

THE FLINT RIVER OBSERVER

NEWSLETTER OF THE FLINT
RIVER ASTRONOMY CLUB

An Affiliate of the Astronomical League

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Officers: President, **Dwight Harness** (1770 Hollonville Rd., Brooks, Ga. 30205, 770-227-9321, rdharness@yahoo.com); Vice President, **Bill Warren** (1212 Everee Inn Rd., Griffin, Ga. 30224, warren7804@bellsouth.net); Secretary, **Carlos Flores**; and Treasurer, **Truman Boyle**.

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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. Fri.-Sat., March 4-5: JKWMA deep-sky observings (at dark); **Thurs., March 10:** club meeting/public lunar & planetary observings (7-10 p.m. at The Garden in Griffin).

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President's Message. First, on behalf of our officers I want to thank you for your vote of confidence in re-electing us to serve you in 2016. I also want to welcome **Jeremy Milligan** to our

board of directors. Jeremy replaces **Jessie Dasher**, who moved to Florida last year.

As always, we'll do our best to make you proud of your club.

Nineteen years have passed since FRAC held its first meeting at the Boy Scout hut in Sunnyside, and the club is still chugging along with 40+ members.

The world has changed in many ways since 1997 – and FRAC has changed, too. We now have a website, a Facebook page, a fragroups chat room, a board of directors, a NASA contact, photos in (and an electronic mailing system for) our newsletter, a star party – well, most of the time – and a list of accomplishments by FRAC and its members that any astronomy club would be proud of. We didn't have any of those things in Feb., 1997.

Besides all that, here's a *Welcome To FRAC!* to our newest members, **Steve Hollander** of Peachtree City and **Lee & Donna Brown** of Thomaston. We're excited to have you join us, folks. We want your time spent with us to be enjoyable and rewarding, so let us know how we can help you.

-Dwight Harness

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Last Month's Meeting/Activities. Our Feb. 5th observing had it all: highs, lows, adventures and misadventures. On the *high* side, **Alan Pryor**, **Felix Luciano**, **Dwight Harness** and **Bill Warren** enjoyed the clearest skies at Joe Kurz since last October. The *low* was the temperature, which Felix said dropped to 26° by midnight. He and Alan stayed out imaging until 2:30 a.m., by which time Dwight and Bill were long gone, having wimped out and left early with feeble, transparent excuses about having to go out of town early next morning. (Yeah, and the dog ate their homework.)

Misadventures? Alan initially had trouble getting his computerized focuser to produce sharp images. He finally got it working, and you can see his and Felix's latest astrophotos on p. 6.

Dwight was limited to binocular viewing because one of his GoTo telescope's two battery packs melted on the way to JKWMA – and the motor wasn't even on!

Their *adventure* began when Alan was working on his focuser and Bill saw a UFO. (Well, it was 2/3 of a *UFO*: an *Unidentified Object*, but it didn't appear to be flying. It was in the woods, not the sky.)

Around 9 p.m., Bill noticed a bright, star-like light in the dense, tree-shrouded darkness to the east

of Site #1. He watched it for a minute or two before pointing it out to Dwight and Felix and asking them what they thought it might be.

FRAC members have seen UFOs at JKWMA and elsewhere. Most of the time we can figure out what they are – usually, weather balloons. We once saw a large, comet-like haze that appeared and remained stationary in the sky for 30 min. or more before it faded out. (It turned out to be the out-gassing of a NASA rocket.) So Dwight and Bill were confident that they could solve this mystery, too. (Felix probably had already figured out what it was, but whether to avoid embarrassing the other two or to let them play **Sherlock Holmes**, he offered no opinions as to what the mysterious object might be.)

As they watched, the light alternately brightened, faded slowly to nothing, came back on, brightened to its former brilliance and moved up, down or sideways. Then it would repeat the process in random fashion. Sometimes it moved fast, sometimes slow, but always in unpredictable directions. They considered possible rational explanations for its presence:

Was it a weather balloon? Balloons move, but they don't have lights.

Was it a distant radio tower, a star, an aircraft or a satellite? Antennas and stars don't move around, and the forest to the east appeared too thick with foliage to permit starlight to peek through. The light was moving too slowly and erratically in a confined area to be an aircraft or satellite.

Was it a car or truck? There were no roads in that direction, and no residual headlight glow on the trees like we see when cars drive by at night on Mt. Carmel Rd. to the south of Site #1.

Was it a house light, or maybe someone camping overnight at the campground? There are no private homes in 3,700-acre JKWMA, and no other lights except at the ranger station. (We see those lights as a faint glow above the trees to the SE.) Anyway, this light was more than 20° away from both of those areas.

Was it someone hunting at night? Changes in the light's altitude and direction were too abrupt to have been someone climbing to a tree stand and then climbing back down – as if someone would do that in sub-freezing weather at 9:30 at night – and then moving through the woods while aiming his flashlight at them. The light wasn't bobbing as it moved.

And it wasn't animal eyes. Or Sasquatch.

What was it, then?

Dwight finally found out what it was – and he and Bill were right all along: it wasn't a weather balloon, radio antenna, star, plane, helicopter, satellite, headlight from a passing car, a light at JKWMA, someone's flashlight in the woods, Sasquatch, or animal eyes. It was –

But first: Have you figured out what it was? (Three hints: It wasn't a UFO. It wasn't the **Moon** [which wasn't up at the time]. What was the only bright light source in the night sky that they didn't consider?)

After Bill left, Dwight saw the mysterious light clearly for the first time when **Jupiter** rose above the eastern treeline. Jupiter hadn't been moving – except in the sense that it was rising ever-so-slowly – but the interplay of darkness, tree limbs and foliage made it appear that the light was dancing around. There hadn't been as much forest as they thought there was.

The moral of this unnecessarily long UFO investigation is this: *No matter how long you've observed the night sky, you aren't immune to mistakes.* Mistaking a planet for a UFO is common among non-astronomers. (Usually, the culprit is **Venus**, as seen from a moving car.) But it's not unheard of for veteran observers to make that kind of mistake under circumstances that are new to them. It's not unheard of – but it *is* embarrassing.

We had thirteen members – **Dan Pillatzki; Tom Moore; David Haire; Carlos Flores; Steven "Smitty" Smith; Vicky Walters; Kenneth Olson; Erik Erikson; Truman Boyle; Aaron Calhoun; Jeremy Milligan; Dwight Harness;** and **yr. editor** – and a guest, **Steve Hollander**, who joined that night – at our Feb. meeting. We watched the dvd "The Winter Sky," and the winter sky showed its appreciation by giving us a cloudless evening and mild temps for observing after the meeting.

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This 'n That. Membership Reminder: If you haven't yet paid your 2016 FRAC dues, please mail your \$15 check made out to "FRAC" to our treasurer, **Truman Boyle**, at 1219 Hwy. 36 East, Barnesville, GA 30204, or give it to him at our March meeting. Our A. L. dues are up for renewal, and we need your payment asap in order to keep your name on the membership list we send them.

***Tom Moore** has qualified for his Master Outreach certificate and pin. That gives FRAC

eight M. O. pins, and it puts Tom 1/10th of the way toward earning a Master Observer pin. (And if he ever completes his Lunar Program – which is about as likely as **Caitlyn Jenner** winning *Time Magazine*'s “Man of the Year” award – Tom will be 1/5th of the way to becoming a Master Observer!)

Elsewhere on the public outreach front, **Erik Erikson** has logged 49 hrs. and **Carlos Flores** 47 hrs. toward their Stellar Outreach certificates (which require 50 hrs.), and **Cherrie O’Keeffe**, **Mason Erikson** and **Emily & Delilah Milligan** have four events toward earning their Basic Outreach pins.

***An Open Letter to Dwight.** As an ex-president of FRAC, I’m aware of the tendency to think sometimes that you’re president only because nobody else wants the job. But whether that’s true or not, there’s a far more compelling reason for being president that trumps everything else: *the club needs you to fill that role.*

The success of any club lies in the loyalty of its members. But loyalty begins at the top, and yours is shown most vividly in your willingness to put the club’s needs above your own, by serving as president when it would be easier to step aside after three years at the helm and turn over the reins of leadership to someone else.

So *Thanks*, Dwight. We’re grateful and proud to have you as our president for another year. –**Bill Warren**

***Thanks, Part 2.** As you’ll recall, last November **Bill Warren’s** laptop developed a glitch the day before our meeting that rendered it unusable: he couldn’t type in the password. He took the laptop to a local computer repair store, and after looking at it the guy said he could order and install a new keyboard for \$150 + \$30 for labor. But even then, the guy said, there was only a 50-50 chance that that would solve the problem. And worse, he said, if Bill ordered the keyboard and it didn’t solve the problem, he’d still have to pay for the keyboard and labor. Hey, forget that! We used **Carlos Flores’s** laptop at the meeting, and Bill was going to junk the faulty laptop when **Truman Boyle** asked if he could take a look at it. After a quick examination, Truman said that two of the keys were stuck (one of them was part of the password), and by jiggling them he got them to work. Problem solved. (Temporarily, at least.)

By January, the keys were stuck again, and this time they wouldn’t come unstuck. Re-enter Truman. All the laptop needed, he said, was a new keyboard that would cost about \$15 on eBay, and if Bill would buy it he’d install it, free of charge. Bill bought it – for \$14.95 – Truman installed it, and the laptop worked like new at the Feb. meeting.

Thanks, Truman. You solved the problem, at a tremendous saving. So don’t believe it if anybody ever tells you that you aren’t worth a plug nickel. To us, you’re worth a plug nickel, the \$165 that you saved Bill, and a lot more.

*Ex-FRAC member (and current president of the Atlanta Astronomy Club) **Rich Jakiel** has an article, “Hunting Beneath the Dog,” in the Feb. 2016 issue of *Sky & Telescope* (pp. 53-55). The dog in the title is, of course, the constellation *Canis Major*.

An astrophoto by Rich of the lunar crater **Clavius** appears on p. 70 of the March issue of *Astronomy*. Thanks, **Smitty**, for pointing it out.

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Upcoming Meetings/Activities. With the unfortunate cancellation of **Ga. Sky View**, we’ve scheduled club observings for that weekend in March. We’ve put in an order for clear skies and moderate temps at JKWMA on **Fri.-Sat., Mar. 4th-5th**, so we hope you’ll be able to join us at Joe Kurz that weekend.

Our club meeting will be held at The Garden in Griffin at 7:30 p.m. on **Thurs., Mar. 10th**, with public lunar/planetary observing from 7-7:30 and additional observing after the meeting. We’ll have our regular meeting, followed by cake and refreshments to celebrate FRAC’s 19th birthday. Then we’ll go back outside for the rest of our public observing.

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Calhoun’s Corner: M36, M37 & M38

by Aaron Calhoun

Most stargazers enjoy observing open clusters – groups of stars numbering from a handful to several hundred stars that formed from the same nebular cloud at about the same time and are traveling through space together. Much of the appeal of open clusters lies in their endless variety: some of them form recognizable patterns called *asterisms*; some

have stars arranged in pairs, trios, arms, rows or arcs; and others are scattered and have no distinct shape. All of them are fascinating, especially when you consider how close together they appear to be, how far apart they actually are, and how far their light has to travel to reach us.

The constellation *Auriga the Charioteer* contains three beautiful open clusters with unusual histories: **M36**, **M37** and **M38**. One of them – M37 – was discovered twice, and the other two were discovered three times. All three of them were discovered in 1654 by the Italian astronomer **Giovanni Batista Hodierna** (who, like **Charles Messier** a century later, was compiling a list of objects that looked like comets but weren't. But Hodierna's list contained only about forty objects, and it never caught on the way that Messier's did – probably because the Italian didn't name his objects but merely recorded their locations in the sky.)

In 1749, the French astronomer **Guillaume Le Gentil** re-discovered M36 and M38, but he somehow missed M37. Messier re-discovered M37 in 1764, and after re-discovering M36 and M38 himself he added all three open clusters to his list of Messier objects.



Auriga is one of the brightest constellations in the winter sky. It lies north of *Orion the Hunter*, and its five brightest stars form a house-shaped pentagon with the bright yellow star **Capella (Alpha Aurigae)** located at the northwest corner. At mag. 0.1, Capella is the 6th-brightest star in the night sky. The three Messier open clusters lie near the southeast edge of the pentagon's "roof", with M37 slightly outside the pentagon and the other two inside it.

M36 is the smallest and youngest of the three: it's about half as large as the others, and at "only" 25 million years old it is too young to have any red giant stars. At mag. 6.3, M36 is easy to see in any telescope, with about two dozen mostly bright stars scattered over an area about twice as wide as your thumb in a low-power eyepiece. Some observers see a crab-like pattern in the cluster, whose light takes about 4,000 years to reach us.

M38 lies 2.3° northwest of M36. It contains about 100 stars, but is fainter than M36 because it contains fewer bright stars than its smaller neighbor. M38's stars are sometimes seen as forming an upside-down Greek letter *Pi*. At a distance of 3,420 light years away, M38 is the nearest of the Auriga Messiers.

M37 is located 3.3° SSE of M36. It is by far the richest and most beautiful open cluster in Auriga, with at least 150 stars of equal brightness filling a high-power field of view. It is a sight not to be missed by anyone who owns a telescope! The British astronomer and minister **Thomas W. Webb** (1807-1885) wrote, "Even in small instruments, M37 is extremely beautiful, one of the finest open clusters in the sky; gaze at it well and long." Other prominent astronomers from the past have described M37 in equally glowing terms: "a diamond sunburst" (**C. E. Barnes**); "a cloud of glittering stars" (**Robert Burnham, Jr.**); "wonderful loops and curved lines of stars" (**Lord Rosse**); and "a magnificent cluster... (of) sparkling gold dust" (**Admiral Smythe**). M37 lies 4,500 light years away; at 300 million years old it is the oldest of the three Auriga Messiers. It contains at least a dozen red giant stars.

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Spaced Out On Space-Time

article by **Bill Warren**

*Okay, all you deep thinkers who have nothing better to do than contemplate your navel or calculate the square root of two in your head: Buckle up for a trip into the fairy-tale world of cosmology. Today's topic is **Space: Where Is It Going, and Where Did It Come From?***

My goal in writing this was to see if I could take a complex concept – space-time -- and make it so simple that even an ex-p.e. teacher and h. s. coach like me could understand it. I left out religion

because this is an article on cosmology, not religion.

To shed light on the subject, I've used an interview format featuring me (**BW**) and a fictional cosmologist I'll call **Cosmo**. (Ladies, feel free to think of the cosmologist as **Molly**.)

BW: What existed before the Big Bang?

Cosmo: Nothing. When the Big Bang took place, the universe and everything in it suddenly came into existence.

BW: Including space?

Cosmo: Right. First there was *nothing*, not even space or time. Then there was the Big Bang, and presto!, there was *everything* – the universe, space and time.

BW: But wasn't that *nothing* the space that the universe would expand into when the Big Bang occurred?

Cosmo: No. Space isn't "nothing."

BW: You could have fooled me. What is it, then?

Cosmo: Whether we're talking about atoms, people, planets, stars, galaxies or anything else containing matter, *space* is the area they occupy, and the distance between them and any other matter in the universe.

We'll never know for sure if anything existed before the Big Bang. But there's a way to show that space and time did not exist prior to the Big Bang.

BW: Enlighten me.

Cosmo: In his special relativity theory, **Albert Einstein** showed that time and space do not exist independently of each other. They are part of the same thing – he called it *space-time* – and they cannot be separated. You can't have one without the other.

For example, a light year is a measure of both space and time. It involves distance (space), of course: it's how far light travels in a year, i.e., 5.8 trillion miles. But it also involves time: how long it takes for light to travel that far in space. They are two sides of the same coin.

Now, tell me: *When did time begin?*

BW: With the Big Bang?

Cosmo: Precisely. The Big Bang was the beginning of the universe, so time began then.

We measure time in seconds, minutes, hours, days, weeks, months and years, etc. But that's not what time *is*, it's merely how we measure it.

BW: Okay, what is time?

Cosmo: *Time* is how long it takes (or took, or will take) for events to occur in our universe. But it's also how long it takes for light or anything else to travel between any two points in the universe. In both cases, time could not have existed in our universe before the universe began.

Since time began with the Big Bang – and time and space are essentially the same thing (space-time) -- space could not already have existed when time began.

BW: What about time travel – going backward or forward in time?

Cosmo: We live in the present. The past and the future are merely the present carried backward or forward. Since time and space are inseparable, in order to travel to another dimension of time – the past or the future -- you'd also have to travel to another dimension of space. There is no evidence that such dimensions exist or can be reached. (The past exists, but only in historical records and our memories.) Traveling to other dimensions of time and space is as unlikely as proving the existence of a parallel universe that occupies the same space as ours.

On the other hand, the possibility of time travel and alternate universes gives science-fiction writers something to write about -- and it gives us cosmologists something to talk about besides whose cat had kittens.

BW: Astronomers tell us that the universe is still expanding; where is it going, if not into space?

Cosmo: It isn't going anywhere, it's simply expanding.

BW: Like my waistline.

Cosmo: Well...not exactly. Here's a better example.

Imagine the universe as a balloon. The Big Bang started the balloon's inflation, and it's still expanding. No matter how large the balloon gets, though, it's still the same balloon. There is no more of it now than there was when it began to inflate. The balloon is simply spreading out, and as it continues to inflate, every part of it is moving farther away from every other part.

As we've said repeatedly, the universe includes everything there is. If there were anything beyond our universe – if it had an outer edge – anything out there beyond that edge, whether matter or space, would be part of the universe.

BW: Does that mean that the universe is infinite?

Cosmo: No, it just means that it's expanding. Stir an anthill of cosmologists with a stick, and half of them will tell you that the universe is infinite, and will expand forever. The other half believe in a closed universe that eventually will double back on itself like a yo-yo returning to your hand.

BW: Which group is right?

Cosmo: Who knows? Cosmologists are intelligent, but they're not *that* smart. Flip a coin.

BW: If space didn't exist before the Big Bang, where did it come from?

Cosmo: It came from wherever the Big Bang came from – and at the same time, too, because the universe could not have formed without space.

Here's the bottom line:

We tend to think of the Big Bang as an explosion that sent matter out into space to fill an empty universe – but as we've seen, that's not what happened.

The Big Bang was an explosion *of space* that gave the newborn universe room to form, inflate and expand with it at the same speed that space was expanding.

The universe is still expanding like a balloon, creating new space within it as galaxies and galaxy clusters move farther apart. So the expansion of the universe is really nothing more than the expansion of space-time. What could be simpler?

BW: Let's see: Calculating the square root of two in my head. Buying enough lottery tickets to guarantee winning the MegaMillions lottery. Finding a friendly, sympathetic IRS tax auditor. Winning an argument with my wife...

Cosmo: Any more questions?

BW: Do you have an aspirin? All this thinking has given me a headache.

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Upper Right Corner: NGC 2207 and IC 2163, an interacting galaxy pair in *Canis Major*. Photo by Alan Pryor.

These two face-on spiral galaxies are in the process of passing each other. NGC 2207, the larger galaxy above center in Alan's photo, is in the foreground, with IC 2163 revolving around it like a minnow circling bait. Only in this case the minnow is the bait.

Galaxy collision models predict that these two galaxies will survive this flyby, but IC 2167 will remain gravitationally bound to NGC 2207. Forty million years from now, the *Observer* will report on

2167's fate when their next close encounter occurs. Stay tuned.



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Below: Lynd's Bright Nebula 777 (The Vulture Head, or Baby Eagle, Nebula). Photo by Felix Luciano.

LBN 777 is a very faint reflection nebula located 4-1/2° N of the **Pleiades (M45)** in *Taurus*. It is part of the **Taurus Molecular Cloud**. The Vulture's reddish "head" is facing left in the photo, below the bright yellow-orange star. The dark brownish patch to the right of the Vulture's intensely dark "eye" is the dark nebula **Barnard 207**. B207 is the densest part of LBN 777. Unseen stars are forming within Barnard 207 at a furious pace.



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Trivia Fact. According to cosmologists, after the Big Bang the entire universe inflated from subatomic size to the size of a grapefruit in one-trillionth of a trillionth of a trillionth of a second.

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