

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. Mon., Dec. 1: boy scouts observing (Brooks United Methodist Church, at dark); **Sat., Dec. 6:** FRAC's Christmas dinner party/meeting (6 p.m., Ryan's Restaurant in Griffin); **Mon., Dec. 8:** boy scouts rainout date (Brooks United Methodist Church, at dark).

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President's Message. Since I didn't remember to do this until about April last year, I'll start off by

wishing everyone in FRAC a very merry Christmas and a Happy New Year! I'm sure that all of you have been good little boys and girls this year, and I hope **Santa** will reward your good behavior with astronomy goodies in your Christmas stocking.

When you make your New Year's resolutions for 2015, I hope that one of them will be to attend as many meetings and observings as possible. We have some very interesting programs coming up, and we're going to try hard to boost attendance at our Joe Kurz observings in 2015. We have great skies out there, and we're going to give you a great reason for bringing your telescope to see how beautiful the universe really is. **Bill Warren** will tell you more about it at an upcoming meeting and in a Special Edition of the *Observer* that he's preparing. I'm excited about it, and I think you will be too.

Beyond that, here's a hearty **WELCOME TO FRAC!** to our newest member, **Scott Cook** of LaGrange. Scott has been an armchair astronomer for some time now, and he wants to experience the night sky as an observer. We're looking forward to helping you in every way possible, Scott!

-**Dwight Harness**

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Last Month's Meeting/Activities. Eight FRACsters – **Truman & Denise Boyle; Dwight Harness; Larry Higgins; Aaron Calhoun; Ron Yates & Polly Bonilla;** and **yr. editor** – showed the partial solar eclipse on Oct. 23rd to about 50 customers and employees at Ryan's in Griffin. It was fun watching the **Moon** take a bite out of the **Sun** (*see p. 6*), and everyone was duly impressed. Hats off to Dwight for a stellar job of arranging the event, and to the night manager at Ryan's for going out of his way to accommodate us and make us feel at home.

Six members took advantage of clear skies at our October JKWMA observings: **Aaron Calhoun** and **yrs. truly** (both nights); and **Ron Yates** and **Erik Erikson** (Sat. night).

Joe Auriemma, Felix Luciano and **Dwight Harness** showed the wonders of the night sky to a large crowd of people at the Rock Ranch on Nov. 1st.

Three visitors – Griffinites **Tesa & Alicia Parker** and **Ally Liggins** – and 13 members (including newcomer **Scott Cook**, who joined the club that night) attended our Nov. meeting. Other attendees were: **Dwight Harness; Larry Higgins;**

Truman Boyle; Cynthia Armstrong; Jessie Dasher; Aaron Calhoun; Ron Yates; Felix Luciano; Tom Moore; Carlos Flores; Erik Erikson; and **yr. editor**, who talked about FRAC's 2008 visit to the Wetumpka (AL) Meteor Crater.

We had 7 members – **Ron Yates; Scott Cook; Dwight Harness; Aaron Calhoun; David & Brendon O'Keeffe;** and **yr. editor** – and 3 guests (**Tyler Mask** and **Erik & Jennifer Buckner**, all invited by David) at our Nov. JKWMA observing. We saw lots of Leonids meteors and satellites, and Ron stayed out till 3 p.m. doing astrophotography.

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This 'n That. On Oct. 21st, **Alan Pryor's** son **Gallagher** was struck by a car while jogging near his home, suffering broken bones in both legs and both arms, numerous cuts and contusions, and possible brain injury as well.

In an update on Gallagher's condition on Nov. 2nd Alan wrote, "Gallagher is having his final surgery – for awhile, at least – tomorrow. He will spend another week at Grady Hospital in Atlanta, after which he will be transferred to the Shepherd Center to begin his rehabilitation.

"In three months Gallagher should be able to put weight on his legs and learn to walk again. He may lose fine control of the fingers in his left hand, but we are hoping they recover too. He has moderate brain injury. There are times when he speaks perfectly and has strong cognitive skills, and I have seen him carry on very technical conversations with some of his employees who have visited him. At other times he appears confused, especially at night. I think it has a lot to do with the drugs they are giving him to help him sleep at night.

"The doctors say that Gallagher should regain most of his cognitive skills within a year."

That's wonderful news, Alan. Gallagher will remain in our thoughts and prayers throughout his recovery.

*On a sadder note, on Oct. 26th 20-year-old **Rico Martinez**, grandson of **Ron Yates** and a sophomore at Middle Tennessee State University, passed away from injuries suffered the previous day when he was struck by a vehicle while walking near his home in Murfreesboro, TN.

"Rico was majoring in metatronics with a path to nanotechnology," Ron said. "He was a member of the 'Baja Buggy Team,' a group of students who designed and built an experimental vehicle. He

loved music, and was a great guitarist, bassist and song writer. MTSU lowered its flags to half-staff during Rico's funeral in his honor.

"Rico was an amazing young man who positively impacted everyone around him. He was loved by all who knew him, and he will be sorely missed."

Our deepest sympathies and condolences are extended to Ron and his family in their loss.

*Atlanta Astronomy Club president (and ex-FRAC member) **Rich Jakiel** has an article, "Realm of the Ice Giants," in the Nov. issue of *Sky & Telescope* (pp. 54-55). Rich's article tells how to find and observe the two outermost planets in the solar system, **Uranus** and **Neptune**.

***Trivia.** *Who was the first known woman astronomer?*

Nice try but no cigar if you said **Caroline Herschel** (1750-1848), **William Herschel's** sister. Caroline was William's collaborator, assistant and a fine astronomer herself: she always claimed that she, and not **Charles Messier**, discovered **M32**. But Caroline was not the first woman astronomer.

No, that honor goes to a remarkable woman, **Elizabeth Hevelius** (1646-1693), who observed with and assisted her husband, the world-famous Polish astronomer **Johann Hevelius**, during the latter half of the 17th century.

As a teenager, Elizabeth Koopman was deeply interested in astronomy. She lived in the same Polish town as Hevelius, and 16-year-old Elizabeth managed an introduction to him. She became his assistant, and despite a 36-year difference in their ages they were married shortly thereafter. While raising their four children, she observed with her husband and helped him manage their observatory.

They lived and worked together for 31 years until Johann's death in 1687. Three years later, Elizabeth completed and published the star catalog and atlas of 1,564 stars and their positions that she and Johann had compiled. After Elizabeth's death in 1693, a French astronomer, **Francois Arago**, wrote that "Madame Hevelius was the first woman, to my knowledge, who was willing to undergo the fatigue of making astronomical observations and calculations."

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Upcoming Meetings/Activities. We'll start off December with an observing for the boy scouts at

Dwight Harness's church (i.e., Brooks United Methodist Church in Brooks, Ga.) at dark on **Mon., Dec. 1st**. (The rainout date will be **Mon., Dec. 8th**.)

To get to the church from Griffin, start at the stoplight intersection at US 19/41 & Ga. 92 (Fayetteville Rd.) Go 1.5 mi. toward Fayetteville on 92, and turn left onto West McIntosh Rd. Go 8.9 mi., and turn right at the dead-end in Brooks. Go 1.2 mi., and the church is on the right, about 100 yds. from the road.

This year's FRAC Christmas party/dinner meeting will be at 6 p.m. on **Sat., Dec. 6th** at Ryan's Restaurant in Griffin. We don't conduct club observings in Dec. because it's a busy time of year and most members' calendars revolve around preparations for the holidays, Christmas and New Year's parties, etc.

To get to Ryan's from, say, Hampton on U. S. Hwy. 19/41, drive past the Hardee's/ McDonald's stoplight in Griffin where you'd turn right to go to Fayetteville on Ga. Hwy. 92. Go past the next stoplight a block ahead at Racquethouse health spa on the right, and before you reach the RR overpass you'll come to another stoplight. Turn right, and Ryan's parking lot will be on your left.

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The Sky in December. **Mars** (mag. 1.0) will be up in the SW sky throughout Dec., and **Venus** (mag. -3.9) will be visible from Dec. 15th on, also in the SW sky. On Jan. 1st, **Mercury** (mag. -0.8) will lie about halfway between Venus and the SW horizon at sunset.

Jupiter (mag. -2.3) will rise in the E about 10 p.m. at the beginning of the month and at 8 p.m. by Jan. 1st. **Uranus** (mag. 5.8) and **Neptune** (mag. 7.8) will be up all night throughout Dec., the former in *Pisces* and the latter in *Aquarius*.

Saturn (mag. 0.6) will be a "morning star" in the E from Dec. 8th on.

Elsewhere, there will be two meteor showers in December: the **Geminids** will peak during the pre-dawn hours of Dec. 14th, and the **Ursids** on the 22nd. Both should offer observing pleasures for meteor fans: the Geminids are well known for producing bright meteors, and unlike most showers they offer meteors all night. The Ursids – named after their radiant's location in *Ursa Minor* (*The Little Bear*), not *Ursa Major* (*The Great Bear*) – peak around optimal viewing time, i.e., the **New Moon**.

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Prof. Stargazer's One Area of Weakness

(Editor's Note: Prof. Stargazer is one of history's most well-rounded astronomers, especially after he gorges himself outrageously on turkey, ham, fried chicken and everything else on the dinner table around Thanksgiving, Christmas and New Year's.

We aren't saying that the professor overeats, but when he stepped on his digital scales last Jan. 2nd, instead of telling him his weight the scales flashed the message, "What did you eat last night? A piano?"

The professor is a modern Renaissance Man in astronomy – an observer of unparalleled skills who is good at everything from dropping eyepieces to using Lysol and scouring pads to clean them.

It was surprising, therefore, that he confessed to us recently that there's one skill he hasn't mastered [besides using deodorant and mouthwash].)

Smitty: Have you ever done any astrodrawing?

Prof. Stargazer: Are you kidding? In **Mrs. Brumby's** kindergarten class, I was the only kid who couldn't draw dots.

Larry Higgins: Aw, c'mon, it's not that hard.

Prof. Stargazer: Well...I *do* possess one rather unique artistic talent: due to my irregular bathing habits, I can draw flies with my eyes closed.

Cynthia Armstrong: If you were to take up astrodrawing, Professor, what would you like to draw?

Prof. Stargazer: Hmm, let's see...I think I'd be pretty good at drawing barred spirals or binary stars: I've been told that I'm a very good b. s. artist.

Tom Moore: Have you ever drawn *snoo*?

Prof. Stargazer: What's *snoo*?

Tom: Nothing's *snoo* with me, what's *snoo* with you?

Prof. Stargazer: Who's doing the jokes here, me or you?

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MOVEMENT IN THE NIGHT SKY

article by **Bill Warren**

Everything in the universe that contains mass is in motion, although we can't always see it.

At one end of the movement spectrum, the atoms in the chair you're sitting in right now are in motion, as are the atoms in your iPhone, your computer and everything else – but you aren't likely to see those movements, are you?

At the other end of the movement spectrum, all of the stars and galaxies in the night sky are moving, too, but in most cases they're so far away that it takes years of observation to detect their movement.

So what *can* we see moving in the sky?

1. Planet Earth rotates counterclockwise. Since it takes 24 hrs. for Earth to complete one rotation, the stars and constellations appear to drift across the night sky from E to W. To see that movement, aim your telescope at anything in the night sky and watch it inch its way across your field of view. The greater the eyepiece magnification applied, the faster the object will appear to move.

In naked-eye viewing, you can follow the movement of planets, stars and constellations by noting their location in the sky, and then waiting for an hour or so before going back to them to see how far they have moved.

2. The **Moon** also appears to move across the sky during the course of an evening. You won't recognize its movement via naked-eye observing when it's high in the sky, due to the absence of visual cues to gauge its movement against. But if you use the horizon or a distant treeline as a visual cue when the Moon is rising or setting, you can actually see its slow but steady upward or downward motion.

The same applies to the **Sun**, of course – but the only times it's safe to observe the Sun naked-eye are when it's a pastel orange disk sinking into the western horizon, or when you're looking at it through a pane of #14 welder's glass or solar sunglasses. (Regular sunglasses will not protect your eyes from the Sun.)

3. **Solar and lunar eclipses** show movement that can be followed if you take precautions in the case of solar eclipses. (Use a solar filter on your telescope.)

Regarding solar eclipses, the most fun to view are, of course, the rarest (i.e., total eclipses). Immediately before and after totality, uneven surface features at the Moon's edges allow beads of remaining sunlight to shine through in some places but not others, creating a brief but lovely phenomenon known as "Baily's beads." And when only one bright "bead" of sunlight remains before

totality, the Sun briefly becomes a "diamond ring" around the dark lunar silhouette.

In lunar eclipses, the Moon changes color as it moves into and out of Earth's main shadow, or *umbra*. The change in color and shadowing is subtle, and gradual; it's not like watching the steady advance of a column of marching soldiers. The best way to study the changes that the Moon undergoes during a lunar eclipse is to switch back and forth between naked-eye, binocular and telescopic views, taking time to enjoy each view. By the time you complete a couple of cycles, the shadow will have advanced or retreated enough for you to see changes in the shadow's size and color.

4. If you have an unobstructed view of the E or W horizon at the beach or elsewhere and conditions are right at sunrise or sunset, you may see the **green flash**, a phenomenon in which a lime-green flash of light appears above the Sun's disk in the last few seconds before it sinks into the horizon, or just as the Sun begins to rise. When it occurs – which isn't often – it is due to the refraction of sunlight at the horizon where the atmosphere is thickest between you and the Sun. For the green flash to occur, the atmosphere must be smog-free and the horizon sharply defined.

I've looked for the green flash many times at Florida beaches, but never seen it. What I *have* seen (in binoculars) is the setting Sun's uppermost edge outlined in a thin layer of lime green. It's a far more common – but less spectacular -- occurrence than the green flash, which is much larger and more obvious.

5. Celestial bodies such as the Moon, planets and asteroids often occult (i.e., pass in front of) stars and other objects. A star that is occulted by a dark asteroid will simply vanish for a few seconds.

Sky & Telescope and *Astronomy* do a great job of alerting their readers to upcoming events such as occultations, eclipses, etc., telling when the events will occur, how long they will last and where in the world they can be seen.

6. The way to observe the motion of a bright **asteroid** is to find out where it's located on a given night and draw or photograph that same field of view on two consecutive nights. The asteroid will be the only "star" that has moved. (That is in fact how **Clyde Tombaugh** discovered **Pluto** in 1930. But since he had only a rough approximation of where he thought Pluto should be located, he had to compare thousands of photographic plates, two at a

time, by a technique known as “blinking” before he detected movement in two of them.)

7. Contrary to what many non-astronomers think, **comets** do not zip across the sky like meteors; in fact, they don’t show movement at all in our immediate view. The way to note a comet’s movement in the sky is to observe it on two consecutive evenings. It won’t be in the same place two nights in a row. To paraphrase an old saying, *Time, tide and comets wait for no man.*

8. The positions of **Jupiter’s** four Galilean moons – **Io, Callisto, Europa and Ganymede** – are always changing. You may not know which one is which – and I certainly don’t – but even though they’re 500 million miles from us you’ll see differences in their positions relative to Jupiter in your telescope in half an hour or less. Their movements are easiest to see when they are about to occult the planet, or when they are reappearing after an occultation.

9. **Meteors, satellites and aircraft** are easy to see as they move across the sky on a clear evening. Meteors move the fastest in our view, and are the shortest-lived. Most of them can be seen for only a second or two. Bolides (fireballs) are larger, brighter and last longer. Occasionally one will zip across 60° or more of the sky. Even rarer are those occasions when you can hear their *whoosh!* across the sky.

Earth-orbiting satellites appear as tiny, star-like points of light moving slowly but steadily across the sky at altitudes of hundreds of miles. Their speed of movement in our view depends on their altitude (among other things), and they can take several minutes to traverse the entire sky. When their antennas or solar panels are aligned to the Earth at certain precise angles, iridium communication satellites produce *iridium flares* that for a few seconds can be brighter than the planet **Venus**.

(Here’s an observing challenge for you if you’re adept at handling a telescope: find out when the International Space Station is due to pass over, and see if you can follow it in your ‘scope and see its solar panels. They give the ISS the appearance of an insect with its wings outstretched.)

Aircraft may take similar lengths of time to move across the sky, depending on how far away they are. Visually, the difference between them and satellites is, of course, that planes display blinking red and green lights on their wings and white lights elsewhere to alert other aircraft to their presence

and indicate which way they’re heading. When a plane draws close enough, you’ll see those lights.

10. **Balloons and balloonists.** Sometimes weather stations or research groups launch balloons, and it’s always fun to follow them telescopically. **David O’Keeffe** watched a weather balloon’s movements for half an hour or more at our Aug. Perseids observing, and two months later **Ron Yates** photographed a research balloon (*The Observer*, Oct. 2014, p. 6).

Occasionally, you’ll see balloonists floating at the mercy of the wind. It’s a colorful sight, especially when there are several balloonists aloft at the same time. In 2013, we watched five balloons that had taken off from our public observing site at the Rock Ranch.

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Above: NGC 7293 (Helix Nebula, a.k.a “The Eye of God”), a planetary nebula in *Aquarius*. Photo by **Alan Pryor**. Although unquestionably one of the loveliest objects in the night sky, Helix Nebula can be extremely difficult to observe visually. Its size – nearly half as large as the Full Moon – spreads its glow over a wide area, significantly reducing its surface brightness. It is best observed under very dark, transparent skies using low magnification and an O-III or nebula (narrowband) filter.

Helix Nebula is in the A. L.’s Caldwell (#63), Planetary Nebula and Universe Sampler observing programs. It also appears on the **FRAC 50 Observing List**, a program you’ll hear much more about in the near future.

Next Page, Upper Left Corner: The **Moon** taking a bite out of the **Sun** during the partial eclipse of Oct. 23rd. Photo by **David O’Keeffe**.



Below: NGC 253 (Sculptor Galaxy), a nearly edge-on spiral galaxy in – where else? – *Sculptor*. Photo by **Alan Pryor**. Like Helix Nebula, Sculptor Galaxy is *huge*, measuring 25' x 7' in size. It lies low in the S sky below *Cetus (the Whale)*, which doesn't help matters. Under optimal viewing conditions it displays an oval nucleus within a thickly elongated, mottled galactic disk.

NGC 253 is in the A. L.'s Caldwell (#65), Deep Sky Binocular and Herschel 400 observing programs – and like Helix Nebula, it appears on the FRAC 50 observing list.



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Upper Right: The Cygnus Wall, a small portion of the massive 2° x 1.8° emission nebula **NGC 7000 (North America Nebula)** in *Cygnus*. Photo by **Ron Yates**. In its entirety, NGC 7000 bears a resemblance to the North American continent, with dark voids representing the Atlantic and Pacific Oceans and the Gulf of Mexico.

From **yr. editor's** Herschel 400 observing notes: "NGC 7000 is a large nebula located between **Xi Cephei** and **Deneb**. I'd never have recognized it as North America Nebula if I hadn't

known what to look for. As it was, all I saw was the Gulf of Mexico and the eastern half of the U. S. Holding my nebula filter over a binocular eyepiece helped somewhat, but the view was far from impressive anyway."

Ron's lovely, detailed photo shows the Cygnus Wall, i.e., the west coast of Mexico and Central America as shaped by the darker Gulf of Mexico. The Cygnus Wall is the brightest and most active star-forming region in North America Nebula.



Below: NGC 7380 (Wizard Nebula), an emission nebula/open cluster in *Cepheus*. Photo by **Felix Luciano**. Discovered in 1787 by **Caroline Herschel** (*see p. 3*). NGC 7380 forms a roughly equilateral triangle with mag. 5.5 stars to the N and W. The cluster measures about 2 thumb-widths in dia., and is fairly easy to see; the nebula is very faint, and best seen with an O-III or nebula filter.



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