THE

FLINT RIVER OBSERVER

NEWSLETTER OF THE FLINT RIVER ASTRONOMY CLUB

An Affiliate of the Astronomical League

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Club Calendar. Fri.-Sat., Oct. 5-6: JKWMA observings (at dark); **Thurs., Oct. 11:** FRAC meeting (7:30 p.m. at The Garden in Griffin); **Fri., Oct. 12:** High Falls State Park public observing time TBA).

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President's Message. The idea of traveling far away from city lights to observe in total darkness doesn't appeal to everyone. Throw in the fact that sometimes we see strange things going on in the sky that we can't explain, and the idea can seem – well, *creepy.*

Not to us, though. The darker it is, the better. As for the other – we enjoy seeing things in the sky that shouldn't be there, and trying to figure out what we saw.

It happened again at JKWMA on Sept. 5th. The sky was clear and very dark.

Bill saw it first. It was traveling east-to-west, and moving slow like a helicopter but not as noisy. We agreed that it was flying very low, but we didn't agree on what we saw.

Bill watched it naked-eye; he said it looked like a long, thin aircraft with some kind of triangular extension pointing downward at the tail end. But I was watching it in my binoculars, so I had a better look at it. It had conventional lights like an airplane, so I'm sure that's what it was. It looked like it was flying in a stall position that raised the front end and lowered the tail end. A landing pattern is 700 ft. altitude, so I'm guessing that's what the pilot was doing. Maybe he saw the large dove field on the other (western) side of the trees from us and thought it was a landing spot. He flew the length of the field but didn't land or turn around and come back. Maybe he changed his mind, gained altitude and flew away instead of landing.

If that's what it was, he was lucky he didn't crash. If he had dropped a wing to one side, he would have crashed and we would have seen it, because he wouldn't have had enough altitude to recover.

Still…The plane didn't seem to be in trouble. It was moving slowly but not erratically, and the engine wasn't cutting out or sputtering. Why would a pilot execute a maneuver like that on such a dark night and at such a low altitude if he wasn't in trouble? And if he *was* in trouble, why didn't he land?

Maybe he was practicing stalling maneuvers. If so, it was a risky thing to do.

-Dwight Harness

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Last Month's Meeting/Activities. The High Falls observing on July 24th was attended by ten guests and eight FRACsters: **Sean, Chelsea & Gianna Neckel; Steve Benton; Elaine Stachowiak; Felix Luciano; Dwight Harness;** and **Truman Boyle.**

"The observing went very well," Sean reports. "We observed four planets spread across the sky at the same time. We also discussed why stars twinkle (and why they twinkle more near the horizon); why the **Moon** changes color as it rises; the ice moons of **Jupiter** and **Saturn**; and the myth of **Orpheus** and **Lyra**. When were discussing some of the unique properties of the planets, Gianna pointed out to the group that scientists believe that it might rain diamonds on **Neptune**."

We had mild temps, skies that ranged between good and very good, and just six FRACsters -- **Aaron Calhoun & yr. editor** (both nights) and

Dwight Harness & Erik Erikson (Fri. night) -- to enjoy them at our Sept. JKWMA observings. As is often the case, we had an encounter with the unknown on Fri. evening. There are a lot of *ifs* and *maybes* about Dwight's theory of what we saw, but it's a better explanation than any of the rest of us could come up with.

Eight FRACsters – **Ken Olson, Dwight Harness, Aaron Calhoun, Felix Luciano, Wayne Gardner, Eva Schmidler, Cindy Barton** and **yr. editor** – showed up for the "Art in the Garden" event on Sept. 9th. About a hundred of those attending visited our solar observing. Ken was the star of the show with his H-alpha view of the **Sun** shown on a computer screen.

We had fifteen in attendance at our September pool party/dinner meeting at **Bill Warren's** house: **Aaron Calhoun; Carlos & Olga Flores** and Olga's mom **Luda**; **Eva & Richard Schmidler; Tricia Lopez; Jeremy, Sarah, Emily & Delilah Milligan; Erik Erikson; Felix Luciano;** and hosts Bill **& Louise Warren.**

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This 'n That. Ex-FRAC member **Rich Jakiel** *(see pp. 4-6 of this issue)* has an article, "Minting a Celestial Memory," in the Sept. '18 issue of *Astronomy* (pp. 32-35). It's the story of solar eclipses as told through coins minted by the ancient Greeks, Romans, and others extending through the Middle Ages to the Enlightenment Period.

Over the years, Rich has written an astronomy book and about two dozen articles in *Astronomy.* This one ranks with the best of them. As baseball's **Yogi Berra** said, "Don't miss it if you can."

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Upcoming Meetings/Activities. We'll begin the month with JKWMA observings on **Fri.-Sat., Oct. 5th-6th**. The **Waning Gibbous Moon** won't hinder our observing.

Our club meeting will be at 7:30 p.m. on **Thurs., Oct. 11th** at The Garden in Griffin. Our program will be **Alex Filippenko's** "Magnificent Saturn."

The following evening, on Fri., Oct. 12th, we'll conduct another High Falls State Park public observing. We won't do the "paddling in the park" segment this time around. The starting time will be announced later.

To get to the park, take I-75 South to Exit 198 (High Falls Rd.). Turn left onto High Falls Rd., and the park will be 1.5 mi. ahead on the left. As you drive into the Visitor Center, you'll come to a stop sign. Turn left there; otherwise, you'll be driving against one-way outgoing traffic!

Drive around the Visitor Center and park in the parking lot between the building and the lake. We will meet in that parking lot.

The G. P. S. coordinates are: N 33.178333, W -084.020533.

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"We Come In Peace" – Or Maybe Not!

by Aaron Calhoun, Dawn Chappell & Bill Warren

Recently you were asked to respond to the following question: *If Earth is ever visited by aliens, do you think they will come with peaceful intentions, or will they be warlike?* Here's what Aaron, Dawn and yr. editor had to say about it:

Aaron Calhoun

I have mixed feelings about whether aliens have visited Earth or will visit it in the future. Even if interstellar travel is possible, we have a LONG, LONG way to go before we can do it. The chances are slim that *anyone* can do it, because interstellar travel may be impossible.

If it *is* possible, I take the optimistic view that if aliens ever visit us, they will come in peace or just to explore. I believe that in order for them to reach the level of interstellar travel, they would have to put aside their petty differences and learn to live in peace. That's something that we've never done.

Whether they are friendly or warlike may not matter, though. They will find enemies here that may be far more deadly to them than humans: microbes, viruses and bacteria. Unless the aliens have the same illnesses and diseases back home that we have here, they won't be immune to ours, and something like a cold or flu likely would kill them. If we landed on their planet, their disease-bearing microorganisms probably would be just as deadly to us.

Dawn Chappell

In regard to future visits from intelligent aliens, I believe that their intentions will be peaceful, and hopefully we won't antagonize them into a war.

Looking at other species within our own planet, you can see that not everyone is hostile (unless provoked). Many species are able to interact and spend the majority of their time in peaceful activities. Humans are one of the few species that start wars with one another for seemingly no reason.

It is my belief that any alien species would be evolved beyond the ego- filled aggression that is prominent on Earth. Once we move past being led by ego, we will find that we can live harmoniously with one another.

*(**Editor's Note:** To underscore Aaron's and Dawn's optimism, consider this: Throughout mankind's recorded history, there have been many accounts of "ancient astronauts" visiting our planet. No one knows whether those stories are true – but **not a single one of those alleged human encounters with alien beings has indicated that they were warlike, or that they came for any purpose other than studying us or helping us technologically**.)*

Bill Warren

There are at least three reasons why aliens might visit Earth: for scientific purposes (i.e., to learn about other worlds and their life forms); to mine Earth's mineral or biological resources; or to find a home for inhabitants of a dying planet. Of the three, only the first one suggests peaceful intentions.

In all three scenarios, the aliens would need a technology and propulsion system that is vastly superior to ours in order to get here – say, something along the lines of *Star Trek's* warp drive or another science-fiction staple, *hyperdrive*. Both of them involve moving across the universe at fantastic speeds that as far as we know exist only in sci-fi novels, movies and tv shows.

The universe is immense, and most of it is empty space. There may be billions of alien civilizations out there – but unless they can travel faster than the speed of light, the chances of one of them ever reaching our planet is practically zero.

But there are other considerations:

*With technology that is advanced enough for them to get here, their weaponry probably will be equally advanced, and therefore far beyond the ability of human defense systems to offer any meaningful resistance to them if they are warlike. They wouldn't come halfway across the universe just to wage war, enslave or eradicate humanity or steal our natural resources unless their weapons are as advanced as the technology that brought them here.

*It is inconceivable to me that intelligent beings, whether warlike or peaceful, would venture across the unknown depths of deep space without carrying weapons to subdue, or at least protect themselves from, whatever dangerous life forms they might encounter. Even if they come in peace, they will be prepared for battle, or at least to defend themselves vigorously if attacked. They might appear as mild-mannered and inoffensive as **E. T.** or accountants wearing horn-rimmed glasses and plastic pocket protectors, but that appearance would be an illusion. Potentially, they would be more lethal than we can possibly imagine, which leads me to wonder:

Would we welcome peaceful visitors from another world, as portrayed in the 1977 movie *Close Encounters of the Third Kind*? Or would we (as E. T. learned in the 1982 movie *E. T.: The Extraterrestrial*) regard them as lab rats to be dissected in order to find out what makes them tick? I'd like to think that we'd choose to greet them as friends – but given mankind's suspicious, paranoid nature and warlike tendencies, it's equally likely that we'd mistreat them and find out just how lethal they are.

If they come, I hope it will be with peaceful intentions, and that they will remain peaceful when they find out how technologically primitive we are compared to them. There will be much that we can learn from them if they are willing to share their knowledge with us – and if we can curb our wild-west tendency to shoot first and ask questions later.

*(This article is fondly dedicated to the memory of the late **Ryan Force**, a FRAC member who was intrigued by the possibility that aliens might have visited our planet in the past. -Ed.)*

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Double Stars
by Aaron Calhoun

When we look up at the night sky, the stars look like single points of light. But that's not the way it is. Astronomers think that as many as 90% of the stars in the universe are double stars.

There are two basic kinds of double stars, visual doubles and binary stars.

Visual Double Stars. Although they are far apart and have nothing to do with each other, we see them in our telescopes as two stars lying close together. They are also called *line-of-sight doubles* because they aren't really double stars, that's just the way we see them.

Binary Stars. Also known as *physical doubles*, binary stars travel through space together or orbit around their common center of gravity. They form in pairs – or sometimes even as multiple stars – because where there is enough gases and dust to form one star, there usually is enough to form at least one more. The brightest one is called the *primary*, and the other is its *companion*.

Binary stars' orbital periods vary widely, depending on their distance from each other. The shortest known period is the x-ray binary **X1820-303** in the globular cluster **NGC 6624** (in *Sagittarius*): the companion orbits the primary every 11.5 minutes.

The longest known binary orbital period belongs to **Delta Serpentis**, a 4-star system in *Serpens*. The two outermost companions take 3,200 years to complete one orbit of the primary star.

Many astronomers believe that the **Sun** is a binary star, although they have no idea what star its companion might be.

There are other types of binary stars.

One is the class of variable stars known as **eclipsing binaries**. (Variable stars are stars that vary in brightness over a given time period for one reason or another.) **Algol (Beta Persei, the Demon Star)** is an eclipsing binary. Its light dims every time the companion passes in front of the primary star.

Another is **spectroscopic binaries**-- stars that lie so close together that not even a very large telescope can split them into two stars. But a spectroscope can do it by revealing the stars' different chemical compositions. Astronomers study those stars by analyzing disturbances caused by the companion.

Finally, there are the **multiple stars** that I mentioned earlier: not open clusters of scattered stars traveling together like a buffalo herd, but two or more companions orbiting the primary. The most famous multiple star system is **Epsilon Lyrae,** the **Double-Double.** To the naked eye it's one star; in binoculars, it becomes two stars; and in a telescope each of the pair is a double star, making four stars in all.

Alpha Centauri is a well-known three-star system. Alpha Centauri is the 2nd-closest star to the Sun. One of its companions, **Proxima Centauri**, is actually closer to us than Alpha Centauri is.

The Astronomical League has three double star observing programs: Double Star, Binocular Double Star and Advanced Binocular Double Star. **Sean Neckel, Alan Rutter** and I are working on the Double Star Program.

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Above: M33 (Pinwheel Galaxy) in *Triangulum*. (North is up in **Alan Pryor's** photo.)

Deep Observing M33

by Richard Jakiel

*(Editor's Note: In stargazing terms, **Rich Jakiel** is a "deep-deep sky" observer. Whereas the typical deep-sky observer studies a galaxy such as **M33** and moves on to something else, Rich goes deeper, examining the components of M33 that make it, in his words, "one of the finest galaxies in the sky…a wonderfully complex instrument."*

Easily accessible via star-hopping, **M33,** the **Pinwheel Galaxy**, is nearly face-on to us, an Sc-type (i.e., open-armed) spiral galaxy located about 1/3 of the way between the stars **Alpha Trianguli** and **Beta Andromedae**. Its mag. 5.7 brightness is

exceeded in galaxies in northern latitudes only by that of nearby **M31, Andromedia Galaxy**.

The posted magnitude for M33 is deceiving, however, since its large visual size – 45' x 25' – serves to significantly reduce its surface brightness. It's not unusual for observers to locate M33 in their finder scope and fail to see it in their main scope. The Pinwheel Galaxy can be very difficult to observe from urban or even suburban sites, due to a lack of contrast with the sky. In observing this galaxy or other low surface brightness objects, the first rule is: Find the darkest skies possible!

Under dark skies, M33 is relatively easy to find and observe. At a distance of over 3 million light-years, it is the most distant object visible to the unaided eye. I've observed the Pinwheel without binoculars under exceptional conditions as a faint glow roughly 1/3 the size of the moon; under similar conditions, 10x50 binoculars reveal traces of spiral structure. Using a 6" to 8" inch telescope, beginners are likely to see M33 as little more than a diffuse, elongated glow measuring 30' x 20' and oriented from NNE to SSW; more experienced observers may detect the familiar backward-S shape of its two main spiral arms plus a few of the brighter star associations and H II regions of ionized hydrogen.

Using a small telescope in 1764, **Charles Messier** designated his latest discovery **M33** and described it as a "nebula…a whitish light of almost even brightness." During the mid-19th century **Lord Rosse III** and **William Lassell** resolved Messier's "whitish light" into spiral arms with numerous bright knots of light. Using the 100-inch Mt. Wilson telescope during the 1920s, **Edwin Hubble** resolved M33 into a swarm of faint stars that helped to establish the galactic nature of the so-called "spiral nebulae."

In telescopes of 16" or larger, M33 can be visually overwhelming, with two dozen or more knots visible, 15 of which have NGC (New General Catalog) or IC (Index Catalog) designations. These "knots" are huge H II regions of nebulosity and/or OB associations of hot, massive stars that help to delineate M33's two main spiral arms and two smaller, fragmented secondary arms that are visible in astrophotographs. These four main spiral arms lend M33 its familiar nickname, the "Pinwheel Galaxy."

NGC 604 is the brightest and largest "knot" in M33. Located in the NE portion of the galaxy *(it's the small white patch to the right of the red star in Alan's photo. -Ed.)*, NGC 604 is 30 times larger than **M42**, **the Great Nebula** in *Orion*, and rivals the famous **Tarantula Nebula** in the **Large Magellanic Cloud** in size and complexity.

At magnitude 10.5, NGC 604 is marginally visible even in small telescopes; its concentrated light is much brighter than the overall surface brightness of the galaxy itself. Nebula filters help to show the cottony inner texture and wispy margins, while high magnification, a large aperture and good seeing conditions are necessary to resolve any of the dozens of faint (16th mag.) Wolf-Rayet stars. With the exception of supernovae, Wolf-Rayet stars are the most distant individual stars visible, their feeble light having traveled 3 million light-years to reach us.

Somewhat less distinct yet a major structural component of spiral arms are the OB associations – vast regions of brilliant stars and diffuse nebulae often spanning hundreds of light-years. In M33, they form diffuse knots of light that respond well to nebula filters. **OB 85** is the closest, a small hazy patch SE of the giant H II region. Most of the OB associations in M33 are magnitude 13 or 14.

Although the spiral arms and associated structures within M33 can be quite impressive in a medium-to-large telescope, the nuclear hub is not very impressive. While this central hub is only weakly concentrated with stars, its higher overall surface brightness allows for the use of greater magnifications. The nucleus appears as a tiny stellar point of about mag. 13, surrounded by a mottled region a few arcminutes across. This is a striking contrast to neighboring M31, whose nuclear hub dominates the view.

Tips for Viewing. Generally, most guidebooks advocate the use of the *lowest* available power. Although this helps in locating M33, it is NOT the best way to observe this galaxy. To maximize contrast and get the best views of M33, use 10x-15x per inch of aperture. If you hope to see more than an unresolved haze, go for the gusto and use medium to medium-high power eyepieces once M33 is in the field of view. High surface brightness regions such as NGC 604 can tolerate higher magnifications if seeing conditions permit.

If you like hunting down small, faint structures, programs like *Megastar* and upgraded versions of *The Sky* can provide detailed maps. Photographs and detailed descriptions can be found in Vol. 4 of *Deep Sky* and in **Luginbuhl and Skiff's** *Observing Handbook and Catalogue of Deep Sky Objects.* So if it's a clear, dark, moonless night, take the time to observe one of our nearest galactic neighbors, M33, the Pinwheel Galaxy. The view can be spectacular when you know what you're looking at.

(Editor's Note: This article first appeared in the 4th-ever issue of the Observer*, in August, 1997. Rich wrote it specially for our newsletter.)*

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Above: NGC 7000 (North America Nebula) and **IC 5070 (Pelican Nebula),** two emission nebulae in *Cygnus*. (Photo by **Vencislav Krumov**.)

Located E of **Deneb (Alpha Cygni), North America Nebula (NGC 7000)** is both huge (2^o x 1.6^o) and challenging to observe. (Use an O-III filter for best results.) The easiest parts to see are the East Coast, an abnormally large Fla., and Mexico with the dark Gulf of Mexico between them. Under dark, transparent skies, NGC 7000 can be seen in 10 x 50 binocs or small telescopes.

Pelican Nebula (IC 5070) lies about $1/2^o$ W (i.e., to the right) of North America Nebula and is a more challenging target. Like the former, the Pelican can be seen in binocs or a small 'scope on a dark, transparent evening, esp. if you use a filter. Look for the pelican's dark eye above and to the right of the bright blue star near the top center, and the beak, head and body will be immediately apparent.

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Above: IC 4628, an emission nebula in *Scorpius*. (Photo by **Alan Pryor**.) **IC 4628** is a large ($1\text{-}1/2^o$ x 1^o) nebula bordering a rich open cluster (**Trumpler 24**) that contains 100+ stars. An O-III filter shows 4628 best.

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Above: NGC 7293 (Helix Nebula), a planetary nebula in *Aquarius*. (Photo by **Vencislav Krumov**.) With a dia. half the size of the Full Moon, **Helix Nebula** (a.k.a. **The Eye of God**) is both the largest planetary nebula in our view and, at just 300 l.y. away, the closest one to us. However, its size works against it in terms of observing, spreading out its light. On a clear evening, an O-III filter will help to show its ring structure. The challenge thus becomes, *How many stars can you see inside the ring?* As a guide to what you might see, **yr. editor** has seen five stars in a 10" 'scope and seven in a 12-1/2" 'scope.) The brightest portions of the ring are on the NNE and SSW sides.

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