# THE

# FLINT RIVER OBSERVER

**NEWSLETTER OF THE FLINT RIVER ASTRONOMY CLUB**

**An Affiliate of the Astronomical League**

**Vol. 20, No. 2 April, 2016**

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Club mailing address: 1212 Everee Inn Rd., Griffin, GA 30224. FRAC web site: www.flintriverastronomy.org.

Please notify **Bill Warren** promptly if you have a change of home address, telephone no. or e-mail address, or if you fail to receive your monthly *Observer* or quarterly *Reflector* from the A. L.

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**Club Calendar. Fri.-Sat., April 8-9**: JKWMA observings (Site #1, at dark); **Thurs., Apr. 14**: FRAC meeting/lunar & planetary observings (7-10 p.m., The Garden in Griffin); **Fri., April 29**: Gordon State College "Relay For Life" observing (Barnesville, Ga., 6 p.m.)

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**President's Message.** Thanksgiving is a long way off, but it's never too early or too late to mention some of the things that I'm thankful for:

*My wife **Betty**, who has put up with my nonsense for 29 glorious years;

*Our three daughters and two grandkids, all of whom have aged me and at the same time kept me young at heart;

***Larry Higgins**, who nineteen years ago thought there ought to be an astronomy club in the Flint River area;

*Good friends like you who accept me as I am, warts and all, and treat me like I'm a friend worth having;

*A club with more outreach than any other astronomy club in the world, and the members (you) who make it possible; and

***Bill**, a UGa fan, probably will take this out, but I'm also thankful for the Univ. of Tennessee football team. (Hey, it's not *my* fault that his Dawgs can't beat my Vols!)

I want to welcome our newest members, **Larry O'Keeffe** and **Gavin Stell** of Rex, GA. We're really happy to have you join us.

**-Dwight Harness**

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**Last Month's Meeting/Activities.** Ten members attended our March JKWMA observings: **Dwight Harness & yrs. truly** (Fri. night); and **Truman Boyle; Aaron Calhoun; Jeremy Milligan; Alan Pryor; Felix Luciano**; and **David, Sarah & Brendon O'Keeffe** (Sat. night). The sky was clear on both evenings; you'll find photos taken on Mar. 5th by Alan, Felix and Sarah on p. 6.

Twenty-four members (including **Larry O'Keeffe** and **Gavin Stell**, who joined FRAC at the meeting) attended our club birthday party. Others present included: **Dwight Harness; Erik Erikson; Tom Moore; Carlos Flores; Truman Boyle; Steve Bentley; Dawn Chappell; Steve Hollander; Kenneth & Rose Olson; Jeremy, Sarah, Emily & Delilah Milligan; Dr. Richard Schmude; Aaron Calhoun; Dan Pillatzki; David, Sarah, Cherrie & Jeffery O'Keeffe**; and **yr. editor**.

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**This 'n That**. Our deepest sympathies are extended to **Jessica** and **Aaron Calhoun** with the recent passing of Jessica's father.

*Five more members are slated to receive Outreach awards: **Cherrie O'Leeffe, Emily Milligan** and **Delilah Milligan** (Basic Outreach

pins); and **Carlos Flores** and **Erik Erikson** (Stellar Outreach certificates).

*From our "**And the Honors Keep Rolling In" Dept.**: FRAC's **Dr. Richard Schmude** recently earned the rare distinction of having an asteroid named for him.

The asteroid, which was discovered in 2000 by the Catalina Sky Survey, now bears the official designation of **Asteroid 30042/Schmude**.

(Re the long interval between discovery and naming: the asteroid originally was called "Asteroid 2000 EY3." The official designation, which is given by the International Astronomical Union [IAU], was delayed until the asteroid's orbital path could be firmly established, which is always a very lengthy process. Under IAU guidelines, asteroids and comets are the only objects that can be named for living persons.)

This is not the first honor that Richard has received. The Astronomical League awarded the Gordon State College professor of chemistry its highest honor, the *Astronomical League Award*, in 2008. And in recognition of his many years of service to the Association of Lunar and Planetary Observers, that organization awarded him both the *Walter Haas Observer's Award* and the *Peggy Haas Service Award*.

And now we have **Asteroid 30042/Schmude**. Dr. Schmude says, "I feel so very honored by this. I don't know who selected me, but I hope I can find out and thank him."

Richard presently is serving as president of the Southeastern Region of the Astronomical League.

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**Upcoming Meetings/Activities.** Our JKWMA observings will be held at Site #1 on **Fri.-Sat., April 8th-9th**.

Our club meeting and lunar/planetary observings will be held from 7-10 p.m. on **Thurs., April 14th**, at The Garden in Griffin. The meeting will begin at 7:30 p.m., with observings at 7 p.m. and again after the meeting.

FRAC will participate in Gordon State College's "Relay For Life" cancer walk-a-thon on **Fri., April 29th**. (We won't be walking, but showing walkers the wonders of the night sky.) The event will begin at 6 p.m., and will be held at Summer's Field in Barnesville. We'll send out directions to the site during the week preceding the event.

As with all Relay For Life walk-a-thons, this one will be an all-nighter. All you need to do, though, is show up and stay as long as you like.

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**People You Should Know: Carlos Flores**

Carlos started in astronomy in 1997, and he joined FRAC in March, 2008. Since then, he has impressed one and all with his friendliness, his sincerity and his commitment to astronomy and FRAC. He has served as our Alcor (Astronomical League correspondent) since February, 2012, and as our secretary since March, 2013.

Carlos lists his interests as astrophotography, meeting new people in astronomy, surfing the internet and music. He is an amateur radio operator (call sign WP4J), and he and his wife **Olga** enjoy traveling here and abroad. Carlos has a daughter from a previous marriage, and two grandsons.

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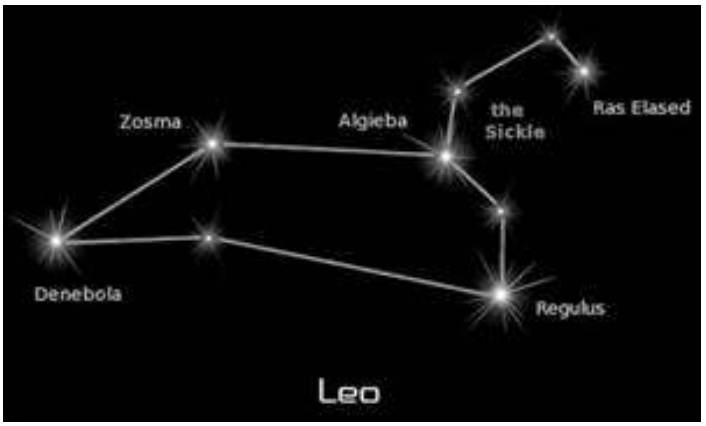


**Calhoun's Corner: Looking at Leo**
**article by Aaron Calhoun**

The rising of *Leo* heralds the coming of spring. Along with *Orion*, Leo ranks among the most recognizable constellation patterns in the sky. It contains several interesting stars and deep-sky objects.

Most constellations don't look much like their namesakes. Leo is an exception, if you regard the six bright stars that form a backward question mark or sickle as a lion's mane and head facing west, and the elongated right triangle of stars at the eastern end as the lion's resting hindquarters. (Seeing Leo standing requires a bit more imagination.)

Leo contains three notable bright stars, and one faint one.

First, there is bluish-white **Regulus** (**Alpha Leo**), the brightest star in Leo and 21st-brightest in the night sky. Regulus lies at the base of the Sickle's handle. (Or, if you prefer, it's the dot below the backward question mark). It is a wide double star, its yellow companion easily visible in binoculars or a small telescope. Regulus is about 78 light years away, and its actual brightness is equal to 240 **Suns**.

Moving two stars up from Regulus you'll find another very bright star, **Gamma Leo (Algeiba).** It's the 3rd-brightest star in Leo, and one of the prettiest telescopic double stars in the sky: its stars shine deep and pale yellow. Algieba is a large star, 27 million mi. in diameter, and it lies about 130 light years away.

At Leo's other end, **Beta Leo** (**Denebola**, which is Arabic for "lion's tail") is the bright white star at the end of the triangle that forms Leo's hindquarters. Denebola is Leo's 2nd-brightest star, 37 light years away and about twice as large as the Sun. It is important to us because it marks the western border of an area known as the "Realm of the Galaxies," with **Epsilon Virgo** (**Vindemiatrix**) at the eastern border. The area between those stars contains dozens of Virgo Cluster galaxies that are visible in backyard telescopes, including eighteen Messier objects, most of them galaxies..

Also in Leo, **Wolf 359** is a red dwarf star lying only 7.8 light years away from us. It is the 4th-nearest star to us, trailing only the **Sun**, **Alpha Centauri** (4.3 light years away) and **Barnard's Star** (6.0 light years away) in *Ophiuchus*. Wolf 359 is only about 1/10th as large and massive as the Sun, but that's not why I included it here. In the TV series *Star Trek: The Next Generation,* Borg aliens destroyed 39 Federation starships in the Wolf 359 star system.

Leo contains many galaxies, including five Messier objects: **M65, M66, M95, M96** and **M105**. Three other bright Leo galaxies somehow missed Messier's sharp eyes: **NGCs 2903, 3521** and **3628**.

All of the Leo Messiers except M105 (an elliptical galaxy about half the size of the Milky Way and located about 32 million light years away) are spiral galaxies.

M65 and M66 are about 37 million light years away; they share a low-power telescopic field of view. M65 is 86,000 light years in diameter, and M66 is 108,000 light years wide.

M95 and M96 also share a low-power field of view. M95 is 66,000 light years from end to end, and lies about 31 million light years away. M96 is about as large as the Milky Way, and lies 62,000 light years away.

Leo also contains the radiant (apparent point of origin) of the annual November **Leonids meteor shower**. Every 33 years, the Leonids shower becomes a **storm**, producing thousands of meteors an hour at peak. The last storm was in 1996, and the next one will be in 2032.

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## The Planets: Who Discovered Them, and Who Named them?

**article by Bill Warren**

**Mercury, Venus, Mars, Jupiter** and **Saturn** have always been visible to the naked-eye, so there was no "discoverer" for any of them. They were given mythological names by the ancient Greeks, but no one knows who decided which gods to name them for.

When Rome conquered Greece in 146 b.c., the Romans adopted the Greek mythology and re-named the planets with Roman equivalent names: *Mercury*, the speedy, wing-footed messenger of the gods; *Venus*, the goddess of love; *Mars*, the surly god of war; *Jupiter*, the king of the gods; and *Saturn*, the god of agriculture and time.

**Earth**, the other visible planet (and the easiest to see) probably was discovered by a prehistoric cavewoman while painting her toenails.

Earth is the only planet not named for a Greek or Roman god or goddess. Although the Greeks had no official name for Earth, they associated it with **Gaia**, the wife of **Uranus** and mother of the Greek gods. Gaia was the Greek equivalent of "Mother Nature" or "Mother Earth" in modern terms.

The Romans sometimes called our planet *Tellus* (the Roman equivalent of Gaia), but they also referred to it as *Terra* (Latin for land). The term *Earth* probably arose about a thousand years ago; it comes from early English and Germanic words meaning ground.

The other planets, too faint to be seen naked-eye, were discovered telescopically.

**Uranus**. The great German-English astronomer **Sir William Herschel** discovered the 7th planet in 1781 – 173 years after **Galileo** first aimed a telescope at the **Moon**. Herschel wasn't looking for a new planet, and when he found it he didn't know what it was. He thought it might be a comet because it was green, so the well-known comet hunter **Charles Messier** was asked to help identify Herschel's discovery. After studying the object and its celestial motion, Messier verified that it was in fact a planet. It was the first addition to the original planetary list in recorded history. Herschel wanted to name it for his patron, **King George III** of England; some astronomers wanted to call the new planet *Herschel*. But the German astronomer **Johann Bode** preferred to continue the practice of naming the planets for mythological characters. He suggested that it be named *Uranus,* and that was the name chosen. Uranus was both the son and husband of Gaia – a weird arrangement if ever there was one -- and he was the ancient Greeks' pre-Olympian god of the skies.

**Neptune**. Not surprisingly, the discovery of a 7th planet led to intense scrutiny of the new addition to the solar family. When irregularities in Uranus's orbit were detected, astronomers decided that the culprit was an as-yet undiscovered planet located farther out than Uranus and exerting subtle influence on its orbit.

In 1846, the French mathematician **Urbain LeVerrier** predicted where the unknown planet might be found. He sent the coordinates to several astronomers and one of them, Germany's **Johann Galle,** found the planet almost exactly where LeVerrier said it would be. Galle was credited with the discovery because he saw it first, but LeVerrier claimed the right to name it. Because the 8th planet was orbiting so deep in space, he chose *Neptune*, the Roman god of the sea. The name was appropriate, too, because Neptune is blue.

**Pluto**. Like Uranus earlier, Neptune was studied at great length by astronomers. And when – again, like Uranus – Neptune's orbit was found to be somewhat erratic, astronomers such as the American **Percival Lowell** predicted the presence of yet another planet beyond Neptune. The search was on – but it was by no means easy.

Discovering Uranus had been an accident, and Neptune had been difficult; but compared to the mysterious "Planet X," they were searchlights blazing across the night sky. If not for the Herculean labors of **Clyde Tombaugh**, an American astronomer working at Lowell Observatory, the 9th planet might never have been found.

To find Planet X, Tombaugh collected hundreds of photos of the area where he suspected that it might be hiding. Then, using a device known as a "blink comparator," he switched back and forth rapidly between pairs of photos, carefully comparing each photo with a similar photo taken a few days later, searching for a single point of light that had moved among the hundreds or even thousands of background stars on each photographic plate. His work finally paid off when, on Feb. 18, 1930, he found a faint (14th-mag.) "star" that had moved a short distance during the interval between two photos.

Tombaugh's labors in discovering **Pluto** have been compared to finding a needle in a haystack, but that understates the case. It was more like finding a specific needle in a huge pile of needles. Even then, though, he was lucky beyond belief: it turned out that Pluto has no influence on Neptune's orbit.

But Tombaugh had discovered a 9th planet in the solar system. According to popular folklore, Tombaugh himself suggested that it be named Pluto to honor **P**ercival **L**owell, and to underscore the planet's depth in space. (*Pluto* was the Roman god of the underworld.) But that's not the case. Pluto was the name submitted by a British schoolgirl, **Venetia Burney**. Hers was the winning entry among hundreds of names suggested by people from all over the world. Venetia wasn't the only person to suggest the name Pluto, but she was the first.

Pluto remained the 9th planet in the solar system until 2006, when astronomy's governing body, the International Astronomical Union (IAU), downgraded it to *dwarf planet* status. It was not – and still is not – a popular decision among many astronomers. Here's why (and how) it happened:

**When Is a Planet Not a Planet**? Almost from the beginning, some astronomers were opposed to naming Pluto a planet. Pluto is small – smaller, in fact, than Mercury and the Moon. Its surface area is roughly the size of Russia, and smaller than Canada. And lying 3.5 billion miles from the **Sun** – nearly twice as far away as Neptune -- Pluto is hardly a prominent feature in the solar system.

Still…No serious opposition arose until 1992, when astronomers began to find other similar objects in the same area of space as Pluto. Those objects – including Pluto – are part of the *Kuiper belt*, a disc of icy bodies orbiting the Sun beyond Neptune at a distance of from 2 to 4.7 billion miles away. Astronomers worried that, because the Kuiper belt contains trillions of ice worlds, they might find thousands of Pluto-sized objects out there that would have to be added to the list of planets. (Objects in the Kuiper belt are known as *trans-neptunian objects* because many of them cross Neptune's orbit.)

The astronomers' fears became a reality when, in 2005, a trans-neptunian object subsequently named **Eris** was discovered. Eris was slightly smaller than Pluto, but substantially more massive.

A heated debate quickly arose: Should Eris be regarded as the 10th planet in the solar system? Or should Eris, Pluto and objects like them be classified as *minor,* or *dwarf, planets?*

The problem was – as hard as it is to believe -- no one in the entire history of astronomy had ever defined the term *planet* in specific terms. How large or massive should an object be in order to be considered a planet?

To solve the problem, the IAU proposed three conditions that an object should meet to be classified as a planet, whether in our solar system or elsewhere:

1. The object must orbit a star without itself being a star.
2. It must be massive enough to be circular due to its own gravity. (Most asteroids have no definable shape: their gravity isn't strong enough to pull them into a circular shape.)
3. It must have cleared the area around its orbit of other similar objects by absorbing or destroying them.

Under those conditions, neither asteroids nor trans-neptunian objects qualify as planets because they have millions and trillions of neighbors sharing their orbits.

The IAU met in 2006 to vote on the proposed definition. It passed by a large margin, and Pluto thus became a dwarf planet. The decision shook the astronomy world: it was hailed by many astronomers as long overdue, and derided by many others who resented the underhanded way in which the resolution was passed.

The IAU special session to vote on the resolution was held in Paris, France on Aug. 26, 2006, with only a day or two of advance notice. Only a handful of American astronomers – who comprise a sizable majority of the IAU's membership – were able to rearrange their schedules at the last minute to attend the hastily-called meeting. Members who were unable to attend were not allowed to vote. As a result, less than 5% of the IAU's members were able to decide Pluto's fate.

Why would the IAU resort to such drastic measures in voting on such an important issue? Why not open the voting to all members, present or absent? The IAU said that the "voting by members present only" requirement allowed for face-to-face discussion prior to the vote being taken. (They discussed it in the morning and voted on it after lunch.) But if that was the case, why did they give only a couple of days' advance notice? Why not schedule the vote six months ahead of time so a majority of their members could be present? Pluto would still be around; it wasn't going anywhere.

The answer is inescapable: *They didn't want the Americans to attend.* They were afraid the American astronomers would vote down the proposal – which might well have been the case. American astronomers (and the American public as well) have always considered the discovery of Pluto to have been a significant event in astronomy history. And it was, too: until Pluto's discovery in 1930, the existence of the Kuiper belt was a theory, not a fact. And it would be **72 years** before astronomers discovered another trans-neptunian object!

So now we're back to eight planets. And according to the IAU and a 1970s TV sitcom, *Eight Is Enough*.

**Other Planets?** Finally, the question arises: *Are there any other as-yet undiscovered planets lurking somewhere out there in the solar system?* Put simply, **No**.

Given the reach of today's telescopes and the millions of amateur and professional astronomers worldwide who are using them, it is impossible that we could have overlooked any planets inside Neptune's orbit. (Earth-based telescopes have produced photos of Mars's moons **Deimos** and **Phobos** from 140 million miles away – and they are 8 and 14 miles in diameter, respectively!) If there were something really big out there among the inner terrestrial planets or the outer gas giants that meets the IAU's planetary requirements, we'd have seen it by now.

As for objects in the Kuiper belt or the *Oort Cloud* (which lies 1,000 times farther from the Sun than the trans-neptunian objects and serves as a storehouse for comets-in-waiting): under the IAU guidelines, their size doesn't matter. They could be as large as Jupiter – well, probably not that big, but you know what I mean – but they cannot be regarded as planets. They haven't cleared their neighborhood of other similar objects. They are part of the solar system, but they aren't planets.

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**Above: M46 & NGC 2438** in *Puppis*. Photo by **Alan Pryor**. **M46**, an open cluster containing about 100 stars of roughly equal brightness, is not well separated from its surrounding starfield. It lies 1.5$^{o}$ E of another, brighter Messier open cluster, **M47**.

M46 was discovered in 1771 by **Charles Messier**. A lovely annular (ring-shaped) planetary nebula, **NGC 2438**, lies among the stars at the NE edge of the cluster. 2438 is not part of M46: it lies 3,300 light years away, about 1/3 closer to us than M46.

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**Upper Right: Lynd's Dark Nebula 1622** (a.k.a. **The Boogeyman Nebula**) in *Orion*. Photo by **Felix Luciano**. There's more than a grain of truth to the contention that the constellation *Orion* is basically a huge area of nebulosity and stars encompassing 1,231 square degrees of the winter sky. Wherever you look in Orion, you aren't far from bright or dark nebulae.

As its name suggests, **LDN 1622** is a dark nebula; and as its nickname implies, it does indeed resemble a celestial "boogeyman," worthy of inclusion in **Phil Sacco's** "Howl-een Hunt" list of scary objects in the night sky. (You can find Phil's list in the Downloads section of our website.) As befits such a fearsome fiend, however, the **Boogeyman** is virtually invisible except in eerie photos such as Felix's. That's why Phil didn't include it in his list.

So thanks, Felix: if we have nightmares about a boogeyman tonight, we'll know who to blame!

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**Above:** *Orion* and **M42**. Photo by **Sarah O'Keeffe**. At JKWMA on Mar. 5$^{th}$, Sarah's uncle **Brendon** (**O'Keeffe)** decided to help her get started in astrophotography. Every journey begins with a single step, and Sarah's maiden voyage into the complex world of space photography encompasses the **Pleiades** (upper right), the constellation *Orion* and its celestial centerpiece **M42** (center), and **Sirius** (lower left).

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