Roanoke Valley Astronomical Society

Amateur Astronomy News and Views In Southwestern Virginia

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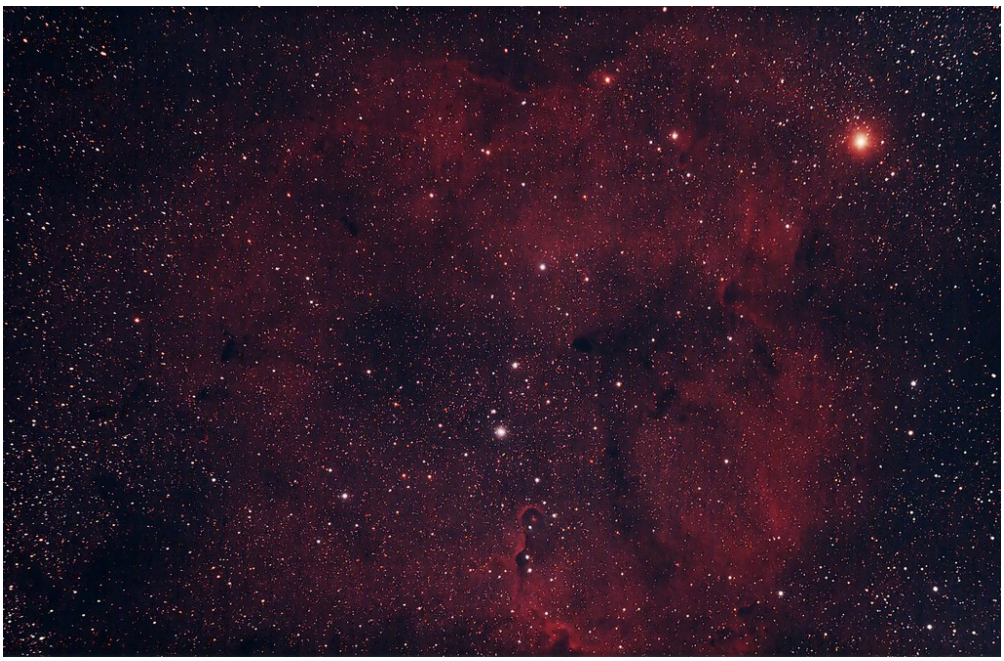
An Elephant Resides in Cepheus

By Clement Elechi

IC 1396 is a large emission nebula in Cepheus. We can visualize the pentagon shape of Cepheus as a house with the roof pointed toward the pole. IC 1396 is in the basement of the house. Located about 3000 ly away, it covers an area of sky several full moons across. There are young stars in this area. One massive blue star near the center ionizes the whole area.



The orange star to the top right in this image is mu Cephei, is a red supergiant also known as Herschel's garnet star. About 1500 ly away, it occupies roughly 2000 times our solar radius. It is very luminous and certainly stands out in that area of sky. Alas, that beautiful reddish golden color is also a sign that this giant is coming toward the end of its life.

Mu Cephei is a variable star in Cepheus, but unlike its near neighbor Delta Cephei, it is not a Cepheid variable. The Cepheid variables have a predictable relationship between their luminosity and their period, a property formalized by Henrietta Leavitt as the "period-luminosity law". This has made this class of variables extremely useful in measuring astronomical distances. Knowing the periodicity of a Cepheid variable allows its luminosity, and therefore its distance, to be measured. In fact, studying Cepheid variables in the Andromeda galaxy had allowed Edwin Hubble to determine that M31 was not a "nebula", but another galaxy far beyond our Milky Way galaxy.

The dramatic-looking Elephant's trunk nebula (vdb 142) can be seen in the lower part of my image. This is an area of star formation. Its shape is carved by radiation from stars within the nebula. It is eerily beautiful in narrowband images. I would like to do one of those some day.

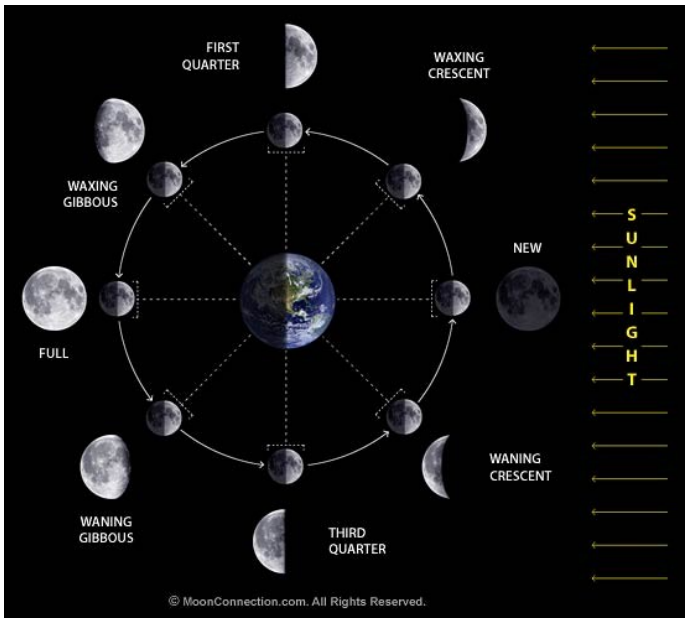
What's Up, Doc?

By Jack Gross

At our last RVAS meeting, June 21st, there was a request for some information on the moon. This article is a feeble attempt to provide a few observations (sorry, bad pun.)

A calendar often gives you the day on which the moon is full and often the day of the new moon as well. Full moons occur about every 29 ½ days – That's pretty close to a month. The idea of using the moon's cycle to measure time (a month) was probably invented in Mesopotamia, although its use in the Stone Age may be a better guess.

So, what's going on? Look carefully at the diagram below and you will notice the various phases of the moon which we see from here on earth.



Phases of the Moon

The new moon, or the "dark of the moon" begins the lunar cycle which is about 29 days 12 hours 44 minutes long, plus or minus a few seconds.

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The waxing-crescent moon appears to increases the size of its lighted portion, as seen from the earth, as the moon gradually becomes fuller. "Waxing-crescent" is a bit of a redundancy because both waxing and crescent mean "to grow" or "to increase."

The first-quarter moon looks more like the "first half" of the moon because it appears to be "half" illuminated from our perspective. Astronomers call it the first quarter because it has completed one-fourth of a revolution around the earth.

The waxing-gibbous moon is still growing but now it's over half full – in other words, past first-quarter, but not yet full. "Gibbous" comes from Latin and means "humpbacked."

The full moon, is fully reflecting the sun's light back to our eyes. From ancient times, the full moon has had considerable religious significance; the Jewish Passover is celebrated at the full moon, and the Christian Easter, from which the dates of all of the other movable religious feasts in the religious calendar are determined, occurs on the first Sunday following the full moon after the vernal equinox. Although that's a bit of a simplification.

The waning-gibbous moon is gradually decreasing during the period after it has become full. The waning-

(*Moon Continued on page 3)*

(Moon Continued from page 2)

gibbous moon refers to the moon being over half full, but has not yet reached last quarter.

The last quarter moon (or waning half-crescent moon) indicates that the moon is in its last quarter or it is three-quarters of a completed revolution around the earth.

The waning-crescent moon is an oxymoron because waning means "decreasing" while crescent means to "increase".

And so, on to another new moon that starts the cycle over again. Actually, most folks consider the "new moon" to be the first waxing crescent that can be seen just after sunset, but astronomers call the dark of the moon the "new moon".

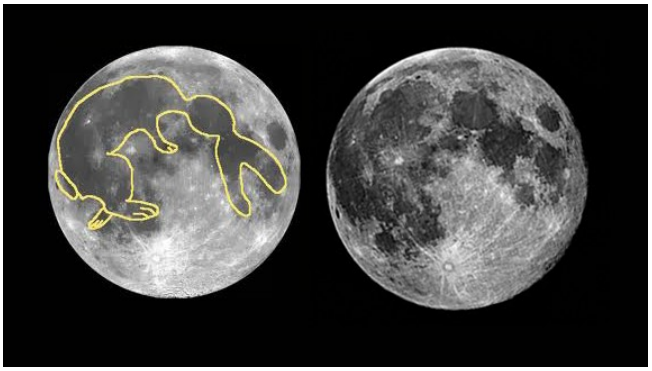
Just like the earth, half of the moon is always lighted by the sun (except during an eclipse). The far side of the moon is in full sunlight even though it is out of earth's view. So "the dark side of the moon" isn't always dark.

Another interesting question was asked at the meeting: when you are looking at a crescent moon, how can you tell if it waxing or waning? There is an old trick I use which may be helpful. If you cup your left hand, thumb pointing down and fingers up, as if you were holding an imaginary football, and then hold your hand, arms length out in front of your eye, your hand will form a "C" and if that fits over the crescent moon, it is a waning moon. If instead you must use your right hand (it makes a "D", well, most of a D anyway) and is facing the opposite way. Since I am right-handed, I curve that hand and, if it fits the crescent moon, I know it's waxing. If not, I know that it is past full and waning. The waxing moon is the "right-hand moon", because the curve of the right hand index finger and thumb follows the curve of the crescent while the waning moon is the "left-hand moon". So, all you really need to do is remember which is which, and that's easy. Here' a mnemonic, just remember that, using the curve of your hand from first finger to thumb … "If the Moon's crescent fits the curve the r(**I**)ght hand, then it is (**I**)ncreasing." (waxing). The "I"s will keep you oriented.

Finally my favorite moon trick - Since telescope mirrors and optics often show the moon inverted or as a mirror image, and these are often printed or shown on the Internet, how can you tell what's up doc? I use my trusty rabbit!

Here's how it works. I know you have heard of the man in the moon, but how about the "rabbit in the moon?" You can't miss it once you know what to look for. In fact once you have seen it, you can't help seeing it. Sort of like that catchy song you can't get out of your head.

Notice in the moons below that the rabbit is looking down at us. His "ears" always point down when viewed



with the unaided eye, or with binoculars. This trick only works when his ears are not in shadow, but they can easily be seen from about a 6-day old moon to a moon that is around 18-days old. After studying the moon for a while, other features such as large craters and the "seas" will serve the purpose as well.

What if the Sun Lost its Spots?

By Clark Thomas

To a flea, within his scale of experience, his dog is his world. To a traditional human his village is his world. To modern humans our polluted blue planet is our world. The differences between a flea's world and our modern world are mostly scale and perspective.

Just as the cartoon doomsday prophet on the street carries a sign saying, "The end of the world is coming!" – why not imagine a cartoon flea on its cartoon dog carrying a sign saying, "The end of the dog is coming!"

Every flea also has bacteria and viruses on its body. We could imagine another cartoon where a bacterium is carrying a sign among its fellow bacteria saying, "The end of the flea is coming!" And a smaller virus on the bacterium is carrying a sign saying, "The end of the bacterium is coming!"

What does this bizarre narrative have to do with our Sun's solar cycles? Nothing and everything.

We are now in Solar Cycle 24, ready soon for Solar Cycle 25. Each cycle is about 11 years. Very tidy. However, the Sun is some five billion years old, and it should be around for another five billion years, long after Andromeda and the Milky Way merge. What will future solar cycles look like; and how long did they typically last millions of years ago? Twenty-four modern solar cycles is 264 years. Even 264 million years is only about five percent of the Sun's age so far.

We don't consider the Sun to be alive, but it does have an atomic "life" cycle. Different types of stars come and go at different paces. Some blue giants last ten million years – whereas red dwarfs can last for hundreds of billions of years. Our Sun (spectral class G2) is a main sequence yellow dwarf; and stars of this type have "lives" of about ten billion years.

In Earth's biosphere we naturally obsess over what the Sun is doing. Sun spots are the easiest way to measure surface mini-cycles within a full life cycle of the Sun. But what do variable spot cycles really mean?

Recently, several types of measurements strongly indicate that the Sun is ready to skip one or more sun-spot cycles. This aberration from the observed normal pattern seems to be a very irregular and disturbing event. Does a quiet Sun foretell the Second Coming, or the end of the Mayan calendar, or maybe a real sci-fi story? Can't say, because it's all too sketchy – hardly a random sample of five billion years.

The best model we have for the relationship between the Sun's surface spots and life on Earth is the **Maunder Minimum**, the period roughly spanning 1645 to 1715 when sunspots became exceedingly rare, as noted by solar observers of the time. (Edward Maunder was a noted solar astronomer publishing in the 1890s.) During one 30-year period within the Maunder Minimum, astronomers observed only about 50 sunspots, as opposed to a more typical 40,000-50,000 spots in modern times. Interestingly, this period coincided with the coldest, middle period of the Little Ice Age in Europe, which lasted from the 12th century until about 1850.

So, have we actually established that the Sun caused the Little Ice Age, and that a second Maunder Minimum could offset global warming? Hardly. For one, during most of the so-called Little Ice Age the Sun behaved "normally." For another, the effects of humans on the currently accelerating global warming are much greater than the cooling effects of any extended solar minimum.

From an astronomer's perspective this sunspot puzzle is just another reason for stepping back from hasty conclusions based upon short-term data, however precise and mathematically correlated.

(Spots Continued on page 6)

The Summer Solstice Ice Cream Social: A New RVAS Tradition?

By John Goss

The June meeting sees the election of new club officers for the coming fiscal year beginning on July 1. By acclamation, the slate of officers was approved the RVAS membership:
President — Michael Good
Vice President — John Goss
Secretary — Rick Rader
Treasurer — Jeff Suhr
Member-at-large — Carol Mesimer

The immediate past president will be Paul Caffrey with Randy Sowden moving into the past president slot.

The RVAS wishes to thank the outgoing president, Paul Caffrey, and the outgoing secretary, Mark Poore, for their valuable service to the club and to amateur astronomy.

While a quick business meeting was held, the members could not help but notice the ice cream buckets and associated toppings being arranged at the front of the room. A line quickly formed for multiple scoops of neopolitan and chocolate ice cream with several choices of toppings: nuts, sprinkles, Jelly Belly toasted marshmellow topper, whipped cream, and, of course, cherries. Judging by the enthusiasm of all, this will surely become an RVAS tradition: The Summer Solstice Ice Cream Social. Thanks go to Genevieve Goss, Carol Mesimer, and Jeff Suhr for arranging this event.

The southern night sky caught everyone's attention when Mark Hodges showed a clip of the Very Large Telescope in Chile with the magnificent southern Milky Way circling overhead. Mark followed this thought provoking video with a northern hemisphere competitor: Dakota prairie night sky. For a third video, spectacular explosions on the sun were seen from helioviewer.org.

The RVAS would like to offer special lunar observing sessions with the goal of having members complete the Astronomical League's Lunar Club program. There are 100 targets. Participants study the moon using the unaided eye, binoculars, and a telescope during these phases: waxing crescent, first quarter, waxing gibbous, full, waning gibbous, third quarter, and waning crescent.

(Social Continued on page 6)

(Spots Continued from page 4)

From an RVAS perspective, where is that high-dollar solar scope we own? When was the last time the club looked through it?

Here are some links for additional data:

http://en.wikipedia.org/wiki/Maunder_Minimum

http://www.astronomynow.com/news/n1106/15solar/

http://www.guardian.co.uk/science/2011/jun/16/sun-astronomy

(Social Continued from page 5)

Full details of the program can be found at www.astroleague.org/observing/ The RVAS would provide the Lunar list and a lunar map, divided into quadrants, which will help locating the various targets. Members should bring (or borrow) a pair of binoculars, and a telescope. A lunar filter is suggested for the brighter phases, but if one is not available, a pair of sunglasses will suffice.

It has been suggested that there would be three rotating sites for this activity. The locations don't need to be dark. In fact, for the first quarter and waxing gibbous sessions, sessions can begin a few minutes in daylight before sunset. Most sessions would last about 1 hour. Observations made during phases after full moon would be conducted individually because they would be done in the early morning.

Here are the July dates and locations with their start times for the different phase observations:

~4 days old (waxing crescent):
None in July due to the Fourth of July holiday

~7 days old (first quarter):
Thursday July 7 (8:30)
Walrond Park off Plantation Road in Hollins

~10 days old (waxing gibbous):
Sunday July 10 (8:30)
First overlook on the Explore Park spur off the Blue Ridge Parkway

~ 14 days old (full):
Thursday July 14 (9:15)
Parking lot near the Discovery Center on Mill Mountain

Astro-Quiz

By Frank Baratta

What is the brightest star within 5 degrees of the celestial equator?

Answer to Last Month's Astro-Quiz: Of the 88 constellations currently recognized by the astronomical community, 48 were listed by the ancient astronomer Claudius Ptolemy. Those 48 became 50 when Argo Navis was separated into Carina, Vela and Puppis. A distant second in naming constellations, Nicolas LaCaille proposed 14, all of which remain in use. Bayer proposed 11, all of which were accepted; Hevelius also proposed 11, of which 9 were accepted.

The Roanoke Valley Astronomical Society is a membership organization of amateur astronomers dedicated to the pursuit of astronomical observational and photographic activities. **Meetings are held at 7:30 p.m. on the third Monday of each month, at Western Va. Community College Natural Science Center, 3102 Colonial Ave. S.W. Roanoke, Virginia. Meetings are open to the public.** Observing sessions are held one or two weekends a month at a dark-sky site. Yearly individual dues are $20.00, Seniors $18.00. Family dues are $25.00, Senior Family $22.00 . Student dues are $10.00. Articles, quotes, etc. published in the newsletter do not necessarily reflect the views of the RVAS or its editor.

RVAS web page: *http://rvasclub.org*

Officers/Executive Committee/Editor

Michael Good, President (*president@rvasclub.org*)
John Goss, Vice President (*vicepresident@rvasclub.org*)
Rick Rader, Secretary (*secretary@rvasclub.org*)
Jeff Suhr, Treasurer (*treasurer@rvasclub.org*)
Carol Mesimer, Member at Large (*memberatlarge@rvasclub.org*)
Paul Caffrey, Immediate Past President (*immediatepastpresident@rvasclub.org*)
Randy Sowden, Past President (*pastpresident@rvasclub.org*)
Clark M. Thomas, RVAS Newsletter Editor (*cmtastronomy@hotmail.com*)

Roanoke Valley Astronomical Society (RVAS)

Monthly Meeting Minutes

June 20, 2011 - 7:30 p.m.

Virginia Western Community College, Natural Science Center

Attendance - 26

Announcements - Paul Caffrey, RVAS President

Observing Reports - various members shared observing reports

Treasurer's Report - in absentia

- Checking Account Balance - $3,805.54 (Balance reported at May Meeting)
- Certificate of Deposit Value - $8,642.19 (Balance reported at May Meeting)
- 2011-2012 Membership Dues are now due
    - Individual: $20.00
    - Student: $10.00
    - Family: $25.00
    - Senior (65+)
        - Individual: $18.00
        - Family: $22.00

Election of Officers - The following officers were elected by unanimous vote.

- President: Michael Good
- Vice President: John Goss
- Secretary: Rick Rader
- Treasurer: Jeff Suhr
- Member-At-Large: Carol Mesimer

The Executive Committee consists of the officers and the following two individuals:

- Immediate Past President: Paul Caffrey
- Past President: Randy Sowden

Refreshments - The club enjoyed ice cream and toppings in celebration of the summer solstice. Thank you to Genevieve and Carol for organizing the ice cream social!

Presentations & Discussions

- Web Videos & Images - Mark Hodges
- Observing Sites - Genevieve Goss
- Field Trip Ideas - Genevieve Goss
- Astronomical League Observing Clubs - John Goss

Respectfully submitted,

Mark Poore

CALENDAR OF EVENTS

By Frank Baratta

MONTHLY MEETING: Monday, July 18th , 7:30 p.m., Western Va. Community College Natural Science Center

3102 Colonial Ave. S.W.

Roanoke, Virginia

Program: To be Announced

RVAS WEEKEND OBSERVING SESSIONS: Unless otherwise indicated, observing sessions are held at Cahas Mountain Overlook, milepost 139 on the Blue Ridge Parkway.

◊ **Friday and Saturday, July 22nd and 23rd .** Sunset is at 8:36 p.m. Astronomical twilight ends at 10:22 p.m. The Moon rises at 12:15 and 12:48 a.m., respectively.

◊ **Friday and Saturday, July 29th and 30th .** Sunset is at 8:30 p.m. Astronomical twilight ends at 10:13 p.m. The Moon sets at 7:38 and 8:17 p.m., respectively.

◊ **Future Sessions:** August 19th and 20th and 26th and 27th.

ROANOKE CITY PARKS and RECREATION PUBLIC STARGAZE: Saturday, July 23rd, 9:15 p.m., Cahas Overlook, Milepost 139 Blue Ridge Parkway. Nonmembers must registerr with Parks & Rec. at 540-853-2236. Members can call 540-774-5651 for information. (Next session: August 27th, 8:30 p.m., Cahas Overlook.)