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Star Points for January 2012

"Sky Events for the 2012 New Year"

by Curtis Roelle

In This Issue:

Here is a short roundup of some heavenly happenings coming up in 2012. Some events may be discussed at greater length in future columns closer to the time of their occurrence.

Let's start with the Moon. No total lunar eclipses occur in 2012. However, a partial lunar eclipse occurs on the morning of June 4. Unfortunately for those of us in this area, the partial eclipse begins shortly after the Moon has set! The only other lunar eclipse of the year, on November 28, isn't even worth mentioning. That's because it's a penumbral eclipse and so not all that spectacular. And besides, once again, the penumbral eclipse begins shortly after the Moon has set anyway.

So we struck out with the Moon. Let's move on to the Sun.

The only solar eclipse visible in the United States is the annular eclipse on May 21. Annular eclipses are also known as "ring" eclipses. It's a special kind of partial eclipse because the Moon, being in a farther part of its orbit, doesn't block the entire Sun. This leaves a ring of bright sunlight visible around the darkened Moon.

Unfortunately, the eclipse is visible only the western part of the country. However, I mention it because its central path intersects some well known park regions including the Grand Canyon in Arizona, as well as Bryce Canyon and Mt. Zion in Utah. If you're planning a trip out that way it might pay to go early before the summer rush so you can catch the eclipse. But remember not to look at the Sun without proper safe filtration or use the pinhole projection technique for viewing.

So the Sun doesn't work out for us either. Next, let's look at the planets.

(*Continued on page 2)*

January Meeting: Wednesday, January 11, 2012, 7:30 p.m., BBNC

Topic: Annual business meeting and election of officers

WASI Observing

Next WASI Observing Weekend: Friday, January 13 and Saturday, January 14

Star Points, *cont.*

The best times to see Mercury in the evening sky will be in early March and early June. Best time in the morning is mid-August and early December.

Mars is currently getting closer to Earth. Technically, it's Earth that's getting closer to Mars, but it's the same difference. On March 3 Mars is at "opposition" (opposite from the Sun) and best placed for viewing this year. It will be a bright, easily visible, orange-red star in the sky. Through a medium-sized telescope Mars appears only a little more than half as large as it did in 2003. Telescope owners will definitely want to mark their calendars for Mars.

Jupiter and Saturn both have good appearances during the year. In fact, the year starts out with Jupiter well placed high in the sky. It will be well placed once again at the end of 2012 as well. Come spring, Saturn will be high in the sky and remains well placed throughout the summer.

The astronomical highlight of the year is the transit of Venus across the face of the Sun on Tuesday, June 5. Venus will be in the midst of crossing the face of the Sun when it sets that evening. This is the last transit of Venus this century. The next one won't be for another 105 years in 2117.

The Venus transit of 2004 was viewed by many persons throughout the greater metropolitan region.

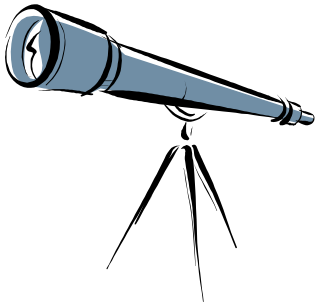
The Sun rose that morning with the transit already in progress. It was the first Venus transit since 1882 — a period of 122 years. I think it's safe to say that the only people alive who have ever seen a transit of Venus probably did so in 2004. Unfortunately, I wasn't one of them. Much of Carroll County was socked in by heavy morning fog.

The date December 21, 2012, has been receiving a great deal of publicity. There was even a Hollywood movie made about it. It seems that the Mayan calendar runs out on that date and some people interpret that as a prophecy for the impending end of the world as we know it. Another interpretation is that the Mayan calendar is cyclical, and it's only the end of the current 5,000+ year Mayan cycle, much like the new millennium in our western calendar that was celebrated earlier this century. A lot has been recently written pointing out in no uncertain terms that our world is doomed. Likewise there's been a lot of ink feverishly spilled in a rather shrill and sometimes haughty effort to debunk it.

Suffice it say the only "debunking" necessary is seeing sunrise next December 22. Hope you have a happy and wonderful 2012.

"Star Points" by Curtis Roelle appears in the Carroll County Times *on the first Sunday of each month. Visit the website at* http://www.starpoints.org or send email to StarPoints@gmail.com.

Upcoming WASI Observing and Events



Annual Business Meeting and Elections January 11, 7:30 p.m., at Bear Branch Nature Center (BBNC)

WASI Member Observing Weekend January 13 & 14 BBNC

Soldiers Delight Public Stargazing January 14, 8 p.m., at Soldiers Delight Natural Environment Area in Owings Mills

Planetarium Show January 28, 7:30 p.m., at BBNC

Event Publicity Items and Schedules
by Bob Clark

As proof of the fact that ability is prerequisite to almost nothing, I have, with the encouragement of the club officers, undertaken an effort to attract new members and positive public attention. What follows is the current plan.

This process can work only if we keep at it. We are trying to get the club and its activities pretty constantly on the minds of the folks who can help us (give money), talk us up (the media), provide venues (state or county fair), and who might join and/or attend our events.

If any members notice any visible sign (even if faint or fuzzy) of anything actually happening, I would be grateful if they let me know. In particular, I can only hear second-hand if any of the press releases actually stick to anything.

I have blundered through one monthly cycle and established a list of the stuff and procedures I have used to bring honor, admiration, and who knows what else down upon our heads. This list 1) -5) goes for any star party. Planetarium shows and special events get slightly different combinations.

Stuff

1) Club Brochures: Check with library headquarters with each batch of posters that each of the six branches have a good supply (at least 10) at least 10 days prior to event. ***This means that we need to have 500 or so produced by Office Depot or ???***
I can't keep producing them. Too expensive in terms of ink.

2) Posters: Deliver 7 to library headquarters at least 10 days prior to public event. This means that I have to have illustration and verbage emailed to my son in Florida at least 20 days prior to event. (He is doing this free so we must make it easy.). Each batch of posters must refer to the ***specific theme of the star party.***

3) Handouts: These are plain paper versions of the posters (same illustration and pretty much the same verbage). Some of these should go with the posters and brochures to the libraries; the rest are for general distribution. I can just print enough of these. ***These serve as production models of the desired posters.***

4) Event Press Releases: Email to press list at least 2 weeks prior to event. ***Same verbage with directions and special notes. Needs to be written in 3rd person. Will be emailed to the press list, which now contains about 30 recipients. Some are friends, etc., about 15 newspapers, 5-10 Radio & TV.***

5) "Event Complete" Press Releases: Email to press list ASAP after event is over. ***This item requires special and prompt production. It is how and where we boast about all the saved souls, etc., 3rd person. Also for events like County Fair, State Fair, Air Port, etc.***

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6) "Event Complete" Press Releases: Email to press list ASAP after event is over. ***This item requires special and prompt production. It is how and where we boast about all the saved souls, etc., 3rd person. Also for events like County Fair, State Fair, Air Port, etc.***

7) Special Press Releases: Email to press list. ***These need to be written to boast about special honors like Skip going to…, members being awarded observing badges, individuals being knighted. Observatory completed????, observatory actually begun??? Martian landing at Bear Branch???? Alien Infiltration of Taneytown.***

Star parties get items 1) – 5). Planetarium shows get items 3) and 4). Make sure that the libraries have enough club brochures; see item 1).

The posters should hit all six county libraries by the first week of the year.

General Details:

Since the posters and handouts are the same except for quality and size, I can just email a handout with the appropriate JPG to my son. We get pictures from Mike Hankey (the guy who gave a meteor presentation). All I need to do is identify what I want from his webpage, and he sends me a high-quality JPG.

We get posters made by my son 3dogprinting@gmail.com.

Get stuff to the Carroll County Library System by hand-delivering them to James Kelly at library headquarters, 1100 Green Valley Rd., New Windsor, MD 21776. This keeps us on his mind.

MPTV is accomplished by going to mpt.org and to community calendar under community. You will have to become a member to create content.

WTTR and the rest of the press release list is easily done by creating an MS Word document like

PRESS RELEASE
Body

Then use Mail Merge Wizard as EMAIL using PRESS as the list.

Building Willow Oak Observatory

by Steve Conard

Like quite a few amateur astronomers, I'd been on the edge about building my own observatory for several years. In late 2010, I visited Marrett Pines Observatory, owned by Paul Valleli in the Boston suburbs, to attempt to time an asteroid occultation as part of the 2010 International Occultation Timing Association meeting. The ease of preparing for this observation with Paul's 14-inch Meade SCT really impressed me. My typical setup time for timing an occultation was about an hour and involved carrying my C9.25 up and down stairs, making many mechanical and electrical connections, and aligning the telescope. Once my 10-minute video-data collection was completed, it would take me about 30 minutes to put everything back away. With Paul's observatory, this time was reduced to about a third or half of what I had been doing. As asteroid occultations can occur at any time of the night, and *seem* to be especially prevalent at 3 AM on work nights, reducing the time to perform my observations was very attractive.

That December I decided to take the plunge and build. The one thing I did not like about using Marrett Pines was the small area of the sky visible through the dome slot, I found it hard to orient myself. This caused me to chose to build a roll-off rather than dome. I also realized that if I was to build it myself, it would be many months to get to the point of being able to use it. This caused me to choose to have Backyard Observatories (BYO) build it for me — for them, a small roll-off takes only about 2 days to construct. I decided I would do the interior trim and electrical work, which could be spread out over time without impacting the use of the observatory. In order to minimize cost, I chose their smallest model, a 9.5-foot by 9.5-foot square building without a motorized roof. I placed my order with BYO in February, which required a deposit of half the total cost in for spring construction.

Locating the observatory was a big problem. My yard, while having no very large trees, has many medium-sized ones. The natural location for the observatory was in the open middle area of the backyard, but this was unfortunately the location of the septic field — disallowing building in that area. That forced a suboptimal location that would be very obstructed either to the east or west. I chose to be more obstructed to the east, as the Baltimore light pollution is strongest in that direction and it was farther from my neighbor's homes. As a result, observations in the east are limited to objects higher than about 45° above the horizon.

While waiting for construction to start, I began to work on getting a larger telescope for the observatory. Friends encouraged me to try to get my dream telescope, a Celestron C-14 SCT on a German equatorial mount, though for cost reasons I was looking at a C-11 instead. I was watching the used equipment market, and found an almost new Celestron CGE mount for a very reasonable price, loaded up with accessories. This mount could handle either the C-11 or C-14, so I continued to hunt for either on the used market. I put an ad on Astromart asking for a used C-14, and found someone in Baltimore County selling one for an affordable price — also loaded up with accessories. This person also worked with some of my former coworkers, which gave me more comfort in making the purchase, and buying local avoided the issues with shipping.

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In Carroll County, building permits are required for any structure, no matter what the size or use. The county treated the observatory like a storage building, and for a storage building less than 150 square feet without footers (sitting on the ground) there is no fee for the permit and no inspections required. However, my 90-square-foot building had 4 footers, and therefore had a $25 permit fee and two inspections required for the building, and another two inspections required for the 2 electrical outlets I would later install myself. Building plans were required by the county, and they accepted my mark-ups of the drawings for the next size larger roll-off. Inspection of the plans resulted in 3 minor changes that BYO accepted.

Scott and Don of BYO arrived at my house late in the day in early June and immediately began digging the footer holes to the required depth and fabricating the decking. I had arranged for the county inspection of the footers and deck framing to occur first thing in the morning the next day. The inspection went well, and BYO put quick-setting cement in the footer holes and lifted the deck in place. By late in the day, the walls and roof were in place. The hole for the pier was then dug through an opening in the floor, and the hole filled with cement. U-bolts to hold the pier were set in the cement using a wood template. At this point, BYO stopped for the day. Note that this was one of the hottest days of 2011, and Scott and Don spent quite a bit of time sitting in air conditioning to keep from overheating.

The following day was for doing the siding and roofing, and installing the pier. This work was completed around noon, and the BYO folks headed for home. Note that I was with them, helping as a go-fer most of the time they were working, and Scott and Don are very entertaining to work with. The following Monday the county did the final building inspection and found no issues as all the work done was first-rate.

Once the pier cement was fully set, the mount and telescope were installed, and then a miracle occurred. That night it was clear — actually, the next few were clear! Even though they were work nights, I was able to observe for an hour or two each night and be in the house within a few minutes after deciding to shut down. For the next few months I stretched an extension cord from the house to the observatory for power.

Doing my own wiring required me to take a county test to show that I understood how the National Electrical Code (NEC) applied to the work I was doing. To prepare for the test, you need to review the NEC, which almost forces you to purchase this $60 very thick book. The test is an open-book test, but it has a time limit, so if you don’t know where to look in the code, you are unlikely to answer the questions correctly.

After the test was successfully completed, I was able to get ready for the first electrical inspection (“open box”) in a few weekends of effort. That inspection went well, although they required me to add an 8-foot ground rod before the final electrical inspection. This work was completed and the final inspection passed in November.

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My thoughts on doing all this:

- People who have observatories always say how much more you'll observe once you have one. This is completely true.
- For me, the only downside of the roll-off compared to the dome is dew. Roll-offs offer almost no dew protection, while domes are almost immune to dew. Being able to sit and look up at the entire sky is still worth the dew problem to me.
- The size of my observatory is fine for when I'm by myself, but when I have friends over it is too small. I should have built the next larger size for that reason alone.
- I feel more comfortable observing now. No worries about being confronted by our neighborhood skunk now, or being startled by looking up and seeing a deer 10 feet away.
- I can now do middle-of-the-night occultation timing with only the loss of 30-45 minutes sleep, compared to about an hour and a half before. This has increased my willingness to try these late-night events.

In the fall, I finally picked a name for the observatory. The limiting tree in the east is a Willow Oak tree that I planted almost 25 years ago. I kept saying to myself for eastern targets "that one will have me observing the Willow Oak" — so Willow Oak Observatory seemed appropriate. I've set up a website with photos of the construction and current configuration; check it out at www.willowoakobservatory.org.

The next project will be doing remote observing. I've done some test runs, and feel that within a few months I'll be routinely observing from the study of my home.

If you are contemplating building an observatory of your own, I'd be more than happy to talk to you more about my experiences in building Willow Oak.

Left: Observatory construction nearly complete.
Above: C-14 inside Willow Oak Observatory.

Dawn Takes a Closer Look

by Dr. Marc Rayman

Dawn is the first space mission with an itinerary that includes orbiting two separate solar system destinations. It is also the only spacecraft ever to orbit an object in the main asteroid belt between Mars and Jupiter. The spacecraft accomplishes this feat using ion propulsion, a technology first proven in space on the highly successful Deep Space 1 mission, part of NASA's New Millennium program.

Launched in September 2007, Dawn arrived at protoplanet Vesta in July 2011. It will orbit and study Vesta until July 2012, when it will leave orbit for dwarf planet Ceres, also in the asteroid belt.

Dawn can maneuver to the orbit best suited for conducting each of its scientific observations. After months mapping this alien world from higher altitudes, Dawn spiraled closer to Vesta to attain a low-altitude orbit, the better to study Vesta's composition and map its complicated gravity field.

Changing and refining Dawn's orbit of this massive, irregular, heterogeneous body is one of the most complicated parts of the mission. In addition, to meet all the scientific objectives, the orientation of this orbit needs to change.

These differing orientations are a crucial element of the strategy for gathering the most scientifically valuable data on Vesta. It generally requires a great deal of maneuvering to change the plane of a spacecraft's orbit. The ion propulsion system allows the probe to fly from one orbit to another without the penalty of carrying a massive supply of propellant. Indeed, one of the reasons that traveling from Earth to Vesta (and later Ceres) requires ion propulsion is the challenge of tilting the orbit around the Sun.

Although the ion propulsion system accomplishes the majority of the orbit change, Dawn's navigators are enlisting Vesta itself. Some of the ion thrusting was designed in part to put the spacecraft in certain locations from which Vesta would twist its orbit toward the target angle for the low-altitude orbit. As Dawn rotates and the world underneath it revolves, the spacecraft feels a changing pull. There is always a tug downward, but because of Vesta's heterogeneous interior structure, sometimes there is also a slight force to one side or another. With their knowledge of the gravity field, the mission team plotted a course that took advantage of these variations to get a free ride.

The flight plan is a complex affair of carefully timed thrusting and coasting. Very far from home, the spacecraft is making excellent progress in its expedition at a fascinating world that, until a few months ago, had never seen a probe from Earth.

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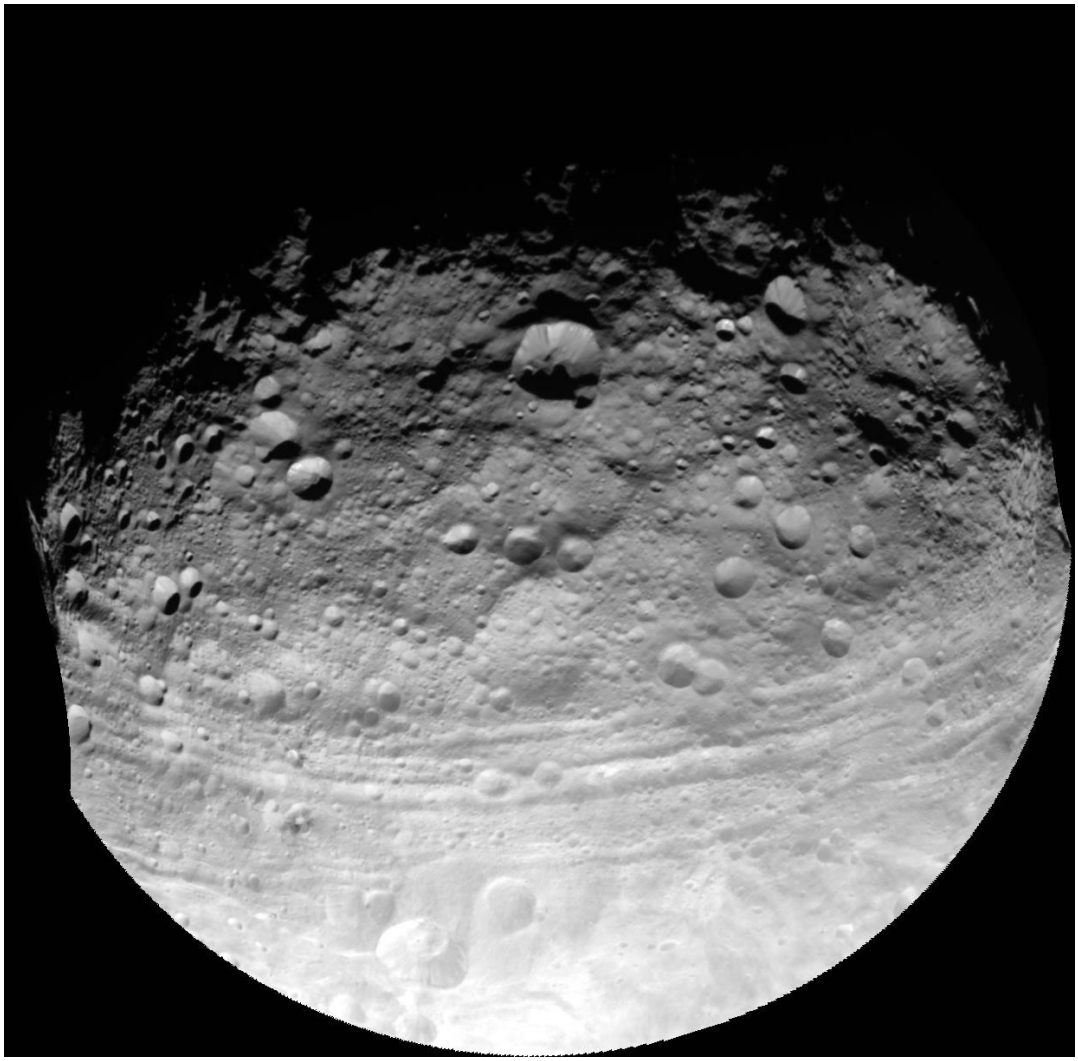
Keep up with Dawn's progress by following the Chief Engineer's (yours truly's) journal at http://dawn.jpl.nasa.gov/mission/journal.asp. And check out the illustrated story in verse of "Professor Starr's Dream Trip: Or, how a little technology goes a long way," at http://spaceplace.nasa.gov/story-prof-starr.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.



This full view of the giant asteroid Vesta was taken by NASA's Dawn spacecraft, as part of a rotation characterization sequence on July 24, 2011, at a distance of 5,200 kilometers (3,200 miles). Credit: NASA/JPL-Caltech/UCLA/MPS/DLR/IDA