THE

FLINT RIVER OBSERVER

NEWSLETTER OF THE FLINT RIVER ASTRONOMY CLUB

An Affiliate of the Astronomical League

Vol. 16, No. 6 August, 2012

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Please notify **Bill Warren** if you have a change of home address, telephone no. or e-mail address.

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Club Calendar. Fri., July 27: UGa-Griffin lunar observing (7-10 p.m.); **Sat., Aug. 11: "**Pool, Pizza & Perseids Party" (**Bill Warren's** house, 1212 Everee Inn Rd., Griffin, Ga., from 5 p.m. [swimming] or 6:30 p.m. [eating] till whenever); **Fri.-Sat., Aug. 17-18:** Cox Field observings (at dark); **Fri., Aug. 24:** UGa-Griffin lunar observing (7-10 p.m.).

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President's Message. A reporter once asked the late NFL coach **Bum Phillips** if his star running back **Earl Campbell** was in a class by himself. "I don't know about that," Phillips said, "but whatever class he's in, it don't take long to call the roll."

That's the way I feel about **Larry Higgins.** I've spent more observing time with Larry than with anyone else, and I've never failed to learn something from him. Whatever I've accomplished as an observer is due largely to Larry's influence and the things I learned from him.

Here are three examples.

Tap Your Tube. Not every object in the night sky is bright or immediately obvious even to the eye of experienced observers.

When what you're observing (or looking for) is extremely faint, use averted vision (i.e., look away from it slightly). If that doesn't work, try tapping your telescope tube lightly. Our eyes are sensitive to motion, and tapping the tube may reveal the presence or details of dim objects that direct and averted vision didn't reveal.

Use a Filter With Your Binoculars. This is an effective technique for observing large nebulae such as **North America Nebula (NGC 7000,** see p. 6) that won't fit into a normal telescopic field of view. Just hold the filter against the eyepiece of your dominant eye.

Keep On Looking. "The longer you look at an object," Larry told me, "the more detail you'll see that you didn't notice earlier." That simple statement did more to improve my observing skills than anything else I've ever learned. It should have been obvious – but it wasn't until Larry mentioned it to me.

So thanks, Larry. I kid you a lot in these pages and elsewhere, but there's no one I've met in astronomy that I respect and admire more than you.

Except **Tom Moore.** And **Steve Bentley.** And **Dwight Harness** and **Mike Stuart** and **Jessie Dasher, Ken Walburn, Phil Sacco, Stephen Ramsden**, **Smitty, Felix, Carlos** and everyone else in FRAC. (Sorry, Larry, I couldn't resist the zinger. I don't know what got into me. Maybe it was the pork & beans and sauerkraut sandwich I ate for lunch.)

-Bill Warren

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Last Month's Meeting/Activities. There were 11 members at our July meeting: **Bagitta & Chris Smallwood; Laura & Dwight Harness; Jessie Dasher; Tom Moore; Carlos Flores; Aaron Calhoun; Felix Luciano; Steven "Smitty" Smith;** and **Charles "Prince of Darkness" Turner.** Dwight ran the show without a hitch and left everyone screaming for more – unlike, say, the June meeting when **yr. president** was in charge (to use the term loosely) and everyone left screaming, period!

Thanks, Dwight, you're a good man. That photo of you on the bulletin board in the sheriff's office doesn't do you justice. They should have told you to smile when they took the picture. It's good to see that you've lost weight since then, though.

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This 'n That. As you should know by now (since we talk about it so much), after participating in five public outreach events you qualify to receive an A. L. Outreach Club certificate and pin. So far, 19 FRAC members have earned one. Well, five more members – **Julie Avery & Sam Harrell; Carlos Flores; Cynthia Armstrong;** and **Erik Erikson –** need only one more event to receive their pins, and five others (**Bagitta & Chris Smallwood, Joe Auriemma, Jessie Dasher** and **John Wallace**) have logged three events.

Did we mention that our next public observings will be at UGa-Griffin on **Fri., July 27th** and **Fri., Aug. 24th**? Or that, if all ten of those fine folks were to show up for both events, we'd have *ten* more pin recipients?

*Speaking of Outreach pins, **Steve Bentley** recently became the third person in FRAC to qualify for a Master Outreach pin and certificate. (**Stephen Ramsden** and **yr. editor** are the other two.) Steve's pin has been ordered but hasn't arrived yet.

To Qualify for the Master Outreach pin (which is slightly different in design from the Outreach pin), you first have to earn an Outreach certificate and pin by participating in five public outreach events. Then comes the Stellar Outreach certificate (but not a pin), which requires 50 hrs. of outreach activities beyond the Outreach pin. Then you need 100 additional hrs. of public outreach to earn the Master Outreach pin and certificate. In all, the Master Outreach pin requires a minimum of 160 hrs. of public outreach.

Next in line to earn a Master Outreach pin are: **Larry Higgins** (needs 15 hrs.); **Betty Bentley** (needs 23 hrs.); **Tom Moore** (needs 43.5 hrs.); and **Dwight Harness** (needs 47.25 hrs.).

*From ads on p. 7 of the Aug. '12 issue of *Astronomy* and p. 13 of the Aug. issue of *Sky & Telescope:* "You Have Now Crossed Over Into the SCAE (Southern California Astronomy Expo) Zone (featuring) exciting speakers like…**Stephen Ramsden** of the Charlie Bates Solar Astronomy Project!"

The 8th annual one-day event ran from 10 a.m.-6 p.m. on July 27th at Oceanside Photo & Telescope in Oceanside, Calif. Is there any doubt that Stephen was the star of the show?

***Trivia Question:** *How many total hrs. of public outreach activities have you and other FRAC members, past and present, logged since 2006?* (Answer on p. 5.)

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Upcoming Meetings/Activities. As mentioned earlier, our July UGa-Griffin lunar observing will be from 7-10 p.m. on **Fri., July 27th,** on the lawn in front of the Flynt Bldg. on the Experiment St. side of the campus. We'll show the **Moon,** of ocurse, and look for Lunar Club features like we did last month.

Instead of our regular club meeting in August, we'll hold a "Pool, Pizza & Perseids Party" at **yr. editor's** house in Griffin on **Sat., Aug. 11th.** Bring the whole family, we've got a plethora of pool toys, rafts, etc. for the kids.

Pool time will be from 5-6:30 p.m., and we'll eat at 6:30. FRAC will provide the pizzas. We're asking everyone to bring one additional item for the meal (including fried chicken if you want to, since not everyone eats pizza). Salad, soft drinks or iced tea, dessert, potato chips, potato salad, pork & beans, or whatever else the spirit moves you to bring will also be fine.

Stay as long as you like afterward. The Perseids meteor shower peaks in the pre-dawn hrs. of Aug. 12th. It won't be dark until around 10 p.m. on the 11th, but you can stick around swimming, chatting, etc. until dark, and then look for Perseids from a float in the pool or bring a lawn chair and watch from the poolside deck. The important thing is, we always have a good time at these summertime get-togethers, and this year will be no different. But it won't be "us" without "u".

To get to Bill's house from, say, Hampton, come S on U.S. 19/41 and stay on the 4-lane past Ga. Hwy. 92, and past the Griffin exit and the exits at Ga. Hwys. 16 and 362. Turn left at the stoplight at Airport Rd. Turn right at the 4-way stop at Everee Inn Rd., and then turn left at the 1st corner (Roberts St.). Bill's large paved driveway is the 1st one on the left; park there, or drive past his fenced backyard, turn around and park on the street by the fence or his mailbox.

If you're coming – and we hope you will – please r.s.v.p. and let Bill know how many people you're bringing so he'll know how many pizzas to order.

Our Cox Field observings will be on **Fri.-Sat., Aug. 17th-18th.** Some of us found Messiers and

Globular Cluster Club targets last month, and we'll undoubtedly do likewise this time around. Globulars are bright, beautiful and easy to find and observe.

Our Aug. UGa-Griffin lunar observing will be from 7-10 p.m. on **Fri., Aug. 24th.**

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The Sky in August. Mars (mag. 1.1) and **Saturn** (mag. 0.8) are companions of **Spica (Alpha Virginis)** throughout August. Mars is tiny – a scant 5" in dia. – and therefore won't show surface details. At 16" in dia., Saturn is better, esp. since its glorious rings are tilted favorably for our viewing pleasure.

The **Perseids meteor shower** peaks during the pre-dawn hours of Aug. 12th, and is predicted to put on a good show for those who stay up late or are early risers. The **Moon** rises around 1 a.m., but its waning crescent shape won't adversely affect viewing because Perseids meteors tend to be bright and fast-moving. *Sky & Tel* says that we should see 1-2 meteors a minute after midnight, with the rate rising as the radiant – the point in the sky from which Perseids meteors appear to be coming – rises in the northeastern sky.

To observe the Perseids, all you need is a lounge chair and an open area of sky. The direction you look doesn't matter, since you're likely to see meteors anywhere. The radiant is important only in identifying them as Perseid meteors (as opposed to sporadic meteors that aren't part of the shower.)

Summertime is the season when globular clusters take center stage. Of the 150+ Milky Way globulars, all but a handful can be found in the summer night sky. Many (if not most) of them are found in three constellations: *Scorpius, Sagittarius* and *Ophiuchus.*

Of the 29 Messier globular clusters, 27 can be seen in August: M4 and M80 (*Scorpius);* M5 (*Serpens);* M9, M10, M12, M14, M19, M62 and M107 (*Ophiuchus);* M3 (*Canes Venatici);* M53 (*Coma Berenices);* M22, M28, M54, M55, M69, M70 and M75 (*Sagittarius);* M13 and M92 (*Hercules);* M56 (*Lyra);* M71 (*Sagitta);* M2 and M72 *(Aquarius);* M30 (*Capricornus);* and M15 *(Pegasus).* Find those 27 globulars, and all you'll need are 23 more NGC globulars to earn a Globular Cluster Club pin.

Check with **yr. editor** to find out how to estimate Shapley-Sawyer concentration levels: he can give you an observing form you can use to log your observations, and he has a chart showing the 12 classes of globulars.

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Answer to Trivia Question on p. 4: In all, FRAC members have logged 1,383 hrs. of outreach activity since Jan. 1, 2006, the earliest date accepted by the Outreach Club. And that total doesn't include unreported outreach activities—or, more importantly, **Stephen Ramsden's** prodigious solar outreach in the past four years.

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The Green Rim: An Observing Report (Well, Sort Of)

by Bill Warren

Like most amateur astronomers, I've always wanted to witness the ultra-cool phenomenon known as the "green flash." Such occurrences are relatively rare, of course, or else I'd have seen one. Heaven knows, I've looked for them often enough!

When green flashes occur, they take the form of a momentary green spot or horizontal bar – the "flash" -- above or across the top of the **Sun** (see photo.) They arise just prior to sunset or just after sunrise, and they last for just a second or two. (It wouldn't be a "flash" if they lasted for thirty minutes.) Their rarity is due to the conditions necessary for them to appear.

First, of course, you need the Sun. That's good news and bad news. The Sun is always easy to find – except when it isn't. Cloudy sunsets and sunrises don't produce green flashes.

Second, you need a clear, unobstructed horizon (such as the ocean or the view from a mountaintop) at sunset or sunrise. The horizon is important because the atmosphere is denser there than when the Sun is overhead. "Clear" means that there's not a lot of dust, smog or haze present to dilute or scatter the Sun's rays. You won't see a green flash above a city skyline or a freeway at rush hour.

When a green flash occurs, it's because a thick layer of atmosphere at ground level, warmer than the air above it, produces a mirage that increases refraction (the bending of light rays) without scattering those rays. Green flashes are actual phenomena and not mirages – but the mirage is instrumental in seeing the flash: it magnifies the green portion of the spectrum into momentary visibility.

Anyway, to make a long story longer I didn't see the green flash during my recent stay in Florida -- but I managed to see a longer-lasting and more common effect, the *"green rim,"* three days in a row. I saw it as a thin, lime-green band just inside the upper edge of the setting Sun. In each case, I watched it for 8-10 min. until it faded away before the Sun set.

Web sources say that a green rim is present at every sunset, but too thin to be seen with the naked eye. But my nephew and I saw it clearly, with and without binoculars.

It wasn't a case of wishful thinking, either: I wasn't looking for a "green rim" because at the time I wasn't aware that they existed. The first time I saw it I asked **Brandon,** "Does the Sun look green around the upper edge to you?" He replied that, Yes, it did, so we looked at it in binoculars. The lime-green band was about 12" thick in my 10x50 binocs.

My visual acuity has diminished somewhat in recent years, but I can still separate the double star Mizar/Alcor **(Zeta/80 Ursae Majoris)** without difficulty on a clear evening. Their separation – 14.4" – is only slightly more than the width of the green rim on those exceedingly clear afternoons, so I'm confident that I did indeed see that phenomenon naked-eye.

Meanwhile, the dying Sun was not so bright as to hurt my eyes even in binoculars, but nevertheless bright enough to leave a green, circular afterimage wherever I looked for another 10 min. An obvious but important rule of thumb for observing the setting or rising Sun is, *If it's too bright to look at comfortably, don't look at it – especially not in binoculars or a telescope.*

(And by the way, **Ken Walburn:** the Sun is hot, but green flashes aren't the same thing as hot flashes.)

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Above: Alan Pryor used 12 sets of LRGBs @ 5 min. each to produce this lovely image of the bright spiral galaxy M88 in *Coma Berenices.* Visually, M88 displays a bright oval core inside an oval, NW-SE oriented halo.

Next Page, Upper Left: Felix Luciano used an H-alpha filter and 10 subs x 900 seconds with darks and flats calibrated to image the beautiful **Lower's Nebula (Sharpless 2-261)** in *Orion.* Discovered in 1939 by astrophotography pioneers **Harold Lower** and his son **Charles**, this 30' x 50' cloud of doubly ionized gases lies near the boundary of *Orion* and *Gemini.*

Above: This close-up of the southern portion of the famous supernova remnant **North America Nebula (NGC 7000, Caldwell 20)** was created by **Felix Luciano,** using 14 subs x 900 seconds for each sub. Pictured are the Gulf of Mexico, Florida, the southeastern seaboard, the southwestern U. S. and Mexico. The resemblance is so uncanny that you'd swear you see a mountain range rising into western Texas.

The entire nebula measures a whopping 2.3^{o} x 3^{o}, and requires dark, transparent skies to be seen visually. **Larry Higgins** has seen it naked-eye, but it is best seen in binoculars.

The "Gulf of Mexico" in Felix's photo is, of course, composed of obscuring dust that hides the stars that lie behind it.

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How can you tell if a group of stars you see in a telescope is an **open cluster,** a **globular cluster** or a **galaxy?** Basically, it's a matter of zeros – or, more specifically, how many zeros go after the 1.

If you can count the stars in a cluster – or if you can reasonably estimate within a few hundred stars how many you're seeing – it's an open cluster. Open clusters contain anywhere from a handful of stars to upwards of a thousand. (Three zeros.)

At the other end of this grouping, galaxies typically contain hundreds of billions of stars (11 zeros). With the exception of the **Large** and **Small Magellanic Clouds** and perhaps a few others, galaxies are too far away for us to see any of their individual stars. Whatever stars you see within their borders are closer to us than the galaxy is.

Between those broad groupings, globular clusters are round or oval groups of up to a million or more gravitationally bound stars (7 zeros). **Omega Centauri (NGC 5139)** is thought to contain about a million stars. If you can resolve individual stars in such a group, it's a globular. Almost without exception, the globulars we see lie within our galaxy, the **Milky Way,** and thus are much closer to us than most galaxies. That's why we can resolve individual stars in many globulars.

All of this breaks down, however, in the case of very small, faint or distant open or globular clusters and galaxies. To cite two examples: M94, a spiral galaxy in *Canes Venatici,* looks very much like an unresolved globular cluster; and M11, an open cluster in *Scutum,* is so rich in resolved stars that it was long thought to be a loose globular cluster. In such cases, the only way to know for sure what kind of cluster you're looking at is to consult outside sources.

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