THE

FLINT RIVER OBSERVER

NEWSLETTER OF THE FLINT RIVER ASTRONOMY CLUB

An Affiliate of the Astronomical League

Vol. 20, No. 8 October, 2017

Officers: President, **Dwight Harness** (1770 Hollonville Rd., Brooks, Ga. 30205, 770-227-9321, rdharness@yahoo.com); Vice President, **Bill Warren (**1212 Everee Inn Rd., Griffin, Ga. 30224, warren7804@bellsouth.net); Secretary, **Carlos Flores**; Treasurer, **Jeremy Milligan**.

Board of Directors: **Larry Higgins; Aaron Calhoun;** and **Alan Rutter.**

Facebook Coordinator: **Laura Harness;** Alcor: **Carlos Flores;** Webmaster: **Tom Moore;** Program Coordinator/Newsletter Editor: **Bill Warren**; Observing Coordinators: **Dwight Harness** & **Bill Warren;** NASA Contact: **Felix Luciano.**

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.

* * *

Club Calendar. Sat., Oct. 7: Girl scout observing (8:30 p.m., Camp Pine Valley in Meansville, GA); **Thurs., Oct. 12:** FRAC meeting (7:30 p.m., The Garden in Griffin); **Fri.-Sat., Oct. 20-21**: JKWMA observings (at dark); **Fri.-Sat., Oct. 27-28:** Georgia Regional Astronomers Meeting (GRAM) in Athens, GA.

*** * ***

President's Message. I can't stop thinking about the solar eclipse. I saw it from Madisonville, TN; the sky was mostly clear, and I would have watched it all day if the **Sun** and **Moon** had let me.

I knew what to expect at totality, but I was still surprised at how quick it happened. The diamond ring was there for just a second, and then it was like somebody turned out the lights. I looked up and saw bats flying around, and crickets began chirping. The corona was just so bright and beautiful in my telescope.

All day, I saw people everywhere being polite to each other. Even in the heavy traffic that morning they treated each other with respect, letting cars in without blowing their horns or raising a finger in anger. Three days later things were back to normal, with people arguing on Facebook about what they saw at totality.

Like the Apollo 11 moon landing in 1969, the eclipse brought us together peacefully for awhile. I hope you got to see it, and that you enjoyed it as much as I did.

Also, congratulations to **Phil Sacco** and **Bill Warren** for their article, "Howl-een Fun," in the Sept. issue of the *Reflector*. It's about spooky objects in the sky at Halloween; reading it will make you want to go out on Oct. 31st and see how many of them you can find.

I hope that you, your loved ones, friends and belongings made it through the winds and rain of Irma in good shape.

And last (but certainly not least), I know you'll want to join me in welcoming to FRAC our newest members, **John Felbinger** of Fayetteville and **John Heard** of Concord.

-Dwight Harness

* * *

Last Month's Meeting/Activities. On Sept. 9th, **Sean Neckel, Mike Stuart, Carlos Flores & yr. editor** conducted a viewing for about 20 girl scouts and their fathers at Camp Pine Valley. Attendance was down due to the expected approach of Hurricane Irma, but the sky was clear throughout and the girls and their fathers were very excited at seeing **Saturn** and the many other things we showed them in the summer sky.

Twenty-one members – **Sean & Gianna Neckel; Dwight Harness; Felix Luciano; Erik Erikson; Steve Hollander; Alan Rutter; Chuck & Neila Davis; Steve Benton; Eva Schmidler;**

Rose & Kenneth Olson; Scott & Cindy Barton; Joseph Auriemma; Dr. Richard Schmude; Aaron Calhoun; Dr. Wayne Gardner; Tom Moore; & yr. editor – and three visitors (**Steve McMinn, Steve Hyde & John Felbinger** (the latter of whom joined FRAC that night) attended our Sept. meeting. Felix gave Cindy a 2-in. refracting telescope, Alan submitted his completed Messier observing log, and everyone enjoyed the **Stephen Hawking** dvd, "Where Are We?"

It's been a decade or more since FRAC has experienced a club observing weekend like Fri.-Sat., Sept. 22nd-23rd. A total of 18 members and three guests attended one or both sessions: **Aaron Calhoun; Dwight Harness; Felix Luciano; Steve Hollander; John Heard; Sean Neckel;** and **yr. editor** (both nights); **Gianna Neckel** and visitors **Chris Chapman & Catherine Schramm** (Fri. night); and **Alan Pryor; Erik Erikson; Phil Sacco** & his guest **Gil Shilcutt** (Sat. night). The sky cooperated nicely, and both evenings had the festive air of a star party.

* * *

There is nothing in nature to match the glory of a total solar eclipse.

-Sir Patrick Caldwell-Moore

* * *

This 'n That. If you've ever wondered why we pass around a roll sheet and have you fill out a name tag at our meetings, here's the answer:

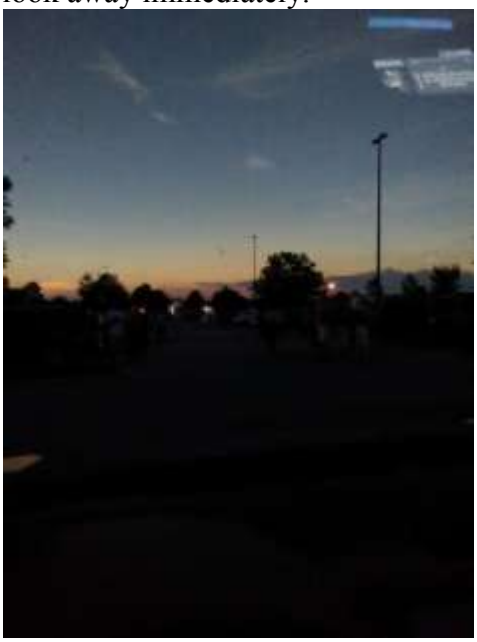
Prof. Stargazer says the roll sheet serves two purposes. On the negative side, it gives the club his signature that we could use to forge checks in his name. *(Yeah, like his checks wouldn't bounce.)* And on the positive side, it gives him an alibi when the police want to know where he was on the 2nd Thursday evening of a given month. (Actually, we do it so your name will appear in the newsletter's "Last Month's Meeting/Activites" column. Members like to see their name in print.)

The professor says we use name tags so forgetful members like **yr. editor** will remember who they are. *(Yr. editor responds: "Hey, I can remember my name -- at least, I did yesterday!)* In fact, we do it so our visitors and new members will know who they're talking to, and vice versa.

***Three Things We Learned About the Solar Eclipse:** 1. Totality mattered only if you were in its path. If you weren't, like everyone else you saw the **Sun** gradually getting smaller and smaller -- then, after a brief pause as a thin crescent, slowly growing larger again. Totality was better, of course – but even a partially eclipsed Sun was a sight to behold.

2. How dark did it get at totality? **Vicki Pryor's** photo (below), taken at Athens, TN inside the path of totality, showed a sky that was dark enough to see people in silhouette, but not light enough to see their features clearly unless you were standing near them.

Alan Pryor said, "The corona was very bright around the darkened solar disk at totality. I could see **Jupiter** and **Venus**, but no stars. In the instant when the Sun peeked out from behind the **Moon** after totality, the sudden burst of light was a thousand times brighter than the corona had been. I had to look away immediately."



Above: Athens, TN at totality. (Photo by **Vicky Pryor**. (The blue and white streaks in the upper right corner are reflections on her windshield.)

At The Garden in Griffin (where 3% of the Sun was visible at totality), the darkness was more subtle, like JKWMA at sunset.

Three percent sunlight may not seem like much, but it was bright enough to hurt your eyes. We didn't see anyone at The Garden looking at the Sun without solar sunglasses to see how bright it was at

totality (except **yr. editor**, of course. There's a joker in every deck).

3. Unlike many previous widely anticipated but ultimately disappointing celestial events – mainly comets that weren't as bright as expected and solar or lunar eclipses that were clouded out -- this one was spectacular! You couldn't watch it without being overwhelmed by what you were seeing. No one had to ask why astronomers love solar eclipses so much; instead, they asked when the next one would be. (The answer: April 8, 2024, and the path of totality will arc from Texas through Maine.)

***History Repeating Itself.** Nearly two decades ago, FRAC conducted monthly public observings at Beaverbrook Elem. School in Griffin, where we held our meetings. One night we set up our 'scopes at a different site on campus, i.e., behind the school. Unknown to us, **Tom & Katie Moore** arrived at the other end of the school, didn't see us and set up their 'scope in front of the gym.

Fast forward many years. While **Alan & Vicki Pryor** were showing the solar eclipse to hundreds of enthusiastic onlookers in a Wal-Mart parking lot in Athens, TN, **Erik & Mason Erikson** *were doing the same thing in a different part of the same parking lot!* The crowd was so large that neither couple knew that the other one was there.

*In the June '17 issue of *Sky & Telescope*, Science Editor **Camille M. Carlisle** wrote a Focal Point essay, "Two Routes to the Truth," in which she described her quest to understand the universe and herself through astronomy and religion. Given the controversy surrounding the subject, the reader response was predictable. Of the seven letters to the editor that appeared in the Sept. issue, four of them were negative (e.g., "Your publication should be supporting critical scientific thinking and not supernatural theories of the universe" and "[Carlisle's religious opinions] are as inappropriate in your journal as would be a cooking recipe, a political endorsement or pornography").

Of the three positive letters, one was written by a friend of FRAC's, A. L. Outreach Coordinator **Dr. Maynard Pittendreigh**. His slant on the issue was interesting, to say the least:

"I have been an astronomer for more than 50 years and a Presbyterian pastor for nearly 40 years. I stand in a long tradition of astronomers who were also theologically trained and rooted -- **Copernicus, Kepler, Tycho, T. W. Webb**, and others. Still, people are often surprised at how I can be both a pastor and an astronomer.

"I often explain that my faith is as different from the religion commonly portrayed in the media as astronomy is from astrology. It is the common thread of a search for truth, one that weaves its way through the fabric of both, that binds me to both astronomy and theology."

***Question:** *When are the best times of the month for observing?*

It depends on what you want to observe. The **Sun** is available on any clear day if you have a solar filter. The **Moon** is an easy target for all but a few days every month (i.e., 1-2 days before and after new moon). The naked-eye planets (**Mercury, Venus, Mars, Jupiter & Saturn**) normally are so bright that, except when viewed near the horizon or a full moon, you'll see what they have to offer.

It's a different story if you want to observe a comet, a meteor shower or deep-sky objects.

Comets and Meteor Showers. The rule of thumb here is, *The less moonglow, the more you'll see and the better you'll see it.* Under a full or gibbous Moon, you may not see anything at all.

Deep-Sky Objects and the Lunar Phases. Moonlight bleaches out the fainter glow of nebulas, star clusters and galaxies. The brighter the Moon is on any given evening, the less detail you'll see in deep-sky objects.

There are eight Moon phases: *new moon* (invisible to us); *waxing* (growing) c*rescent*, ¼ lit; *first quarter*, ½ lit; *waxing gibbous* (3/4 lit, see **Venci Krumov's** photo, Sept. issue, p. 6); *full*; *waning* (growing smaller) *gibbous* (3/4 lit); *third quarter* (1/2 lit); and *waning crescent* (1/4 lit).

Of course, the Moon doesn't just leap from one phase to the next like slides in a powerpoint presentation. During the half of the month from new moon through full moon, the lighted portion grows slightly larger and rises higher in the W sky every night. After full moon, the process reverses itself, with the lighted portion growing smaller and the Moon dipping lower in the E until it disappears at new moon, only to reappear in the W sky a day or two later.

Observing calendars such as *Astronomy's* and *Sky & Telescope's* list just four of those phases: new moon, first quarter, full and third quarter. But that just makes it harder for us to plan our deep-sky observings, so here's a closer look at the eight phases, arranged from best to worst.

1. **New Moon**. Ideal. The Moon is too near the Sun to be seen at new moon, and for 3-4 days on either side it is a very thin crescent.

2-3. **Waxing Crescent/Waning Crescent**. These are the two ¼ lit phases on either side of new moon. Both offer excellent observing possibilities. The waxing crescent Moon still lies relatively low in the W sky after new moon and sets a couple of hours after sundown; the waning crescent Moon in the E sky doesn't rise until around 11 p.m. (And even then it takes 2-3 hrs. to rise enough for its glow to affect observing. When that happens, look for objects in the W sky.)

4-5. **First Quarter/Third Quarter.** The farther you are from new moon on either side of it, the more difficulties it presents. Both of these phases are half-lit; of the two, first quarter is better. Although fairly high in the W sky, the Moon will move out of harm's way in a couple of hours. It will still be up there, but you'll have a good view of objects in the E portion of the sky.

The third quarter Moon, however, will be up for several hours. Look for objects in the W early on, and for those that lie farthest N or S of it when it's at zenith.

6-7. **Waxing Gibbous/Waning Gibbous.** With ¾ of the Moon visible, look for bright objects on your observing list. As before, the waxing gibbous phase may be better because, as it moves W in your view, your access to objects in the E will improve.

8. **Full Moon.** If you're observing the deep sky, the full moon is not your friend. At mag. -11, its overwhelming brightness affects the entire night sky, hiding all but the brightest deep-sky objects from view. Work on your lunar pin, or see what the planets are doing.

***Trivia question:** *Who was the first person to catalog deep-sky objects that are visible in telescopes?* (Contrary to what we've told you in the past, it wasn't **Charles Messier.**)

Seven years before Messier began compiling his list in 1758, another French astronomer, **Nicolas-Louis de Lacaille** (pronounced: La KAI, the last syllable rhymes with high) cataloged 42 non-stellar objects in the southern hemisphere in 1751-52.

Using a ½-in. refractor, Lacaille cataloged such well-known (today) deep-sky objects as the **Jewel Box Cluster (NGC 4755); Eta Carinae Nebula (NGC 3372);** the two finest globular clusters in the sky, **Omega Centauri (NGC 5139)** and **47 Tucanae (NGC 104);** and the **Large and Small Magellanic Clouds.** Like Messier after him, Lacaille didn't know what he had found, but he knew they were not comets or stars.

Unlike Messier, however, Lacaille was not a comet hunter. The deep-sky objects he cataloged were incidental to his real purpose, which was to chart the locations of all of the bright stars visible from the southern hemisphere. Over the course of nearly a year spent observing at Cape Horn at the southern tip of Africa, Lacaille plotted the locations of nearly 10,000 stars.

As if having a telescope that was smaller than Messier's were not challenging enough, Lacaille faced another problem: Most of the southern sky had not yet been divided into constellations. Lacaille's solution was to create 17 new southern constellations. Most of them are faint – but all of them are still in use. Nicolas-Louis de Lacaille created more constellations than any other astronomer in history.

Finally, here's another trivia question: *Of the 88 constellations, which is the only one named after a geographic feature?*

Lacaille's original name for the constellation *Mensa* was "Mons Mensa*"* (Latin for Table Mountain, which overlooks Johannesburg in South Africa). Later, the "Mons" part was dropped, leaving us with Mensa, the Table Mountain.

* * *

Upcoming Meetings/Activities. We'll return to Camp Pine Valley for another girl scout observing on **Sat., Oct. 7th.** The event will begin at 8:30 p.m. We'll have more attendees this month, so we'll need a bunch of FRAC members and their 'scopes.

To get to Camp Pine Valley from Griffin, start out at the 4-lane US Hwy. 19/41 Bypass at Williamson Rd./Ga. 362. Go 2.4 mi. south on the 4-lane. Turn right and follow US 19 South where it turns west at the BP-Ingles-McDonald's stoplight.

Stay on 19 S for 11.3 mi from that stoplight, through and beyond Zebulon, and turn left at Ga. 109.

Follow Ga. 109 for 3.1 mi., through and beyond Meansville, and turn right at unpaved Camp Pine Valley Road. (It's just beyond a large, fenced white house on the left and a white structure on the right.)

Go 1.1 mi. on Camp Pine Valley Rd. and turn left at the camp's gated entrance. The office is about 100 yds. ahead.

The g.p.s. coordinates for Camp Pine Valley are: 33.04491, -84.28154.

Our club meeting will be at 7:30 p.m. on **Thurs., Oct. 12th** at The Garden in Griffin. Last month's **Stephen Hawking** dvd episode was so well received that we've decided to show another one at our Oct. meeting. This one should be verrrrry interesting: "Are We Alone?"

Our JKWMA observings will be on **Fri.-Sat., Oct. 20th-21st.** It's 1-2 days after new moon, so the conditions should be perfect for observing, the sky permitting.

On **Fri.-Sat., Oct. 27th-28th,** the annual Georgia Regional Astronomers Meeting (GRAM) will be held on the Univ. of Ga. campus in Athens. **Felix Luciano** and **Tom Moore** sent out information about the event earlier, but if you've misplaced it and want to attend, contact Felix at 770-471-4160 or montb02@yahoo.com.

* * *

The Planets in October. Let's talk about **Saturn's** rings. This month they will be tilted 27^{o} to our line of sight, which is as open and visible as they ever get. Presently we see them as tilted down, but after this month they will gradually begin to close (and grow smaller in our view) until, in 2025, they will be edge-on to us and we won't see them at all.

After that, the process will reverse itself, with the rings slowly opening again and growing larger, but tilting up this time. In 2032, they will be tilted to their 27^{o} maximum as seen from below the ring plane.

Why does this happen? Because approximately every 15 years Earth's line of sight passes through Saturn's ring plane, revealing first one side of the rings and then the other.

Amateur astronomers enjoy the periods of maximum ring visibility because they are so lovely to look at. Professional astronomers, however, prefer the edge-on view because they can study the planet's surface features without the rings' bright glare interfering with their view.

At any rate, with the rings at maximum visibility in Oct. even a small telescope will show you the **Cassini Division,** a thin black gap in the rings that lies about 1/3 of the way from the rings' outer edge to their inner edge. If you don't see it immediately, keep looking. Sometimes turbulence in Earth's upper atmosphere causes subtle features like the Cassini Division to pop into and out of view.

* * *

Dumb Astronomy Questions

by Bill Warren

Introduction. To encourage beginners to ask questions I've often told them, "We learn by asking questions about things we don't understand. There are no dumb astronomy questions."

I was wrong.

Here are some actual questions that astronomers have been asked. Some of them were asked online, and others at public observings and reported online. They considerably lower the bar regarding how dumb questions about astronomy can be. I've included some of the astronomers' replies because they are as ridiculous as the questions – occasionally sarcastic, but funny nevertheless.

No FRAC member, past or present, asked any of these questions or gave the answers quoted.

Earth

"Are you sure the earth is relly cerculer? If it is, why hasen't antartica fallen off sence gravity holds things down and antartica is at the bottom?"

"Does gravity affect our health? Lots of people I know got sick or injured last week."

"Since scientists have discovered that Pluto doesn't exist, does that mean there are only 49 states?"

Space Travel

"Instead of going UP into space, wouldn't it be easier to go out the SIDE of the earth?"

”Supposedly we landed on the moon in 1969, but how did we get there? I’ve seen launch videos that show the space shuttle going up into the sky, but that can’t be true. You would have to dig a hole through the ground to get out of Earth.”

*If we carried worms into space, would they still be earthworms?”

”Do you think NASA invented thunderstorms to cover up the sound of space battles?” *(The astronomer’s reply: “Yes, and they invented clouds so we can’t see them fighting. But you can see those battles in the* Star Wars *movies.” The questioner to a friend: “See? I told you so.”)*

“If you fell off the Earth, would you fall to the moon? If so, why do we need rockets to get there?

”Do you think humans will ever walk on the Sun?” *(The astronomer’s reply: “Not barefoot.”)*

The Sun and Moon

“Does the moon really exist?” *(The astronomer’s reply: “When’s the last time you looked up at the sky at night?”)*

“I saw the Moon during the daytime. Does that mean it has veered off course and is heading toward us?”

“Is the moon a planet, a moon or a star?”

“How come we can see the moon in the daytime but not the sun at night?”

”Is the sun really a star? If it is, why can’t we see it at night? It doesn’t twinkle like a star.”

”What color is the dark side of the sun?”

”Does the sun ever rise at noon?” *(The astronomer’s reply: “No, but I do.)*

Stars, etc.

”Where do the stars come from when it gets dark?”

“Are stars ever covered by clouds?” *(The astronomer’s reply: “Only when it’s cloudy.”)*

“How many constellations are there in the galaxy?”

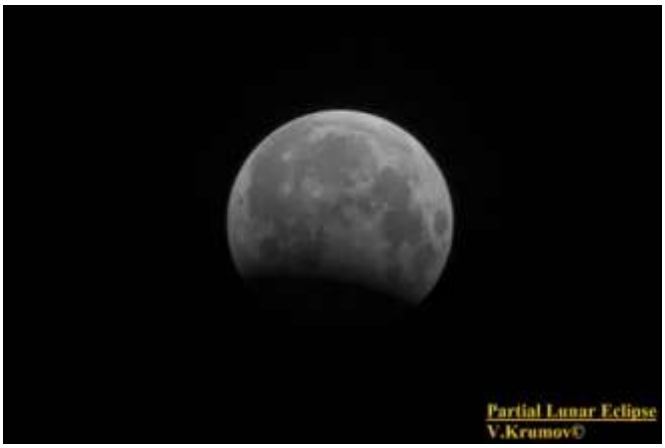
“I read a lot. If I start now, how long will it take for me to learn everything about astronomy?” *(The astronomer’s reply: “It took me two weeks, but I’m a speed-reader.”)*

“Is it true that we’re all going to die on Sept. 23rd? I heard that the eclipse on August 21st will cause a new planet they don’t want us to know about called **Niribu** to crash into Earth 33 days after the eclipse. I need someone who has researched it to tell me if it’s true or not.” (*The astronomer’s reply: “The short answer is* No, you have nothing to worry about. *But do you see that man over there*?” *[He pointed to another astronomer.] “He looks like one of us, but actually he’s from Niribu. He can tell you everything you need to know.”)*

Finally, there is this:

”Do I need a telescope to become an astrologer*?” (The astronomer’s answer: “Astrologers don’t use telescopes, they use horoscopes.”*

* * *



Above: Partial Lunar Eclipse. (Photo taken by FRAC’s favorite Bulgarian, **Vencislav Krumov,** in Abu Dhabi on July 8, 2017.) Venci is an attorney who travels the world representing a construction firm that builds power plants. He joined FRAC while working on two plants near Columbus. (Now, if we can just get him to stop putting captions on the photos he sends us…)

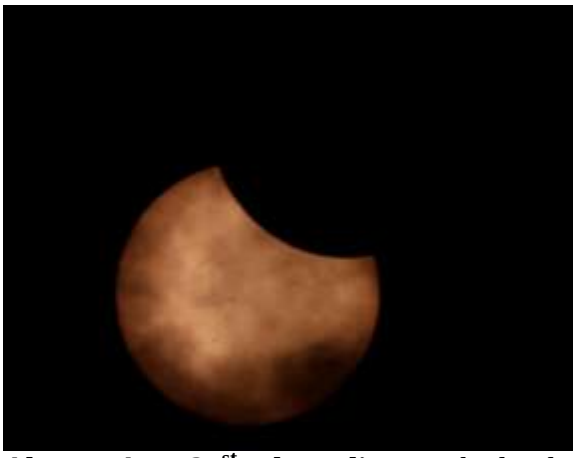
The **Moon** needs no introduction.

Above: M13 (Photo by **Venci Krumov). M13** is the largest and brightest globular cluster in the northern hemisphere. It was discovered, not by **Charles Messier**, but by **Edmond Halley** (of **Halley's Comet** fame) in 1711. Messier re-discovered it in 1764.

Halley found M13 naked-eye and, like everyone since then, he was blown away when he saw it telescopically. M13 contains at least half a million stars; in a 'scope of 10" or larger you'll see more than a thousand of them – a ball of glittering points of light that will leave you breathless.

Above: NGC 6888 (Crescent Nebula), an emission nebula in **Cygnus**. (Photo by **Alan Pryor**.) Alan writes, "**NGC 6888** has an unusual mottled appearance that has been a few hundred thousand years in the making. The bright star near the center of this nebula is responsible for its creation. Millennia ago, that star was a red giant. Much of its outer atmosphere was blown off, which left a gas cloud that expanded as a slow stellar wind. When its hydrogen fuel ran out, the star collapsed, forming a Wolf-Rayet star. At that point, the star began (and still is) transitioning through nuclear reactions into heavier elements. The star is very hot, and it is ejecting gases into space. Intense radiation accelerates those gases to a speed of 2 million miles per hour. As a result, the gases are overtaking and colliding with others that were expelled millennia ago, leaving a mottled shell of gases which are being disturbed by at least two shock waves."

As its nickname implies, **Crescent Nebula** appears in the 'scope as a faint, **C**-shaped arc of nebulosity that is best seen using an O-III or nebula filter. It appears in both the Caldwell (C12) and Herschel II observing programs.



Above: Aug. 21st solar eclipse with clouds. (Photo by **Carlos Flores**.)

* * *

Finally:

***Venus** is the only planet besides **Earth** known to have active volcanoes.

*The total mass of all of the asteroids in the asteroid belt is less than 5% of the **Moon's** mass – and half of that total mass resides in just four asteroids: **Ceres, Vesta, Pallas** and **Hygiea**. (At 587 mi. in dia., Ceres is the largest asteroid in the asteroid belt; it contains 1/3 of the total mass of the entire asteroid belt.)

*NASA's *Voyager I* spacecraft, launched in 1977, is now 12.276 billion miles from **Earth** – so far away that it takes 15 hrs. for its signals to reach us. To reach a point as far away as **Proxima Centauri**, the nearest star to us besides the **Sun**, Voyager will have to travel 48,000 times farther out into space. (But by then none of its transmitters will still be working.)

##