

THE FLINT RIVER OBSERVER

NEWSLETTER OF THE FLINT
RIVER ASTRONOMY CLUB

An Affiliate of the Astronomical League

Vol. 20, No. 4 **June, 2017**

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Club Mailing Address: 1212 Everee Inn Rd., Griffin, GA 30224. FRAC website: 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*.

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Club Calendar. Thurs., June 8: FRAC meeting and public lunar & planetary observing (meeting at 7:30 p.m., observing before and afterward); **Fri.-Sat., June 23-24:** JKWMA observings (at dark).

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President's Message. Last winter wasn't too bad, but it's good to have warm weather again, and things like: flowers blooming; birds nesting in the trees; dew to fog our telescopes; mosquitos; daylight until 10 p.m.; spring cleaning; more mosquitos; mowing the lawn every week; and – Hey, those aren't the things I was looking forward

to last winter! But they're part of spring and summer, so it's time to go to the FRAC website and read **Smitty's** article on spring and summer observing, "Attack of the Martian Mosquitos." Then come out and join us at our JKWMA observings on June 23rd and 24th. You'll be glad you did – and we'll be glad you did, too!

Also, I know you'll want to join me in welcoming our newest member, **Marla Smith** of Jackson, Ga. Marla came to our Joe Kurz observing on Apr. 28th and joined the club that night.

-**Dwight Harness**

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Last Month's Meeting/Activities. Knee-deep grass, hazy conditions and a few scattered clouds didn't deter six avid FRACsters and a visitor – **Aaron Calhoun; Dwight Harness; Alan Rutter;** new member **Marla Smith; Sean Neckel** and his guest, **Bryan Thompson;** and **Bill Warren** – from enjoying the universe, up close and personal, at JKWMA on April 28th. **Jupiter's** Great Red Spot swam in and out of focus: it was a bright salmon-color, and clearly defined.

Next day, Sean – who has been a blessing to our club since joining FRAC a few months ago – went out and mowed the observing area at Site #1. However, Bill, trying to help members decide whether to risk traveling to JKWMA that night, sent out an e-mail containing the weather forecast for the area: thunderstorms at 7 p.m., mostly clear after that. So everyone (except Bill) stayed home, and the skies were clear throughout.

Thanks for the weather update, Bill! Where do you get your forecasts, from a Ouija board?

We had 19 attendees at our May meeting: **Truman Boyle; David Haire; Sean & Gianna Neckel; Elaine Stachowiak; Dawn Chappell & David Clay; Ken & Rose Olson; Larry, David, Cherrie, & Sarah O'Keeffe; Aaron Calhoun; Mark Smith; Erik Erikson; Steve Hollander; Dwight Harness;** and yr. editor. It was fun listening to the late **Carl Sagan** in the opening segment of *Cosmos*. Like **Dr. Richard Schmude**, Sagan was a gifted speaker who could explain the complexities of the universe in ways that even beginners could understand.

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This ‘n That. A final reminder: If you haven’t paid your 2017 dues yet, please send your \$15 check made out to FRAC to: **Jeremy Milligan**, 100 Old Mill Way, Senoia, GA 30276.

*It occurred to **yr. editor** recently that the parents of **Dwight Harness** might actually have been a Chinese couple named Wong. But that couldn’t be true because, as everyone knows, two Wongs don’t make a Dwight.

***Something You Already Knew...**Binocular specifications feature two numbers (e.g., 6x30, 8x50, etc.) The first number refers to the magnification, and the second number to the diameter of the lenses in millimeters.

***...And Something You May Not Have Known:** Most people refer to those specifications as “ten-by-fifty,” etc. – but technically, at least, that’s incorrect. (Hey, we’re talking about binoculars, not a mobile home or RV!) The proper pronunciation is “ten-X-fifty.”

Okay, we’re splitting hairs here, like debating whether **Betelgeuse** should be pronounced “BET ul jooz,” “BAYT ul jooz” or “Beetlejuice.” (As if it matters. However you want to pronounce binocular specifications, Betelgeuse or anything else in astronomy is correct.)

*Hey, gang, what time is it? Why, it’s time for another installment of **Trivia Questions** – a time when **yr. editor** answers trivia questions that you didn’t ask. So let’s get started.

***Question:** *Black holes have the most intense gravity of anything in the universe; what is second on the list?*

Answer: *Pulsars and neutron stars.* They’re the same thing, only different -- the collapsed cores of massive stars that have gone supernova but were too small to have sufficient gravity to become black holes. Instead, they left behind a dense, dead core that is called a *neutron star* because most of its electrons and protons have been squashed into neutrons. That compact core packs up to three times the **Sun’s** mass into an area about 12 mi. in dia. (A more down-to-earth comparison: Mt. Everest squeezed into a thimble. A black hole would be that mountain squeezed to infinity.)

Unlike other neutron stars, pulsars are highly magnetized at their poles, and they rotate at speeds that defy belief.

As a pulsar rotates, it excites charged particles around it. Those particles, whirling at fastastic speeds, congregate in large masses at the pulsar’s magnetic poles, where they are expelled in the form of X-rays, radio waves and visible light. The pulsing effect they produce is like lighthouse beams: we don’t see them unless we are in their path. The ones we’ve seen – there are about 2,300 of them – have completely changed our thinking about how fast objects in the universe are capable of rotating.

For example, it takes 24 hours for Earth to rotate once on its axis, and ice skaters have been known to spin as fast as five times per second. But the pulsar at the center of **Crab Nebula (M1)** is the size of a small city, and it rotates *33 times per second*. And that’s slow, compared to many other pulsars that have rotational rates of more than *100 times per second*.

The fastest-rotating pulsar, **PSR J1748-2446ad**, rotates *716 times per second!*

(Note: In Part 1 of the original Cosmos series, Carl Sagan stated that pulsars rotate as fast as twice per second. It wasn’t a faulty estimate on his part; rather, it reflected what was known at the time. Today’s increased rotational speed figures are due to improvements in our ability to measure them since the 1980s. -Ed.)

Beyond that, pulsar beams are incredibly precise: their emissions vary by about a billionth of a second per year – the same rate as the U. S. Naval Observatory’s atomic clock that provides the official standard of measurement of time everywhere on Earth. Pulsar transmissions are so precise that, when they were first detected by American astronomer **Jocelyn Bell** in 1967, she wondered if they might be transmissions from an advanced alien civilization.

***Question:** *A p.s. to a story you’ve heard before: In 1996, 39 California cult members committed mass suicide after their leader convinced them that an alien spacecraft behind **Comet Hale-Bopp** was coming to transport them to heaven. But here’s the question: Why did the leader believe that a UFO was out there?*

Answer: In Nov., 1996 an amateur astronomer claimed to have photographed an object that he said

was “following in Hale-Bopp’s wake.” He was wrong, of course, but his announcement made headlines around the world and sparked the Heaven’s Gate tragedy.

***Question:** *Stars generate energy by fusing hydrogen into successively heavier elements at their cores, but the process stops when it reaches iron. Why?*

Answer: The fusion of iron doesn’t generate energy. When iron fuses, it absorbs energy and the core temperature drops.

***Question:** *Since no Earth rocks date back to when the planet formed, how do scientists know that the Earth is 4.55 billion years old?*

Answer: In the mid- to late-1940s, scientists discovered that radioactive elements decay at a precise rate, a fact that can be used to date ancient objects. And in 1953, American geologist **Clair Cameron Patterson** realized that studying meteorites would give the age of the solar system and Earth. In studying the decay of uranium in lead isotopes in meteorites from Barringer Crater (a.k.a. Canyon Diablo Meteor Crater) in Arizona, Patterson arrived at the 4.55 billion years old figure, which has since been verified with an accuracy of + or –70 million years. So Earth is somewhere between 4.48 and 4.62 billion years old.

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Upcoming Meetings/Activities. Our FRAC meeting will be held at The Garden in Griffin at 7:30 p.m. on **Thurs., June 8th**. The program will be Part 3 of **Carl Sagan’s** *Cosmos* tv series. In “The Harmony of the Worlds” we’ll visit the life and times of **Johannes Kepler** (2571-1630), who was the last scientific astrologer, the first modern astronomer and the author of the first science fiction novel. Kepler provided the insights into how the **Moon** and planets move in their orbits that permit today’s astronomers to predict with incredible precision the timing of events such as eclipses and occultations. Without the understanding of orbital paths that Kepler gave us, we could not have sent spacecrafts to explore the planets, asteroids and comets, humans would not have walked on the Moon and we would not be formulating plans for astronauts to walk on **Mars**.

Our Joe Kurz club observings will be on **Fri.-Sat., June 23rd-24th**.

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The Planets in June. **Mars** (mag. 1.7) will be low in the WNW sky during the 1st week of June, hovering in the lingering twilight. Best view of it will be in binoculars.

Jupiter (mag. -2.2) will be up all night, as will **Saturn** (mag. 0.0). If you’re in the mood for being mooned, look for Jupiter’s four Galilean moons – **Ganymede, Io, Callisto & Europa** – and Saturn’s brightest moon, **Titan**. All are bright and easily seen in any telescope.

Mercury (mag. -0.4), **Venus** (mag. -4.4), **Neptune** (mag. 7.6) and **Uranus** (mag. 5.9) will be morning targets in June. The first two will be visible to the naked eye; blue Neptune and greenish-gray Uranus will require binoculars. (The June issue of *Astronomy* will tell you where to find them.)

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An hour sitting with a pretty girl on a park bench passes like a minute, but a minute sitting on a hot stove seems like an hour.

-**Albert Einstein**, explaining his complex theory of relativity in laymen’s terms

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Novels With an Impact: Part I

Sunward Passage, by Harold McAlister book review by Bill Warren

(Editor’s Note: This review first appeared in the June, 2013 Observer. I re-read the book last week – again, in just two days – and found it just as compelling as the first time. It’s the fictional account of an astronomer’s search for a long-lost comet that is thought to be on a collision course with Earth.)

Excerpt. “(Walker and Alyssa) were enveloped in the blackness of the moonless night until their eyes slowly adapted to the dark and they first saw Orion’s familiar stars shimmering high in the southeast through the skeletal forms of oak and poplar, recently denuded of their leaves. Low below Orion, Sirius twinkled furiously, the prismatic effect of the atmosphere causing it to glint in all the colors of the spectrum. Within minutes, they were fully dark adapted, and the stars now

glittered and twinkled overhead like a multitude of iridescent grains of sugar stuck to an inverted bowl.”

Background. **Harold McAlister** is director of both the venerable Mt. Wilson Observatory and CHARA (Center for High Angular Resolution Astronomy), the array of high-resolution telescopes located atop Mt. Wilson in California.

More to our purposes, Dr. McAlister, a Ga. State University emeritus professor, is also the author of *Sunward Passage*, an exciting and highly readable novel. It's 221 pp. in length and costs \$3.98 from amazon.com in Kindle form, but is not available in paperback or hardcover. Since it's a Kindle book, there are no shipping charges and no long wait to receive it in the mail. You can download it immediately.

I'm an avid reader but not primarily a sci-fi fan. But *Sunward Passage* is so intensely exciting and well written, and its portrayal of astronomy and astronomers so compelling, that I couldn't put it down. I read it in two days.

As you know, astronomy is often difficult to understand. But this is an action novel, not a scientific paper. You won't get lost in a forest of complex terminology or technological jargon; rather, you'll find yourself immersed in the sort of high-impact – literally! – thriller that **Michael Crichton** (author of *Jurassic Park*) might have written if he had lived longer.

Plot. Walker Ransom, a 40-ish astronomer, lives with his Airedale terrier in an isolated cabin located on Clickrattle Creek in the Blue Ridge Mtns. of western North Carolina near Asheville.

A specialist in the study of comets, Dr. Ransom is interrupted by uniformed troops during an observing session at Kitt Peak Observatory in SW Arizona and taken to a nearby air force base. There, he learns that an old colleague, Joachim Schmidler, has been brutally murdered in Germany. Schmidler's dying words to his wife were to protect his “secret library” and contact the only astronomer who will understand why he has been attacked: Walker Ransom.

Ransom embarks on a quest to decipher Schmidler's cryptic words, which Ransom suspects refer to a long-lost comet for which both of them

have been searching for years. Apparently, Schmidler found the comet, plotted its orbit and determined that its path will intersect with Earth's orbit – and someone unknown, for reasons equally unknown, wants that information to remain secret.

With the assistance of Kitt Peak staffers Alyssa Kennedy and Paul Collins and his friend Duke Wayne, Ransom searches for the missing photographic plates that will reveal the comet's whereabouts. Their quest takes them to Germany, Washington, D. C., his home at Clickrattle Creek, and finally to the Big Island of Hawaii, where all the pieces of the puzzle come together under potentially devastating circumstances for the inhabitants of Planet Earth.

Three Reviews (from amazon.com). 1. “From the first page on, I couldn't set this book (well, actually my wife's Kindle) down. Simultaneously suspenseful, insightful and humorous, I was sitting on the edge of my chair in anticipation of what would happen next to the story's hero, astronomer Walker Ransom, nodding my head in agreement on the devious ways of bureaucracy and laughing at the many truly funny passages in Dr. McAlister's novel. This novel honors professional astronomy's hard-working, unsung stars – the mountaintop telescope operators – by assigning Alyssa Kennedy the heroine's role.

“For the nonscientist, this novel provides an illuminating peek into the world of astronomy research. For all astronomers – student, amateur and professional alike – this is a rare treat indeed! And the next time you see an unusually active display of shooting stars – well, I don't want to give anything away! Enjoy a great novel! At the same time, through your purchase you will be contributing to Mt. Wilson Observatory where Edwin Hubble discovered both the immensity of the universe and its expansion.”

2. “I thoroughly enjoyed the mix of science, romance, intrigue and suspense that this book delivered. It is also very timely because the potential for collisions between our spaceship Earth and the multitude of orbiting rocks and snowballs numbers in the thousands. I heartily recommend *Sunward Passage* to anyone who enjoys a suspenseful read mixed in with some real science.”

3. “It is pretty rare these days to find realistic science coming out of the entertainment industry.

But if the author is not only a gifted and entertaining writer but also an accomplished astrophysicist, it really is possible! Carl Sagan was a talented storyteller and respected scientist, so it isn't unheard of.

"Being familiar with both Kitt Peak and the Big Island of Hawaii, I was able to add an extra dimension of personal experience to the fast-paced story. With a couple of small exceptions (because this is, after all, a fictional story), the author's descriptions and details of these locations is spot-on and entertaining. I am a professional engineer who works on observatories for a living, and I can verify that Dr. McAlister's descriptions of major telescopes and observatories are accurate and informative.

"The surrealistic night scene during the story's climax was so well done that I now have a mental image of it that I will carry around for a long time.

"Good job, Dr. McAlister!"

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Another Botched Prof. Stargazer Interview

To say that Prof. Stargazer is difficult to talk to is an understatement. As Dwight Harness said after the following interview, "I've had better conversations with my dog. At least we understand each other."

It started out normally – or at least as normally as interviews with the senile old gentleman ever get. But then it branched out in a totally unexpected direction. (That often happens when the professor forgets to take his medications, or when he has spent an evening with an old friend such as Jack Daniel, Jim Beam or George Dickel.)

Ken Walburn: I ordered some new binoculars, and I can't see anything in them.

Prof. Stargazer: I don't want to get too technical here, Ken, but I think you'll see more if you take them out of the box they came in.

Ken: Oh. (He takes them out of the box and looks at the sky.) I still can't see anything.

Prof. Stargazer: Try taking off the lens caps.

Sean Neckel: Professor, I read recently that the space probe *Gaia* orbits the Earth at the Lagrangian point. What is the Lagrangian point?

Prof. Stargazer: I don't know. I've never been to Lagrange. It's somewhere in Georgia. Ask someone who lives there.

Joe Auriemma: I have a question about space travel, Professor: Which planet are astronauts most likely to walk on for the first time?

Prof. Stargazer: Whichever one they land on.

Joe (frowning): Will that planet be Mars?

Prof. Stargazer: Only if they land on it.

Joe (gritting his teeth and smiling grimly): I'll try again, Sir: When will astronauts walk on Mars?

Prof. Stargazer: I'll say this for you, Joe: You're persistent. But so am I.

Current estimates are that humans will walk on Mars sometime after they land on it. But that could change if NASA comes up with a better plan.

Ken Olson: Wait a minute! Are you saying that men might walk on Mars before they land on it? That's impossible!

Prof. Stargazer: Well...*No*, that's not what I meant, Ken. But now that you mention it, one of the things astronomers have learned over the years is that *Nothing is impossible in astronomy, except Tom Moore earning his Lunar pin.*

Just because we haven't done something yet that seems impossible doesn't mean it *can't* be done. But it doesn't mean that it *can* be done, either. So astronomers develop theories to explain what they can't explain.

Take black holes. In theory, black holes exist although they cannot be seen. But now astronomers are trying to photograph a black hole. How can you photograph something that can't be seen?

Essentially, those astronomers are trying to photograph a theory (black holes). What's next? Photographing an emotion, or a thought?

Steve Benton: You're confusing us, Sir.

Prof. Stargazer: Imagine that. Welcome to the world of astronomy theory where, in order to understand the largest things in the universe, you have to study the smallest things.

Elaine Stachowiak: So far, Professor, this interview hasn't been very funny.

Prof. Stargazer: You want funny, Elaine? A penguin walks into a bar and asks the bartender,

“Have you seen my brother?” The bartender says,
“I don’t know. What does he look like?”

Or how about this?

Same bar. A skeleton walks up to the bartender
and says, “Gimme a beer...and a mop.”

Marla Smith: What does that have to do with
astronomy?

Prof. Stargazer: An astronomer told me those
jokes.

Any more questions?

Steve Bentley: You mentioned the smallest
things in the universe, Sir; what’s the smallest thing
in the universe?

Prof. Stargazer: It’s a tiny subatomic particle
called the *hawaya*. (It’s pronounced sort of like the
state: huh WAH yuh.)

David O’Keeffee: Hawaya?

Prof. Stargazer: I’m fine, David, thanks for
asking.

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Upper Right: NGC 5139 (Omega Centauri), the
largest and finest globular cluster in the night sky.
Photo by **Alan Pryor**.

Here’s how impressive Omega Centauri is: most
large globular clusters have between 500,000 and
one million stars; Omega has ten million. It is
bright enough to have been included as a star in
Ptolemy’s 2nd-cent. a.d. star atlas, the *Almagest*.

NGC 5139 is called Omega Centauri because,
when **Johann Bayer** assigned Greek letter prefixes
to the brightest stars in each constellations in 1603,
he also mistook the globular cluster for a star. It
wasn’t until 1677 that **Edmund Halley** observed it
telescopically as a star cluster.



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Above: IC 2574 (Coddington’s Galaxy), a dwarf
irregular galaxy in *Ursa Major*. **Felix Luciano**
took this photo from his driveway in light-polluted
Jonesboro. It’s a remarkable photo under the
circumstances.

IC 2574 was discovered by **Edwin Coddington**
in April, 1898. It is a member of the M81 Galaxy
Group. About 50,000 light-years in dia., it lies 25
million light-years away. Coddington’s Galaxy has
experienced two periods of intense star formation,
one about 100 million years ago and another 10
million years ago.

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