

THE FLINT RIVER ASTRONOMY CLUB

NEWSLETTER OF THE FLINT
RIVER ASTRONOMY CLUB

An Affiliate of the Astronomical League

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Officers: President, **Dwight Harness**; Vice President, **Bill Warren**; Secretary, **Carlos Flores**; Board of Directors: **Larry Higgins**; **Aaron Calhoun**; and **Alan Rutter**.

Alcor: **Carlos Flores**; Webmaster: **Tom Moore**; Program Coordinator/Newsletter Editor: **Bill Warren**; Observing Coordinator: **Sean Neckel**; NASA Contact: **Felix Luciano**.

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Club Calendar. Fri.-Sat., Jan. 4-5: JKWMA observings (at dark); **Thurs., Jan. 10:** Club meeting (7:30 p.m., The Garden in Griffin); **Sat., Jan. 26:** Home schooling observing (TBA, details still in the planning stage) **Fri.-Sat., Feb. 1-2:** JKWMA observings (at dark).

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President's Message. In mid-November, FRAC lost a treasured member, **Alan Rutter**, and the pain of that loss will not soon be leaving us.

Alan was a great guy, a talented astronomer, loyal FRACster and board member. I don't know the hows or whys of his passing; all I know is that we lost much more than a member; we lost a friend.

Rest in peace, dear friend.

-Dwight Harness

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Last Month's Meeting/Activities. A fine crowd of 24 – **Cindy & Lucy Barton**; **Denise & Truman Boyle**; **Aaron Calhoun**; **Mason & Erik Erikson**; **Betty & Dwight Harness**; **Larry Higgins**; **Steven Hollander**; **Sarah, Jeremy, Emily & Delilah Milligan**; **Rose & Ken Olson**; **Courtney Seabolt & Philip Paul Sacco**; **Eva Schmidler**; **Dr. Richard Schmude, Jr.**; **Elaine Stachowiak**; and **Mike & Danielle Stuart** -- attended our Christmas dinner party at Bryan's Restaurant. Thanks, Truman, for handling the distribution of doorprizes.

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This 'n That. In Memoriam. It is with deep sadness that we note the passing of FRAC board member **Alan Rutter** on Nov. 16th at his home in McDonough.

Alan, 40, was a veterinarian and owner of the Lake Harbin Animal Hospital in Morrow, Ga. An ardent and extremely talented observer, he earned four A. L. observing pins: Hydrogen Alpha Solar; Lunar; Messier; and Outreach. Alan also was involved in the Henry County Players stage group as an actor and director.

A memorial service was held on Dec. 8th at St. Joseph Episcopal Church in McDonough, where Alan was a member.

Member responses:

"Condolences on the loss. 2018 has taken a lot of good people. Prayers for his family." (**Dawn Chappell**)

"My thoughts and prayers to Alan's family." (**Aaron Calhoun**).

*Ancient astronomers referred to **Algol (Beta Persei)** as "the Demon Star" because, of all the thousands of stars they saw in the night sky, Algol changed in brightness over a short period of time. (In Greek astronomy, Algol represented the severed head of the mythological Gorgon **Medusa** being held aloft by **Perseus**, her slayer.)

Algol is an eclipsing binary star. Normally it shines at mag. 2.1, or about as bright as **Polaris**, the **North Star**. Every 2 days, 20 hours and 49 minutes, however, an unseen companion star passes between Algol and us, dimming the Demon Star's

glow to mag. 3.4. Each eclipse lasts ten hrs., after which Algol returns to its former brightness.

Even an inexperienced stargazer can measure Algol's brightness changes. (It's one of the simple challenges in the A. L.'s Universe Sampler Program for beginning astronomers.)

The constellation *Perseus* is shaped very much like the Atlanta Braves "A". Its brightest star is mag. 1.8 **Alpha Persei**, on the western arm of the "A". To the SW of Alpha Per on that arm lies mag. 3.4 **Gamma Persei**. You can gauge Algol's brightness by comparing it with those stars.

Most of the time Algol, lying farther S on the eastern arm of the "A", is roughly as bright as Alpha Per. But during eclipse, Algol dims to the brightness of Gamma Persei.

*It's unavoidable, but true: The presence of humans or human technology contaminates, however severely or slightly, the environments of extraterrestrial places they visit. One example is the rocket stages, satellites, landers, rovers and other disposable scientific equipment we've sent to the **Moon**, planets, asteroids and comets. When their missions are completed and they run out of fuel or battery power, they become orbital or surface junk, like leaving trash in your neighbor's yard.

(For an in-depth look at this subject, see **Johnathan McDowell's** article, "Litter in Orbit," in the July, 2018 issue of *Sky & Telescope*, pp. 34-40.)

Another example of contamination took the form of a mystery that arose in 1971-72 when Apollo 15 & 17 astronauts placed sensors several feet below the Moon's surface in order to measure internal heat flow and geological activity. Those sensors recorded unexplained temperature rises at that depth. The warming continued until 1977 when the sensor batteries failed. Geologists were expecting temperature fluctuations at the surface due to the monthly lunar phase cycle – but they were not expecting (and couldn't explain) the 2° to 4° rise in temperatures 9-10 ft. below the surface.

Well, now they know: The culprits were the astronauts themselves. Whether collecting rock samples or soil specimens, setting up scientific apparatus or conducting experiments, drilling or digging in the soil or riding around in moon rovers, they disturbed the lunar surface, allowing additional solar heat to reach the subsurface soil. Lunar Reconnaissance Orbiter images of the Apollo 15 &

17 landing sites showed darker areas where the astronauts and rovers had traveled and disturbed the soil around the sites and the sensors. (Source: *Sky & Telescope*, Sept., 2018, p. 9.)

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Upcoming Meetings/Activities. We'll start the new year with Joe Kurz observations on **Fri.-Sat., Jan 4th-5th**. The New Moon will be on the 4th, so all we'll need for a perfect start to 2019 are clear skies and you.

Our club meeting will be at 7:30 p.m. on **Thurs., Jan. 10th**. The stars of the show will be **Alan Pryor** and his new 22-in. telescope. If it's clear outside, Alan will take us on a guided tour of the universe via the largest 'scope that anyone in FRAC has ever owned. And if the sky doesn't cooperate, we'll stay indoors and Alan will show and tell us about the care and feeding of a monster telescope.

Sean Neckel has scheduled a public observing for a home-schooling group on **Sat., Jan. 26th**. We'll send out details when they are finalized.

Next month's JKWMA observations will be on **Fri.-Sat., Feb. 1st-2nd**.

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The Sky in January: A Bevy of Beauties. Let's start with the biggie: There will be a **total lunar eclipse** on the evening of **Sun.-Mon., Jan. 20th-21st**. It will begin at 10:34 p.m. Totality will arrive at 11:41 p.m., and will last until 12:43 a.m. The eclipse will end at 2:48 a.m.

Hope for clear skies: if we miss this one, the next total lunar eclipse we'll be able to see will be on the evening of May 15-16, 2022.

Then there's the **Quadrantids meteor shower**, which will peak around 9 p.m. on **Thurs., Jan. 3rd**. The **Moon** will be just 2 days short of New, so the skies should be deliciously dark all night. The radiant (i.e., the point in the sky from which Quadrantids meteors will appear to be coming, regardless of where you see them) will not rise until the early morning hrs. of Jan. 4th, but you should still see 30-60 meteors per hr. from 9 p.m. on.

Like comets? **Steve Bentley** saw **Comet 46P/Wirtanen** in his 10x50 binoculars on Dec. 5th. "It was in the constellation *Eridanus*," he writes, "and barely visible in the light dome of Forsyth to the south of my house. The coma was quite large,

but may actually have been even larger under darker skies. The comet looked like a round cloud through the light pollution, and I had to use averted vision to get a decent look at it. I used the sky chart off the spaceweather.com site to locate it.”

Comet Wirtanen will be bright – 7th mag. -- and visible throughout January as it crosses between *Lynx* and northern *Ursa Major*. We’ll get a very good view of it at JKWMA during our club observings on Jan. 4th-5th. It will sport a fan-shaped dust tail.

As for the planets... **Mars** (mag. 0.5) will be up in the SW sky until about 11 p.m. in Jan.; blue-gray **Neptune** will be up there, too, in *Aquarius*, but will be lower in the SW sky than Mars.

Blue-green **Uranus** (mag. 5.8) will be an easier viewing target than Neptune: it will be brighter and higher in the sky, residing near the 4th-mag. star **Omicron Pisces**. Uranus will set after midnight.

Venus, Jupiter, Mercury and **Saturn** will be visible in the pre-dawn hrs. during January.

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A Look at Some Solar and Lunar Myths by Bill Warren

Whether gathered around campfires at night or performing basic survival activities during the daylight hours, early humans recognized the importance of the two celestial bodies whose presence dominates the sky. Many of mankind’s earliest beliefs were based on what people knew – or thought they knew – about the **Sun** and the **Moon**.

The Sun. Probably the first scientific-type thought that ever occurred to early humans was associating daylight with the Sun’s presence in the sky. It allowed them to do things they could not do at night. As a result of the Sun’s unrivaled brightness and the heat it produces, most if not all early cultures worshipped the Sun. For example, in 3,000 b.c. the ancient Egyptians revered **Ra, the Sun God**, as the king of their gods. Ra was depicted in hieroglyphics as having the head of a falcon, probably because the Sun “flies” across the sky.

Early on, solar eclipses were thought to be caused by animals attempting to eat or take away

the Sun. The Vikings blamed flying wolves prowling the sky, and in what is now Vietnam villagers thought the culprit was a hungry toad or frog in search of a hot meal.

In Peru, ancient Incas shot flaming arrows toward the Sun to drive off a jaguar that was attacking it. And in Korea it was believed that the emperor sent fire dogs to steal the Sun, so people tried to scare them off by shouting and making loud noises. (It worked in both cases, too, because the Sun always came back.)

Some early cultures believed that the Sun god rode across the sky every day in a fiery chariot. When the Sun god vanished below the horizon, he pulled a blanket over the sky to produce night. The stars were daylight seen through tiny holes in the blanket. Some holes were larger than others, allowing more daylight to peek through.

The Moon. Although not nearly as bright as the Sun, the Full Moon is the same size in our view and vastly larger than the stars. Unlike the Sun, though, the Moon regularly changes its shape and brightness. Those changes were considered important enough for most early cultures to regard the Moon as a minor deity – not as powerful as the Sun god, but a god (or, more commonly, a goddess) nevertheless. In some cultures, the Moon was a vessel that carried the gods around the sky.

The Moon has always been linked to romance, and its waxing and waning associated with cycles of human fertility, creation and destruction. (Even today, many people believe that a woman’s fertility increases during the Full Moon.) The lunar cycle also formed the basis for mankind’s earliest calendars, which were developed by ancient Sumerians around 8,000 b.c.

When the Moon is in the seventh house and
Jupiter aligns with Mars,
Then peace will guide the planets, and love will
steer the stars.
This is the dawning of the Age of Aquarius...
-The Fifth Dimension (The *Age of*
Aquarius [1969])

The Moon and Human Behavior. Originally, people who studied the sky were known as *astrologers*, not astronomers. Ancient astrologers produced the world’s first star charts; they gave

names to the brightest stars; and they grouped stars into shapes and patterns that were familiar to them -- the constellations. The annual reappearance of certain star patterns told them things like when to plant their crops and when to start preparing for winter.

Over time, however, astrology moved in directions that were decidedly unscientific. When that happened, astrology was replaced by astronomy as a more scientific approach to studying the universe around us.

Modern-day astrology is a pseudo-science. It arose from some ancient astrologers' faulty reasoning that:

- (a) The Moon undergoes dramatic changes during its cycles;
- (b) Humans undergo dramatic changes in their moods and behavior; therefore,
- (c) The Moon influences human activities and behavior.

When astronomers realized that five other celestial objects – **Mercury, Venus, Mars, Jupiter & Saturn** – were also different from everything else in the sky, the astrologers attributed human behavior to the combined influence of the Moon and the planets. Astronomers thought that was silly – we still do – but many people believed it because astrology offered explanations for why people behave the way they do. Even today newspapers and other sources publish daily astrological horoscopes -- guides to human activity based on the lunar phases and positions of the Moon and planets within the twelve zodiac constellations.

There's a bad moon on the rise.

-John Fogerty (*Bad Moon Rising*, 1969)

Blood Moon. The term blood Moon has become fashionable in recent years to describe the Moon's color during lunar eclipses.

Astrologically, lunar eclipses were thought to be omens of bad tidings, since anything that interrupts the Moon's regular cycle would also have a negative effect on human activities and behavior. Bad things are always happening, and since they don't stop before, during or after lunar eclipses, people blamed the eclipses for whatever bad things happened afterward.

In ancient Mesopotamia, astrologers learned how to accurately predict lunar eclipses. To protect the

king at such times, they installed a substitute king to pose as the monarch during the eclipse, while the real king went into hiding until it was over. Then the fake king was put to death and the true king returned to his throne. (So the eclipse *was* in fact an omen of bad news for the king's temporary replacement.)

Lunatic Illusions. The belief that the Moon strongly affects human behavior was not limited to astrologers. The word lunatic comes from the Latin word for Moon (Luna). It was widely believed as late as the 1500s that the Full Moon was the cause of insanity. (The belief originated with **Aristotle** and the Roman historian **Pliny the Elder**, both of whom believed that, because the brain is the "moistest" part of the human body, it was subject to the Moon's influence the same way that Earth's tides are. Of course, the Full Moon had the greatest influence, so when people went insane it was thought to be because they spent too much time outside at night during Full Moon.) As one great writer put it,

It is the very error of the Moon.

She comes more near the Earth than she ought,

And drives men mad.

-Shakespeare, *Othello*

The Howling. Native Americans respected wolves for their courage, hunting skills and cooperation. They believed that wolves howled at the Full Moon, and that when the Moon disappeared (during New Moon) they sang it back into existence with their howling. (Actually, howling is a way of communicating over long distances. Wolves howl at night because they are nocturnal pack hunters. They are easiest to see under a Full Moon, and they point their faces upward when howling because it allows the sound to carry farther. But it looks like they're howling at the Moon.)

Combining the beliefs that the Moon causes changes in human behavior and that wolves were thought to react strongly to the Moon's presence or absence brings us to one of mankind's most enduring – but certainly not endearing – myths: *werewolves*, or humans who turn into ravenous wolves during Full Moon and revert to their human states afterward. Over the years, very convincing movies about werewolves have made the myth

appear to be a realistic possibility, but it's not something you'd want to sink your teeth into.

Final Thoughts On the Full Moon. Regardless of what else schoolteachers know about the Moon, most of them will tell you in a heartbeat that *during Full Moon their students are more excitable, energetic and prone to misbehavior than at other times.*

My wife and I were teachers for more than four decades. Every year, on numerous occasions we heard teachers say "Better watch out: it's Full Moon. The kids are gonna be antsy today," or something to that effect. In our experience, at least 85% of the teachers we taught with were convinced that children's behavior changes during Full Moon.

That percentage probably is pretty accurate -- and it probably hasn't changed much since we retired. But is it true? And if not, why do so many teachers, who spend so much time dealing with student behavior, believe otherwise?

In fact, children are *always* energetic and excitable, and some of them are always more prone to misbehavior than others. (I certainly was.) But of all the lunar phases, the Full Moon is by far the most familiar and noticeable. News sources remind us when it's due to occur, and we see it shining brightly overhead when we go outside at night. As a result, teachers are more likely to remember and associate misbehavior or other classroom problems with the Full Moon than with other times or lunar phases when the Moon is less visible. And if you're already convinced -- as many teachers and parents are -- that the Full Moon affects children's moods and behavior, any unusual behavior or misconduct that occurs during that time will be regarded as evidence that it's a fact, not a myth.

Finally, there is this...

"Once in a Blue Moon." You've doubtless heard this phrase many times before; it's used to describe situations that occur only rarely. But it's not a myth. On a few occasions, catastrophic events such as volcanic explosions, desert windstorms or raging forest fires have sent abnormally large amounts of ash, dust or smoke particles into the air, scattering the Moon's visible light and making it appear to be blue.

*In 1883, the explosion of the volcano Krakatoa in Indonesia produced blue Moons worldwide for nearly two years. (It also happened on a limited basis after two other volcanoes exploded, Mt. St. Helens in Washington in 1980 and Mt. Pinatubo in the Philippines in 1991.)

*In 1927, the late arrival of the monsoon season in India sent vast clouds of dust and sand from the Thar Desert into the atmosphere, turning the Moon blue in that part of the world.

*In 1951, smoke and soot from massive forest fires turned the Moon blue over western Canada until the fire was brought under control.

In all of those cases, moonlight was scattered in all directions by the clouds of debris. But light toward the red end of the spectrum was scattered more strongly by large particles in the air than the blue light at the other end of the spectrum, so less red light passed through the obscuring dust, smoke or ashes. (It's the opposite of what happens at sunset to turn the sky red.) The result was a Moon that appeared blue rather than white.

But as you know, that happens only once in a blue moon.

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Above: IC 1396, an emission nebula in *Cepheus*. (Photo by **Felix Luciano**)

An enormous ($3^\circ \times 2^\circ$) emission nebula and open cluster, **IC 1396** can be seen under good sky conditions in 10x50 binoculars -- the nebulosity as a huge but faint circular patch that shows up well in a nebula filter, and a bright cluster of 50 or more stars. The nebula and cluster lie immediately S of

one of the loveliest stars in the sky, 2nd-mag. **Mu Cephei**, the blood-red star that is better known as **Herschel's Garnet Star**. (It does not appear in Felix's photo.)

At the bottom of the photo, about halfway between the bright star and the lower right corner, you'll see a thin C-shaped patch of nebulosity surrounding 3 stars and expanding to the lower right edge. The dark nebula within that "C" is **Barnard 161**; it outlines **Elephant's Trunk Nebula (NGC 1396A)**, a small but bright nebulosity resembling the silhouetted head and upward-curling trunk of a pachyderm.

Felix's photo also contains several dark nebulas: **LDN 1110**; **LDN 1111**; **LDN 1112**; **LDN 1117**; and **LDN 1130**.

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Above: **Sharpless 2-170** (a.k.a. **Little Rosette Nebula** and **LBN 577**), an emission nebula in *Cassiopeia*. (Photo by **Felix Luciano**)

Sh 2-170 is 7,500 light-years away. The bright stars overlying it are known collectively as **Stock 18**.

Sh 2-170 also contains two Lynds Dark Nebulae: **LDN 1260** and **LDN 1263**.

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Above Right: **NGC 7635 (Bubble Nebula)**, an emission nebula in *Cassiopeia*. (Photo by **Alan Pryor**)

NGC 7635 was discovered in 1787 by **William Herschel**. Although lovely in photos, the bubble is notoriously difficult to observe visually. It was

created by the stellar wind from an 8th-mag. central star in a rich star field.

Bubble Nebula is a Herschel II target.



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Above: **NGC 1499 (California Nebula)**, an emission nebula in *Perseus*. (Photo by **Vencislav Krumov**)

With a nickname derived from its resemblance to the state of California, **NGC 1499** is beautiful in Venci's photo but virtually impossible to see visually without an h-beta filter. Besides being extremely faint, it is also about 2.5° long: If you manage to see it at all, all you'll see is a tiny portion of it in your field of view unless you are using a rich-field telescope.

California Nebula is about 1,000 light-years away. It was discovered in 1884 by the American astronomer **Edward Emerson Barnard**.

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