THE

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., July 25-26: Joe Kurz observings (at dark); **Thurs., Aug. 14:** FRAC meeting/Perseids Pizza Party (7-10 p.m., The Garden in Griffin, Ga.); **Fri.-Sat., Aug. 22-23:** Joe Kurz observings (at dark).

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President's Message. If you're a pizza lover, you won't want to miss our Aug. or Sept. meetings. In Aug., we'll have a "Perseids Pizza Party" at The Garden in Griffin from 7-10 p.m. on **Thurs., Aug. 14th**; and in Sept., **Bill & Louise Warren** will host their annual pool party picnic on **Sat., Sept. 13th**. Both events will be open to your entire family, so start making plans now to attend.

We'll have more to say about the pool party next month. As for August – Bill will tell you what you need to know about meteor shower observing on p. 4. FRAC is footing the bill for the pizzas and soft drinks, so all you'll need to bring is yourself, your family and a healthy appetite. The "Upcoming Meetings/Activities" column on p. 2 will fill in the blanks. I hope you'll be able to attend, because our Perseids Pizza Parties are always fun.

-Dwight Harness

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Last Month's Meeting/Activities. A fearsome foursome of fractured FRACsters – **Joe Auriemma, Aaron Calhoun, Dwight Harness** and **yrs. truly** – defied the clouds that lingered over Joe Kurz on June 28th. The sky didn't cooperate quite as well as it could have, but it wasn't wasted time: Joe flew two of his model planes until dark; we saw **Jupiter, Mars & Saturn;** we discussed arrangements for our upcoming party meetings in Aug. & Sept; and we found a new Observing Site #2 that offers splendid views of the western half of the night sky.

The new Site #2 is located much nearer to the gate than the old site, on the other side of the treeline from Site #1. (And here's an added bonus regarding *all* of our JKWMA sites: *the road from the gate has grassed over, making the drive to those sites much smoother than previously.*)

Our 14 attendees at the July meeting included: **Dwight Harness; Truman Boyle; Tom Moore; Aaron Calhoun; Felix Luciano; Steve Bentley; Teresa Watson; Sarah, Cherrie & David O'Keeffe; Steven "Smitty" Smith; Joseph Auriemma; Jessie Dasher;** and **yr. editor.** Felix and Bill brought some door prizes, and five members were awarded A. L. observing club certificates & pins: Truman, Sarah & David (Basic Outreach); Dwight (Master Outreach); and Felix (Lunar Program).

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This 'n That. We didn't find out about it until nearly a month after it happened, but **Andy Hasluem** was bitten by a tick in mid-June and

contracted Rocky Mountain spotted fever. It was touch-and-go for awhile whether he would survive. He was defibrillated -- *while awake!* -- and spent five days in the hospital, but he says he's good to go now and looking forward to our next JKWMA observings and the Aug. meeting.

We're glad to hear you're doing better, Andy. We thought you weren't at JKWMA because we weren't wearing deodorant. (It attracts bugs.)

***Stephen Ramsden** is the star of photo #18 on p. 74 in "Spring into NEAF," **Sean Walker's** review of products and activities at the Northeast Astronomy Forum 2014 (*Sky & Telescope,* Aug. '14, pp. 68-75).

Stephen also appears on p. 71 in photo #8: look for his greenish-brown Charlie Bates cap to the left of the man in the yellow shirt.

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Upcoming Meetings/Activities. We'll have Joe Kurz observings on **Fri.-Sat., July 25th-26th**. The rangers have planted crops on Site #3, so we won't be able to use that site for awhile.

Our new Site #2 is located about 100 yds. beyond Site #1. Just drive past Site #1 on your right, follow the road where it curves first left through the trees and then right, and that's it. You can't miss us, our 'scopes will be set up by the roadside. If you arrive after dark, switch on your parking lights before you turn right, since **Alan** and **Felix** might be astroimaging. Someone will show you where to park.

The most important part of the sky for us is the southern sky. The northern sky isn't terribly important because of the light glow of Atlanta and the Speedway, and Griffin's sky glow is to the east. When we observed at Cox Field, we waited until northern objects drifted to the west to observe them, and for eastern objects to rise above Griffin's light dome.

We'll do the same thing at the new Site #2. We won't see objects in the eastern sky until they clear the treeline, but when they do we'll see them for the rest of the night. The roadside parking is better than it was at the original Site #2, and the setup area is more level.

At our new Site #2, we're trading off the early-evening view of objects rising in the E and SE for longer views after they reach their highest point in the sky (called the *meridian*).

Our Aug. club meeting will feature a "Perseids Pizza Party" at The Garden from 7-10 p.m. on **Thurs., Aug. 14th.** Bring the entire family (except maybe weird Uncle Max, who likes to tell about the time he was abducted by aliens). If it rains, we'll go indoors and watch a segment from the original *Cosmos* series featuring **Carl Sagan.** (Recent NASA research has shown that pizza tastes just as good outdoors or indoors.) If it's cloudy, we'll stay outside and do what we do best, i.e., *eat* and *make up lies about everyone who's not present.* (And if you bring Uncle Max, he can tell us about the medical tests the aliens conducted on him.)

Please let **Dwight** know at **770-229-9321** if you're coming and how many family members you're bringing, so he'll know how many pizzas to order.

Finally, we'll wind up August with two Joe Kurz observings on **Fri.-Sat., Aug. 22nd-23rd.** That will give us four chances of having at least one clear night for observing between now and then.

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People You Should Know: John Wallace.

*(Editor's Note: It may seem strange at first glance that we should devote an installment of this occasional feature to a FRAC member whom many of you have never met. But during his years living in Griffin, John Wallace was more than just another club member. He is, like **Felix Luciano,** the kind of person who makes you proud to be in a club with astronomers like him in it.)*

John Wallace is a charter member of FRAC. He is also a dedicated turkey hunter.

Before moving to Athens, Ga. several years ago with his wife **Heidi** to be near their children and grandchildren, John was *very* familiar with JKWMA**.** We always knew that, during turkey season, we wouldn't see John at our club observings. Joe Kurz Wildlife Management Area and Cox Field (our observing site at the time) were his two "homes away from home."

John is a splendid observer, as anyone who has ever shared an observing field with him knows. Naturally, we tried to convince him that there were plenty of huntable animals in the night sky. There's no turkey up there, of course -- although a wise guy like **Dwight Harness** might point out that there are plenty of "turkeys" with telescopes at our observings. But there are two bears (*Ursa Major, Ursa Minor*), two lions (*Leo, Leo Minor),* a wolf (*Lupus),* a bobcat (*Lynx),* a fox *(Vulpecula),* a rabbit

(Lepus), a crow *(Corvus)*, and even two hunting dogs *(Canes Venatici).* Not to mention a **Wild Duck Cluster (M11).**

Didn't matter to John: during turkey season, observing took a backseat to his beloved turkey hunting, and nothing short of a change in state hunting regulations was going to change it.

The rest of the year, John was a regular fixture at our Cox Field observings. He earned four A. L. observing pins – Messier, Binocular Messier, Deep Sky Binocular and Double Star. Doubtless, he would have added considerably to that total if he hadn't moved to Athens. (He's still in FRAC, and we still miss him at our meetings and observings.)

John lived a few miles S of Griffin, but he never complained about the time, preparation and travel involved in hunting at JKWMA or observing at Cox Field. He was doing things at those places that gave him great satisfaction and joy. He understood what **James M. Barrie** meant when he wrote, "It's not work unless you'd rather be doing something else."

Much attention has been paid in recent months and years to the problem of attracting young people into astronomy – and it's important, obviously. But there is a larger point that's being missed in focusing on the young: *What astronomy needs is people* of any age *who love astronomy enough to consider it an important part of their lives* – even if, like John Wallace, their priorities change with the beginning of turkey season.

(**John's response: "**My absence at FRAC during turkey season was not in fact absence from stargazing, but just a change in the timing of it. I became an early morning stargazer from late February through early March.

"Since one listens for gobblers to sound off at (or before) daybreak, the mornings start long before then. I would always reserve a little time for binocular viewing before leaving the house, and again after getting to the field. As you know, the best viewing conditions are often after 3-4 a.m., so I had some great skies.

"I was reminded at those times of the seasonal changes of the heavens, and how our ancestors began to mark those changes and relate them to their lives. I related in the same manner. I was always excited when I saw *Scorpius* rising early in February; by mid-March it was fully risen and I could observe the scorpion's tail, **M6** and **M7**. This signaled that it was time for scouting, and then the start of another turkey hunting season.")

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All About Meteors

article by Bill Warren

I've seen it raining fire in the sky.

-John Denver
Rocky Mountain High (1972)

Introduction. Besides the **Sun,** planets, moons and asteroids, our solar system contains untold numbers of smaller space rocks and other debris. Those debris particles range in size from microscopic to several miles in diameter. As long as they remain outside Earth's atmosphere, they are referred to as **meteoroids.**

When a meteoroid enters Earth's atmosphere, it becomes a **meteor** and begins to burn due to its velocity and friction with the atmosphere. Meteors the size of a softball or larger can become fireballs called **bolides.** A few bolides have been bright enough to be seen in the daytime. Sometimes bolides explode like silent skyrockets at the end of their fiery journeys through the night sky.

Most meteors, however, are no larger than grains of sand. They appear as momentary streaks across the night sky at altitudes of 30-80 miles and burn up before they reach the ground. Such meteors are extremely common. An estimated 10 tons of them burn up in Earth's atmosphere every day. On any clear evening at a dark site, you're likely to see 6-12 meteors even if there is no meteor shower in progress.

Meteors that reach the ground are called **meteorites.**

Origins. Meteors have always been around. They were first mentioned in a Chinese manuscript that dates back to 644 B.C. The Greeks and Romans were aware of meteors; in fact, the word *meteor* comes from the ancient Greeks, and means "thing in the air."

Meteors originally were thought to be bursts of hot gases in the atmosphere. It wasn't until the early 1800s that the idea of rocks falling from the sky arose, when French astronomer **Jean-Baptiste Biot** collected and studied more than 3,000 meteorites that fell on the village of L'Aigle in Normandy, France on April 26, 1803.

Meteors come from either of two places. Some are fragments of colliding rocks in the asteroid belt or elsewhere, or rocks that strike the **Moon** or **Mars**; they can come from any direction at any time. When they enter our atmosphere, they are referred to as **sporadic** meteors.

Other meteors are debris left over from passing comets.

Dirty Snowballs. Comets come from the **Oort Cloud**, where they reside in uncountable numbers until something sends one of them hurtling toward the Sun. They are "dirty snowballs" – icy mixtures of gas and dust, remnants of the formation of the solar system.

When one of them begins an inward journey toward the **Sun**, its outermost layer eventually begins to melt due to solar radiation, releasing gas and dust in the process. Those particles usually form one or more tails. Gas (ion) tails are bluish; dust tails are brown, and can stretch for hundreds of millions of miles from the comet's head.

Meteor Showers. After the comet does whatever it's going to do – crash into the Sun, fly by it and exit the solar system or round the Sun and establish a solar orbit – the gas particles in the tail disperse but the dust stays together in a stream and establishes its own predictable orbit like miniature planets.

If Earth regularly passes through the orbital path of a comet's debris, once or twice a year it will encounter those particles, creating a **meteor shower**. The area from which the meteors appear to be coming is called the *radiant*, and it gives the shower its name. For example, the **Perseids meteor shower** peaks in mid-August, and the radiant is always somewhere in the constellation *Perseus.*

Some comets -- e.g., **Halley's Comet** -- return periodically. (In Halley's case it's every 76 years.) When they return, their fresh debris trails produce new meteor showers that are named, not for the comet that spawned them, but for whatever constellation they appear to be coming from. Comet Halley has produced two annual meteor showers, the **Eta Aquarids** in May and the **Orionids** in October.

Meteor Storms. Most of the best annual meteor showers produce 80-100 meteors per hour at peak. Occasionally, however (as happens with the **Leonids meteor shower** every 33 years), Earth passes through an unusually large swarm of meteoroids. When that happens, the result is a **meteor storm.**

On Nov. 17, 1966 a Leonids meteor storm produced meteors at the astonishing rate of nearly *four meteors per second* for a 20-min. period at its peak!

(After singer/songwriter **John Denver** wrote in 1972 of having "seen it raining fire in the sky," he later said that he was referring to the high he got from watching Colorado's colorful sunsets. He never saw the Leonids meteor storm. Critics contended that his "Rocky Mountain High" was due, not to what he and his friends were watching around the campfire, but to what they were smoking.)

The Leonids storm's peak wasn't as productive 33 years later in 1999; still, **Dr. Richard Schmude** counted more than 1,500 meteors between midnight and dawn.)

Observing Meteor Showers. Unless you're planning to record how many meteors you see, when you see them and chart their paths across the sky, watching a meteor shower is simplicity itself. All you need is your eyes, since binoculars or a telescope will restrict your viewing area to a tiny piece of sky. You won't see many meteors that way.

The only other aids you'll need are: a reclining lounge chair (so you won't have to crane your neck upward for hours at a time); a blanket, insect repellent or other seasonal comfort aids; and perhaps a pizza or two to share with your family and friends.

Where you look doesn't matter, because meteors can be seen anywhere in the sky. Those associated with the shower will appear to be heading away from the radiant, but you won't see more of them near the radiant than anywhere else. Just direct your attention to the part of the sky that is farthest from any light pollution sources such as the Moon or city lights, and lie back to watch the show.

(Incidentally, most meteor showers aren't confined to a single night. It depends on the length of the stream, which can be millions of miles. You're likely to see early and late arrivals a week or more before and after the peak, which is simply the part of the stream where the debris is most heavily concentrated.)

Listening to Meteor Showers. What if it's cloudy? Well, you can *listen* to the meteors on your car radio regardless of whether the sky is cloudy or clear.

As meteors pass through Earth's atmosphere, they leave behind a trail of ionized gas molecules. If you tune your radio to a commercial FM station you can't normally pick up that's about 600 miles away – say, 91.7 FM (WMKL in Miami) or 91.5 FM (WBJC in Baltimore) – you'll hear static. But whenever a meteor zips through the atmosphere, the radio waves will bounce off the meteor's ion trail and the station will come in loud and clear until the signal fades back to static in a second or two – or you might briefly hear booming, whistling or popping sounds on the radio.

Meteorites. As mentioned earlier, meteorites are meteors that are large enough to survive their plunge through Earth's atmosphere. Collecting meteorites is a hobby in itself. It can be expensive, but finding meteorites and selling them can be a lucrative pastime if you're lucky and skillful. Meteorites of lunar or Martian origin are rare, but they can sell for $11,000-$22,500 an ounce.

In 2012, 35 fragments of a green meteorite designated as **NWA 7325** were found in the Sahara Desert in Morocco. They were tentatively identified as having come from **Mercury**; if their identification holds up – and so far it has -- they are unique and therefore the rarest (and most valuable) meteorites ever found.

Meteorites are similar in composition to asteroids. There are three broad classes of meteorites: *stony; iron;* and *stony-iron.* Stony types are the most common, but iron meteorites are easier to find with a metal detector. Stony-iron meteorites are a combination of both types.

The best places to search for meteorites are in areas where they are known to have fallen, or in places where they stand out from their surroundings (e.g., in deserts or at the snow-laden north or south poles).

Questions about meteors.

1. Why do meteor showers usually reach their peak activity between midnight and dawn)? As Earth rotates on its axis, the shower's radiant moves across the sky like the stars, planets and everything else. When the radiant is at its highest point in the sky, the Sun will be rising because the Earth's front side will be rotating into the path of the meteor debris. It's the same reason that a moving car receives more rain on its windshield than its rear window.

2. Why do meteor showers have a radiant, or area of apparent common origin? Although the meteoroids in a shower travel together in their orbital path, they can enter Earth's atmosphere anywhere, and from any angle. They seem to be coming from the same direction for the same reason that railroad tracks appear to merge into one track in the distance: it's a matter of perspective.

3. Why don't we find any meteorites from Venus or the outer planets? Their thick atmospheres incinerate incoming meteors and prevent fragments of exploded meteors from returning to space. Mercury and Mars have relatively little atmosphere; the Moon and asteroids have none at all.

4. **How do astronomers know where meteorites come from?** By comparing their chemical composition with that of planets and asteroids whose compositions are known. When they find a match – *presto!* – that's where the meteorite came from.

5. Has anyone ever been struck by a meteorite? On Nov. 30, 1954, a 9-lb. meteorite crashed through the roof of **Ann Hodges's** home in Sylacauga, AL. It ricocheted off a fireplace and a radio before striking Mrs. Hodges on the arm and hip. She was hospitalized briefly but suffered no lasting harm.

When a large meteor exploded above Chelyabinsk, Russia on Feb. 15, 2013, more than 1,500 people were injured by flying glass fragments when windows were shattered by shock waves from the blast, but fortunately no one died. No one was struck by meteor fragments.

6. What is the largest meteorite ever found? The Hoba West meteorite, discovered by a farmer plowing his fields near Grootfontein in Southwest Africa (now Namibia) in 1920, measures 9 ft. x 8 ft. and weighs an estimated 65 tons.

The greatest amount of meteorites collected from a single meteor is from the one that fell in the Sikhote-Alin Mtns. in eastern Siberia on Feb. 12, 1947: 70 tons of iron fragments were recovered in an area measuring about ½ mi. in dia.

(Incidentally, the smallest meteorites are known as **micrometeorites.** They're not much larger than dust particles, and they fall to Earth at a rate of about one per second. As **Larry Higgins** points out, you're likely to find iron micrometeorites by passing a magnet along the rain gutters of your roof.)

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Below: Felix Luciano loves to image edge-on spiral galaxies. One look at his beautiful photo of **NGC 5907** will show you why. (It will also show you why 5907 is called the **Splinter Galaxy**.)

The Splinter, located 3^{o} SW of 3rd-mag. **Iota Draconis,** is one of the largest, brightest and

prettiest galaxies in the Herschel 400 Program. **Yr. editor** described it as "long and flat – maybe 10' x 1.5' – with a bright, thickly elongated core that fades evenly to the edges."

Visually, NGC 5907 is slightly smaller (and one magnitude fainter) than **NGC 4565 (Needle Galaxy)** in *Coma Berenices,* but the two edge-on galaxies are strikingly similar in other respects.

North is at the top center of Felix's photo.

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Upper Right Corner: **M16 (Eagle Nebula),** an emission nebula/open cluster in *Serpens Cauda* (the Serpent's Tail). North is at the top center of **Alan Pryor's** photo; the dark Eagle is at the center.

If you've been in astronomy awhile, you've probably seen the famous Hubble Space Telescope photo, "The Pillars of Creation." It's one of the most recognizable astrophotos ever taken, along with the Spitzer Space Telescope's "The Eye of God" photo of **Helix Nebula (NGC 7293),** a planetary nebula in *Aquarius.*

Awhile back, Alan mentioned that he's always wanted to see the Pillars of Creation, and maybe image it.

"Have you ever seen Eagle Nebula?," we asked. He said that he had.

"Then you've seen the Pillars," we replied. The Eagle's upraised left wing – the one on our right – is the "Black Pillar"; another, equally large pinkish pillar curls over the bright star just above the Eagle; and the third pillar shown in the Hubble photo is the small, dark one lying just below the NW end of the Black Pillar. (Alan's lovely photo encompasses a much greater area than the Hubble close-up of the Pillars.)

Technically, at least, M16 is the large, scattered open cluster above and to the upper right of the Eagle, and the nebulosity that contains the Eagle is **IC 4703.** But it's customary to combine the two under the familiar title of "M16, Eagle Nebula."

Visually, the cluster contains about 50 stars of mag. 8 or fainter in an area encompassing 1/3 of a degree. Most of its stars are concentrated NW of the Eagle.

The nebula is much larger, of course, and is lighted by fluorescence from the stars in the cluster.

Seeing the Eagle can be difficult, especially in a small telescope. It requires dark skies, good transparency and seeing, and patience. Find the cluster, and then study the nebulosity to the SE. A nebula filter will be helpful.

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