

THE FLINT RIVER OBSERVER

NEWSLETTER OF THE FLINT
RIVER ASTRONOMY CLUB

An Affiliate of the Astronomical League

Vol. 23, No. 5 **July, 2019**

Officers: President, **Sean Neckel**; Vice President, **Bill Warren**; Secretary, **Aaron Calhoun**; Board of Directors: **Larry Higgins**; **Cindy Barton**; and **Felix Luciano**.

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Observing Coordinator: **Sean Neckel**;
NASA Contact: **Felix Luciano**.

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Club Calendar. Fri.-Sat., June 28-29: JKWMA observings (at dark); **Thurs., July 11:** FRAC meeting (7:30 p.m. at The Garden in Griffin); **Fri.-Sat., July 12-13:** ALPO/SERAL conference (Gordon State College, Barnesville, GA); **Sat., July 20:** "Astronomy in the Park" observing (8:30 p.m. at High Falls State Park, Jackson, GA); **Fri.-Sat., Aug. 2-3:** JKWMA observings (at dark).

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President's Message. I want to thank **Carlos Flores** for ordering several boxfuls of handout materials for our outreach activities. It should be enough to last for a long time.

On **Fri.-Sat., July 12th-13th**, **Dr. Richard Schmude** will host an ALPO/SERAL conference at Gordon College in Barnesville. (ALPO is the Association of Lunar & Planetary Observers; SERAL is the Southeast Region of the Astronomical League, and Dr. Schmude is its representative to the A. L.)

The registration fee is \$30 for the 2-day event. That fee does not include the Sat. night banquet dinner at Brian's Buffet in Griffin. You can (a) send your check payable to Gordon State College to Richard c/o: **Dr. Richard Schmude, 109 Tyus St., Barnesville, GA 30204**; (b) pay online at www.gordonstate.edu (click on Community Education, then on Registration Page, Astronomy Symposium, and Enroll Yourself); or (c) register onsite when you arrive. The fee will be the same whichever way you register.

Information regarding the speaker schedule will be sent out later. If you have questions, contact Richard at 678-359-5832 or 770-358-0728; or at schmude@gordonstate.edu. He will host observings at his home in Barnesville from 9-11 on both nights, weather permitting.

Dr. Schmude has been a loyal supporter of FRAC for more than two decades, having spoken at our meetings dozens of times. Please show your support for him and repay his thoughtfulness by attending this event.

-Sean Neckel

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Last Month's Meeting/Activities. Thirty people attended our High Falls observing on May 25th, including FRACsters **Sean Neckel**, **Mike Stuart**, **Felix Luciano**, **Truman Boyle** and **Elaine Stachowiak**.

Ten members attended our JKWMA observings on May 31st-June 1st: **yr. editor** (both nights); **Sean & Gianna Neckel** (Fri. night); and **Alan Pryor**; **Felix Luciano**; **Aaron Calhoun**; **Dwight Harness**; **Mike Stuart**; and **Carlos Flores** (Sat. night). The sky was clear both evenings, and we caught up on some long overdue astrophotography and observing.

Fifteen members attended our June meeting: **Sean & Gianna Neckel**; **Aaron Calhoun**; **Dennis Nelson**; **Ken Olson**; **Mark Grizzaffi**; **Dawn Chappell**; **Tom Moore**; **Truman Boyle**; **John Killian**; **Erik Erikson**; **Jeremy Milligan**; **Phil Sacco & Courtney Sebolt**; and **yr. editor**.

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This 'n That. Be sure to check out our FRAC Facebook and Web sites when you have time. Both of them contain information and material that, along

with the newsletter, will keep you abreast of what's going on in the club and astronomy.

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People You Should Know: Aaron Calhoun.

Aaron & his wife **Jessica** live in Griffin. In late 2011, Jessica's mother heard about a local astronomy club. She told Aaron, and he joined FRAC in Jan., 2012. He bought an 8-in. Dob, and has become an excellent observer.

Aaron's interests include the science of stars, exoplanets and the vast distances of the universe. He has written several articles on those and other topics for the newsletter under the heading "Calhoun's Corner."

What Aaron likes best about FRAC is the broad range of member interests: "Some of them know about things like astrophotography and telescopes, others know about other areas of astronomy, and everyone is willing to teach beginning astronomers what they need to know."

"You don't need to be an expert astronomer or good at math or science to enjoy astronomy," he goes on. "All you need is to want to know more about this wonderful universe we're living in."

Aaron has worked at Publix in Peachtree City for 22 yrs. He served on FRAC's board of directors from 2014-2019, and was elected secretary this year. He is also our Alcor (A. L. correspondent) and Facebook coordinator.

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Upcoming Meetings/Activities. Due to a quirk in the lunar phases, we won't have any JKWMA observings in July. Instead, we'll conduct them on **Fri.-Sat., June 28th-29th**, and again on **Fri.-Sat., Aug. 2nd-3rd**.

Our club meeting will be held at 7:30 p.m. on **Thurs., July 11th** at The Garden in Griffin.

As noted in **Sean's** "President's Message," the ALPO/SERAL conference at Gordon State College in Barnesville will be held on **Fri.-Sat., July 12th-13th**. The event is open to the general public as well as amateur and professional astronomers. The talks, which will be delivered by Gordon State's **Dr. Chad Davies** and area astronomers, will be on topics of interest to non-astronomers and amateurs as well as professionals, and at a level that the general public will understand. We hope that you'll be able to attend.

To get to the Gordon State campus from, say, Fayetteville, take Ga. 92 to Griffin and turn right at the 4-lane US 19/41 intersection. Stay on US 41 South all the way to Barnesville, and after 41 S becomes US 341 S look for a Marathon gas station on the left. Turn left there onto College Drive, and after about ½ mi. look for visitor parking on the left. Additional directions to the conference site will be sent out prior to the event.

On **Sat., July 20th** we'll return to High Falls State Park for another "Astronomy in the Park" public observing. The event will begin at 8:30 p.m.

To get to the park, take I-75 South to Exit 198 (High Falls Rd.). Turn left onto High Falls Rd., and the park's Day Use Area will be 1.7 mi. ahead on the left, beyond the main entrance to the park and across the bridge. Turn left into the Day Use Area, pass the pay station and park on the left. The observing site is between the parking area and the pavilion.

See <http://goo.gl/maps/RQFN3gmvgTA2>.

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The Solar System in July. **Mars** (mag. 1.8) and **Mercury** (mag. 1.4) in the WSW will share the sky with the **Crescent Moon** from July 1st-4th.

Jupiter (mag. -2.5) and **Saturn** (mag. 0.1) will be up all night in July. Saturn will reach opposition this month, so it will be about as bright as it ever gets.

Mag. 5.8 **Uranus** also will be up all night in **Aries**, and **Neptune** (mag. 7.8) will rise around midnight in **Aquarius**.

The **Delta Aquariids meteor shower** will peak over a three-night period lasting from July 28th-30th. The Moon won't disturb viewing, so you might see 12-15 meteors an hour on those evenings. (As with most meteor showers, viewing will be best in the pre-dawn hrs.)

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"Magnificent Desolation"

by Bill Warren

(Note: This article is based in part on an article by *yr. editor* that appeared in the Observer a few years ago.)

“I believe that this nation should commit itself to achieving the goal, before this decade is out, of landing a man on the Moon and returning him safely to the Earth. No single space project in this period will be more impressive to mankind, or more important for the long-range exploration of space; and none will be so difficult or expensive to accomplish.”

-**Pres. John F. Kennedy**, in a speech to Congress on May 23, 1961. That statement marked a shift in U. S. policy regarding the development of space technology from military to exploratory and scientific purposes.

When **Neil Armstrong** stepped down onto the lunar surface at 10:56 p.m. EDT on July 20, 1969, only 164 days remained in the 1960s.

Background

There were five components of the package that delivered the Apollo 11 astronauts to the Moon: the mighty 3-stage Saturn V rocket that lifted the astronauts beyond Earth’s atmosphere; the command module (*Columbia*) piloted by **Michael Collins** that carried the three astronauts the rest of the way to the Moon and remained in orbit while Armstrong and **Edwin “Buzz” Aldrin** went to the surface; and the lunar module (*Eagle*) that landed in the Sea of Tranquillity.

Armstrong, Aldrin and Collins spent two years preparing for the Apollo 11 flight. Armstrong was the mission commander, Collins the command module pilot, and Armstrong and Aldrin the lunar module (LM, pronounced “lem”) co-pilots. Collins was the most outgoing of the three, Aldrin the most scientifically minded and Armstrong the most experienced pilot.

The Rest of the Story

*The Saturn V engines generated a thrust of 7.5 million lbs. During liftoff, the astronauts experienced a force of 4.5 g’s. A 150-lb. astronaut would have felt as if he weighed 675 lbs. (Sort of the way you feel after a hefty Thanksgiving dinner.)

*Originally, NASA selected Aldrin to be the first to walk on the Moon. However, sometime during their training Armstrong complained that, as mission commander, he should be the first one down the steps. In order to avoid any problems

that might jeopardize their already-precarious schedule, NASA caved in and reversed their order of exit. Aldrin, ever the team player, accepted the change without complaint.

*Unless you lived back then, it’s difficult to imagine how unsophisticated technology was in 1969. For example, the Univ. of Georgia didn’t own a computer until 1968, and the one they bought cost \$7 million. It took up the entire basement floor of the Education Bldg. (Compare that with the computer you carry around with you every day – your phone.)

Aldrin, having little faith in NASA’s computers, insisted from the start that all of the mathematical computations for the trajectories of Apollo 11 be done by a group of African-American women working at the Jet Propulsion Laboratory who did their calculations by hand (i.e., pencil and paper). His judgment – and their accuracy -- was vindicated when, of all the problems the astronauts and NASA faced during the mission, none were the result of miscalculations by those remarkable ladies.

*That same unsophistication carried over into science. NASA’s geologists knew next to nothing about the composition of the lunar surface in 1969. For example, they didn’t know whether the surface would support a lunar lander, or if the 32,000-lb. LM would sink or tip over in loose lunar surface material. The support struts featured large saucer-shaped pads, but no one knew what would happen when the *Eagle* landed.

What happened? Nothing. Armstrong guided the LM to an acceptable site, the craft landed gently but firmly at about the speed of a descending elevator, and everything was okay.

“Houston, Tranquillity Base here, the *Eagle* has landed.”

-**Neil Armstrong**

*Armstrong was regarded as NASA’s calmest and most resourceful problem-solver in times of extreme duress, having survived two earlier potentially lethal equipment malfunctions as a pilot in the X-15 and Gemini programs. So when the guidance computer began giving out incorrect data as the *Eagle* neared the planned touchdown

site, Armstrong took control manually and steered them to a level landing site. It was a harrowing experience because the LM was running out of its fuel allotment for landing. When the Eagle finally touched down in the Sea of Tranquillity, the computer indicated that they had 25 seconds of fuel left before the landing would have had to be aborted. (Actually, it had 50 sec. of fuel left, but they didn't know that because the fuel indicator data was wrong.)

*There were no seats in the LM. Armstrong and Aldrin stood up throughout the LM flights, held in place by cables and straps.

“That’s one small step for (a) man, one giant leap for mankind.”

-**Neil Armstrong**, after stepping down onto the Moon. (It doesn't matter whether he left out the word “a” or if it was unheard in the somewhat indistinct audio transmission from the Moon; either way, his message was a powerful reminder of what that small step represented, and what it had taken to achieve it.)

*In order to exit the LM, the astronauts knelt on all fours and backed out until they reached the 9-rung ladder to the surface. Due to the way their helmets and uniforms were constructed, they could not see the lunar surface while they were on the ladder. The last rung was 3 ft. above the surface, so after hopping down they practiced hopping back up a couple of times to make sure they could get back into the LM after their moon walk. It was an easy hop back up despite their bulky spacesuits, thanks to the Moon's reduced gravity. (See below.)

*The original plan was for the astronauts to plant the flag, collect a few rock samples and then leave after spending half an hour on the lunar surface. Geologist **Gene Shoemaker** was instrumental in convincing NASA that Apollo 11 should be more than a mere exploratory mission, it should also be scientific. So NASA had Armstrong and Aldrin set up a seismometer to measure the Moon's internal activity; a retro-reflector to accurately measure the distance from the Moon to Earth; and a solar wind collector to capture charged solar particles. Armstrong took

more than 200 photos while Aldrin was setting up the scientific apparatus, and they collected 47.5 lbs. of lunar material to bring back. (Incidentally, that retro-reflector is still working; that's how we know that the Moon is moving 1-1/2 in. farther away from Earth every year.)

***The lunar soil.** First, let's clear up a technical detail: Neither the Moon nor **Mars** contains soil. By definition, soil is composed of material containing water and nutrients that plants need in order to germinate and grow, so the sterile lunar and martian surface material is referred to as regolith.

Second, Armstrong described the lunar regolith as black in color and “very, very fine-grained...almost like a powder”. It clung to the astronauts' gloves, the soles of their shoes and elsewhere on their spacesuits, and deposited itself inside the LM when they re-entered the Eagle. (Later Apollo missions carried minivacs to clean off the regolith.)

***Lunar Gravity.** We all know that the Moon's gravity is just 1/6th that of Earth. However, it's easy to forget gravity's effect on the astronauts: even with their oxygen packs attached, they weighed no more than 35-40 lbs. on the Moon.

During the 2-1/2 hrs. that Armstrong and Aldrin spent outside the LM, they had no trouble walking but found that the best way to move from one place to another was via a series of small, galloping hops like children riding hobby horses. They were careful to land with their weight slightly forward in order to avoid falling over backward due to the weight of the oxygen tanks on their backs. Falling could have ruptured an astronaut's spacesuit or disconnected his oxygen supply, in either case with fatal results. (None of the Apollo astronauts who walked on the Moon ever fell down during their EVAs (extravehicular activities).)

*The U. S. flag at Tranquillity Base is the only one of the six planted by Apollo astronauts that is not still standing. (It was blown over during the Eagle's takeoff after Armstrong and Aldrin returned to the LM.) The other five flags

were planted far enough away from the LMs to avoid the Apollo 11 flag's fate.

“Here men from the planet Earth first set foot upon the Moon, July, 1969 A. D. We came in peace for all mankind.”

-Plaque left at Tranquillity Base on the Moon in July, 1969. It was signed by the three astronauts and **Pres. Richard M. Nixon**.

*After Apollo 11, none of the three astronauts ever returned to the Moon. Mike Collins was scheduled to fly on Apollo 17, but he turned it down. He felt that “we’d done what Kennedy told us to do and (going back) would be a bit anticlimactic.” But more than that, he said, “I saw myself living in a motel room for the next 3 yrs., being separated from my family...(so) I said, “Uh-uh, that’s enough.”” (*Astronomy*, July, 2019, p. 32.)

*Conspiracy theorists were quick to debunk Apollo 11’s success. They said the Moon landing never happened, but was faked by NASA. The takeoff and landing sequences were taken from previously filmed rocket flights, they said, and the scenes on the Moon were actually filmed on a Hollywood sound stage by clever moviemakers. Some even said that CBS newsman **Walter Cronkite** was part of the conspiracy, reading from a prepared script as the event unfolded on live tv. It was watched by 500 million people worldwide.

One of the conspiracy accusations was that the U. S. flag appeared to be blowing in a gentle breeze on the airless Moon. (In fact, the flag – which was made of nylon, not cloth – was not attached to its supports in a manner that would have stretched it to its fullest. It was wrinkled from being stored on the LM.)

Another criticism was that neither TV images nor still photos showed any stars in the background, and the astronauts didn’t mention seeing any during their moonwalk. (The truth: It was daytime on the Moon, so cameras were pre-set to show features that could be seen in broad daylight. The astronauts’ eyes initially were not adapted to night vision conditions during their moon walk -- and by the time they were, Armstrong and Aldrin were preoccupied with

their scheduled tasks and neglected to mention what they might have seen in the sky. However, they were well aware of the bleakness of their surroundings, Aldrin referring at one point to the lunar surface as “magnificent desolation.” On later Apollo missions, astronauts mentioned seeing a few stars.)

Conclusion

As **Mark Twain** noted, *Two people can keep a secret – if one of them is dead*. If it’s hard to believe that people could doubt that men walked on the Moon in 1969, it is even more unlikely that, of the more than 400,000 scientists, technicians and workers associated with the Apollo 11 project, not one of them would ever admit, whether intentionally or accidentally, that the whole thing was a hoax, if in fact that was the case. But no one ever did that because the landing actually occurred, and was repeated five times in the next three years. (Not surprisingly, the conspiracy crowd said that those landings never occurred, either.)

The Apollo missions remain, in my humble estimation, the greatest accomplishments in mankind’s history. Other humans doubtless will walk on the Moon in the future, but none of them will face the primitive conditions and unique challenges that our Apollo scientists, technicians and astronauts met and conquered. The next lunar astronauts will, to borrow a phrase from **Sir Isaac Newton**, stand on the shoulders of those giants who preceded them.

The twelve American astronauts who walked on the Moon between 1969-72 were pioneers, all of them. Neil Armstrong and Buzz Aldrin were simply the first. (The others were: **Pete Conrad, Alan Bean, Alan Shepard, Edgar Mitchell, David Scott, James Irwin, John Young, Charles Duke, Eugene Cernan and Harrison Schmitt**.)

P. S.: Two Failed Russian Attempts to Beat the U. S. to the Moon. During the 1950s-‘60s, the U. S. and the Soviet Union were embroiled in a furious “space race” to see which nation would be the first to land a man on the Moon. By 1969, the Russian space program was lagging far behind the U. S., and the Soviets were well aware

of U. S. plans to attempt a manned lunar landing in July of that year.

1. Sometime early in 1969, European scientists detected the launch of a rocket at the Soviets' Baikonur space facility in Kazakhstan. Shortly thereafter, ham radio operators around the world picked up transmissions of a conversation in Russian between the pilot and mission control. But then the transmission stopped suddenly and never resumed, leaving the listeners wondering what was going on. When asked about it, the Russians said that no such rocket, manned or unmanned, had been launched on that date.

Immediately, speculation arose that, in a last-gasp effort to reclaim their lead in the space race, the Soviets had decided to skip some of the preliminary steps that the Apollo program had taken and send a cosmonaut to the Moon. But something went cataclysmically wrong, and rather than admit their failure and the loss of a cosmonaut the Soviets preferred to say that it never happened. They said it was all an American hoax created to make the Soviet Union's space program look bad. (As if they needed any help in that regard.)

2. Unable to land a man on the Moon, shortly before the Apollo 11 liftoff from launch pad 39A at Cape Kennedy the Russians launched Luna 15, an unmanned spacecraft. Luna 15 was intended to soft-land on the Moon, collect a few rock samples and return to Earth with its payload while the Americans were still up there.

Unfortunately for the Soviets, Luna 15's landing was anything but soft. The spacecraft failed to decelerate and crashed into the lunar surface on July 21st.

To this day, the Russians have never landed a man on the Moon. However, they plan to try again in 2030.

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Above Right: NGC 3242 (the Ghost of Jupiter), a planetary nebula in *Hydra*. (Photo by Alan Pryor.) Telescopically, NGC 3242 is about the same size as Jupiter, thus its nickname. The nebula is 2 l.y. in dia., and lies 1,500 l.y. away.

A popular observing target, NGC 3242 is included in four A. L. observing programs:

Caldwell (#42), Herschel 400, Planetary Nebula and Urban.



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Below: M92, a globular cluster in *Hercules*. (Photo by Alan Pryor.) M92 is smaller and less well known than its nearby constellation mate M13 ("The Great Cluster") – and that's a shame because the little globular is magnificent in its own right. At mag. 6.3, M92 is one of the brightest (and oldest) globular clusters visible from the northern hemisphere.

M92 was discovered by **Johann Bode** in 1777, and re-discovered independently by **Charles Messier** four years later. It appears in three A. L. observing programs: Messier, Binocular Messier and Urban.



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