky conditions. Even then, it is extremely challenging and best seen (if at all) by averted vision.

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Below: Barnard 29, LDNs 1522 & 1523 and **Doboshi 4390**, dark nebulas in *Auriga*. Photo by **Felix Luciano**, who writes, "This is one of my images from Sat. night at Joe Kurtz. Besides the dark nebulas, there is some dust extending to the lower left corner of the image. I really enjoy imaging those Barnard dark nebulas, and any others for that matter."

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Above: NGC 2683 (UFO Galaxy, an edge-on spiral galaxy in *Lynx)*. Photo by **Alan Pryor**. **Yr. editor** described this Herschel 400 galaxy as follows: "Incredibly beautiful, sharply outlined at low power but loses detail at medium power. A slender shaft of light with a faint star at the NE end. I saw it fully only by averted vision; direct vision lost much of the ends. I didn't see the dusty features."

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Below: IC 417, an emission nebula in *Auriga*. Although undeniably beautiful in **Alan Pryor's** photo, **IC 417** is likely to be a visual no-show unless the sky is extraordinarily clear and you're using an O-III or narrowband nebula filter with a very large telescope.

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Above: Rosette Nebula, an emission nebula **(NGCs 2237-39, NGC 2246)** and open cluster **(NGC 2244)** in *Monoceros*. Photo by **Felix Luciano. Rosette Nebula** is both a dreamscape and a nightmare. It is breath-takingly beautiful – especially in photographs – and the roughly 3 dozen stars in **NGC 2244** are bright enough to be seen as a faint blur on a clear, dark night at JKWMA.

The Rosette is by far the largest annular (ring-shaped) nebula in the night sky: it covers an area four times as large as the **Moon**! But its size works against it because it won't fit inside the FOV of ordinary telescopes. The nebulosity is apparent in any telescope, but to see the whole thing you need a rich-field telescope or binoculars. (An O-III or narrowband nebula filter brings out additional details. For binocs, just hold the filter over one of the eyepieces.)

Rosette Nebula is 4,900 light-years away; it spans 90 l.y., and the central cavity that gives it its doughnut shape comprises 1/3 of its total area.

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Above: The Moon, two views. The upper photo was made by **Felix Luciano** at his home in Clayton Co.)**.** The lower photo was made by **Vencislav Krumov** at the Dead Sea in Jordan.

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Space is big. Really big. You just won't believe how vastly, hugely, mind-bogglingly big it is. I mean, you may think it's a long way down the road to (the drugstore), but that's just peanuts to space.

-Douglas Adams
The Hitchhiker's Guide to the Galaxy (1979)

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