

THE FLINT RIVER OBSERVER

NEWSLETTER OF THE FLINT
RIVER ASTRONOMY CLUB

An Affiliate of the Astronomical League

Vol. 23, No. 10 **December, 2019**

Officers: President, **Sean Neckel**; Interim Vice President/Secretary, **Aaron Calhoun**; Treasurer, **Jeremy Milligan**; Board of Directors: **Larry Higgins**; **Cindy Barton**; and **Felix Luciano**; Program/Observing Coordinator: **Sean Neckel**; Alcor/Facebook Coordinator: **Aaron Calhoun**; Webmaster: **Tom Moore**; Newsletter Editor: **Bill Warren**; NASA Contact: **Felix Luciano**.

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Club Calendar. Thurs., Dec. 12: FRAC Christmas party (7:30 p.m., The Garden in Griffin); **Fri.-Sat., Dec. 27-28:** JKWMA observings (at dark).

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President's Message. On behalf of FRAC's officers, I want to wish you a very merry Christmas and the happiest New Year ever! I hope you'll be able to attend our Christmas party and Joe Kurz WMA observings this month.

-Sean Neckel

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Previous Meetings/Activities. A terrific turnout of FRACsters – **Sean Neckel**; **Bill Honea**; **Steve Knight**; **Felix Luciano**; **George Ruff**; **Erik Erikson**; and **Steve Hollander**—made our Lake Horton observing on Nov. 1st a special evening for 35 Fayette Co. residents on a chilly evening.

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This 'n That. “I can scratch one more item from my astronomical bucket list,” **yr. editor** reports. “After years of looking for it without success, **I finally saw the green flash!** (It’s a rare, short-lived atmospheric phenomenon that sometimes occurs near the horizon at sunrise or sunset.)

“I was watching the sunset in my 10x50 binoculars at Panama City Beach on Oct. 20th. When only about ¼ of the golden orb remained, it suddenly turned lime-green and stayed that way, until it sank beneath the horizon three seconds later. It was just as beautiful as it appears in photos.

“A teacher aide once told me that she had seen the green flash; she said she and her husband watched it for thirty minutes. I didn’t argue the point with her, but hey!, there’s a reason why they call it a *flash* and not the ‘green half hour’. It never lasts more than two or three seconds.

“It occurs near the horizon because the atmosphere is thicker there in our view than when the Sun is higher in the sky. The dense air serves as a prism to refract the sunlight into its component colors. Blue light is scattered the most, but since the Sun is dipping below the horizon the blue light is scattered away from our line of sight. The remaining light ends up appearing green. (Originally I thought it was due to the yellow of the Sun merging with the blue water -- but if that were so, there’d be a green Sun every time it reaches the waterline.)

“How do you know if the air is clear enough to momentarily turn the Sun lime green? If it’s pastel orange as it approaches the horizon, enjoy the lovely view but don’t expect to see anything more than that. It’s easy to look at then, but its lack of brightness is due to the presence of particles or contaminants that pollute the air: they absorb the shorter blue and green wavelengths of sunlight and reflect the longer orange or red wavelengths.

If the air is smog- and haze-free, however, the Sun will be a brighter white, yellow or orange hue as it reaches the horizon. Even under those conditions the flash may not occur, but that’s the best time to look for it.”

“Green flashes sometimes appear at sunrise, but it’s dangerous to look for them then because the Sun is rising, not disappearing. They are most commonly seen at the ocean where the observer’s

view of the horizon is least restricted, but they can also be seen from mountaintops or airplanes.

“(For the record, I achieved three other bucket list goals when I watched **Venus** and **Mercury** transit the Sun in 2012 and 2016, respectively, and the **Leonids meteor storm** in 1999. [FYI, the next Leonids storm will be in Nov., 2032; until then, it will be just another meteor shower.] It’s unlikely that I’ll ever accomplish my other astronomy goal, i.e., finding a meteorite.”

***Trivia Question:** *Aside from Prof. Stargazer hitting on one of his Astronomy 101 coeds, what is the significance of the phrase, “Oh, be a fine girl, kiss me”?*

Answer: It’s a mnemonic to help you remember the spectral classes of stars in the order of their decreasing stellar temperatures: **O-B-A-F-G-K-M**. Since the hottest stars are classes O and B, the **Sun’s** G2 classification defines it as a middle-aged star, past its prime but still productive.)

*We’ve spent considerable time telling you how absolutely incredible **Dr. Alex Filippenko** is. Well, here’s an example. He’s a professor of astronomy at the University of California (Irvine), whose school colors are yellow and blue. The most widely observed double star in the night sky is **Albireo**, a lovely pair of stars in *Cygnus*. Since Albireo’s stars are also blue and yellow, Dr. Filippenko persuaded the powers-that-be at UC-Irvine to designate Albireo as the school’s “official star.” UC-Irvine is now the only college or university in the world with its own star. Cool, huh?

(While we’re on the subject of Albireo, consider this: The ancient Greeks listed the naked-eye stars in each constellation in order of their brightness by giving them Greek letter designations [e.g., **Alpha**, **Beta**, **Gamma**, **Delta** and **Epsilon Cygni**, etc.]. **Deneb**, the brightest star in *Cygnus*, is **Alpha Cygni**, but for reasons largely unexplained mag. 4 Albireo – the 5th-brightest star in *Cygnus* – is listed as **Beta Cygni**, not Epsilon. [It’s probably because Albireo forms the head of *Cygnus the Swan* and the base of the **Northern Cross**, both of which were well known to the ancients.]

***Of Mice and Men.** Any way you slice it, the Apollo lunar program was a huge success. We built mighty rockets that sent men to the **Moon**, and they

came back safely after walking on the lunar surface. But those factors alone were not enough to satisfy NASA’s definition of success. According to Apollo 11 command module pilot **Michael Collins**, the ultimate success of the Apollo missions depended, not on the astronauts, but on...*white mice*?

Before the *Eagle* landed at Tranquillity Base on July 20, 1969 no human had ever set foot on the Moon. So no one knew whether the lunar regolith (sterile soil) contained deadly pathogens, or whether the moonwalking astronauts might have been exposed to potentially lethal microorganisms and brought them back to Earth. Having returned safely, the astronauts were quarantined with a colony of white mice for three weeks. Only when the mice survived without complications were the astronauts released from quarantine and allowed to go home.

“We went to the Moon and came back successfully,” Collins said. “Was that a great success? Was that good, terrific all the way around? It depended on the white mice. So which were more important, the mice or the men? I came to the conclusion that the mice were more important.”

(Incidentally, Collins has admitted to being concerned during the Apollo 11 flight that their lunar ascent module might malfunction and prevent **Neil Armstrong** and **Buzz Aldrin** from rejoining him for the return trip to Earth. “We loved to have duplicates and redundancy in all of our equipment,” Collins said, “but it was not possible in this case. Just one tiny thrust chamber: if it didn’t work, they were stuck forever on the surface of the Moon...I would have been ‘the guy who left them up there on the Moon to die.’ It would have been an awful, terrible national catastrophe.”)

*If everything goes as planned, NASA will send astronauts to walk on the **Moon** again in 2024. The crew has not been announced yet, but last March vice president **Mike Pence** revealed that at least one of them will be a woman.

There were no female astronauts in the Apollo program, but times and attitudes have changed since the 1970s. Roughly a third of the space shuttle astronauts were women, and about half of today’s new astronaut recruits are women. As befits NASA’s commitment to gender equality, the 2024 lunar program has been named for **Artemis**, the

twin sister of Apollo and the Greek goddess of the Moon.

Such a move is long overdue because, aside from NASA, women have traditionally been treated as second-class citizens in astronomy and science. No better example exists than **Vera Rubin**, the woman who discovered dark matter.

Rubin once said, "I live and work under three basic assumptions. One: There is no problem in science that can be solved by a man that cannot be solved by a woman. Two: Worldwide, half of all brains are in women. Three: We all need permission to do science, but for reasons that are deeply ingrained in history, this permission is more often given to men than to women." (*Note: Obviously, anyone can conduct scientific research; Rubin was referring to the process by which grants are awarded to men or women. -Ed.*)

"Vera Rubin, who essentially created a new field of astronomy by discovering dark matter, was a favorite to win the Nobel Prize in physics for years. But she never received that call. She died in 2016 at the age of 88.

"Countless scientists were inspired by her work. Countless scientists are researching questions that wouldn't exist if not for her work. But the Nobel Prize cannot be awarded posthumously, so the most prestigious award in physics will never be bestowed upon Vera Rubin, who richly deserved the honor."

-Rachel Feltman, *Popular Science*

"Do you see how important this is? Most of the universe, Rubin discovered, is invisible to us, yet this material has had a profound effect on literally everything."

-Phil Plait, author of *Seeing In the Dark*

"The existence of dark matter has utterly revolutionized our concept of the universe and our entire field; the ongoing effort to understand the role of dark matter has basically spawned entire subfields within astrophysics and particle physics at this point. **Alfred Nobel's** will describes the physics prize as recognizing 'the most important discoveries' within the field of physics. If dark matter doesn't fit that description, I don't know what does."

-Emily Levesque, Univ. of Washington

The reason cited by the selection committee for not awarding Rubin the Nobel Prize was that her work was theoretical, and therefore unproved. But even before her death other physicists had received the Prize for theory-based research that has had far less impact on astrophysics than the discovery of dark matter.

Of her failure to receive the Nobel Prize, Rubin once said, "Fame is fleeting. My numbers mean more to me than my name. If astronomers are still using my data years from now, that's my greatest compliment."

*We've addressed this topic before, but it bears repeating: *How much would you pay to become an astronaut?* If you happen to have \$50 million in pocket change lying around and are wondering what to do with it, you might want to consider undergoing astronaut training, visiting the International Space Station and participating in NASA science projects in space.

NASA's civilian astronaut program began in 2016 as a way of defraying some of the enormous cost of NASA's programs. So far, five candidates have undergone two years or more of basic astronaut training. Other candidates are presently being prepared, and the flights will begin next year.

During their rigorous physical training, the civilian astronauts also learn to speak Russian (in order to communicate with Russian cosmonauts on the ISS); they learn the tech skills necessary to operate the equipment on the ISS; and they learn how to perform land-and-water survival maneuvers in case their spacecraft launch is aborted or their capsule lands in the wrong place.

Up to two private individuals per year will be permitted to fly ISS missions. Despite the dangers involved, the hefty price tag and the stringent requirements for being considered for candidacy, 18,600 applicants applied for the citizen astronaut program in 2016, and there has been no shortage of applicants since then. There are about 50 companies operating science experiments on the ISS; many of the applicants have corporate sponsorships, but most of them cannot pass the requirements to be selected for the program.

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Upcoming Meetings/Activities. In a departure from previous years, FRAC's 2019 Christmas party will be held at 7:30 p.m. at The Garden in Griffin on **Thurs., Dec. 12th**. "We are going to do a gift exchange," **Sean** explains. "Everyone will be encouraged to bring a dessert and an astronomy-themed gift to exchange." Contact Sean if you have any questions.

We'll wind up the month with Joe Kurz WMA observings on **Fri.-Sat., Dec. 27th-28th**.

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The Solar System in December. **Saturn** (mag. 0.6), **Venus** (mag. -3.9) and **Jupiter** (mag. -1.8) can be seen in the SW sky during the 1st half of the month. **Neptune** (mag. 7.8) and **Uranus** (mag. 5.6) are up, too, but they are harder to find manually. **Mercury** (mag. -0.6) and **Mars** (mag. 1.6) are "morning stars" in the SE sky.

One of the best annual meteor showers, the **Geminids**, will peak on Dec. 14th, sharing the sky with a waning gibbous **Moon**.

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What Can We Believe In an Age of Disbelief? by **Bill Warren**

(Note: Portions of this article are based on material that has appeared in previous issues of the Observer. -Ed.)

Everybody's gotta believe in something. I believe I'll have another beer.

-Anonymous

People often forget that just because something appears in newspapers, magazines or on tv, the Internet, or Facebook, etc., doesn't necessarily mean it's true. Examples abound:

*If you believe certain tv documentaries, our planet has been visited in the past by aliens from other worlds, and some of them (or their descendants) are walking among us today. *(If so, one of them probably is Dwight Harness. -Ed.)*

Much of the basis for modern belief in extraterrestrial visitations lies in the fact that, in

some instances, ancient humans apparently had access to knowledge that we do not possess today. If so, that knowledge could have been imparted to them by visitors from space.

Perhaps the most striking example of this phenomenon concerned the Dogon tribesmen of Mali. They were so isolated from civilization that they lived in caves and had never seen a Caucasian when two French scientists arrived in the 1930s – but those primitive tribesmen knew that **Sirius** had a tiny companion that was "the smallest thing there is"; its orbital path around Sirius was oval, not round, and it took 50 years to complete. Those facts were not known to astronomers at the time, yet the Dogon had known about it for something like 2,300 yrs. Their shaman, or spiritual leader, said their ancestors were told about Sirius B by fish-like creatures that arrived from the sky.

Carl Sagan insisted that the Dogon must have had prior contact with European astronomers. But how? The Dogons' existence was unknown to the outside world until those scientists arrived. Even so, how did the Dogon know astronomical facts that were unknown to science until more than two millennia later?

*Other tv documentaries have dealt with topics such as ghosts and haunted houses, Sasquatches, abominable snowmen, the Loch Ness Monster, etc., treating them as facts rather than as conjecture, myths or legends.

A producer of one such documentary was asked how, given his obvious intelligence, he could participate in projects of such questionable scientific value. "I don't believe any of this stuff," he replied. "But my audience does, and that's what matters. I'm just giving them what they want."

*The 1948 presidential election pitted the heavily favored Republican governor of New York, **Thomas E. Dewey**, against the incumbent Democrat, **Pres. Harry S. Truman**, who assumed the presidency when **Franklin D. Roosevelt** died in office on April 12, 1945.

On the morning after the election, Chicago residents awoke to a front page newspaper headline and article in the *Chicago Daily Tribune*

that proclaimed, “**DEWEY DEFEATS TRUMAN!**”

Trouble was, Dewey didn’t win the election, Truman did.

Facing an early publishing deadline that came before the polls closed in the heavily populated eastern U. S., the editors of the *Daily Tribune* assumed that Dewey would win as expected, so they went ahead and declared him the winner, to their everlasting embarrassment. Later, newspapers around the world carried a photo of a grinning, triumphant Pres. Truman holding aloft that front page headline for all the world to see.

It was the greatest publishing blunder in newspaper history.

*In 1975, the world’s leading authority on global warming said that, due to melting at the polar ice caps, New York City and all of the other large coastal cities on Earth would be under six feet of water by 1985. When that date came and went with life proceeding as usual in NYC and elsewhere, few people remembered the prediction, or how wrong it had been.

*In 1997, an amateur astronomer who was observing **Comet Hale-Bopp** announced that he had seen certain anomalies associated with the comet that he identified as an alien invasion force hiding behind Hale-Bopp to shield their approach to Earth and catch us unawares. (Fortunately for us, the astronomer was not a member of FRAC.) NASA was unimpressed, but many people believed it.

The comet came and went – and apparently so did the alien invasion force. Years later, one wit suggested that “If the invaders ever reached Earth, they must have attacked Detroit; at least, that’s the way it looked the last time I was there.”

*In 1999, many technology experts predicted that all of the world’s computers would reset to zero and crash at the stroke of midnight on Dec. 31, 1999, plunging civilization into chaos. The deadline passed, and nothing happened.

*Most hoaxes and misinformation are believable because they contain at least a grain of truth that has been embellished with other “facts”

that are blatantly false. Such was the case with the 2003 “**Mars hoax.**”

In August, 2003, an anonymous e-mail message was spread to 600,000 people that, on the evening of Aug. 27, they needed to go outside and look at the sky because, on that evening, “***Mars will be the same size as the Moon!***”

Although it began as a misrepresentation of the facts – telescopically, Mars would be as large on that date as the naked-eye Moon, but the message didn’t read that way – it became a hoax when virtually the same message (with doctored photos added for emphasis) appeared every summer in e-mails or on Facebook for more than a dozen years thereafter, including some years when Mars wasn’t even visible on that date.

The original message stated that “**This will be a once-in-a-lifetime event that you cannot afford to miss! The next time Mars will be this close to Earth will be in 2287 a.d.!**” But if that was true in 2003, a skeptic might ask – and it was -- *How could it also be true in 2004 and every year thereafter for more than a decade?*

*Can a calendar cause the end of the world?

Beginning around 2009, we were warned that the world would end on Dec. 21, 2012, as predicted by the ancient Mayans’ calendar. Reasons cited by various doomsday prophets included: the arrival on that date of the next solar maximum that would fry the Earth and its inhabitants; a sudden, catastrophic reversal of Earth’s polarity; a freak alignment of forces in our galaxy opening a portal in space-time that would allow the black hole at the center of the **Milky Way** to engulf our planet; and Earth colliding with a previously unknown planet called **Niribu**. The prediction was so highly publicized that it spawned an absolutely dreadful movie, *2012*, that featured Earth besieged by worldwide earthquakes, volcanic eruptions and miles-high tsunamis.

Whether factual or far-fetched, many people are always willing to believe bad news – and the worse it is, the more likely it is to be believed – probably because bad news has always played a large role in human affairs.

The only truth in this hoax was that the Mayans believed that, on Dec. 2, 2012, the world *as we know it* would end. They didn’t say

whether they believed it would no longer exist or simply be changed into something else – and they didn't indicate what the world might be like after that date, or how or why any such changes would occur.

*Want more? Consider this:

On April 17, 2016 the *New York Post* reported that “A newly discovered planet (called Planet Nine) could destroy Earth *as early as next week!*” (*My emphasis.*)

Earth's demise, the article explained, would come from a barrage of asteroids and comets shaken loose from their location in the Kuiper Belt by Planet Nine and sent hurtling toward the **Sun**, with Earth in their path.

Never mind that it would take years for those deadly objects to reach us – or that Planet Nine presently exists only in theory because it has not been confirmed: None of that matters if you are trying to sell newspapers. And one of the best ways to do that is to frighten people, even if it means inventing facts. Speaking of which...

*A month later, in May, 2016 a British newspaper, the *Daily Mail*, claimed that **Saturn's** moon **Iapetus** is actually an artificial object created by aliens. As proof, the article cited a 2004 Cassini spacecraft photo that shows a line around the moon's equator that resembles a trench around the Death Star in *Star Wars*. (That trench housed the battle station's engines, thrusters and docking bays.) The line in the Cassini photo is actually a mountain ridge – but that's not nearly as exciting as imagining Iapetus to be a gigantic Death Star, is it?

*Also in 2016, both *Astronomy* and *Sky & Telescope* reported that scientists had finally proved the existence of gravitational waves – the long-hypothesized and sought-after “ripples in the fabric of space-time” that **Einstein** had predicted. Further investigation showed that the data had been wrong, and what the scientists had seen was actually dust in the Milky Way.

So what (and who) can you believe? Best advice here is, *Consider what you've read, and if you question its validity do further research.* Discuss your concerns with other club members.

If you have a problem believing something you've heard about or read, chances are good that we've heard about it, too. Hoaxsters and fake news are as common as spam on the social media, and astronomy is not immune to that trend.

Just because Joe Blow from Kokomo considers himself an expert on a given subject doesn't mean that what he says is true or accurate. He may in fact know less about it than you or I do – or he may be making it up, whether to boost sales for his new book, to scare people or to enlist gullible believers to support his bizarre theories, whatever they are.

It's different with FRAC.

For example, our members, both individually and in groups, sometimes see things in the night sky at JKWMA and elsewhere that we can't explain. Here are three reasons why you should believe someone – or a group of *someones* – in FRAC who says that he/she/they have seen something unexplained in the sky:

1. There *are* unexplained mysteries in the universe, our galaxy, the solar system and in the sky above us. Anyone who spends as much time studying the night sky as we do in FRAC will encounter some of those mysteries at least occasionally.

2. Beyond the time we spend developing observing skills and interpreting what we see in the night sky, unlike non-astronomers we also use binoculars and telescopes to study celestial objects and phenomena. In many cases, those tools permit us to get close enough to the mystery to find out what we're actually seeing.

3. As astronomers, we deal in facts, not unwarranted assumptions. We don't have hidden agendas that would lead us to conclude that those unexplained sightings are evidence of alien presence or activity. We try to figure out what we're seeing, of course; sometimes we're successful, and just as often we aren't. But until someone produces solid physical evidence that is more trustworthy than photos that can be faked or doctored, we'll continue to chalk up those unexplained sightings as just that – unexplained occurrences -- and nothing more.

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Above: NGC 891 (a.k.a. **The Silver Dollar Galaxy** or the **Silver Sliver Galaxy**), an edge-on unbarred spiral galaxy in *Andromeda*. (Photo by **Vencislav Krumov**.) A member of the NGC 1023 galaxy group, **NGC 891** lies about 20 million light-years distant. It was discovered in 1784 by **William Herschel**, and appears in three A. L. observing programs: Herschel 400, Caldwell – it’s #23 on that list – and Two In the View. (The other galaxy, **NGC 910**, does not appear in Venci’s incredible photo.)

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Above: M56, a globular cluster in *Lyra*. (Photo by **Alan Pryor**.)

As a beginning observer using a 3-1/2” refractor, **yr. editor** had no trouble finding **M57 (Ring Nebula)**. Since **M56** was located nearby, he also looked for that globular too, but with considerably less success. (In fact, he never found M56 in the little refractor.) Two years later, however, after circumstances forced him to

purchase a 10” Dobsonian reflector, he found **M56** in less than 30 seconds. Even then, the cluster was only partially resolved into individual stars, but the hazy ball of light was large enough to make him wonder, *Why has it taken two years for me to find it?*

The answer, of course, lies in the familiar observers’ adage, “Aperture Rules All”. The larger a telescope’s aperture, the more photons of light it gathers. **M56** was there all along, but so small and faint in the refractor that he overlooked it even though he knew exactly where to find it (i.e., 40% of the way from **Albireo** to **Gamma Lyrae**).

M56 was discovered by **Charles Messier** in 1779. It appears in three A. L. observing programs: Messier, Binocular Messier and Globular Cluster.

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Above: M31 (Andromeda Galaxy), a companion spiral galaxy to the **Milky Way**. (Photo by **Alan Pryor**). Beauty is timeless. We’ve shown **M31** many times before in these pages; its loveliness is not diminished by the 2.5 million light-years that separate us.

M31 is the most distant object that can be seen naked-eye. It won’t resemble what you see in Alan’s wonderful photo, of course – and you certainly won’t see the satellite galaxies **M32** (below M31’s core) and **NGC 205** (to the upper right of the core) without a telescope – but so what? That faint glow in the night sky to the

NNE of the **Great Square of Pegasus** is the collective light of more than a trillion Suns spread out over an area that is twice as large as our galaxy!

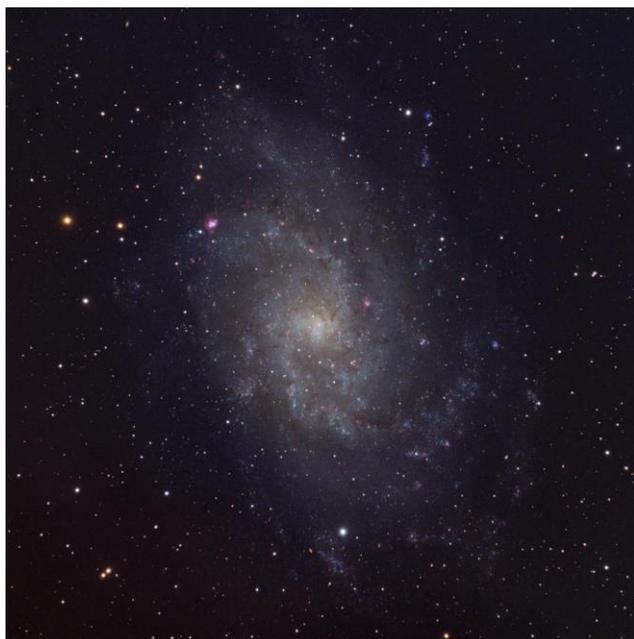
As befits one of the most familiar and popular deep-sky objects, Andromeda Galaxy appears in five A. L. observing programs: Messier, Binocular Messier, Two In the View, Universe Sampler and Urban.

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Above: The core of **M31 (Andromeda Galaxy)**. (Photo by **Vencislav Krumov**.) This close-up gives **M31** an eerie 3-D quality due to variations in the brightness and size of the stars and star clouds in Venci's photo.

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Lower Left Corner: **M33**, a spiral galaxy in *Triangulum*. (Photo by **Alan Pryor**.) **M33** ranks 3rd in size behind **Andromeda Galaxy** and the **Milky Way** in the Local Galaxy Group. Despite being face-on to us (and therefore notoriously difficult to observe in small scopes under less than ideal conditions), **M33** appears in three A. L. programs: Messier, Binocular Messier and Herschel 400.

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A Personal Message from Yr. Editor. After two months of hectic activity involving selling one home, buying another one in another state and making all of the necessary changes at both ends, **Louise** and I are comfortably settled into our new residence in Panama City Beach.

It doesn't make a lot of sense for your newsletter editor to be located 250 mi. away from the Griffin/Flint River area, so this will be my last issue as editor. (That's why this edition of the *Observer* is longer than usual.)

I hope you've enjoyed my editing efforts over the past 2+ decades. I may continue to submit articles occasionally, but I'm sure that you'll give your new editor(s) the same high level of support that you've always given me.

I was 55 yrs. old when FRAC began, so I've always known that my time with you would be limited. I just didn't know that the next 23 yrs. would pass so quickly, or that I'd be around long enough to enjoy them.

At any rate, I'm part of FRAC's past now, not its future. **You** are FRAC's future – you, and others like you who, although not yet members, will join the club and help you shape what FRAC will become.

Your friendship has meant more to me than you'll ever know. I will not forget you, or FRAC.

Before signing off for the last time as your newsletter editor, I'll reveal my least highly guarded secret: *I was Prof. Stargazer!* It's only fitting, then, that I leave my final statement to that kindly old gentleman.

Prof. Stargazer: I see by the old clock on the wall that it's stopped. (I guess I forgot to change the batteries.) But Bill and I don't need a clock to tell us that it's time to say adieu, so we're a-

doin' it. As **Porky Pig** put it, "Th-Th-That's All, Folks!"

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**MERRY
CHRISTMAS!**