THE

FLINT RIVER OBSERVER

NEWSLETTER OF THE FLINT RIVER ASTRONOMY CLUB

An Affiliate of the Astronomical League

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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 14: FRAC meeting/lunar observings (7-10 p.m., The Garden in Griffin); **Fri.-Sat., May 15-16:** Joe Kurz observings (Site #3, at dark).

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President's Message. Things we talked about at our April meeting:

*The folks at the Rock Ranch were very happy with our star party there in March; they said they'd be glad to have us come back next year. I hope we can, because the Rock Ranch is a first-rate facility.

*The Covered Wagons campsite was really nice: it was isolated, and when the clouds parted for a couple of hours on Fri. night we managed to get in some observing under very dark skies. The meeting hall had everything we needed, and we liked being able to buy lunch onsite. The Rock Ranch staff was courteous, friendly and efficient.

***Smitty** talked about the Aug. 2017 total solar eclipse, and we agreed that FRAC needs to travel to a site within the path of totality to watch it. I think we need to have several sites in Tenn., north Ga. and South Carolina in mind. So far, the best candidate is Black Rock Mtn. State Park in the NE corner of Ga.

***Bill Warren** volunteered to apply for one of the $300 4-1/2-in. "Library Telescopes" that the A. L. is giving to a club in each of its regions. The winners will be selected at this year's ALCON.

*I'm looking for someone to serve as coordinator of boy scout observings. The scouts are an important part of astronomy outreach and education, and they need someone who can devote more time to them than I've been able to do. I've been doing most of it myself, but when six groups of scouts requested our help in a recent 8-day period, I had to turn them down. Let me know if you're willing to help out as FRAC's scouting coordinator.

Finally, I'm pleased as punch to welcome new members **Joel & Risa Cox** and **David Haire**. All of them joined the club at our April meeting. Joel and Risa heard about us through **Brendon O'Keeffe** in his job as an observing coordinator at Columbus State; David was the guest of **Truman Boyle**.

Joel, Risa and David: You're part of our FRAC family now; we want to show you how much fun astronomy can be, and to help you learn whatever you need to know in order to enjoy it to the fullest.

-Dwight Harness

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Last Month's Meeting/Activities. Fourteen members – including three who joined the club that night – attended our April meeting. Those attendees were: new members **David Haire** and **Risa & Joel Cox**; and **Dwight Harness; Jessie Dasher; Cynthia Armstrong; Tom Moore;**

Orren Haynes; Erik Erikson; Andy Hasluem; Truman Boyle; Steven "Smitty" Smith; Aaron Calhoun; and **yr. editor**. The dvd program on **Sombrero Galaxy, Edwin Hubble, Henrietta Leavitt** and island unverses was very good – thanks, Jessie, for setting up the equipment and taking it down and packing it up afterward – and we had a lot of time before and after the meeting to get to know our new members. They're *great*!

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This 'n That. After 25 years in space and five servicing missions involving 28 astronauts to repair or upgrade the instrument, the Hubble Space Telescope (HST) is, like the Energizer bunny, still going strong. The venerable telescope will receive no further servicing – but it is in first-rate condition and, barring unforeseen problems, it is expected to dazzle us with its images until at least 2020.

From its famous "Pillars of Creation" photo (and literally millions of others) to its significant role in advancing man's understanding of the universe, HST has secured its place among mankind's most significant achievements. It has become virtually synonymous with astronomy in the public's consciousness.

(Re those five servicing missions: Of the ten longest space walks in history – including the Apollo **Moon** walks -- six of them involved working on the HST.)

*Before grumbling about how far we have to travel to observe at JKWMA, consider this: *Astronomy* Senior Editor **Michael Bakich** defines a "dark" observing site as "one that is at least forty miles from any city. (**Astronomy** [Nov., 2014], p. 61)."

And you think *we* worry about whether to drive to Joe Kurz on partly cloudy evenings? Members of the Houston (TX) Astronomical Society travel 150 mi. to their club's observing site. At least we don't face a five-hour round trip drive for every club observing.

Truth is, if you observe in or near any area where there is significant light pollution, it's going to have a negative impact on your observing. Even a single poorly placed security light or headlight beams from passing cars can mess up your adapted night vision and rob you of much of what you should be seeing.

***R. I. P.: Walter Haas**, founder of the Assn. of Lunar and Planetary Observers (ALPO), passed away on April 6th at age 98.

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Upcoming Meetings/Activities. Our FRAC meeting/lunar observings at The Garden in Griffin will be from 7-10 p.m. on **Thurs., May 14th**. Our speakers will be **Dawn Knight** and **yr. editor**; their topic will be "The FRAC 50 Observing Program." It's a list of 50 deep-sky objects that every astronomer absolutely, positively should see for himself or herself.

Our club observings will be on **Fri.-Sat., April 15th-16th** at Site #3 at Joe Kurz Wildlife Management Area.

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The Planets in May. Four planets will grace the evening skies in May.

Mercury (mag. -0.4) will be about one fist-width held at arm's length above the NW horizon half an hour after sunset during the first half of the month. Its waning crescent telescopic shape will appear as a fully-lit disk to the naked eye.

Venus (mag. -4.4 and nearly as bright as it ever gets) will be high in the W sky after sunset. It will remain visible until around midnight in May and, like Mercury, it will show a waning crescent shape telescopically.

Saturn (mag. 0.0, the brightest it's been in the last 8 years) will rise in the SE around 9:30 p.m. early in May, at sunset in late May, and it will be visible throughout the rest of the night. Its rings will be tilted toward us at an angle of 24°, offering us wonderful opportunities to enjoy their beauty, symmetry and structure.

Jupiter (mag. -1.9 and the 2nd-brightest of the planets) will be visible in the SW sky until around midnight in May. At 11:38 p.m. on **Wed., May 27th,** a rare and unusual kind of double shadow transit will occur: the shadows of two Jovian moons, **Io** and **Ganymede,** will merge into one shadow on the face of Jupiter. The eclipse will last for 22 minutes before the shadows separate.

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THE FRAC 50

report by Bill Warren

In the mid- to late-1700s the French comet hunter **Charles Messier** published his now-famous list of non-cometary objects in the night sky. The Messier list contains so many beautiful deep-sky objects that many of today's astronomers regard finding and observing the Messiers to be a necessary part of becoming an astronomer. The Astronomical League (A. L.) offers a lapel pin and certificate to any A. L. member – including *you*, of course – who finds all 109 Messiers.

Still…The Messier list does not include many other equally beautiful, interesting and familiar deep-sky objects that are within range of small telescopes. So in 1995 the late British astronomer **Sir Patrick Caldwell-Moore** produced the "Caldwell Catalog," a list of 109 deep-sky objects that Messier overlooked. But the Caldwell list covers the entire sky from one celestial pole to the other. Many of its targets lie too far south to be seen by observers living in northern latitudes (or vice versa for folks living in southern latitudes). As a result, to earn the A. L.'s Caldwell pin and certificate you have to find and observe any 70 of the Caldwell objects.

There's another problem, though: at our latitude, we can see about 80 of the Caldwells – but finding and observing them can be extremely difficult in some cases. Caldwells like **Bubble Nebula (C11)** in *Cassiopeia*, **North America Nebula (C20)** in *Cygnus*, **Flaming Star Nebula (C31)** in *Auriga*, **NGC 188 (C2,** an open cluster in *Cepheus*) and certain others have presented severe challenges even for FRAC's finest deep-sky observers.

Enter **Dawn Chappell** and **Larry Fallin**. (Larry is no longer with the club.)

Several years ago, Dawn and Larry decided to create an alternative observing program for beginners that would combine the best of the Caldwells with other deep-sky objects that are equally interesting but better suited for viewing from our neck of the woods. The result was **The FRAC 50**, a splendid group of 22 open clusters, 11 galaxies, 10 planetary nebulas, four double stars, two asterisms and one diffuse nebula.

The FRAC 50 contains no globular clusters because Messier found all of the best and brightest ones that are visible at our latitude except **Omega Centauri (**which lies too far south for us to see it well). It contains 22 open clusters because Dawn and Larry liked them so much. I like them too, and I wholeheartedly agree with their choices. The FRAC 50 is fun, and if you enjoy observing you'll enjoy working your way through the list.

We can't afford lapel pins – but if you find all of the FRAC 50 objects we'll give you an attractive FRAC 50 certificate (suitable for framing) that you'll be very, very proud of.

For a sneak preview of what Dawn and I will be showing and telling you about at the April meeting, go to our club website at www.flintriverastronomy.org and click on the Downloads link for an article and a list of The FRAC 50.

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Telescope Myths

article by Bill Warren

***Myth #1:** *You need a telescope to be an astronomer.*

Fact: All you need is an interest in the universe around us. Humans were fascinated by the **Sun, Moon**, planets, comets and stars thousands of years before the telescope was invented.

Telescopes are useful tools for learning about the universe – but there are other tools available, such as astronomy books, DVDs, TV programs and astronomy clubs. You only need a telescope if you want to see for yourself what the universe looks like beyond what your eyes or binoculars can show you.

***Myth #2:** *Large-aperture telescopes are better than small-aperture telescopes.*

Fact: It depends on what you want to do with a telescope. Larger telescopes gather more light, so they will take you farther back in time and show you fainter objects than a small 'scope will. You'll see more in deep-sky objects, too, because the images will be larger.

Still…I have a 12-1/2" Dob that serves me well for deep-sky observing -- but I also have a 3" refractor. When it comes to finely detailed observing, the refractor is vastly superior: it gives a sharp, clear image of planetary features that appear fuzzy in the larger reflector, and it does a better job of splitting close double stars.

Other advantages of small telescopes include: they generally are less expensive than larger 'scopes; they weigh less and are more portable; they are easier to set up; and unlike reflecting telescopes of any size, refractors don't require collimation.

* **Myth #3:** *GoTo and PushTo telescopes are easier for beginners to use than traditional manually operated telescopes.*

Fact: That's true if you know how to polar align them. But it's not always easy to do unless you have someone to teach you how it's done. The printed directions can be complicated and confusing, especially if you're new to astronomy.

***Myth #4:** *The more magnification you use, the better you'll see objects.*

Fact: Increased magnification makes objects larger, but it doesn't necessarily make them clearer. With galaxies, for example, high magnification spreads out their light, reducing the sharpness of the image away from the galaxy's core.

You need three eyepieces to have the best chance of seeing all that an object can show you: a low-power eyepiece to find things; a medium-power eyepiece to improve the view; and a high-power eyepiece to get you up close and personal. In observing about 1,800 objects over the years, low power has given me the best view about 20% of the time, medium power about 65% of the time; and high power about 15%.

***Myth #5:** *Primary mirrors should be cleaned regularly.*

Fact: It's a matter of semantics. Any veteran observer will tell you that primary mirrors should be cleaned *periodically*, not regularly. Cleaning your primary mirror more often than once a year is unnecessary.

Mirror coatings are delicate, and must be treated with extreme care. Beyond the possibility of dropping the mirror cell while taking it out or putting it back, the mirror surface must be cleaned *very* gently and carefully. Within reasonable limits, a dirty mirror will not affect the quality of telescopic images.

Myth #6: *You can't see colors in a telescope.*

Fact: While it's true that our eyes can't collect and store colors in the night sky the way that long-exposure astrophotos can, visual observers aren't totally color blind at night. We see colors best when they are concentrated in the disks of small objects such as the planets, stars and planetary nebulas.

The most colorful planets are **Mars** (orange), **Uranus** (blue-gray) and **Neptune** (blue). **Jupiter** is white, but it has brown belts and the Great Red Spot (which is actually a soft pastel orange). **Saturn** is pale yellow, and its rings black and white. **Mercury** and **Venus** are white.

Stars show a broad range of colors from blue (e.g., the companion star in **Albireo**) to white (**Sirius**) to yellow (Albireo's primary component) to orange (**Betelgeuse**) to red, with subtle variations of each color. (The reddest star I've ever seen is **R Leporis, Hind's Crimson Star** in *Lepus*.) To see star colors most vividly, use high power and de-focus the star until it forms a fuzzy disk.

The majority of planetary nebulas appear as grayish disks. However, a few of them are blue (e.g., **Saturn Nebula** in *Aquarius* and the **Blue Snowb**all in *Andromeda*), and others (e.g., the **Blinking Planetary** in *Cygnus* and **Cat's Eye Nebula** in *Draco*) are blue-green.

In most larger objects, except in very large telescopes the light is too diffuse or faint to reveal colors other than in shades of gray. Still…as author **E. L. James** showed her readers, fifty shades of gray can be very exciting.

***Myth #7:** *When you buy a new telescope, eyepiece or accessory, the weather will turn bad. And the more you spent for it, the worse the weather will be and the longer it will stay.*

Fact: Purchasing new equipment doesn't cause bad weather, it just gives us someone to blame for it.

Atlanta Astronomy Club ex-president **Art Russell** explained the myth nicely: "The sky knows you're coming." When you buy something new and can't wait to try it out, *that's* when the clouds roll in. Or so the myth goes.

This isn't just a local myth, either: **Ron Yates** came to us from the Louisville (Ky.) Astronomical Society, and he said recently, "I may be responsible for the recent round of bad weather since I bought a new 20mm Williams Optics objective lens before the bad weather struck. Sorry about that."

So *Yes*, it's a myth. But it's also true that (a) Ron bought an eyepiece for his telescope, and (b) the weather turned bad.

Thanks, Ron. We can't help but wonder what your old clubmates bought that caused the flooding in Louisville a couple of months ago. (Or could you have jinxed them by long distance? What else have you bought lately?)

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Trivia Questions. *1. How many moons are orbiting the planets in our solar system?* As of Jan. 1, 2015, there were 173: **Jupiter** and **Saturn** lead the way with 67 and 62, respectively, followed by **Uranus** with 27, **Neptune** 14, **Mars** 2 and **Earth** 1. (**Venus** has no moons, and the dwarf planet **Pluto** has five.)

2. What's the difference between an open cluster and a globular cluster? Both are groups of gravitationally bound stars that are traveling through space together. **Open clusters** may contain as many as a thousand or more hot young stars; they usually are relatively nearby in space, and appear scattered in our view.

Globular clusters, on the other hand, are groups of up to a million or more older, distant stars. Some globulars (e.g., **Omega Centauri**) are thought to be remnants of galaxies that lost stars over countless millennia. You can see individual stars in some globular clusters; others appear as tightly compact, fuzzy balls of light.

3. Why do the planets vary in brightness from one month to another? Because their apparent size and distance from us varies as they (and the Earth) orbit the **Sun**. The farther away they are, the smaller and dimmer they appear compared to when they are closer.

4. Why is the hottest part of the year known as the "dog days of summer"? **Sirius** is, of course, the brightest star in the night sky. It is commonly referred to as the "Dog Star" because it lies in the constellation *Canis Major, the Big Dog*.

Since the Dog Star is highest in the night sky during the winter months, six months later it shares the daytime sky with the Sun. Ancient astronomers believed that, when Sirius rose before sunrise during the summer, it added to the Sun's heat, producing the hottest days of the year – the "dog days of summer."

*5. How much lunar material did the Apollo astronauts collect during their **Moon** walks between 1968-1972?* They brought back 842 lbs. of Moon rocks.

6. Why are solar and lunar eclipses so rare? It's a big sky out there. There's plenty of room for the Earth, Sun and Moon to pass each other in the sky without achieving the total or partial alignment necessary for an eclipse to occur.

Total eclipses require perfect alignments; that's why partial eclipses are far more common.

Solar eclipses occur only during the New Moon when the Moon is precisely aligned between Earth and the Sun. They do not occur every month because the Moon's orbit is tilted to the plane of Earth's orbit, so most months the Moon does not pass directly between Earth and the Sun.

Lunar eclipses, on the other hand, occur only during the Full Moon, when Earth is between the Moon and the Sun. Lunar eclipses do not occur every month because on most Full Moons the Moon passes above or below the shadow cast by Earth.

Every year, Earth experiences between 2-5 lunar eclipses and between 2-5 solar eclipses, although they cannot be seen from everywhere on Earth. Lunar eclipses are more common and last longer because Earth's shadow is much larger than the Moon, whereas the Moon is never larger than the Sun. Lunar eclipses are more visible since anyone can watch a lunar eclipse without the aid of a filter to protect your eyes.

7. *Obviously, the Sun is much larger than the Moon; why do they look the same size to us?* The Sun is 400 times larger in diameter than the Moon – but it is also 400 times farther away from us, making them appear the same size.

Finally, there is this, gleaned from a recent interview with **Prof. Stargazer**:

Scott Cook: What held the **Earth, Moon** and planets in place before **Isaac Newton** discovered gravity?

Prof. Stargazer: Duct tape.

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Next Page, Upper Left: NGC 1499 (California Nebula), an emission nebula in *Perseus.* At our recent **Ga. Sky View** star party, **Felix Luciano** used California Nebula as an example of preparing an astrophoto image. This is his finished product – a lovely, haunting work of art.

Visually, California Nebula is a difficult challenge for observers. Its name derives from its vague similarity to the state of California, but its size – roughly 3^o x $3/4^o$ –means you won't see but a small portion of it in a normal low-power telescopic view – if in fact you see it at all. The nebula is extremely faint and diffuse, so much so that a

nebula filter or an O-III filter will show it at best as a slight brightening of the sky. Probably the best way to see NGC 1499 is in binoculars or a rich-field telescope, using an h-Beta filter.

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Above: Okay, we've all seen the **Moon** before. We've seen **Andromeda Galaxy,** too, but that doesn't stop us from revisiting it whenever possible. **Orren Haynes** is a fledgling astrophotographer who wants to explore the mysteries and splendor of the universe they way that fellow FRAC astrophotographers **Alan Pryor, Felix Luciano** and **Ron Yates** do. Consider this his maiden voyage.

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Opposite: If you look past fun-loving, globe-trotting, camera-hogging FRACster **Steve Bentley**, you'll see **Barringer Crater** in the background. It's the best-preserved meteor crater on Earth. (Wish we could say the same for Steve.)

The Crater – a.k.a. **Meteor Crater** and **Canyon Diablo Crater** – was a must-see side trip for Steve during his recent visit to the Grand Canyon, and we're proud to report that he didn't fall into either one.

The Crater is located 18 mi. from Winslow, AZ. It is 570 ft. deep and about ¾ mi. in diameter. It was created 50,000 years ago by a meteorite measuring about 160 ft. in diameter. Most of the meteorite was vaporized at impact, which generated energy equivalent to about 10 megatons of TNT.

When the impact occurred 500 centuries ago, woolly mammoths and giant ground sloths grazed in the area's lush grasslands and woodlands. Today, tourists with cameras graze on Happy Meals and milkshakes in an unforgiving desert landscape where 100^{o} temps are considered a cold front going through. Then they send photos home of themselves standing in front of a hole in the ground.

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The total solar eclipse of Aug. 21, 2017 that Smitty discussed at our April meeting will be the first total solar eclipse visible from the continental United States in 38 years. The path of totality will run from NW Oregon through central-eastern South Carolina before it moves out into the Atlantic Ocean. The only large city that lies directly along the center line (where totality will last the longest) is Nashville, Tenn.

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