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CVAS Officers

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Gus Saikaly	Director of Observations
Sam Bennici	Observatory Director
Dan Rothstein	Historian
Chris Powell	Editor

CVAS
PO Box 11
Chagrin Falls, OH 44022
www.chagrinvalleyastronomy.org

THE VALLEY SKYWATCHER

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President's Corner

Hello All,

I'd like to take this time to update you on a project I have been working on with Martin Mullet on behalf of the club. We have been working on a Jr. Astronomy club in partnership with the Geauga Park District, the Foundation for Geauga Parks, the Geauga County Public Library and Burton Public Library.

The group will be called Geauga Skywatchers Club. Our tagline is "We Look Up." It is geared for grades 6-12. The Foundation was kind enough to finance the telescopes available at the library branches for club members and other patrons to check out.

Our members will be hosting monthly meetings within the public libraries, or at Observatory Park. We will provide hands on activities and lectures, along with access to equipment and supervised observing. I will be calling on our member volunteers to help with these sessions when the time comes. If you see a topic you would like to volunteer for, let me know. You can be part of the planning and creative process early!

(Continued on Page 2)

President's Corner

Our first club meeting will be in September. Please see the sell-sheet advertisement on Page 3 of this newsletter.

Here is a list of lectures and activities in no particular order:

- Folded Solar System Activity
- Sundials, Latitude & Longitude
- Telescopes: from Galileo to Cassegrain
- Constellations: Hop-Skip & Jump
- Geocentrism: A springboard to Copernicus
- The Moon: Our Satellite
- The Solar System
- The Sun & Stars
- Galaxies
- Solstices & Equinoxes
- Mercury, Gemini & Apollo
- Space Exploration: Hubble, Voyager, Curiosity, Rosetta & etc.
- Eclipse!
- Trigonometry: The Power of Triangles

I see this as an opportunity to fulfill our club outreach mandate, and to build awareness of the Chagrin Valley Astronomical Society locally. I anticipate parents getting involved in a "Merit Badge" advancement process with their kids. We may hook some parents and older kids into OUR club along the way, too! I'm also hoping to find a home for our own telescope mirror grinding interest group with the contacts I'm making. We shall see. I'll keep everyone posted.

President's Corner

Geauga Skywatchers Club is an Astronomy Club founded by a consortium of organizations interested in promoting scientific thinking to the young and young-at-heart through the study and practice of astronomy. We meet within the Geauga County Public Library, and at Observatory Park.

We Explore Astronomy with the guidance of local experts and sophisticated equipment available through local organizations. Our goal is to teach the wonders of the solar system and universe while honing skills in mathematics, engineering, optics, observing, reason and critical thinking. We recognize accomplishment with an optional system of advancement.

We Help Make Bright Minds Shine with the light of new knowledge. We inspire the next generation of working scientists in our community by "Looking Up."

Geauga County Public Library | Chagrin Valley Astronomical Society | Foundation for Geauga Parks | Geauga Park District

Ask your librarian about meeting times, and how to borrow a telescope.

Observer's Log #1

George W. Gliba

Meteors and Good Observing early February in Starry West Virginia

Lynne and I had mostly cloudy weather for our recent monthly visit to our cabin at Screech Owl Hill Observatory in West Virginia. However, there were a few very nice sucker holes on at least three nights that allowed us to get some good observations in of several Deep Sky objects in a relatively dark moonless sky anyway. I was also able to see a few nice meteors. We had a nice fireplace fire to help keep us warm on the colder nights on the mountain.

During one of these sucker holes we got a great view of the Great Orion Nebula with our 20-inch F/5 modified Sky Design Dobsonian telescope in the observatory. Recently, I had upgraded this telescope with a two-inch Coma Corrector and was eager to test it out with a 32mm Edmund Scientific Erfle eyepiece. The result was a breathtaking view of M42 and M43. It was almost better than a Nagler eyepiece I thought. I also saw the Open Star Clusters M41 in Canis Major and M44 in Cancer. They too looked very nice with the new observing set-up.

On another night, while on the deck of our cabin where I usually meteor observe, I was able to observe comet C/2018 Y1 Iwamoto in Leo with the 12x63 binoculars. It was about 6.3 magnitude and had a coma about 10 arc-minutes wide, but no tail. That was my 107th comet that I had seen since 1965. The following night while I was looking at the comet again to confirm its motion I saw a beautiful 4th magnitude orange telescopic meteor that broke-up into many pieces with the 12x63 binoculars. I tried but couldn't see the comet with the naked-eye.

During another early February evening I was able to observe a very transparent Sky that came after some stormy weather. The Winter Milky Way looked great and the Limiting Magnitude was around 6.8 or better! About as good as it gets here. I enjoyed some leisurely sweeping with my 12x63 Optolyth Royal binoculars. I went from Cassiopeia in the far North and swept the Milky Way all the way to Canis Major observing the numerous Open Star Clusters, Asterisms, and Dark Nebulae. I also took a look at the Hyades and the Pleiades. The Alpha Persei Association was also outstanding and I thought it was a richer object than the Pleiades, Several galaxies were also seen in Leo and Ursa Major as well.

(Continued on Page 5)

Observer's Log #1

(Cont.)

I also tried to do some formal meteor observing on the morning of February 6th but the weather ended my efforts when yet another sucker hole ended the show. I was looking for meteors from the **Bootid-Coronae Borealid Complex**. I helped with discovering this radiant complex way back in 1997 at the Winter Star Party in the Florida Keys when I saw several meteors coming from an area near the star Xi Bootis on several consecutive nights. This meteor stream complex is now recognized by the IAU.

Anyway, I did get a short 20 minute sucker hole that morning and was able to see two BCB meteors, one FLO (February Leonid), and a lone Sporadic (SPO) meteor. I had a 6.3 magnitude limit with about 35% clouds during the time period of 9:10 to 9:25 UT. Unfortunately, conditions did not allow me to get very much scientifically useful meteor observing in as conditions deteriorated rapidly after that. I saw two meteors from the BCB complex, including a nice yellow-orange 1st magnitude one with a long trail coming from Corona Borealis. So, at least I was able to confirm that this stream is still active 22 years later: **Possible New Radiant in Early February**. Keep looking up.

Editor: I asked George to provide a definition of a "sucker hole" as used in this Observer Log. I had never heard the term before, though I suspected I had a vague idea of the meaning. I tried a search on Duck-Duck-Go and found the web site "Uncle Rod's Astro Blog" from a fellow amateur astronomer in Mobile, Alabama. He likened amateur astronomy viewing to angling for fish which I thought an interesting approach and also used the term sucker hole. Still, there was no actual definition of what one was. George was kind enough to respond to my (ignorant) request as follows to enlighten this nuclear engineer.

George: Definition of a "Sucker Hole"
An apparent clearing of all or part of the Sky, giving one a false sense of hope, only to have that hope dashed by the return of complete cloudiness a short time later.

Observer's Log #2

George W. Gliba

Early Spring Galaxy Hunting in Leo and Virgo

Lynne and I went up to our cabin at Screech Owl Hill Observatory up at Mathias, West Virginia in early April. We were there about a week just after New Moon and had a couple of good clear nights with few clouds. After that the waxing moon became gibbous making good Deep Sky observing difficult. It also stayed mostly cloudy for several days.

On the evening of April 9th, with the crescent moon setting, we took our traditional look at M104, the Sombrero Galaxy in Leo with the 20-inch F/5 Dob. I was also able to see some nice galaxies in the Leo 1 Group, including M65, M66, NGC 3628, M95, M96, and M105 respectively. My new eyepiece set-up with a Coma Corrector and a 2-inch 32 mm Edmund Erfle eyepiece again worked great. It is really a poor man's Nagler eyepiece, but the edge isn't quite as good as a real Nagler. At about a third the cost it worked very well indeed, and delivered beautiful wide panoramic views.

I also observed several Open Star Clusters, including M35, M44, and M67 with the 8-inch F/8 planetary scope, also inside the observatory. A few very nice Double Stars were also split, including Algieba (gamma Leonis) , and Izar (epsilon Bootis). Before I closed the observatory I took my last look with the 8-inch at the Globular Star Cluster M 3 in Canis Venatici, which looked spectacular using a 12.5 mm Ortho.

Later, I observed a few meteors casually between 12:35 AM and 01:05 AM EDT after Midnight. From our deck I observed three nice meteors, one was a 3rd magnitude Sporadic, then a nice long trailed 1st magnitude Northern Apex Meteor with a wake, and a 3rd magnitude Anthelion Meteor. The Spring Peepers were singing in a pond nearby, which provided a nice serenade under the starry West Virginia sky.

It was clear the following night on April 10th and Lynne and I decide we wanted to see the Giant Elliptical Galaxy M87 in Virgo with the 20-inch F/5 Dob. It was announced on the News that day the Supermassive Black Hole at the core of this galaxy was imaged using an array of Radio Telescopes globally that created a synthetic aperture that equaled the size of Earth. It was fun seeing M87 on the same day as this great feat was announced. This galaxy is located at the center of the famous Virgo Cluster of Galaxies; so there were many galaxies visible when sweeping the area between beta Leonis & epsilon Virginis. Luckly we were able to see M87 that night because shortly afterwards it became very cloudy and we closed up the observatory.

Observer's Log #3

Gus Saikaly

Images of the Eclipse of the Super-Moon (Jan. 20~21st)

The afternoon of January 20, 2019, few hours before the eclipse of the Supermoon, the sky was clear and hopes were high for a beautiful evening, until about sunset when bands of "lake effect" snow took over and continued off and on throughout the night. It did, however, give us enough breaks to allow a series of images showing the slooow devouring by the Umbra of the Supermoon. The pictures span the time between 11:42 PM, January 20. 2019 and 12:20 AM January 21, 2019. Shortly after, the snow became heavy, and the Umbral victory was total, and I called it a night…a successful night!

Observer's Log #3 (cont)

Observer's Log #3 (cont)

Notes & News

- Hubble's Messier Catalog

  George Trimble forwarded this message from Robert Gold to pass along this very interesting link for the Hubble's Messier Catalog to everyone. George enjoyed it and hopes you all do too. Thanks, Robert.

  https://www.nasa.gov/content/goddard/hubble-s-messier-catalog#.XLN4T55-zJU.gmail

- Renewing your Sky & Telescope Subscription

  Editor: This is reprinted from the CVAS Valley Skywatcher winter 2018 issue for those renewing their subscription this quarter.

  Philip Sherman provided the following advice for renewing your S&T subscription and receiving the "astronomy club member" renewal price ($32.95). Phil noted that our full club name is too long (over 30 characters) and is not acceptable to the online renewal service.

  Web address: **https://ssl.palmcoastd.com/03401/apps/-182322?iKey=I**EML**

  Club name: CVAS

  The web site is currently listing five free gifts with a years subscription:

  1. Messier And Caldwell Observation Cards, a guide to finding the night sky's most spectacular sky clusters, galaxies and nebulae.
  2. Let's Go Stargazing, a guide to getting started in astronomy and getting the most from your telescope.
  3. Skygazer's Almanac, a guide to celestial events for the next year.
  4. The Solar System's Top 100 Photos CD , featuring over 100 of NASA's best images of planets, moons, and other worlds of our solar system. *(Available only with your paid subscription)*.
  5. The Official Sky & Telescope Decal *(Available only with your paid subscription)*.

- Super-ionic Ice Discovered? (Chris Powell)

A former co-worker sent me a link (below) to an article that suggests one of the world's most powerful lasers at the Laboratory for Laser Energetics in Brighton, New York blasted a droplet of water, creating a shock wave that raised the water's pressure to millions of atmospheres and its temperature to thousands of degrees creating a new form of water ice. This new form or ice is composed of oxygen atoms forming a crystalline structure through which highly energetic hydrogen atoms (really positively charged ions) moved freely through the oxygen crystal structure. This new "Ice" has been designated Ice XVIII to distinguish it from seventeen other forms of ice either discovered or postulated theoretically. The interest to planetary astronomers is as explained below (extracted from the article by Joshua Sokol):

> *"Across the solar system, at least, more water probably exists as superionic ice—filling the interiors of Uranus and Neptune—than in any other phase, including the liquid form sloshing in oceans on Earth, Europa and Enceladus. The discovery of superionic ice potentially solves decades-old puzzles about the composition of these "ice giant" worlds."*

Read the whole article at the link below.

https://www.wired.com/story/a-bizarre-form-of-water-may-exist-all-over-the-universe/

Late Spring Binocular Viewing

Martin Mullet

For this issue, I've created some observing lists for binoculars. The beginner's list is for those new to astronomy and those with smaller (under 40 mm) binoculars. The advanced list will likely require 60 mm binoculars unless you have dark skies. Good luck with the challenge items, they require very large binoculars and/or exceptionally dark skies.

Beginner's List

Object	Type	R.A.	Dec.	Const.	Size	Mag.	Comments
Mel 111	OpCl	12h 25.0m	+260 00'	Coma Ber	275'	1.8	Coma cluster
NGC 5272	GbCl	13h 42.2m	+280 23'	C Ven	16'	5.9	M 3
NGC 6121	GbCl	16h 23.6m	-260 32'	Scorpius	26'	5.8	M 4
NGC 6205	GbCl	16h 41.7m	+360 28'	Hercules	17'	5.7	M 13
NGC 6218	GbCl	16h 47.2m	-010 57'	Ophiuchus	15'	6.8	M 12
NGC 6254	GbCl	16h 57.1m	-040 06'	Ophiuchus	15'	6.6	M 10
NGC 6341	GbCl	17h 17.1m	+430 08'	Hercules	11'	6.4	M 92
NGC 6405	OpCl	17h 40.1m	-320 13'	Scorpius	33'	4.2	M 6
IC 4665	OpCl	17h 46.3m	+050 43'	Ophiuchus	70'	4.2	
NGC 6494	OpCl	17h 56.8m	-190 01'	Sagittarius	30'	5.5	M 23
NGC 6523	Pl Nb	18h 03.8m	-240 23'	Sagittarius	90'	5.0	M 8
NGC 6611	OpCl	18h 18.8m	-130 47'	Serpens	120'	6.0	M 16
NGC 6656	GbCl	18h 36.4m	-230 54'	Sagittarius	24'	5.1	M 22
IC 4756	OpCl	18h 39.0m	+050 27'	Serpens	40'	4.6	
NGC 6705	OpCl	18h 51.1m	-060 16'	Scutum	13'	5.8	M 11
Cr 399	OpCl	19h 25.4m	+200 11'	Vulpecula	60'	3.6	Coathanger
NGC 6853	Pl Nb	19h 59.6m	+220 43'	Vulpecula	8'	7.3	M 27
NGC 6913	OpCl	20h 23.9m	+380 32'	Cygnus	6'	6.0	M 29

Late Spring Binocular Viewing (cont)

Advanced List

Over 60mm

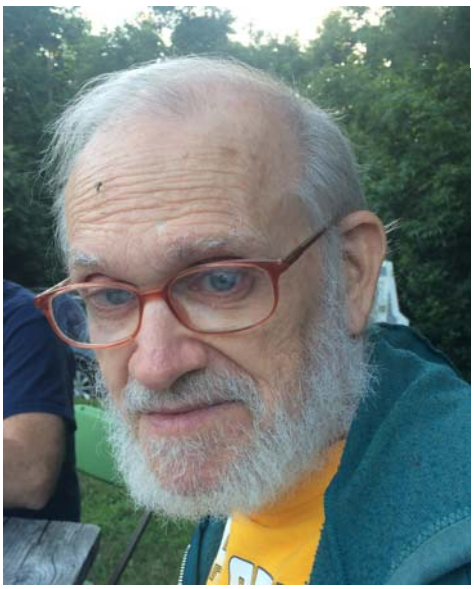
Object	Type	R.A.	Dec.	Const.	Size	Mag.	Comments
NGC 3368	Gal	10h 46.8m	+110 49'	Leo	7'	9.2	M 96
NGC 3623	Gal	11h 19m	+130 00'	Leo	8.2’	9.3	M 65
NGC 3627	Gal	11h 19m	+130 00'	Leo	8.7’	8.9	M 66
NGC 4258	Gal	12h 19.0m	+470 18'	C Ven	20'	8.4	M 106
NGC 4382	Gal	12h 25.4m	+180 11'	Coma Ber	7.5'	9.1	M 85
NGC 4472	Gal	12h 29.8m	+080 00'	Virgo	8.1'	8.4	M 49
NGC 4736	Gal	12h 50.9m	+410 07'	C Ven	13'	8.2	M 94
NGC 4826	Gal	12h 56.7m	+210 41'	Coma Ber	9.2'	8.5	M 64
NGC 5055	Gal	13h 15.8m	+420 02'	C Ven	13.5'	8.6	M 63
NGC 5194	Gal	13h 29.9m	+470 12'	C Ven	8.2'	8.4	M 51
NGC 5466	GbCl	14h 05.5m	+280 32'	Bootes	11'	9.0	
NGC 5897	GbCl	15h 17.4m	-210 01'	Libra	12.6'	8.6	

Challenge Objects:

Object	Type	R.A.	Dec.	Const.	Size	Mag.	Comments
NGC 3587	Pl Nb	11h 14.8m	+550 01'	Ursa Major	3.1'	9.9	M 97
NGC 4125	Gal	12h 08.1m	+650 11'	Draco	6.1'	9.7	
NGC 5866	Gal	15h 06.5m	+550 46'	Draco	6.6'	9.9	
NGC 6229	GbCl	16h 47.0m	+470 32'	Hercules	4.5'	9.4	

Constellation Quiz

Dan Rothstein



This month's questions:

1. Many cultures referred to this grouping as the Giant. Name it.
2. There are several dippers in the sky other the two bears and others I have asked about. Most of this one occupies part of an important summer asterism, inverted in the zodiac. Find it.
3. An earlier name of this region was the Apparatus Chemicus. What is its modern name.
4. Find the 12th century Tarabellum et Vexillum. Christianize all the constellations.

Answers to last issue's questions:

1. The Cross of Orion is a Christian symbol, the ensign on a hill. The top of the hill is the belt of Orion. On either side of the hill are Bellatrix and Saiph, located on the steep slopes below, with Sirius even farther down on the eastern side. The cross itself stands above the hill, anchored at Alnilam, the middle star in the belt. The upright runs from Alnilam (ε) all the way to Orion's head, a triangle of three stars about the size of the full moon composed of λ (Mensa), φ^1, and φ^2. The crossbar runs across Orion's shoulders from Betelgeuse to Bellatrix.
2. In 1690 the Polish astronomer Hevelius added something to the already composite constellation of Aquila and Antinous. The region that would become Antinous was first named by the Greeks after the Trojan Ganymede who was abducted by Aquila and delivered to Zeus to be his cup-bearer. The Romans repurposed the stars with a somewhat different story (victim). This was the subject of an earlier quiz. Antinous commemorates the beautiful teenage "companion" of the much older Roman Emperor Hadrian. Many statues of the boy have been found. Several versions of the story exist. One has it that Antinous' devotion to Hadrian was so strong, that when Hadrian fell deathly ill, Antinous jumped off a ship to get back to him, but drowned trying. The other version is that Antinous became a voluntary sacrifice to Osiris, the God of the Nile, and was ritually drowned and then deified. About 130 AD Hadrian, who had miraculously recovered, instructed Ptolemy to replace the Greek figure placing Antinous among the stars, being carried in flight in the talons of Aquila the Eagle by his hair or by his arm. Ptolemy does mention the new grouping, but doesn't specifically include it in his official list of constellations in the Almagest. The pair of constellations maintain an off and on joint

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Constellation Quiz

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2. (Cont.) existence as Aquila and Antinous. Antinous disappears in medieval times due to its scandalous association with a heathen emperor and his male lover, reappearing in the early 16th century on globes and in Johann Bayer's Uranometria of 1603, but named for the original Greek Ganymedes. Kepler elevates Antinous to full constellation status. Late in the century Hevelius enters the picture. In his atlas he adds a bow and arrow (Arcet de la Fleche in the French) to the outstretched arm of Antinous, southeast of Antinous and southwest of Delphinus. This has no connection to Sagitta which is on the opposite side of Aquila. Why he adds them is unclear, since there is no reference linking Antinous and archery. Some later atlases include them and others don't. In the ones that include it, some show the bow pulled back as if Antinous was snatched while in the act of shooting. In others the lax bow and arrows are all held in the outstretched hand.

   Antinous lies south of the bright stars of Aquila: Altair (α), Alshain (β) and Tarazad (γ). It included (using Aquila's star designations and using the best map of him I could find) his head or neck (η and π), the outstretched hand (θ), the other hand hidden under Aquila's wing (δ), the chest (ν and ι), one thigh (κ), and the other foot (λ). The arrow includes η, θ, and 69 Aquilae, pointing southeast, in the general direction of the ecliptic (no explanation of what he's shooting at is known) in Aquarius or Capricorn. His hand and the handle of the bow include 69, 70, and 71 Aquilae. The upper end of the bow lies near 1 Equulei and the lower end near 51 Aquilae. The bow and arrow designation by Hevelius doesn't last long, most atlases not showing it, and Antinous slowly goes out of use. References to Antinous slowly disappear by the mid-19th century, its stars merging back into Aquila.

3. John Hill's Gryphites replaces the earlier obsolete groupings of Cerberus (the three-headed dog guarding the entrance to the underworld) and Ramus Pomifer, (the apple branch), both earlier quiz subjects. Ironically, in many cases, the stars from which Hill drew in forming his constellations were later appropriated by other authors for the same purpose, all of which become extinct. From Hill's *Urania*, "the Gryphites is a species of shellfish [of the genus Gryphae], the remains of which are very frequent in beds of stone, and at depths in the earth, but which in its recent state is an inhabitant of the deep sea only, and scarce is ever washed on shore: it is of the oyster kind, but has a figure approaching to the Nautilus." One common name for it today is the devil's toenails. Hill's asterism is situated between the left (southern) arm of Hercules, Lyra, Vulpecula, Aquila, and Serpens, running parallel and just north of the 20°N line. The open end of the shell is northwest of Rasalhauge and Rasalgetti, over the head of Ophiuchus. The curled-up closed end lies south of the parallelogram of Lyra, ending west of 1 Vulpeculae. Its stars are all part of Hercules: 95, 96, 98, 101, 102, 106, 109, 110, 112, and 113, from west to east.

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Constellation Quiz

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4. In the mythology of the Babylonians our constellation Lyra was known as the She-Goat (Uza), representing the goddess Gula, the patron of healing and medicine. Each divinity was also associated with an animal in the sky. The bright star of Uza was known as Lamma, our Vega. She was often drawn together with her dog (the bright star of our southern Hercules). It has also been proposed that later Lyra was associated with the Egyptian asterism of Sit, the tortoise. There have been many attempts to Christianise the constellations. The best known of these attempts was by the German lawyer, cartographer, and astronomer Julius Schiller, who in 1627 (the year he died) published his life-long work *Coelum stellatum Christanum*, based on Johann Bayer's earlier work. In it he replaced the 12 zodiacal constellations with the 12 apostles, the northern constellations with New Testament figures and the southern constellations with Old Testament figures. In Schiller's work, the Greek Lyre became the Manger, "Thrice Venerated Manger of Christ the Savior" (not to be confused with Praesepe, the Manger, or its more common name the Beehive, in Cancer). However, the saints were no match for the pagans, and as John Hill wrote in his *Urania*, Schiller "had few followers. It is obvious to all men what confusion must attend altering the figures of the constellations." The snappy new names never caught on. A list of Schiller's Christian constellations can be found on the web by searching 'SkyEye-The Constellations'.

A Brief Introduction to Screech Owl Hill Observatory

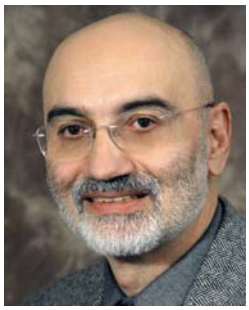
George W. Gliba

Screech Owl Hill Observatory is in Mathias, West Virginia. Here is a nice day picture showing me on the ladder ready to use the 20-inch F/5 modified Sky Design Dobsonian. Just out of the picture to the right of me and below the roof-line is an 8-inch F/8 planetary scope. The observatory was built by 'Backyard Observatories" in the Summer of 2016. It is the Club Model 1. It was built 18 months after I retired from NASA/GSFC in December 2014 after working there 35+ years. Backyard Observatories headquarters is in Lodi, Ohio. A crew of two completed the whole structure in only five days. It includes a warm room.

CVAS founding member George Gliba in Screech Owl Hill Observatory, Mathias, West Virginia

Book Review

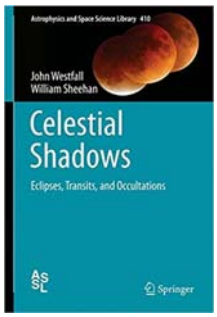
Tony Mallama



Celestial Shadows: Eclipses, Transits, and Occultations

By John Westfall and William Sheehan

Published by Springer, 2015 Edition



Readers at all levels of expertise will find a wealth of interesting, informative and useful information in *Celestial Shadows: Eclipses, Transits, and Occultations*. Authors John Westfall and William Sheehan cover an enormous range of astronomical 'shadow' phenomena in slightly more than 700 pages. The book is very accessible because technical details are made clear, and because the book centers on people and on history from antiquity to the present time. One story from very ancient times is that of Hi and Ho, two Chinese court astronomers. The duo failed to predict a solar eclipse and, as a result, their emperor ordered that they should lose their heads! The book's index names more than 500 individuals, both living and dead. There are nine kings, three emperors, three czars and two U.S presidents listed. There are also eighteen scientists and philosophers from the ancient world, four astronomers from the famous Cassini family, and three more from the renowned Struve line. Many writers, musicians and poets including Herman Melville, John Philip Sousa and John Milton are also referenced as are at least three different European wars. Three CVAS members are mentioned, too, including this reviewer, Robert Modic, and the late Bruce Krobusek. Bob recorded a rare eclipse of Saturn's moon Iapetus as well as a mutual occultation of the Uranian satellites Ariel and Umbrial. The occultation was observed with the 16-inch telescope at Indian Hills. Go CVAS!

Much of the book is devoted to three main topics which are solar eclipses, lunar eclipses and transits of Venus. The explanations of these phenomena are very clear and are aided with hundreds of high quality illustrations. This tome is a marvelous achievement.

Solar eclipses are thoroughly examined and discussed. The Great American eclipse of 2017 August 21 and others in that Saros 145 cycle are described in depth as special examples. So, those of us who witnessed the event will really appreciate the coverage. The next Great American eclipse of 2024 April 8 is also forecast in good detail. There is plenty of information about Bailey's beads and all the other solar eclipse phenomena, too. As for lunar eclipses, here is one of many interesting facts from *Celestial Shadows*. The Earth's umbral shadow is observed to be about 2% larger than our planet's diameter. Westfall and Sheehan discuss this phenomenon and cite investigations of the intriguing anomaly by more than a dozen astronomers.

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Book Review (cont)

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Observers who witnessed the transits of Venus in 2004 or 2012 can attest that they are memorable events. The next of these rare occurrences will not happen until 2117. Edmond Halley, hundreds of years ago, realized that accurate timings of the transits could provide an accurate distance scale for the solar system by means of the inferred parallaxes. So, the famous English explorer Captain James Cook sailed his ship *Endeavour* to the island of Tahiti for the transit of 1769. However, the observations were not as successful as anticipated because the atmosphere of Venus added uncertainty to the timings. In any case, the adventure-filled expeditions from those early times are fascinating to read about.*

Celestial Shadows includes many other topics related to shadow phenomena as well. Occultations of stars by the Moon, eclipses of planetary satellites, asteroids occulting stars, eclipsing binary stars, and transiting exo-planets are examples. Each phenomenon adds important information about celestial bodies and enriches the science of astronomy. The full range of astronomical events and topics described in the book is far too broad to be summarized in a book review such as this though.

I had read and commented on an early draft of *Celestial Shadows* and the authors were kind enough to send me a copy after it was printed. Nevertheless, I would hold this book to be the best and most complete reference on the history and science of eclipses, transits and occultations even if I had not read the draft or received a gratis copy.

The one unfortunate aspect of this book is its price which lists as $179 in the hardback format, $149 in soft cover and $109 for the eBook. Used book sellers may be able to provide more affordable copies and the book is probably available in technical libraries. In summary though, *Celestial Shadows* is a wonderful book that every amateur or professional astronomer would appreciate.

* This first voyage by by Captain Cook in the *Endevour* (1768 ~ 1771) as well as his second (1772 ~ 1775) and third (1776~1780) voyages in the *Resolution* are described in fine (exhaustive) detail in ***The Life of Captain James Cook*** by J.C. Beaglehole. Astronomical observations were a a significant impetus to these voyages. - Editor

Deep Thoughts on Engineering and Physics

In the Winter 2018 issue of the Valley Skywatcher (my first as new editor), I propose a new, light-hearted, regular feature of what I call "Physics and Engineering Folklore". I have collected these items since 1980 for my own amusement after being given some interesting items by my father. As the term folklore implies, often the original author or source are not clear or known, and multiple and differing versions can be found. In my case, these were often pieces that circulated in the workplaces of GE, Westinghouse, Bechtel, Sargent&Lundy, or any number of nuclear electrical utilities between 1980 and 2015. I suspected many CVAS members had some favorite "folklore" pieces of their own more directly related to Astronomy. I welcomed submittals for inclusion in future issues, which could be passed to me at any of our CVAS monthly meetings or directly to my email at christopher.powell@earthlink.net.

As I did not receive any negative feedback from the last issue and some positive, I will continue this column.

In this issue we have two more entries. The first is the poem, "***To a Quaesar***" provided by CVAS member and former president, **Dan Rothstein**. Like last week, the author of this poem is known, but there is an interesting back story about it's inspiration.

The second entry is one of my favorites I received by email in 1997. It is paleo-anthropology related.

Chris Powell, Editor

Deep Thoughts on Engineering and Physics (#1)

The following poem was submitted by **Dan Rothstein**. I believe this poem was taken from Scientific American. Per the annotation, the writer was inspired by John Updike's poem in the January 1969 issue of Scientific American, ***Dance of the Solids***, and an article on quasi-stellar objects by Geoffrey Burbridge and Fred Hoyle in the December 1966 Scientific American.

"TO A QUASAR"

By Stanley A Bell
Laguna Hills, California

Twinkle, twinkle, little quasar,
Candidate for Occam's razor:
    Are you near or are you far?
    Are you nebula or star,
Emitting all that energy
Like any normal galaxy?

Is your message from the dark
Sent by positron or quark?
    Spectrum lines, though rather faint,
    Tell us only what you ain't.
What strange phenomenon's involved
In this enigma, yet unsolved?

Editor: John Updike produced a number of poems humanizing the wonders of physics and the physical world. The ***Dance of the Solids*** referenced above can be found at this link:

https://www.scientificamerican.com/article/john-updike-poem-1969/?redirect=1

I found another John Updike poem, ***Cosmic Gall***, described as "playful" which was published in 1960 and "captures (the) elusive nature of neutrinos." It can be found at this link:

http://physicsbuzz.physicscentral.com/2015/05/physics-in-verse-john-updike-poem-about.html

Deep Thoughts on Engineering and Physics (cont)

Editor: The following is one of my favorite items, if not my favorite, from my Folklore folder. I cannot vouch for the authenticity of this letter from the Antiquities Curator of the Paleoanthropology Division of the Smithsonian to an un-named "field researcher", but I desperately want it to be true. The email with this was sent to me in 1997, and the author of the original email and distribution have been redacted to protect those who should have been working at GE Nuclear at the time instead of sending these types of emails.

Regarding the authenticity, I will say the email originated from an individual working on the International Thermonuclear Experimental Reactor (ITER) Project, an international nuclear fusion research and engineering megaproject. It was (in 1997) to be the world's largest magnetic confinement plasma physics experiment. It is an experimental tokamak nuclear fusion reactor being built next to the Cadarache facility in Saint-Paul-lès-Durance, in Provence, southern France. Construction is scheduled to be completed in 2025 with fusion experiments to start the same year. So hey, this must be real…..

A copy of the letter follows on the next two pages.

Deep Thoughts on Engineering and Physics (#2)

Subject: FW: A little humor for the day
Date: Thursday, February 13, 1997 7:55AM

>The story behind this: There's this nutball who digs things out of his back
>yard and sends the stuff he finds to the Smithsonian Institute, labeling
>them with scientific names, insisting that they are actual archeological
>finds. The really weird thing about these letters is that this guy really
>exists and does this in his spare time! Anyway - here's a letter from the
>Smithsonian Institute after receiving one. of his "discoveries".

> -- -- -- -- -- -- -- -- --

> Paleoanthropology Division
>Smithsonian Institute
> 207 Pennsylvania Avenue
>Washington, D.C. 20078

>Dear Sir,

>Thank you for your latest submission to the Institute, labeled "211-D, layer
>seven, next to the clothesline post - Hominid skull". We have given this
>specimen a careful and detailed examination, and regret to inform you that
>we disagree with your theory that it represents "conclusive proof of the
>presence of Early Man in Charleston County two million years ago." Rather,
>it appears that what you have found is the head of a Barbie doll, of the
>variety one of our staff, who has small children, believes to be the "Malibu
>Barbie." It is evident that you have given a great deal of thought to the
>analysis of this specimen, and you may be quite certain that those of us who
>are familiar with your prior work in the field were loathe to come to
> contadiction with your findings; however, we do feel that there are a number
>of physical attributes of ,.the specimen which might have tipped you off to
>its modern origin:
> 1. The material is molded plastic. Ancient hominid remains are typically
>fossilized bone;
> 2. The cranial capacity of the specimen is approximately 9 cubic
>centimeters, well below the threshold of even the earliest identified
> proto-hominids;
> 3. The dentition pattern evident on the "skull" is more consistent with
>the common domesticated dog than it is with the "ravenous man-eating
>Pliocene clams" you speculate roamed the wetlands during that time. This
>latter finding is certainly one of the most intriguing hypotheses you have
>submitted in your history with this Institution, but the evidence seems to
>weigh rather heavily against it. Without going into too much detail, let us
>say that:

>A. The specimen looks like the head of a Barbie doll
> that a dog has chewed on.
>B. Clams don't have teeth.

>It is with feelings tinged with melancholy that we must deny your request to
>have the specimen carbon-dated. This is partially due to the heavy load our
>lab must bear in its normal operation, and partly due to carbon-dating's
>notorious inaccuracy in fossils of recent geologic record. To the best of
>our knowledge, no Barbie dolls were produced prior to 1956 AD, and
>carbon-dating is likely to produce wildly inaccurate results. Sadly, we
>must also deny your request that we approach the National Science
> Foundation's Phylogeny Department with the concept of assigning your
>specimen the scientific name "Australopithecus Spiff-arino." Speaking

Deep Thoughts on Engineering and Physics (#2)

>personally, I, for one, fought tenaciously for the acceptance of your
>proposed taxonomy, but was ultimately voted down, because the species name
>you selected was hyphenated, and it didn't really sound like it might be
>Latin.
>However, we gladly accept your generous donation of this fascinating
> speciment to the museum. While it is undoubtedly not a hominid fossil, it
>is, nonetheless, yet another riveting example of the great body of work you
>seem to accumulate here so effortlessly. You should know' that our Director
>has reserved a special shelf in his own office for the display of the
>specimens you have previously submitted to the Institution,, and the entire
>staff speculate daily on what you will happen upon next in your digs at the
>site you have discovered in your back yard.
>We eagerly anticipate your trip to our nation's capital that you proposed in
>your last letter, and several of us are pressing the Directol> to pay for it.
> We are particularly interested in hearing you expand on your theories
>surrounding the "trans-positating fillifitation of ferrous ions in a
>structural matrix" that makes the excellent juvenile Tyrannosaurus Rex femur
>you recently discovered take on the deceptive appearance of a rusty 9-mm
>Sears Craftsman automotive crescent wrench.
>Yours in Science,
>Harvey Rowe
>Curator, Antiquities
>