THE VALLEY SKYWATCHER

The Official Publication of the Chagrin Valley Astronomical Society
Est. 1963

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Regular Features

CVAS Officers

Connie Meier	President
Open	Vice President
Scott Kuntz	Secretary
Patrick Sonday	Treasurer
Laszlo Ilyes	Director of Observations
Open	Observatory Director
Dan Rothstein	Historian
Chris Powell	Editor VSW
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The Great Geauga County Fair Astronomical Update

Chris Powell, Editor

At the last CVAS meeting on July 12th at Indian Hill, there was a discussion on the inability of CVAS astro-photography buffs to submit their photos in competition at the Great Geauga County Fair because of rules that prohibited alteration of photos during processing. Privately, I decided to approach the attendants inside the Fine Arts Building during the recent fair to discuss this with their responsible committee.

As I have reached a healthy retirement age and like everyone else either a veteran or 60 years old +, my wife and I went on Friday because "free". We made our way past the usual entertainment and food stalls and entered the Fine Arts Building near the south-west corner of the fairgrounds. (As an aside, I found it amusing that something like 40% of the entries in the "Fine Arts" Building were Lego construction pieces and dioramas).

I got the attention of two women behind the counter and introduced myself as a member of CVAS. I said it was our members understanding that no photos submitted for entry and judging could be retouched or exposed to post process editing. They confirmed this was true. I then explained to them how astro-photography worked in the real world, using multiple filters and software packages specifically designed to bring out and enhance details in deep sky objects and planetary objects. I suggested that rather than prohibit entries of the CVAS membership sort, they could create a special category specifically for astro-photography. They were interested in this and had a notebook on hand to record suggestions from fair-goers. Suggestions were to be reviewed at their next committee meeting for potential changes.

I recorded my suggestion and provided my name, email address, and phone number and indicated I was the editor of the CVAS

(Continued on the following page)

The Great Geauga County Fair Astronomical Update (cont)

Chris Powell

Valley Skywatcher quarterly newsletter. I indicated that on request I could provide many excellent examples of these types of photos with explanations of the processing performed as I have all the Observer's Log submittals on file from as far back as late 2018.

From there my wife and I left and entered the Agricultural Produce Building where we immediately ran into Marty and Sue Mullet. I gave Marty the update as we admired the zucchini.

The infatuation with the night sky continued to manifest itself at the Fair, as the "Best in Show" for decorated cakes was astronomically themed (see below left). I decided to dig out and republish a photo I took at the 2019 Fair on the 50th anniversary of the Apollo 11 Moon Landing and published in Volume 56-3 of the VSW (below right). It also took "Best in Show" despite the rather Sci-Fi look of the Lunar Lander!

I will follow-up on this to see how the Fine Arts Committee decides. In the meantime, if anyone does not want any of their previously submitted photos to the VSW provided as possible examples, let me know and I will honor your request. Best regards, Chris

Observer's Log #1

Joe Petrick

NGC 7331

Sent July 25th, 2025

Jeff sent a message the other day of a Supernova SN 2025rbs in spiral galaxy NGC 7331. So I imaged it last night. I've attached three images. The first (below, this page) is an image I took of NGC 7331 in 2023. It's a 20 minute luminance and it was the very first image I took after I set up the Planewave 17 inch scope in New Mexico. The next image is a luminance image I took last night of NGC 7331. Enlarge it, and you can see the supernova at the 10 o'clock position not far from the very center of the galaxy. While I was imaging this through the Planewave scope I also was imaging with the piggybacked Takahashi 106N scopee. So the third image is a LRGB from last night taken through the Takahashi 106N. Enlarge it, and you can also see the supernova. To the right of the Takahashi 106N image is Stephans Quintet.

NGC 7331, also known as Caldwell 30, is an unbarred spiral galaxy about 40 million light-years away in the constellation Pegasus. It was discovered by William Herschel on 6 September 1784. The galaxy appears similar in size and structure to the Milky Way, and is sometimes referred to as "the Milky Way's twin".

Stephan's Quintet is best known for being prominently featured in the holiday classic film, "It's a Wonderful Life." Stephan's Quintet is a visual grouping of five galaxies of which four form the first compact galaxy group ever discovered. The group, visible in the constellation Pegasus, was discovered by Édouard Stephan in 1877 at the Marseille Observatory. Joe

Observer's Log #1 (cont)

Joe Petrick

NGC 7331 (cont)

Sent July 25th, 2025

Above: NGC 7331 with Supernova on Planewave on 7-25-25

Below: NGC 7331 with Supernova on Takahashi on 7-25-25

Observer's Log #1 (cont)

Joe Petrick

M20 Trifid Nebula

Sent August 3rd, 2025

Attached are two images I took last night of M20, the Trifid Nebula. The first image is a wide-field view taken through the Takahashi FSQ 106N telescope (4 inch refractor) and is a total exposure of 3 hours. The second image was taken through the Planewave CDK 17 telescope (17 inch reflector) and is a total exposure of 4 hours. The Takahashi telescope is piggybacked onto the Planewave 17 inch. M20 is low in the southern sky so it's taken through a lot of muck.

The Trifid Nebula is so-named because it is a combination open star cluster, emissions nebula, reflection nebula, and a dark nebula that looks like it consists of three lobes. M21 which is a small open cluster is visible in the Takahashi image at the right edge. The Trifid lies 5200 light years from Earth while the small open cluster M21 is 3900 light years from Earth.

Photographically, the red emission nebula contained within Messier 20 has a bright blue star cluster in it central portion. It glows red because the ultraviolet light of the stars ionizes the hydrogen gas, which then recombines and emits the characteristic red hydrogen-alpha light captured on film. Further away, the radiation from these hot, young stars becomes too weak to ionize the hydrogen. Now the gas and dust glows blue by reflection!

No matter how it is observed, the Trifid - or "three lobed" - nebula has a distinctive set of dark dust lanes which divide it. These also have a classification of their own, and were cataloged by E.E. Barnard as a dark nebula. Charles Messier discovered this object on June 5th, 1764. Joe

M20 with Planewave 17 inch 8-2-25

Observer's Log #1 (cont)

Joe Petrick

M20 Trifid Nebula (cont)

Sent August 3rd, 2025

M20 Trifid nebula on Takahashi 8-2-25

Observer's Log #2

Jeff Ratino

M13, The Great Globular Cluster

Sent August 19th, 2025

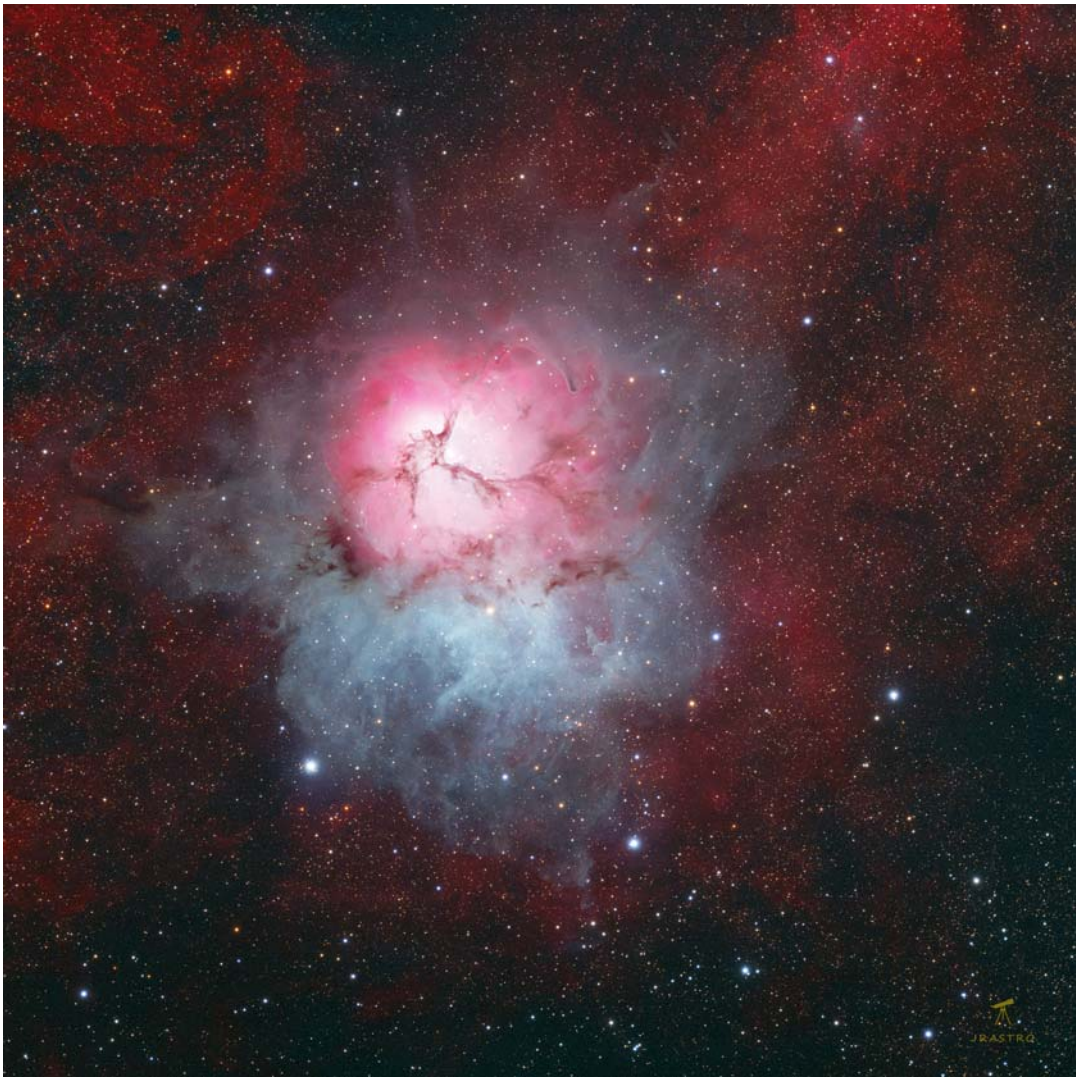
A couple of firsts for me with this image. First time imaging it. And my first nebula image from Starfront. This would have been difficult, if not impossible from home since it is so low on the horizon.

Also this image was processed by combining RGB and HOO data using NBRGB combination script in Pixinsight. Another first for me.

The Trifid Nebula (catalogued as Messier 20 and as NGC 6514) is an HII region in the north-west of Sagittarius in a star forming region in the Milky Way's Scutum-Centaurus Arm. Trifid means "three lobe".

The Trifid Nebula is an unusual combination of an open cluster of stars, an emission nebula (the relatively dense, reddish-pink portion), a reflection nebula the mainly blue portion), and a dark nebula (the apparent 'gaps' in the former that cause the trifurcated appearance, also designated Barnard 85).

Total Integration: 16 hours 45 mins shot using my mono camera and R, G, B, Ha, OIII filters.



Observer's Log #2 (cont)

Jeff Ratino

SH2-155, The Cave Nebula in SHO with RGB Stars

Sent August 25th, 2025

The Cave Nebula (Caldwell 9, Sh2-155) is a diffuse emission nebula within a larger nebula complex that includes a reflection nebula and dark nebula. This deep-sky object is located in the constellation Cepheus and lies roughly 2,400 light-years from Earth.

This was imaged over the past few weeks from my rig at Starfront. I believe this is the first time I shot it. I haven't done a SHO color palette in a while. I felt this palette really brought out the OIII blue vs the others that were primarily red.

Total Integration: 26 hours 15 minutes.

• CVAS Ohio Turnpike Astronomical Association Picnic, June 28th 2025

Below are some of the photos of this years CVAS OTAA picnic held at Indian Hill. No expense was spared as a porta-potty was rented and the new grill used to cook the hotdogs, hamburgers, and steak bites. We had five attendees from the Black River and six from the Mahoning astronomical societies. Marty raffled off $364 of tickets for various surplus and donated equipment. Weather accommodated and several members setup telescopes for later viewing. A lot of new and younger members were also in attendance.

- **CVAS Ohio Turnpike Astronomical Association Picnic, June 28th 2025 (cont)**

• Satellite Constellations Are too Bright for Astronomy

By Anthony Mallama

Editor's Note: The following is an excerpt from the article written by Tony for the July issue of Sky &Telescope. To read the entire article, please see the July issue.

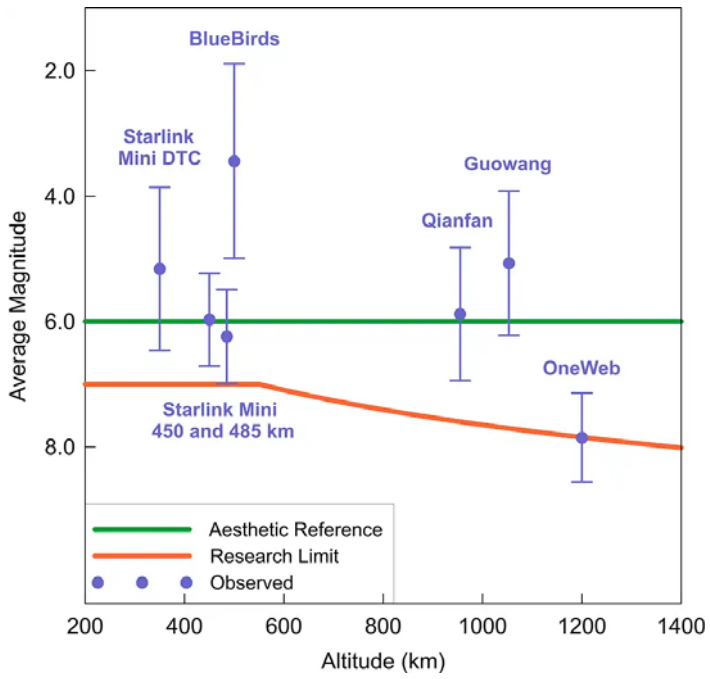
"The International Astronomical Union has recommended brightness limits for satellites, butcompanies aren't abiding by them.

Bright spacecraft spoil aesthetic appreciation of the night sky for amateur astronomers and interfere with professional research. But there are already several thousand spacecraft in orbit and that number is expected to grow to tens of thousands in the coming years: Industries and governments are launching six major "constellations" of communication satellites: Starlink, BlueBird, Qianfan, Guowang, OneWeb and Kuiper.

In response to this problem, the International Astronomical Union created a Centre for the Protection of the Dark and Quiet Sky from Satellite Constellation Interference (IAU CPS). The IAU CPS recently recommended brightness limits for constellation satellites. Those limits are designed to ensure that satellites in operational orbits are never visible to the unaided eye. But I (Anthony Mallama) and my colleague Richard Cole have found that companies aren't abiding by these limits.

In dark-sky locations, people can see objects of visual magnitude 6, which I refer to as the aesthetic limit. For professional astronomers, the research limit is magnitude 7 for satellites at altitudes up to 550 km and it gradually becomes fainter at higher elevations. ~~

~~Except for two satellite types — OneWeb and Starlink Mini satellites at 485 km — all of the satellites are brighter than the aesthetic limit. And every satellite constellation except OneWeb exceeds the research limit."



The average magnitudes for satellite constellations are plotted as a function of their altitude in kilometers. The vertical bars are standard deviations which represent the measurements' scatter around the average. Three models/heights of Starlink Gen 2 Mini satellites are shown; the discontinued Starlink Gen 1 spacecraft are omitted. Source: Mallama and Cole 2025

- **Amended CVAS Constitution**

Provided by Dan Rothstein, Historian

Constitution and Regulations of The Chagrin Valley Astronomical Society

Article I Name of the Organization

Section 1 This organization shall be known as the Chagrin Valley Astronomical Society.

Section 2 This organization's business shall be as specified in the Bylaws

Section 3 All incoming and outgoing mail concerning the business of this organization shall become the exclusive property of the organization, and shall be kept by the Secretary.

Article II Purpose of the organization

Section 1 The Chagrin Valley Astronomocal Society shall be founded as a non-profit educational and scientific corporation under Section 501 (c) (3) of the Internal Revenue Code of 1954, in the State of Ohio, County of Cuyahoga.

Section 2 This corporation is organized exclusively for educational and scientific purposes, including for such purposes:

a) The making of distributions to organizations that qualify as exempt organizations under Section 501 (c) (3) of the Internal Revenue Code of 1954 (or the corresponding provisions of any future United States Internal Revenue Law).

b) Perfecting the skills and increase the knowledge of Astronomy among the general public.

c) Promoting and encouraging interest in the vocation of Astronomy among the general public.

d) Owning and operating an astronomical observatory for research and educational purposes.

e) Conducting astronomical research, results of which shall be available to any interested persons.

Section 3 No part of the net earnings of the corporation shall inure to the benefit of or be distributed to its members, trustees, officers, or other private persons, except that the corporation shall be authorized and empowered to pay reasonable compensation for services rendered and to make

payments and distributions in furtherance of the purposes set forth in Article II, Section 2. No substantial part of the activities of the corporation shall be carrying on of propaganda, or otherwise attempting to influence legislation, and the corporation shall not participate in or intervene in (including the publishing or distributing of statements) any political campaign on behalf of any candidate for public office.

Notwithstanding any other provisions of these articles, the corporation shall not carry on any other activities not permitted to be carried on (a) by a corporation exempt from Federal Income Tax under Section 501 (c) (3) of the Internal Revenue Code of 1954 (or the corresponding provisions of any future United States Internal Revenue Law) or (b) by a corporation, contributions of which are deductible under Section 170 (c) (2) of the Internal Revenue Code of 1954 (or the corresponding provisions of any future United States Internal Revenue Law).

Section 4 Upon the dissolution of the corporation, the trustees shall, upon paying or making provisions for the payment of all liabilities of the corporation, dispose of all assets of the corporation exclusively for the purposes of the corporation in such manner, or to such organization or organizations organized and operated exclusively for charitable, educational, or scientific purposes as such at the time qualify as an exempt organization or organizations under Section 501 (c) (3) of the United States Internal Revenue Code (or the corresponding provisions of any future United States Internal Revenue Law) as identified in Article VI, Section 7. Any such assets not so disposed of shall be disposed of by the Court of Common Pleas of the county in which the principle office of the corporation is then located, exclusively for such purposes or to such organization or organizations, as such court shall determine, which are organized and operated exclusively for such purposes.

Section 5 The Trustees of this organization shall be President, Vice-President, Secretary, Treasurer, and Observatory Director, and will be elected in accordance with Article IV, Sections 2 and 3.

Article III Membership

Section 1 Any person 12 years or older interested in Astronomy shall be eligible for membership. Family membership will be available. Members

younger than 18 shall be considered Junior Members.

Section 2 Election to membership shall be by a plurality vote of members active at the beginning of a regular monthly meeting.

Section 3 Twelve consecutive absences will be cause to be considered an inactive member.

Section 4 Members must pay dues regularly. Five months delinquency in dues shall be cause to be considered an inactive member.

Section 5 Members can become inactive voluntarily.

Section 6 Repealed

Section 7 Members may be removed from the organization only by a ¾ vote of all active members.

Section 8 Inactive members or other members of the astronomical community who have made a contribution to this organization may be designated honorary members by a majority vote of the active members present at a regular monthly meeting. These honorary members shall have no voting privileges or dues-paying responsibilities.

Section 9 Inactive members upon becoming active again must pay back dues up to six months.

Article IV Officers

Section 1 The officers of this organization shall be as follows: President, Vice-President, Secretary, Treasurer, Assistant Treasurer, Director of Observations, Observatory Director, Historian, and Editor.

Section 2 The election of officers shall take place at the November meeting each year. The election becomes effective immediately.

Section 3 The election of officers shall be by a plurality of the members active at the beginning of a regular monthly meeting. A tie shall require a run-off. If after two ballots a tie still exists for any office, the winner shall be the candidate with the better attendance record during the preceding year.

Section 4 Elections shall be held whenever an office is vacant. The election shall be for the vacant office only.

Section 5 Officers may resign by giving written notice to the Secretary.

Section 6 The Agent for Service of Process shall be designated in the Bylaws and elected in the same manner as officers, with no limit on the length of the Agent's term of office. The Agent for Service of Process shall

handle communications with the State and Federal Governments.

Section 7 The President shall conduct regular and special meetings, and speak for the organization when representation is required.

Section 8 The Vice-President shall act as President if that officer is absent or unable to perform his duties. The Vice-President shall be chairman of the Publicity Committee, which directs the public relations of this organization with the community. Other members of the Publicity Committee shall be elected in the same manner as the other officers.

Section 9 The Secretary shall keep the minutes of all meetings and handle any communications with other organizations pertaining to the business of the organization.

Section 10 The Treasurer, or when needed an Assistant Treasurer, shall collect dues or other monies which may be due this organization, will pay all obligations incurred by this organization, maintain the organization's bank accounts, keep records of and the possession of all financial transactions, and keep the attendance records at monthly meetings for the purpose of determining active members.

Section 11 The Director of Observations shall keep the membership informed about upcoming astronomical events, coordinate observation programs, and communicate these observations with other organizations to which they may be useful.

Section 12 The Observatory Director (or Directors if necessary) shall be in charge of the care of all this organization's lands, buildings, telescopes, and equipment, subject to approval of the agenda and expenses as described in Article VI, Section 5.

Section 13 The Historian shall keep all publications receive by this organization and allow for their free circulation to the members of the organization. The Historian shall keep the organization's scrapbook and history current.

Section 14 The Editor shall be responsible for the editing, printing, and distribution of all publications of the organization..

Section 15 Officers may be changed by referendum by a ¾ vote of all active members.

Section 16 Officers must remain active members. Upon becoming inactive, the member's office shall be declared vacant.

Section 17 If neither the President or Vice President is available to conduct the regular monthly meeting, then this duty shall be assumed by one of

the following officers, in this order: Secretary, Treasurer, Observatory Director, Editor, Director of Observations.

Article V Meetings

Section 1 Regular monthly meetings shall be held at a time and place as specified in the Bylaws, unless otherwise notified.

Section 2 Special meetings in which no business is transacted may be held at any time.

Section 3 A quorum to conduct business at a regular monthly meeting shall be at least ⅓ of the members active at the beginning of a regular monthly meeting. Members who attend a regular monthly meeting via web or phone conference technology are considered to have attended in person.

Section 4 Only active members can vote on organization business. A family membership will have a single vote on any issue.

Section 5 Organization business must be approved by a majority vote of the members active at the beginning of a regular monthly meeting.

Section 6 Special recognition of the contributions by members of this organization may be given from time to time. A majority vote of active members shall be required.

Article VI

Section 1 Repealed

Section 2 Dues will be specified in the Bylaws

Section 3 Changes in the monthly dues can be made by a ⅔ vote of all active members.

Section 4 Monies acquired by this organization shall become part of the treasury and shall not be distributed to its members except as compensation for services or payment of obligations incurred by the organization, and only upon approval at a regular monthly meeting.

Section 5 All project expenditures of this organization over $100 must first be approved by a majority vote of all members active at the beginning of a regular monthly meeting. Expenditures less than $250 can be made by officers on behalf of this organization, however, reimbursement for such expenditures must be approved at a

subsequent regular monthly meeting by a majority vote of all members active at the beginning of the regular monthly meeting.

Section 6 Repealed

Section 7 Upon dissolution, the organization's land will be donated to the Geauga Park District. Telescopes and other optics belonging to the organization will be donated or sold to other Astronomy clubs which qualify as 501 (c) (3) organizations. Any other assets will be sold and all remaining funds will be donated to the Geauga Park District.

Section 8 Repealed.

Article VII Constitution Changes

Section 1 This constitution may be amended by an affirmative vote of ¾ of all active members .

Amendment 1

Section 1 This organization may establish bylaws by a majority vote of all active members.

Section 2 Bylaws shall be concerned with but not limited to specific areas not covered by the constitution.

Section 3 Bylaws shall not take precedence over the constitution.

Bylaws

Section 1 This organization's business address shall be P. O. Box 11, Chagrin Falls, Ohio.

Section 2 The Agent for Process of Services shall be the Treasurer, the address for the Agent shall be the organization's P.O. Box.

Section 3 Regular monthly meetings shall be held at a place and time published at least one month in advance.

Section 4 Privileges of membership shall include: receiving the club newsletter, the Valley Skywatcher; membership in The Astronomical League; and access to the organization's observatories, subject to being over 18 and approved by the Observatory Director.

Section 5 Dues shall be $100 annually, for both individual and family memberships, payable in July. Junior memberships shall be $50 annually.

Approved May 3, 2025

- **Wild Theories Abound Over Gigantic "Comet" Careening Through Our Solar System In The Fall**

Authored by Michael Snyder via TheMostImportantNews.com

Zero Hedge August 25, 2025

Editor's Note: My nephew, Aaron Sells, brought the news of 3I/ATLAS to my attention during the wedding reception on August 16th for another nephew. Aaron has worked for and with NASA in Cleveland and thought I might be interested in the speculation surrounding it and forwarded me a couple of links. I then ran into this on the Zero Hedge website. I suggest we start stockpiling survival supplies in the worst case scenario that this is in fact a nuclear powered invasion comet.

A colossal interstellar space rock that was originally known as "A11pl3Z" but has since been given the designation "3I/ATLAS" will be making a very alarming run through our solar system in September and October. Based on their initial observations, scientists estimated that 3I/ATLAS has a diameter of approximately 20 kilometers, and that would make it larger than Manhattan. But now scientists are telling us that it is probably at most 5.6 kilometers wide. Even if it is only about 5 kilometers wide, we are still talking about an extinction-level event if it were to hit us.

Over the next couple of months, 3I/ATLAS will be zipping through our solar system at a speed of about 130,000 miles per hour, and scientists assure us that the gravity of the sun cannot significantly alter the trajectory of anything moving that fast.

But what if they are wrong?

…..3I/ATLAS is supposed to fly past Mars at a distance of just 0.19 AU on October 3rd. That is even closer than astronomers were originally projecting, and that is making some people nervous.

Hopefully the experts are correct and there is no threat of collision, because if this thing actually hit Mars it would be a cataclysm unlike anything that any of us have ever seen.

According to Harvard astrophysicist Avi Loeb, it appears that 3I/ATLAS may actually be emitting its own light…

> Interstellar object 3I/ATLAS — which is zooming through our inner solar system — appears to be emitting its own light, according to Harvard astrophysicist Avi Loeb.
>
> The observation by Loeb, if verified, would contradict NASA's classification of the Manhattan-size object as a comet, the scientist argues in a new blog post.

Obviously, more observations will have to be done in order to confirm this.

But there are essentially two options.

If this theory is not true and 3I/ATLAS is not emitting its own light, Loeb says that this giant space rock is probably about 12 miles long…

> If 3I/ATLAS were reflecting light, it would mean the object was 12 miles long, which is improbable, according to the astrophysicist.

(Continued on the following page)

• Wild Theories Abound Over Gigantic "Comet"…(cont)

The second option is that 3I/ATLAS is emitting its own light, and that would be even more ominous, because Loeb believes that 3I/ATLAS could potentially be "a spacecraft powered by nuclear energy"…

> Loeb speculated that the nucleus of the object could in fact be nuclear — and possibly an engine crafted by an alien people.
>
> "A natural nuclear source could be a rare fragment from the core of a nearby supernova that is rich in radioactive material. This possibility is highly unlikely, given the scarce reservoir of radioactive elements in interstellar space," Loeb wrote.
>
> "Alternatively, 3I/ATLAS could be a spacecraft powered by nuclear energy, and the dust emitted from its frontal surface might be from dirt that accumulated on its surface during its interstellar travel," Loeb conjectured, adding, "This cannot be ruled out, but requires better evidence to be viable."

And Loeb has pointed out that the fact that the trajectory of 3I/ATLAS will take it so close to Mars, Venus and Jupiter is more evidence for the theory that it could be an alien spacecraft…

> Loeb has also raised questions about its unusual trajectory.
>
> "If you imagine objects entering the solar system from random directions, just one in 500 of them would be aligned so well with the orbits of the planets," Loeb told Fox News Digital earlier this month.
>
> The interstellar object, which comes from the center of the Milky Way, is also expected to pass near Mars, Venus and Jupiter, another improbable coincidence, he said.
>
> "It also comes close to each of them, with a probability of one in 20,000," he said.

It follows a retrograde orbit aligned within 5 degrees of the ecliptic plane, passing close to Venus at 0.65 astronomical units, Mars at 0.19 AU, and Jupiter at 0.36 AU. Loeb calculates the probability of such alignments at 0.005 percent for random arrivals.

When I originally wrote about this giant space rock, we were being told that it would pass Mars at a distance of approximately 0.4 AU.

But now we are being told that it will pass Mars at a distance of just 0.19 AU on October 3rd.

This is a story that we will want to watch very closely.

Following the close encounter with Mars, 3I/ATLAS is expected to be closest to the Sun on October 30th.

Subsequently, 3I/ATLAS is supposed to come closest to Earth on December 19th at a distance of approximately 1.8 astronomical units.

Type 1A Supernova SN 2025rbs

by Rob Beers

SN 2025rbs was discovered on July 14, 2025. As of July 19, 2025, it was listed at a magnitude of 13.8. It is located near the core of NGC7331. The spiral galaxy NGC 7331, located 39.79 million light years away in the constellation Pegasus.

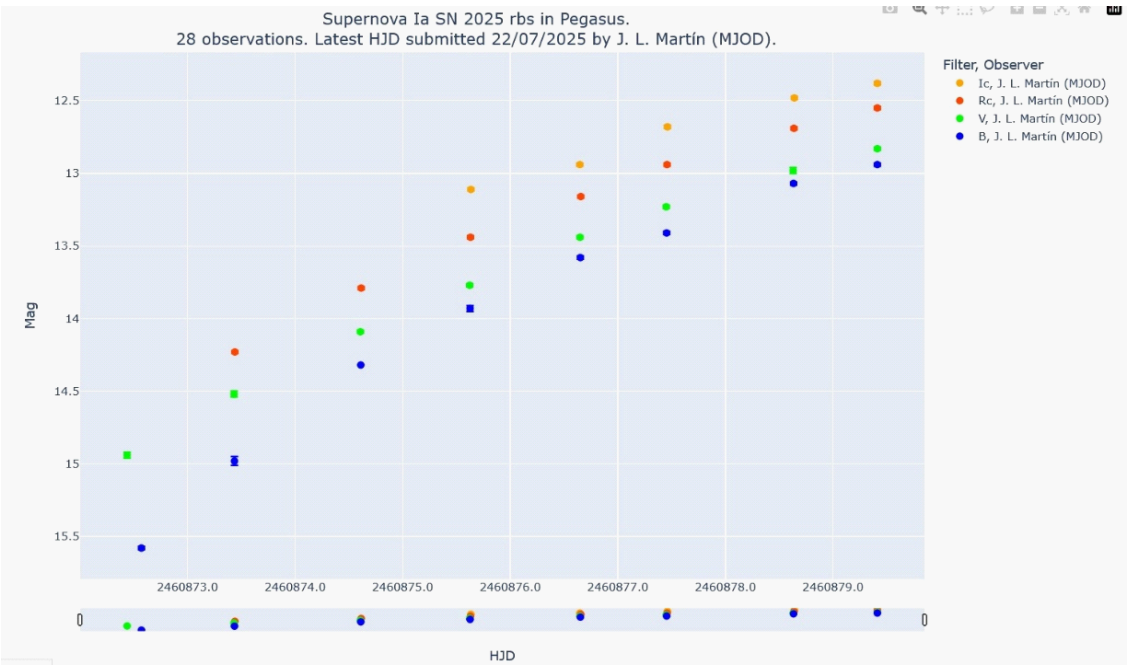
Supernova SN 2025rbs is a type Ia supernova. Type Ia supernovae are valuable to astronomers because they have a very consistent peak brightness. This allows them to be used as "standard candles" to measure distances in the universe. By observing how bright a Type Ia supernova appears, astronomers can determine how far away it is.

A Type Ia supernova is a type of thermonuclear supernova that occurs in binary star systems, where one star is a white dwarf. These explosions happen when the white dwarf accretes enough matter from its companion star (or merges with another white dwarf) to reach the Chandrasekhar limit (approximately 1.4 times the mass of the Sun), causing a runaway nuclear reaction and a massive explosion that destroys the white dwarf.

A white dwarf is a dense remnant of a star that has exhausted its nuclear fuel and shed its outer layers. It is primarily composed of carbon and oxygen. Type Ia supernovae occur in binary star systems where the white dwarf has a companion star. This companion can be another white dwarf, a red giant, or even a main-sequence star. The white dwarf can gain mass by accreting material from its companion star, or by merging with another white dwarf. As the white dwarf gains mass, it eventually reaches a point where it can no longer support itself against its own gravity. This critical mass is known as the Chandrasekhar limit. When the Chandrasekhar limit is reached, the intense pressure and temperature in the white dwarf's core trigger a runaway thermonuclear reaction. Carbon and oxygen fuse into heavier elements, releasing a tremendous amount of energy.

The sudden release of energy causes a massive explosion, completely disrupting the white dwarf. This is a Type Ia supernova.

Observations from the Carpe Noctem Observatory (SPAIN) over several days noted a maximum magnitude of about 12.4 on 7/22/2025.

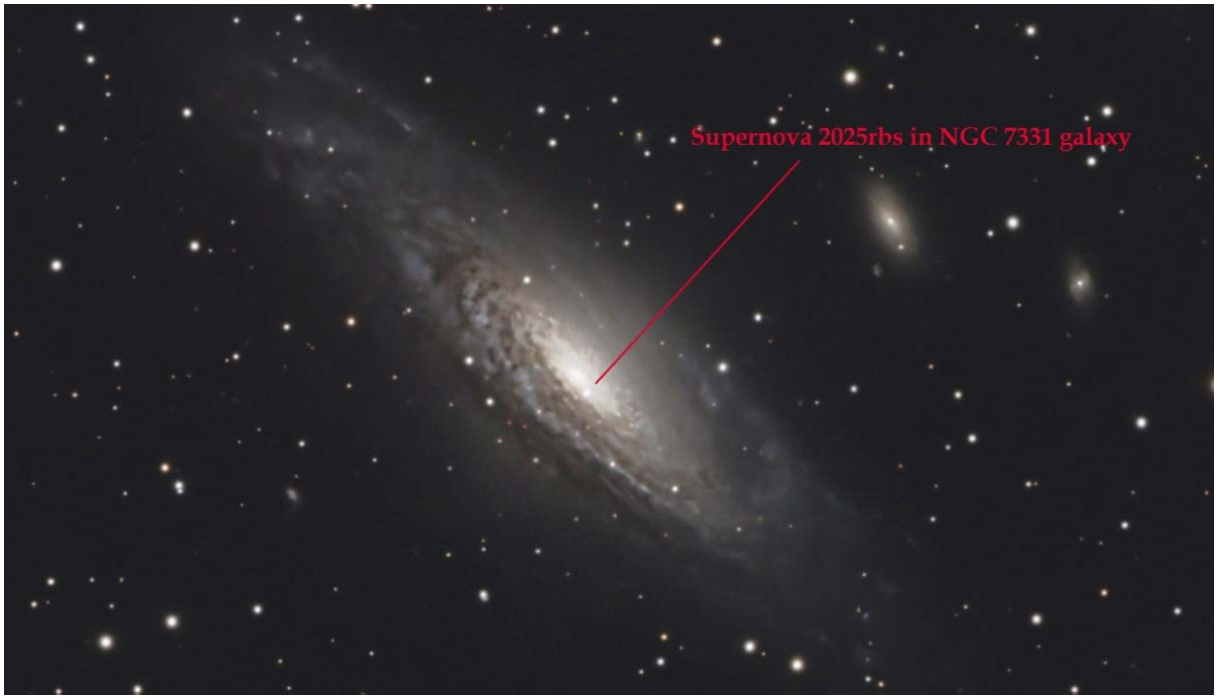


Reference: https://estelario.blogspot.com/2025/

Type 1A Supernova SN 2025rbs (cont)

by Rob Beers

This image was taken on 7/21/2025 at about 2am DST by Rob Beers.



Scope: Stellavue SV152T 6” APO Refractor with Televue 2X Powermate

Camera: ZWO ASI2600MC

Focal Length: 2400mm

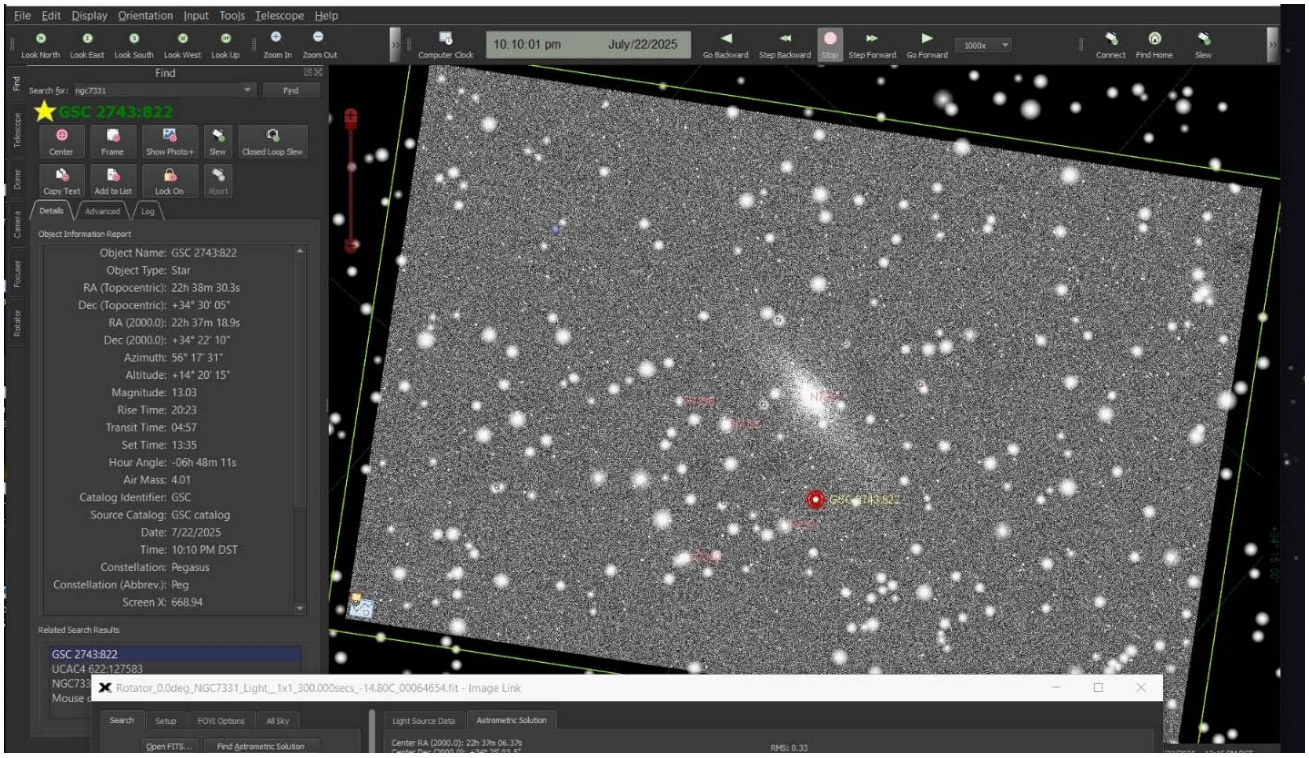
Total image time 40 minutes (8 - 5 minute exposures)

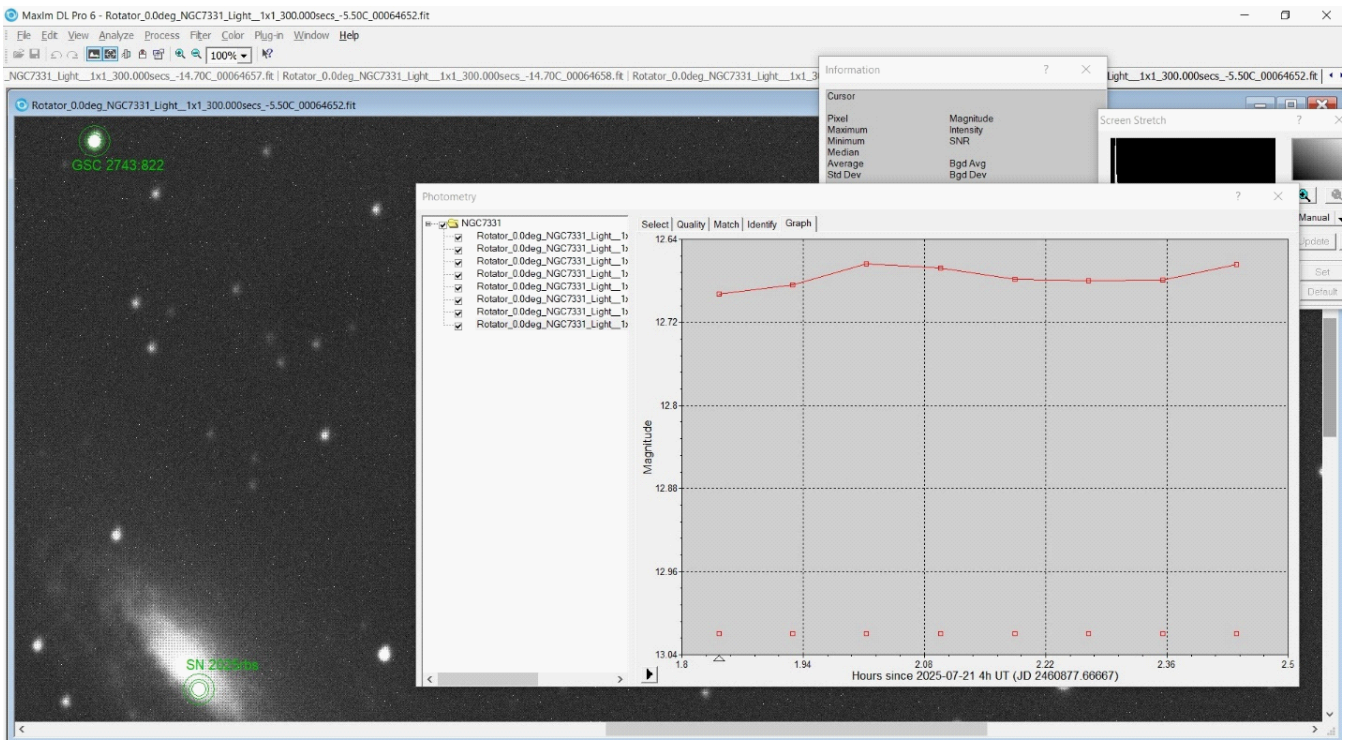
Processed in Pixinsight.

Type 1A Supernova SN 2025rbs (cont)

by Rob Beers

By using a known magnitude star GSC 2743:822 (Magnitude 13.02) and the photometry tools in MaximDL the magnitude of SN 2025rbs was determined to be approximately 12.7 (See below).





The graph is for 8 of the images taken from 1:53am till 2:28am on 7/21/2025.

Four Images for the Hubble Night Sky Challenge

by Jeff Ratino

These four images [on the following page] of star clusters were submitted for Hubble's Night Sky Challenge for the month of July. All were imaged from Starfront Remote Observatory in Texas.

M4

Messier 4 (M4 or NGC 6121 or the Spider Globular Cluster), located in the constellation Scorpius, is a huge, spherical collection of stars known as a globular cluster. At just 5,500 light-years away, it is the closest globular cluster to Earth, making it a prime object for study. Because of its apparent magnitude of 5.9 and proximity to the orange-red star Antares, one of the brightest stars in the night sky, M4 is relatively easy to find with a small telescope.

M62

The star field here is incredible. I did attempt a star reduction, but it didn't look as good. So opted to leave as is.

Messier 62 (M62) or NGC 6266 is a globular star cluster located in the southern constellation Ophiuchus. The cluster has an apparent magnitude of 7.39 and lies at an approximate distance of 22,200 light years from Earth. Messier 62 is known for being one of the most irregularly shaped globular clusters in our galaxy. This might be because it is one of the closest globular clusters to the center of our galaxy and is affected by galactic tidal forces, displacing many of the cluster's stars toward the southeast.

M107

Messier 107 is one of approximately 150 globular star clusters found around the disk of the Milky Way galaxy. As globular clusters go, M107 is not particularly dense. M107 is located 20,000 light-years from Earth in the constellation Ophiuchus (The Serpent Bearer). It has an apparent magnitude of 8.9 and can be spotted through a small telescope most easily during July.

C82 - Star Cluster

Open star cluster Caldwell 82 (or NGC 6193), is host to about 30 stars. With an apparent magnitude of 5.2, this bright open cluster of stars is visible to the unaided eye away from light-polluted skies. It located in the constellation Ara roughly 3,700 light-years from Earth.

This is a "Southern" target in the Hubble Night Sky Challenge. My fourth target of the month. It is very low on the horizon and would have been impossible from home.

This image is a great example of imaging from dark skies. This is only 47 minutes of integration. My goal was to get at least double, but since imaging C82 on the 25th, it got too low on the horizon.

Four Images for the Hubble Night Sky Challenge (cont)

by Jeff Ratino

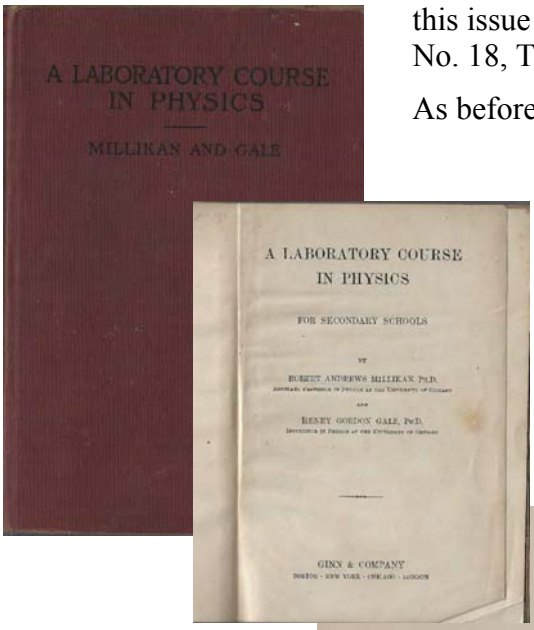
A Laboratory Course in Physics (circa 1906)

Chris Powell

As mentioned in the fall 2022 issue of the VSW, I picked up a battered copy of "A Laboratory Course in Physics" by Robert Andrew Millikan, PhD (Noble Prize for Physics in 1923) and Henry Gordon Gale, PhD, published in 1906 (cover and title page below). This work was selected by scholars as being culturally important, and part of the knowledge base of civilization as we know it. The work is in the public domain in the United States, and it was encouraged to be freely copied and distributed. The book includes fifty-one experiments starting with the determination of Π (pi) and ending with an experiment on photometry. This series of excerpts started with the ten experiments on optics which I thought might be of the most interest to our members. Having concluded these in past issues, we proceeded to the earlier experiments. In this issue we have Experiments No. 17, The Laws of the Pendulum; and No. 18, The Law of Mixtures and the Water Equivalent of a Metal Vessel.

As before, homework will be left as an exercise for our members.

(Begin below and on the following pages)



EXPERIMENT 17

THE LAWS OF THE PENDULUM

I. To find whether or not the time of swing is different for different amplitudes and different weights. Attach with sealing wax a small weight, preferably a steel ball about 3/4 in. in diameter, to a fine thread about 180 cm. long, and suspend it in a wooden clamp with square jaws, like that shown in Fig. 29.

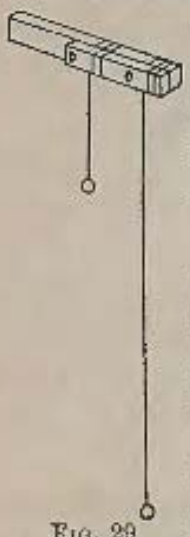


FIG. 29

Let one student set his eye in some particular position, such that the thread is in line with some fixed mark or small object. Then let the pendulum be set into vibration through an arc 10 cm. or 12 cm. long. Let a second student keep his eye on the second hand of a watch while the first taps with his pencil upon the table at the instant of each passage of the pendulum past the fixed mark. When the timekeeper is ready let him call "now" at the instant

of some tap, and record the hour, minute, and second at which he called it, and let the other observer take up the count "one" at the instant of the next tap, and continue up to 100. Let the timekeeper record again the hour, minute, second, and, if possible, the fraction of a second, at which the count 100 occurs.

Increase the amplitude of swing from 20 cm. to 30 cm. and again observe the time of one hundred vibrations exactly as before. Make another trial when the amplitude has been increased to 2 m. or more.

Suspend another pendulum of the same length from support to center of bob, but of quite different mass and material; for example, use for the bob a lead bullet, and see whether one pendulum gains at all upon the other when they are set going together through an arc of 30 cm. or 40 cm.

Tabulate your results as follows:

Arc 10 cm.	*Time of beginning count*	*Time of ending count*	*Total time*	*Time of one vibration*
First trial	$10^h\ 45^m\ 10.4^s$	$10^h\ 47^m\ 25.0^s$	134.6^s	1.346^s
Second trial	10 49 15.0	10 51 29.4	134.4	1.344
Third trial	10 53 47.2	10 56 2.0	134.8	1.348
			Mean =	——
Arc 30 cm.				
First trial	——	——	——	——
Second trial	——	——	——	——
			Mean =	——
Arc 200 cm.				
First trial	——	——	——	——

So long as the amplitude is small, do you find that the period depends upon it at all? What is the effect of a very large amplitude? What influence has the weight of the bob upon the period of a pendulum?

II. To find the relation between the lengths of two pendulums and their periods. Replace the last pendulum by a second one which has a bob like the first, and adjust its length by slipping

it through the clamp, the screw being only moderately tight, until it makes exactly two swings to every one made by the pendulum 180 cm. long. In order to make this adjustment, let one student tap the floor at the instant of each passage of the long pendulum through its middle position, while another does the same with the short one. Adjust until the taps coincide.

Measure the lengths of the two pendulums from the bottom of the clamp to the top of the ball, and add to each measurement the radius of the ball. From these results predict, if you can, how long a pendulum must be made to vibrate three times as fast as the 180-cm. pendulum. Test your conclusions experimentally. Record thus:

Length of pendulum No. 1 = ——
Length of pendulum No. 2 = ——
Length of pendulum No. 3 = ——

$$\frac{\text{Length No. 1}}{\text{Length No. 2}} = \text{——} \qquad \left(\frac{\text{Period No. 1}}{\text{Period No. 2}}\right)^2 = 4$$

$$\frac{\text{Length No. 1}}{\text{Length No. 3}} = \text{——} \qquad \left(\frac{\text{Period No. 1}}{\text{Period No. 3}}\right)^2 = 9$$

III. To find from the above data the length of the second pendulum. Take a mean of all the above observations with shorter arcs on the time of one vibration of the longest pendulum. From this mean and the measured length of this pendulum compute, with the aid of the law just found connecting lengths and periods, the length of a pendulum which will beat seconds.

In order to obtain this quantity as accurately as possible, determine it again from the above data by the graphical method as follows. Let t_1, t_2, t_3 be the respective periods of the three pendulums, and l_1, l_2, l_3 the corresponding lengths. Thus, in the example given above,

$t_1 = 1.346$ sec.	$t_2 = \frac{1}{2} \times 1.346 = .673$ sec.	$t_3 = \frac{1}{3} \times 1.346 = .4487$ sec.
$t_1^2 = 1.812$ sec.	$t_2^2 = .4530$ sec.	$t_3^2 = .2013$ sec.
$l_1 = 180.00$ cm.	$l_2 = 45.00$ cm.	$l_3 = 20.00$ cm.

Now plot t_1^2, t_2^2, t_3^2 as distances to the right of OY (Fig. 30), and l_1, l_2, l_3 as distances above OX, using a scale large enough to make the figure cover a full page and thus obtain three points 1, 2, 3. With a pencil having a very fine point draw the straight line through O, which passes as near as possible to all of the points 1, 2, 3. Read off upon this straight line the length

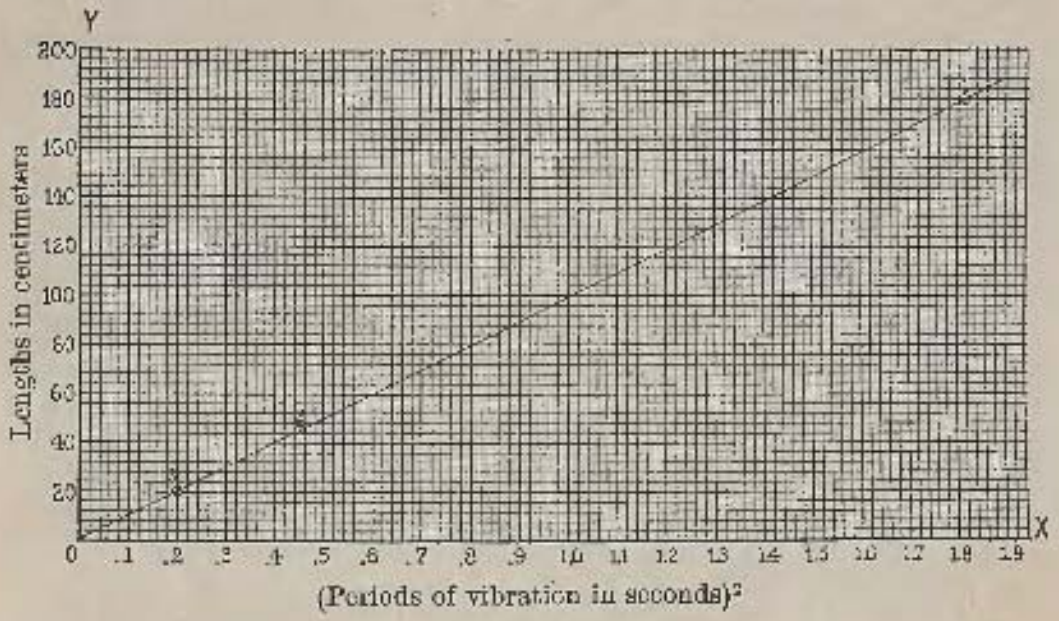


FIG. 30

l corresponding to the value $t^2 = 1$. This is the length of the seconds pendulum.

This graphical method here outlined is often the simplest and most satisfactory way of averaging a number of observations.

State in your own words the laws of the pendulum which have been proved by the above experiments.

How would you obtain from the graph the time of a pendulum of any assigned length, say 141 cm.?

It is shown in more advanced work in physics that the velocity g which a falling body acquires in a second can be found by multiplying the length of the seconds pendulum by π^2. Compute g in this way and compare with the accepted value, viz. 980.

EXPERIMENT 18

THE LAW OF MIXTURES AND THE WATER EQUIVALENT OF A METAL VESSEL

1. The law of mixtures. The unit of heat is called the *calorie*. It is defined as the amount of heat which passes into 1 g. of water when its temperature rises 1° C., or the amount which passes out of 1 g. of water when its temperature falls 1° C. Thus, when the temperature of 100 g. of water rises 10° C., we say that $100 \times 10 = 1000$ calories of heat have entered the water; or when the temperature of 100 g. of water falls 5° C., we say that 500 calories of heat have passed out of the water.

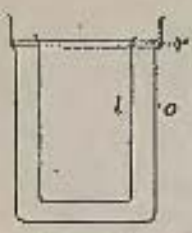


FIG. 31

Allow a dry thermometer to stand for two or three minutes in a metal vessel of at least 300 cc. capacity, — for example, the inner vessel *i* of the *calorimeter* of Fig. 31, and then take its reading and call this the temperature of the room.

(*a*) From a vessel of cold water pour 100 g. of water into each of two small vessels, — for example, the small brass cylinders used in Experiment 3. By heating with a Bunsen flame and by continual stirring adjust the temperatures of the two vessels of water until one is 6° or 8° below the temperature of the room as measured by one thermometer, while the other is about the same amount above it as measured by a second thermometer. Immediately after taking these temperatures pour the two bodies of water together into the vessel which is at the temperature of the room. Stir for about one minute with both thermometers, then take the temperature of the mixture on each thermometer.[1]

[1] Use two thermometers because the temperature of one vessel would otherwise change while that of the other was being taken. Take the final temperature with both thermometers because the readings of inexpensive thermometers often differ from one another as much as ½° C.

Compute and record how many calories of heat the warmer water has lost and how many the colder water has gained.

(*b*) Repeat, this time mixing 200 g. at a temperature about 6° C. below that of the room with 100 g. at a temperature 12° C. above that of the room. Record thus:

(*a*)

Temperature of room	= 19.15° C.
Temperature of first 100 g. water	= 12.7° C.
Temperature of second 100 g. water	= 25.7° C.
Final temperature of mixture on first thermometer	= 19.1° C.
Final temperature of mixture on second thermometer	= 19.3° C.
Number of calories gained by first 100 g.	= ——
Number of calories lost by second 100 g.	= ——

(*b*)

Temperature of 200 g. water	= ——° C.
Temperature of 100 g. water	= ——° C.
Final temperature of mixture on first thermometer	= ——° C.
Final temperature of mixture on second thermometer	= ——° C.
Number of calories gained by the 200 g.	= ——
Number of calories lost by the 100 g.	= ——

State in your notebook the relation which you find to hold in the above experiments between the number of calories gained by the body whose temperature rises and the number lost by the body whose temperature falls, remembering, of course, that your temperature readings may easily be in error as much at .1°. This is found to be a law which governs the process of heat exchange in all cases of mixture of bodies at different temperatures.

In the above experiments the vessel into which the water was finally poured was in every case at the temperature of the room. The next experiment is one in which this is not the case.

II. Water equivalent of a metal vessel. Pour 150 g. of water into the inner vessel *i* (Fig. 31) of the calorimeter[1] and 100 g.

[1] If a calorimeter is not available, use two of the small cylinders of Experiment 8; but in this case put 75 g. of water into each and make the temperature of one about as far above the temperature of the room as that of the other is below it.

into one of the small cylinders used in Experiment 3. Adjust the temperature of the 150 g. until it is about 10° below that of the room, while the temperature of the 100 g. is made a little more than one and a half times as much above that of the room. Place the inner vessel of the calorimeter in the outer one *o* (Fig. 31), supporting it by the ring *r*. This is done to avoid communicating heat to the water from the hand. With different thermometers, stir the water in each vessel thoroughly, and at the same time tip the vessel containing the cold water so as to bring the water into contact with as much of the walls as possible. This is to give the whole of the vessel the temperature of the water. Read the temperature of the water in each vessel very accurately, then quickly pour the warmer water into the colder. Stir for half a minute, then read the final temperature on each thermometer. Compute the number of calories lost by the hot water and the number gained by the cold. They are no longer equal. Why? From the difference and the number of degrees through which the vessel has been raised, find the number of calories required to raise it through 1° C. This is called the *water equivalent of the calorimeter*, since it is the number of grams of water to which the vessel is thermally equivalent. The following are typical observations.

Temperature of the 150 g.	= 8.1° C.
Temperature of the 100 g.	= 38.0° C.
Temperature of mixture	= 19.5° C.
Rise in temperature of vessel	= 11.4° C.
Calories gained by cold water	= 1710
Calories lost by hot water	= 1850
Difference (= calories going to vessel)	= 140
Water equivalent of vessel	= 12.3

The calculated value of the water equivalent of a brass vessel is its weight (in this case 135 g.) times the specific heat of brass (viz. .095; see Experiment 18). This product is in this case equal to 12.8, and differs from the observed value, 12.3, by 4 per cent.

A Laboratory Course in Physics (Circa 1906) (cont)

The only reason for making the initial temperature of the 100 g. one and a half times as far above the temperature of the room as that of the 150 g. was below it was to make the final temperature of the mixture the same as that of the room. Can you see why this arrangement is desirable if we wish to know the temperature of the mixture accurately?

Why did we not need to consider the heat absorbed by the vessel into which we poured the two bodies of water in the experiments on the law of mixtures?

If you read one of the thermometers which gave you the final temperature of the mixture .1° too high, what is the real value of the water equivalent? (Actually work it out, making the final temperature .1° higher.) Do you then consider that your result is within the limits of legitimate observational error?

2006 - Finishing the Electric Upgrade

Steve Fishman

As noted in the 2005 history, we had First Energy install a pole at the north end of our parking lot in October. The next task, which had to wait until late spring/summer was getting that power to the new North Observatory, then up to the top of Indian Hill. In March, we asked First Energy for installation (running cable from the street to the new pole) around May/June.

Starting in late 2004, we encouraged a "pass the hat" for an electric fund that within 1 year, collected $2,377 from CVAS members. The June minutes show that Marty Neimi and Larry Boros met with an electrical contractor, Bill Mitchell, and he was in the process of quoting the electrical service. Also, First Energy would send me, as Treasurer, an invoice for $780 to install a meter and run it to our pole.

Larry Boros purchased all the material on July 3 with an estimated cost of $1,280, which ended up being $1,181. Marty Neimi scheduled work sessions in July to complete the 1st phase of running a line from the pole to the North Observatory. Marty and his son dug a trench on July 14, then the next day, they buried the cable in the trench, installed a meter completed wiring to the north observatory. A few trees were also taken down on the east boundary and just south of the north observatory. Multiple photos of the July work session are included in this article. Marty then dumped 10 tons of gravel on the trench.

First Energy completed their connection in August, then on September 29, Marty, Steve Mordarski, Phil Sherman, Russ Swaney, Steve Kainec and a professional electrician (Mark Pegritz) ran the electrical line from the north shed to the observatory on the hill. This completed the project to connect our observatory to the electric grid and disconnect our connection from Keith's house. Many photos of the trenching, laying the cable and connecting to the North Observatory are included in this story.

Left: Marty Niemi watching the trench getting started from the pole to the North Observatory.

Right: Looking north to the pole.

Below left: Getting ready to lay the wire. Bill Mitchell at the left, then Russ Swaney standing behind him. Steve Kainec in the trench. Marty Niemi having a laugh while talking with Steve Mordarski.

Right: Steve Mordarski steadying the ladder while Bill Mitchell climbs to work on the connection. Unidentified helers with the two white t-shirts. Marty in the tan t-shirt.

2006 - Finishing the Electric Upgrade (cont)

Steve Fishman

Upper left: Marty getting ready to pop a wheelie in the tractor.

Above: Marty watching the trench getting started from the pole. Looking south to the North Observatory.

Left: Marty finishing trench at the North Observatory.

Below: Marty taking a break on this warm and humid day.

2006 - Finishing the Electric Upgrade (cont)

Steve Fishman

Upper left:Bill Mittchell and Steve Kainec lay cable in the trench.

Upper middle: Cable up to the North Observatory.

Upper right: Looking north at the cable to the pole.

Above: Bill Mitchell working on the electric hook-up on the pole 1.

Right: Bill Mitchell working on the electric hook-up on the pole 2.

2006 - Finishing the Electric Upgrade (cont)

Steve Fishman

Above left: Marty working on the connection to the North Observatory.

Above right: Bill Mitchell working on the connection in the North Observatory.

Left: Bill Mitchell working the junction box on the pole near Huntley Road.

Below: Finished.

2006 - Finishing the Electric Upgrade (cont)

Steve Fishman

Other events this year included:

- Marty was playing around with free software that that permitted a private network to be created across the internet on demand. One January evening, Marty was at the hill while I was able to run the dome and a video camera from my home PC.

- Many star parties; 2 at Mentor Headlands, Holden Arboretum, Wickliffe Library, North Chagrin, Painesville City Park, Big Creek Park north of Chardon, Swine Creek east of Middlefield and our annual Super Star Party at Penitentiary Glen.

- Moved our insurance carrier to State Farm, still our current provider today. The prior company was charging $594, which we reduced to $390 at State Farm.

- Oberle Scope at the future Observatory Park. The Geauga Park District had preliminary estimates for the project and was currently in a fund-raising mode. The same night as our September meeting, they were holding a fund-raising dinner, which CVAS member Ian Cooper was attending. Sandy Oberle, Norm's widow was also in attendance.

- Winter meetings were held Sunday afternoons at Penitentiary Glen for a few years. Membership approved moving the meetings to North Chagrin reservation on the first Monday at 7:30 PM.

A final note about electric power at Indian Hill. First installed in 1987 by running 700 feet of cable from Keith's house. We paid Keith $7 each month for the service. Then this 2006 upgrade connecting to the First Energy grid, which also ended up running $5-$8 per month from First Energy. Who could have predicted then the cost would jump to nearly $100 a month in the late 2010's. In 2023, it became cost-effective to install solar panels to run both observatories, a story for another Indian Hill history.

Left: June OTAA convention. Bob Modic, Tom Quisenberry, Tony Mallama (CVAS co-founder) and Ian Cooper.

Right: Star Party in Painesville City Park.

2006 - Finishing the Electric Upgrade (cont)

Steve Fishman

Left: Steve Kainec and Bob Modic at Wickliffe public library star party.

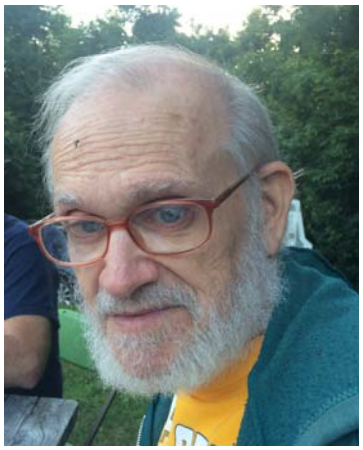
Below: Beartown Lakes star party. Dan Rothstein and Bob Modic in the foreground. In the back is Vickie Ford talking with Roseanne Radgowski.

Above: Roseanne Radgowski talking with visitors at the Mentor Headlands star party.

Right: Penitentiary Glen

Constellation Quiz

Dan Rothstein



This month's questions

1. Locate Proboscis Major.
2. One name among many for this M Object is the Lobster. List its other names.
3. Where is the Baby Scorpion?
4. Find the Crouton.

Answers to last issue's questions:

1. Locate The Little Queen, a miniature version of Cassiopea.

   The Little Queen is a dim asterism which is a miniature version of the W of the Queen Cassiopeia. It is located in Draco about halfway between the head of Draco and Polaris. Start at the triangle formed by Phi (φ), Chi (χ), and Upsilon (υ) Draconis. From Chi, the Little Queen is about 1 degree east-southeast. It's a small clump of 6th to 9th magnitude stars about ½ degree wide, visible in 8x50's under dark skies. Only three of its stars are plotted in the Pocket Sky Atlas due to its 7th magnitude limit, but it is plotted in other atlases which have dimmer limits. It lies at about 18° 35' RA, and +72° 20' Dec. Telescopes reveal 18 stars down to 11th magnitude. It can also be described as a question mark.

   Philip Harrington; My Favorite Asterisms; *Sky and Telescope;* May, 1998.

2. Find the Measuring Cup Dipper.

   The Measuring Cup Dipper is a 4 ° long asterism extending from β Cephei (Alfirk, the flock), which is one of two stars which anchor the roof to the body of the house of Cepheus. Alfirk marks the end of its handle. 16 and 24 Cephei create the side of the dipper farthest from Alfirk. 11 Cephei lies where the handle joins the bowl. The star, which with 16 forms the bottom of the bowl, has no designation that I can find. Alfirk is a 3rd magnitude spectroscopic binary and the other four stars are 4th magnitude so this asterism should be an easy target for binoculars, possibly for the naked eye.

   Hugh Bartlett; Binocular Targets for Late Summer; *Sky and Telescope*; Sept. 2010.

(Continued on the following page)

Constellation Quiz (cont)

Dan Rothstein

3. Where is Jiuliu, the Nine Flags or Banners of the Emperor?

   I didn't research this one before I chose it in the last issue. I couldn't find much about Jiuliu, the Nine Banners (Flags) of the Emperor other than its general location in Eridanus right along the borders with Orion and Lepus. My one source says it is supposed to be a north-south chain of nine stars, magnitude unknown, an unknown distance south of the Witch Head Nebula, west of Rigel. I couldn't find any such line of stars. One problem with the Chinese constellations and asterisms is that they didn't consider the magnitudes of the stars in their groupings important, so the Nine Banners could be a mixture of stars down to the naked-eye limit of their most acute eyes. In the atlases I have I couldn't find any line of stars that corresponds to the description. This asterism was supposed to represent part of a hunting scene imagined to occupy this area of the sky. In a google search I found another more recent reference to the Nine Flags of the Emperor in a completely different part of the Chinese sky. Seven of the Nine Banners are supposed to be the seven stars of the Big Dipper. For some reason the other two are hidden to our sight. These nine white banners were carried at the front of the armies of Genghis Khan, who ruled most of China at the beginning of the sixteenth century.

   Ian Ridpath; *Star Trails*; IanRidpath.com/startrails/eridanus.htm

4. The Chevron lies on the outskirts of a famous cluster. Find it.

   The Chevron lies on the outskirts of the Pleiades cluster, directly south of its brightest star Alcyone. Its name refers to the chevrons that indicate military rank. This one is single, which indicates a private, being a nearly flat V pointing west. The northern part of the V runs straight north-south, being 3 stars of 7th magnitude which end at the vertex of the V. The southern half of the V includes 3 more stars of 8th magnitude, which have a slight curve, extending in a south-southeast direction. There is another version of our chevron adjoining it which uses the northern half of our original as its southern half, with the 2nd chevron's northern half stretching northwest in the direction of Maia, with the chevron reversed in direction, pointing east. Combined with our Chevron it creates a wide-open s-shape.

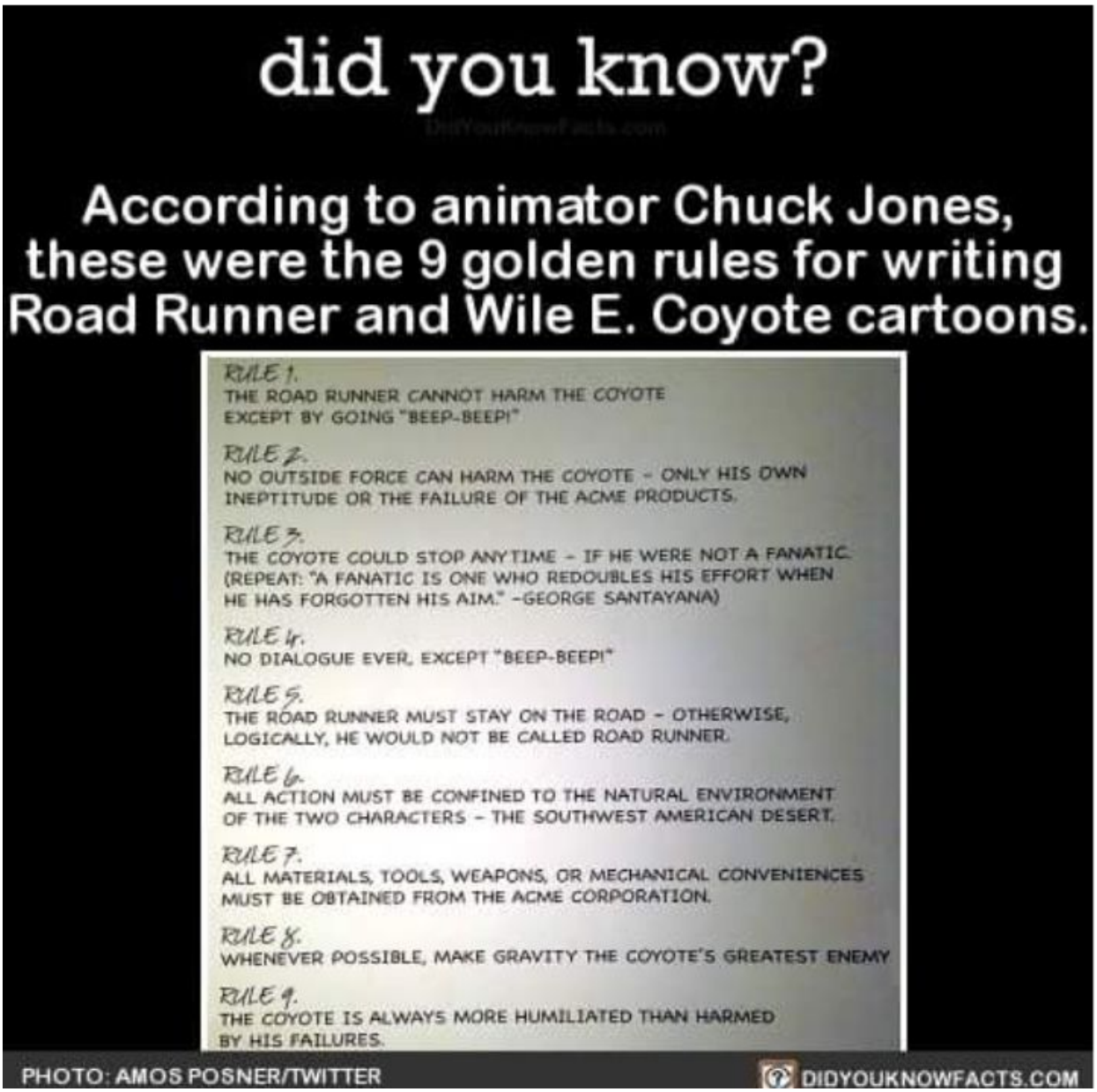
   Hugh Bartlett; Binocular Targets for Winter; *Sky and Telescope*; Dec. 2010.

Deep Thoughts on Engineering and Physics

Chris Powell

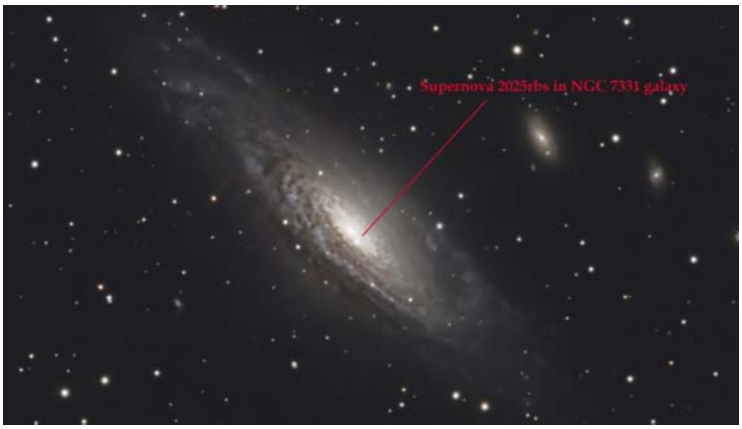
The following four items are an addition to our continued collection of "Physics and Engineering Folklore". As the term folklore implies, often the original author or source are not clear or known, and multiple and differing versions can be found. However, in the first submission, it is pretty clear that the author is suppose to be known. That in itself may be folklore. All of these have, at least, a bare minimum necessary content of physics or astronomy. And anyway, I thought all of them amusing.

As always, I welcome 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**.



Deep Thoughts on Engineering and Physics (cont)

Chris Powell



Question: Who went to more trouble to caption their astrophotograghy? The anonymous highway engineer on the left, or Rob Beers above?

The item above is for Steve Fishman and all the other CVAS members who have fled to New Mexico and Arizona for clearer skies.

On the left, I will simply observe that this is the father of Newtonian physics and that is enough to qualify for this section.