THE FLINT RIVER OBSERVER

NEWSLETTER OF THE FLINT RIVER ASTRONOMY CLUB

An Affiliate of the Astronomical League

Vol. 21, No. 3 May, 2018

Officers: President, **Dwight Harness** (1770 Hollonville Rd., Brooks, Ga. 30205, 770-227-9321, rdharness@yahoo.com); Vice President, **Bill Warren (**1212 Everee Inn Rd., Griffin, Ga. 30224, warren7804@bellsouth.net); Secretary, **Carlos Flores**; Treasurer, **Jeremy Milligan**.

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Club mailing address: 1212 Everee Inn Rd., Griffin, GA 30224. FRAC web site: www.flintriverastronomy.org.

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. Thurs., May 10: FRAC meeting (7:30 p.m., The Garden in Griffin). **Fri.-Sat., May 18-19:** JKWMA observings (at dark).

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Vice President's Message. More than three years ago, **Dwight & Betty Harness** lost the patter of little feet around the house when their youngest daughter **Laura** went off to college. Now they're facing a new and more permanent change in the Harness household: in late May Laura will shed her bachelorette status by becoming **Mrs. Laura Feltman**.

Everyone in FRAC wishes Laura and **Trent Feltman**, her husband-to-be, years of happily wedded bliss.

-Bill Warren

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Last Month's Meeting/Activities. We had 21 members – speaker **Felix Luciano** and **Dwight Harness, Alfred McClure, Bill Warren, Carlos Flores, Ken Harris, Tom Moore, Kenneth & Rose Olson, Alan Rutter, Aaron Calhoun, Erik Erikson, Truman Boyle, Dan Pillatzki, Larry Higgins, Eva Schmidler, Dawn Chappell, John Felbinger, Sean Neckel, Steve Hollander** and **Cindy Barton –** at our April meeting. Felix's impressive performance took us through the process he uses to convert captured photons of light into his amazing astrophotos that you see in the *Observer*. Our non-photographers might not have understood everything he talked about, but we appreciate the effort that goes into the making of an astrophoto. It's a lot of work, but to folks like Felix and **Alan Pryor** it's a labor of love.

"Into each life some rain must fall," sang **Ella Firzgerald** and the **Ink Spots** in 1944. For astronomers, though, it doesn't take rain to cancel an observing. Clouds can do the job just as well.

Six stalwarts – **Alan Rutter, Dwight Harness, Steve Hollander, Aaron Calhoun, Sean Neckel** and **Alfred McClure** – gave it their best shot at JKWMA on April 13th, but the sky refused to cooperate. As Dwight put it, "The skies were horrible. We tried to make the best of it, but before you could get to an object, it would cloud over. That happened over and over, until finally we gave up and went home."

The next day, same song, second verse. Then, to complete the trifecta, on Earth Day our observing at The Garden was clouded out.

Our losing streak ended that same weekend, however. **Truman Boyle** writes, "My wife **Denise** and I went camping at Vogel State Park. We set up along with another guy on a large, grassy area, and more than 40 people came over and looked through our 'scopes. We were out there for about 2 hours."

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This 'n That. If you haven't already done so, please send your $15 check payable to FRAC for your 2018 dues to: **Jeremy Milligan, 100 Old Mill Way, Senoia, GA 30276,** or give it to him at our May meeting.

Our A. L. membership is up for renewal this month; we hope you're planning to stay in FRAC for another year of fun and fellowship with the nicest group of astronomers on planet Earth.

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Upcoming Meetings/Activities. Our May club meeting will be at 7:30 p.m. on **Thurs., May 10th** at The Garden in Griffin. Our speaker, **Carlos Flores,** will present *Astronomy Under Clear Skies,* a powerpoint program he has prepared for club use at indoor presentations like the one we gave recently at Sun City Peachtree.

Our club observings will be at JKWMA on **Fri.-Sat., May 18th-19th.**

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The Sky in May. Jupiter (mag. -2.5) will be visible all night in May. Because it's a gas giant and rotates very rapidly – a Jovian day is less than 10 hrs. long – it bulges 6º wider at the equator than at the poles. Your observing task: *See if you can detect Jupiter's slightly out-of-round shape in your telescope.*

Venus (mag. -3.9) will be visible low in the W sky shortly after sunset in May. You won't see surface features because thick atmosphere always hides it from view – but since 84% of the planet will be lit you'll have no problem telescopically in seeing Venus's gibbous shape in May.

Mars (mag. -0.4), heading for a spectacular opposition this summer, will rise after midnight in May. It will increase in brightness and size throughout the month, revealing dark surface features telescopically if you stay up late or rise early. (See article below.)

Saturn (mag. 0.2) rises after midnight in early May, and at around 10 p.m. later in the month.

Mercury (mag. 0.6) is a "morning star" in the E this month.

Comet PANSTARRS (C/2016 p2) will be a mag. 10 or 11 target in *Auriga*. *Astronomy* (May, 2018, p. 42) contains an excellent finder chart for this comet, which should be visible in 'scopes of 4" or larger. Use high power for best results.

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Mars – The Truth and the Hoax

Article by Bill Warren

(Editor's Note: This article will be circulated to area newspapers prior to July 31st.)

On July 31, 2018, Mars will be 36 million miles from Earth. It's the closest the two planets have been since 2003 when the Red Planet moved to within 34.6 million miles of us. As a result, Mars will be larger and brighter in July than it has been in fifteen years. Amateur astronomers with backyard telescopes will see the martian polar ice caps – but they will also see dark surface features that do not reveal themselves when Mars is farther away in its solar orbit.

The Hoax. Sometime between now and July 31st, you may receive an anonymous e-mail or Facebook message telling you that, on that date, Mars will be as large as the **Moon** in the night sky. A cleverly doctored photo accompanying the message will show a cathedral with a Full Moon and an equally large Mars in the sky above the church. The message will urge you to "Mark your calendar, and share this with your children and grandchildren! NO ONE ALIVE TODAY WILL EVER SEE THIS AGAIN!"

Don't believe it. It's a hoax. No one will ever see, it, period, because it will never happen!

That same false message has circulated to millions of people every summer since 2003. Every summer, people go out on a certain date in July or August expecting to see Mars as big as the Moon in the night sky, and they are disappointed when it doesn't happen.

The Truth. Here's what you'll see without a telescope on July 31st:

The Waning Gibbous Moon (four days past Full Moon) will be large and bright, as it always is.

Mars, on the other hand, will appear as a bright orange star in the southern sky.

Mars is smaller than Earth and larger than the Moon – but Mars never gets closer to us than 34.5 million miles. It always looks like an orange star except when seen in a telescope. That's how the "Mars hoax" got started.

In the original 2003 message, the anonymous author stated that, when seen in a telescope at 75x magnification, Mars would be the same size as the Moon appears to the unaided eye – which was true. However, subsequent re-circulations of the message that year and afterward were amended to leave out the part about “a telescope” and “75x magnification,” which led people to believe that the Moon and Mars would be the same size.

Still…Just because they won’t be the same size without a telescope on July 31st or any other time doesn’t mean that they aren’t worth looking at. Even without a telescope or binoculars you can see large surface features on the Moon such as the dark maria (“seas”) that ancient stargazers thought were bodies of water.

As for Mars – well, it’s easily recognizable by its rich orange color. You won’t see surface features without a telescope, but it’s impressive to think that, when you’re looking at Mars, you’re seeing it not as it is now, but as it was more than 12-1/2 minutes ago. That’s how long it takes for the light from Mars to reach us.

Finally: you don’t have to wait until July 31st to see Mars. It won’t suddenly leap into prominence one evening. It is moving closer to us in its orbit, and will be brighter than usual throughout July and August. Just look south for two bright orange “stars” that are more than a fist-width apart. The brighter and more easterly of the two will be Mars; the other will be **Antares** (Greek for “rival of Mars”), the brightest star in the constellation *Scorpius*.

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TELESCOPES, Part 2

article by Bill Warren

There’s a huge array of telescopes on the market today. Choosing which one to buy can be as confusing as doing your own income tax returns if you’re new to astronomy and don’t know what you’re looking for. The manufacturers can’t help you there: they don’t know what you need. All they can do is tell you what they have, and leave it to you to decide what you need.

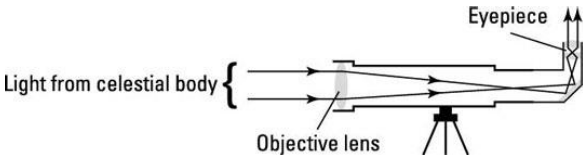
Basically, telescopes fall into three categories; *refractors; reflectors;* and *Cassegrains.* All of them are good if they are made by a reputable manufacturer such as Orion, Celestron or Meade, etc.; all of them possess strengths and weaknesses that you need to understand before you buy a telescope. That’s why we urge members not to buy anything before they see what we use, and to talk with us about what they want to use their telescope for. We don’t know what you need, either – but we can help you find out. (And you can believe what we tell you because we aren’t trying to sell you anything. We just want you to buy a telescope that you’ll enjoy using.)

Trouble is, if you’re new to astronomy and don’t know much about telescopes, the only difference between telescopes that you’ll understand is likely to be the cost. The telescopes you’ll see advertised in catalogs and magazines are described in terms you may not be familiar with -- terms like *altazimuth; aperture; apochromatic; Dobsonian; equatorial; finderscope; focal length; focuser; f ratio*; *GoTo; optical tube assembly (OTA); Maksutov-Cassegrain; primary mirror; PushTo; reflector; refractor; Schmidt-Cassegrain; secondary mirror;* and many other terms that you may not understand. Eventually you’ll learn what they refer to – but that doesn’t help you much when you’re at the beginner end of the learning curve, wading through the literature and trying to decide what to buy.

Here’s the good news: While all of those terms are important, you need to understand just a few of them – the ones that **Smitty** and I refer to in these three articles – before you buy a telescope.

When I bought my first telescope – actually, my wife bought it for me as a Christmas present – the only terms I was familiar with from the above list were *refractor* and *finderscope* – and I knew them only because she bought me a refracting telescope with a finderscope. I wasn’t aware of the differences between telescopes – except cost, of course. All I knew was that I was determined to learn how to use my new telescope to see what the sky had to offer.

Refracting Telescopes. For sixty years after **Galileo** aimed his tiny telescope at the night sky in 1608, refracting telescopes were the only game in town – and with good reason. Refractors are by far the simplest optical design for collecting starlight and transmitting it to the eyepiece.



Refracting Telescope Design.

Refractors consist of two or more lenses at the closed upper end of the tube, and an eyepiece at the lower end. In order to make viewing comfortable at the lower end of the 'scope, a diagonal mirror called a *star diagonal* deflects (i.e., refracts) the light upward from the tube to the eyepiece that fits inside it.

Due to their simplicity of design, refractors produce sharp, clear images in the eyepiece that cannot be equaled by any other type of telescope. Lenses focus light much better than mirrors do.

Another bonus is that, unlike reflecting telescopes, refractors do not require periodic collimation, or re-alignment of the optical assembly in order to ensure that incoming light travels along its intended path. That alignment is done at the factory and never needs adjustment. Refractors require very little maintenance or cleaning.

The down side of refractors is that, because light travels only one way in the tube, that tube must be longer and therefore bulkier and more expensive per inch of aperture than other kinds of telescopes. (Meade's new 4-1/2" Series 6000 ED Triplet APO refractor sells for a hefty $1,899 [tripod, mount and finderscope not included]. Many refractors that size cost twice as much.)

As a result of their expense, refractors tend to be very small in terms of aperture. My 3-1/2" Meade refractor (which cost $500) is better than my 12-1/2" reflector at things like splitting close double stars and showing the planets in exquisite detail. But it's not especially good for deep-sky observing because the images are too small to see all that deep-sky objects have to offer.

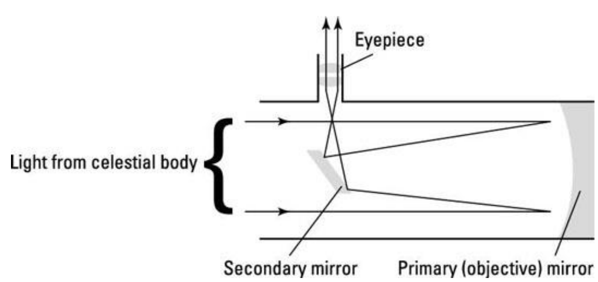
I started out in astronomy with that refractor. After 2-1/2 yrs. of searching for Messier objects, I had found 32 of them. I bought a 10" Dobsonian reflector, and it took me just 6 months to find the other 78.

The one I remember most vividly was **M56**, a faint globular cluster in *Lyra*. I knew exactly where M56 was located – halfway between the bright stars **Albireo** and **Gamma Lyra** – but I never saw it in the little refractor. The first time I looked for it in my 10" Dob, I found it within 30 sec. That taught me a valuable lesson about the importance of aperture in deep-sky observing.

No one in FRAC owns an equatorial, motor-driven refracting telescope, so none of us has ever attempted astrophotography with a refractor. It can be done – but why? The images you'd get would be marvelously clear, but tiny. Refractors just don't possess the light-gathering power to make astrophotography worthwhile when larger telescopes can do a better job of it.

Finally – and this may not be a problem for you, but it was for me – refractors turn images upside-down. My star diagonal corrected the images vertically but reversed them horizontally. This was a problem for me because the finderscope inverted images but didn't reverse them. I constantly found myself guiding the 'scope the wrong way when searching for objects. While most observers probably would have adapted their thinking to the problem or bought an image corrector, I never did. But that was my fault, not the telescope's.

Reflecting Telescopes. Known as Newtonian reflectors because **Isaac Newton** improved the original reflector design in 1668, reflecting telescopes feature an open upper end that contains a small diagonal (secondary) mirror. Incoming light travels through the tube to the lower end where a larger, concave primary mirror mounted on an adjustable mirror cell gathers it and reflects it back up the tube to the secondary mirror. (The primary mirror cell is adjustable because the mirror must be taken out occasionally for cleaning.) The secondary mirror deflects the light into an eyepiece receptacle located on the side of the telescope's upper end.



Reflecting Telescope Design.

Newtonian reflectors invert images in the eyepiece, but it's not a problem since finderscopes do the same thing. (Anyway, inverted images don't matter unless you're searching for an object manually. There is no up and down in space, so normally it doesn't matter how objects are oriented in your eyepiece. It's not like looking at an upside-down car or a tree in your field of view.)

The most obvious advantage of reflectors is increased light-gathering power. Since the tube is shorter per inch of aperture than refractors, you can have virtually unlimited aperture if you're willing to pay for it. (A few years ago, Orion advertised 50-in. reflectors for an obscene amount of money.) Larger aperture affords larger and brighter images than you can get in smaller refractors. They bring the universe much closer to you than refractors can do it.

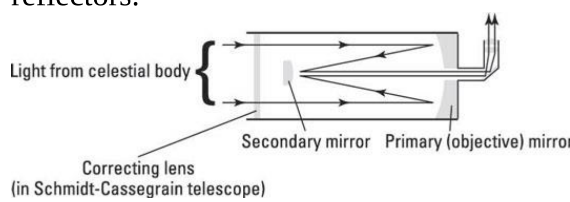
Another advantage is expense. Reflectors – particularly *Dobsonian reflectors* that feature an inexpensive but sturdy and efficient lazy Susan-type altazimuth mount – are far less expensive than refractors or Cassegrain telescopes on a cost-per-inch-of-aperture basis. Affordability makes it possible for amateur astronomers to buy large-aperture reflectors (we call them *light buckets*) that will take them as far out into space as they want to go.

10" Dobsonian Telescope.

On the other hand, having the eyepiece at the upper end of the tube means that, if you're using a really big Dob – say, 14" to 16" or larger -- you may need a ladder to see through the eyepiece. Reflectors also require collimation to keep the mirrors aligned properly; the primary mirror may need cleaning every year or so; and images in reflecting telescopes are not as sharply defined as they are in refractors because the mirrors scatter the light.

Astrophotography is possible with an equatorially-mounted, motor-driven reflector -- but not with a Dob unless you're willing to buy a motorized base for the mount to rest on.

Cassegrain (Compound) Telescopes. There are several kinds of Cassegrains, the most popular being Schmidt-Cassegrains (SCTs) and Maksutov-Cassegrains. You don't need to know the technical differences between them, but both feature short, compact tubes in which the light bounces back and forth between lenses and/or mirrors before it reaches the eyepiece. This bouncing explains why Cassegrain tubes are shorter than refractors or reflectors.



Cassegrain Telescope Design.

Both SCTs and Maksutovs can be purchased in fairly large sizes, which makes them ideal for both planetary and deep-sky photography; that's why FRAC's serious astrophotographers prefer them.

Cassegrains invert images, but it's not a problem because Cassegrains feature computerized GoTo systems to find objects and keep them centered in the field of view.

Eyepieces are located at the lower end of SCTs and Maksutovs, which can make assembling a large Cassegrain challenging. After setting up the tripod, you lift the mount into place on it, lock it down and then lift the entire optical tube assembly, fit it onto the mount and lock it in place. It's not an activity for the faint of heart, as you'll see if you watch **Alan Pryor, Felix Luciano** or **Sean Neckel** set up their 'scopes at JKWMA.

(Next Month: Comparing telescopes in terms of cost, portability, simplicity of use, quality of images received and light-gathering power.)

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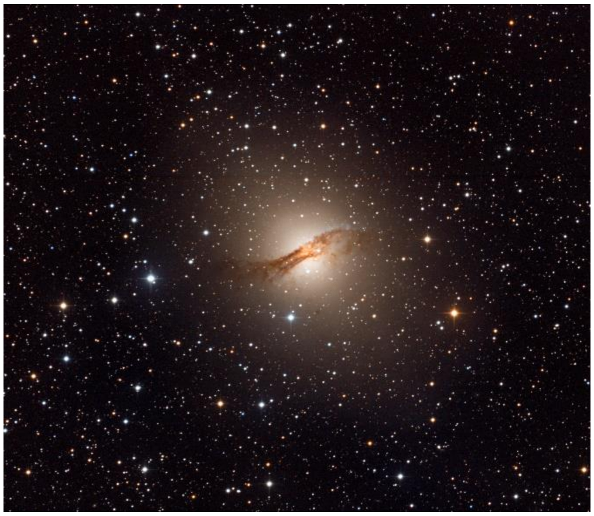
Next Page, Upper Left Corner: NGC 5128, an irregular spiral galaxy in *Centaurus*. (Photo by

Alan Pryor: it is, in **yr. editor's** estimation, the finest astrophoto Alan has ever produced.)



Above: NGC 5128, an irregular spiral galaxy in *Centaurus*. (Photo by **Alan Pryor**.)

Also known as **Caldwell 77** and **Centaurus A**, this lovely peculiar galaxy is one of the strongest emitters of radio signals in the sky. Its unusual, cheeseburger-like appearance is due to the broadest and most obvious dust lane of any galaxy visible in amateur telescopes. Alan long-distance imaged NGC 5128 in a 20-in. 'scope located in Australia.

This galaxy can be seen at JKWMA during the spring months. Its location above the S treeline means that its light must travel through more turbulent atmosphere to reach us than if it were located higher in the sky, but 5128 will still appear as a black-and-white hamburger. (The striking clarity of Alan's photo is due, not just to the camera's ability to store light, but also to the fact that in the southern hemisphere Centaurus A is located high in the sky.)

NGC 5128 is one of the most beautiful objects in the night sky. The late **Sir Patrick Caldwell-Moore** included it in his list of deep-sky objects as Caldwell 77. If you are a serious observer, you'll want to see it because there is nothing else like it.

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Opposite: Markarian's Chain, a galaxy chain in *Virgo.* This remarkable wide-angle photo by **Vencislav (Venci) Krumov,** a FRAC member who lives in Bulgaria, is one of the best ever to grace the pages of this newsletter.

Markarian's Chain is a meandering chain of 16 galaxies, all of which can be seen (but not in the same field of view, you'll have to move from one galaxy to another) in telescopes 6" or larger. To find and identify them, find **M84** and **M86**, both of which are bright and easily seen on any clear spring evening. (They are located exactly halfway between 3rd-mag. **Vindemiatrix [Epsilon Virgo]** and 2nd-mag. **Denebola [Beta Leo].**) Then follow the directions below. Your low-power field of view will always contain the next galaxy or galaxies in the chain.

Start at the "Smiley Face" at the lower right in Venci's photo. The eyes are **M86** (on the left) and **M84** on the right. An eyebrow (**NGC 4402**) is above M86, and a tiny nose (**NGC 4387**) and mouth (**NGC 4388**) form the rest of the Smiley Face.

Moving left, elongated **NGC 4438** and **NGC 4435** form "The Eyes," a bright, well-known galaxy pair. To their upper left are elongated **NGC 4461** an**d NGC 4458,** and to their upper left lies bright **NGC 4473**, with equally bright **NGC 4477** above it. (Tiny **NGC 4479** is to the lower left of 4477.)

At that point, the chain curves to the upper right, where **NGC 4459** hovers near a yellow star. Slightly above and to their left lies faint **NGC 4468** and brighter **NGC 4474**.

The chain ends at elongatedly bright **M88**.

(Also in the photo at the lower left: the giant elliptical galaxy **M87**, the brightest galaxy in Virgo. It is also a powerful source of radio waves and home to one of the largest known black holes.

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