The Valley Skywatcher

Official Publication of the Chagrin Valley Astronomical Society

PO Box 11, Chagrin Falls, OH 44022

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Founded 1963

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Regular Features

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Vice President	Marty Mullet
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Stephan Quintet Galaxy Cluster photographed by CVAS member Sam Bennici with a Starlight Express MX516 CCD camera and 8-inch SCT, manually guided with an illuminated reticule.

Cosmology, in the CVAS Era

By Tony Mallama

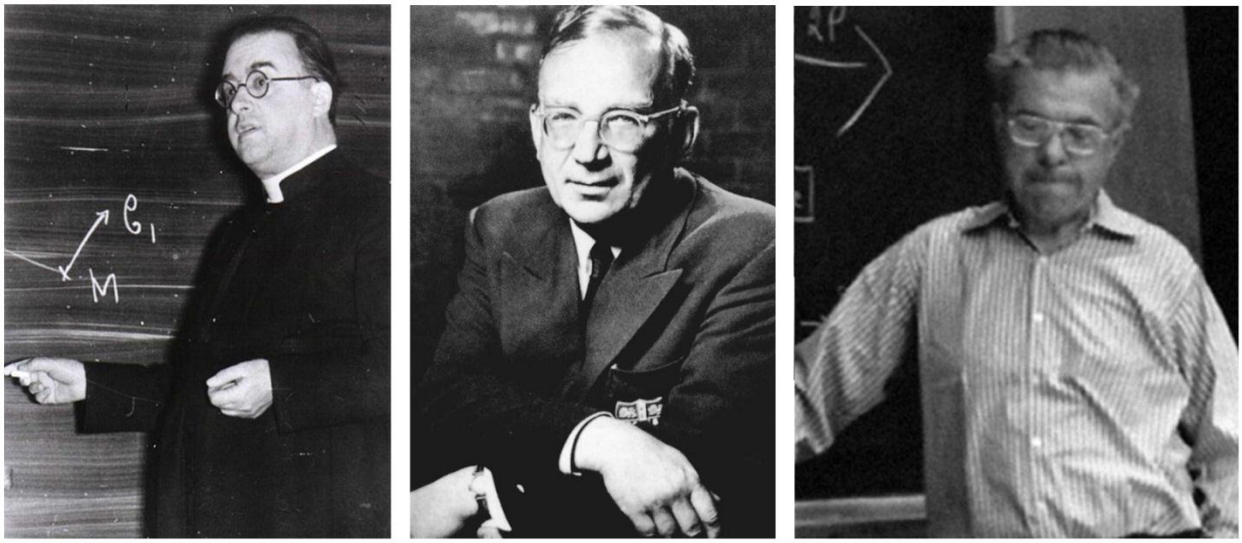
The origin of the Universe was a topic reserved for speculation fifty years ago when the CVAS began. There were two competing theories, the Steady State and the Big Bang, but not enough observational data to determine which was true. So, club members were free to choose their favorite cosmology without much chance of being proven wrong.

The Big Bang theory drew on the well documented expansion of the Universe as indicated by galaxy red shifts. The cosmologist Abbe LeMaître inferred from this observed expansion that all matter and energy were concentrated in a primordial atom billions of years ago. The Steady State theory, on the other hand, held that the Universe had always been the same and that no primordial atom ever existed. In order to square their theory with the observed fact of galaxy expansion Steady State supporters including Fred Hoyle posited that new matter was steadily being created out of the vacuum of space. Thus, they said, expansion has been going on forever but the Universe always appears the same overall.

Taking the long view on human history it was no surprise that such a profound question as the origin of the Universe did not have an answer in those days. After all, hadn't mankind been pondering this enigma for thousands of years without reaching a consensus? The events of the next few years, then, were surely among the most remarkable in history because we finally puzzled out what the Universe was like at the very beginning and how it evolved!

The Steady State theory was driven by its assertion of an unchangeable Universe which was termed the *perfect cosmological principle*. However, astronomers had recently discovered quasars and radio galaxies. These objects were abundant at large distances so they must have been prevalent eons ago, yet they were absent from the nearby realm of galaxies. So it appeared that the Universe was changing after all. The quasars and radio galaxies represented a chink in the armor of the Steady State theory that supporters found difficult to address.

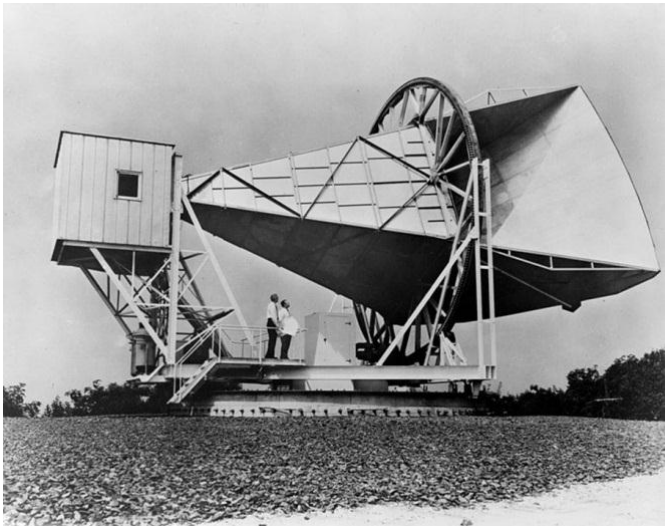
Another problem for the Steady State theory was the observed abundances of several isotopes of hydrogen, helium and lithium. The Big Bang theory correctly predicted these abundances based on creation of the isotopes during the few minutes when



Left: Abbe LeMaître who first proposed the Primordial Atom theory was a clergyman who doubled as an astronomer. Center: George Gamow correctly predicted that energy from the Big Bang explosion would be observed as microwave radiation. Right: Fred Hoyle proposed the competing Steady State theory. Hoyle was the first to use the term 'Big Bang' which he probably meant as a joke.

the primordial atom was still hot. The Steady State theory offered no such insight and since these species are not generated in the cores of stars the Big Bang clearly trumped the Steady State theory in this respect.

In 1966 the Big Bang theory landed its knockout punch over the Steady State model when Arno Penzias and Robert Wilson discovered cosmic microwave radiation. Using their new radio telescope at Bell Labs in New Jersey, Penzias and Wilson found microwaves arriving from every direction in the Universe. This is exactly what the theorist George Gamow predicted based on his analysis of the Big Bang theory. The radiation, he said, would be a tell-tale sign from the aftermath of LeMaître's primordial atom or, to put it another way, it was an echo of the Big Bang.



This antenna at Bell Labs was the first to record microwave radiation from the Big Bang.

Steady State theorists continued to support the hypothesis for a while longer but their arguments became increasingly unrealistic. Additional data favoring the Big Bang over Steady State continued pouring in until a super-majority of astronomers accepted the LeMaître-and-Gamow theory over that of Hoyle. The Big Bang theory is now so well supported by such a wide array of empirical data that it is termed the *standard cosmological model*. Besides, you've never heard of a TV show called "The Steady State Theory", have you?

PRESIDENT'S CORNER

By Gus Saikaly

Hello Friends:

The Chagrin Valley Astronomical Society will be celebrating its golden anniversary this year. It is hard to believe 50 years have passed since a group of teens came together to form a club whose members needed only to have one qualification: look up and enjoy the wonder. In 2013 we aim to celebrate their vision by highlighting the accomplishments of the club and its members past and present, active and inactive. A club where education about our Universe is made fun. Towards that goal I invite you to fill the pages of The Valley Skywatcher, a publication of note, with history, and reminisces to complement its usual scientific articles and beautiful photographs.

I invite you to consider a travelling exhibit of club astrophotography of past and present, active and inactive members in area libraries and other public places. I invite you to reach out to former members to join us at our convention and other celebrations this year.

The above is meant to initiate a conversation out of which we can generate a program for the year. Please do not hesitate to share your ideas. In the meantime keep enjoying the wonder.

Astronomy Pictures of the Season

Jupiter, Callisto and Europa

By Aaron Worley

Image recorded on December 13, 2012 with a Celestron 9.25 telescope equipped with a Skynyx 2-0 CCD camera, RGB filters, and a Powermate 2.5x image amplifier.

From left to right: Callisto, Jupiter, and Europa. This image shows Jupiter next to two of its moons, Callisto and Europa. The Great Red Spot is barely visible on the planet's left limb. The Oval BA storm is to its right. Jupiter's Southern Equatorial Belt is fully returned after its disappearance in 2010. Europa had just exited a transit of Jupiter when this image was taken. The albedo difference between Europa and Callisto is very apparent.

Seeing was average with slightly hazy skies. 500 frames stacked per filter using Registax 6. RGB merged in Photoshop CS5. Sharpened using wavelets and high pass filter.

John A. Brashear Optics and Warner & Swasey Telescopes

By George Gliba

John A. Brashear was a famous optician and instrument maker from Allegheny, Pennsylvania. He was the maker of fine astronomical equipment at the beginning of the 20th century, second only to Alvan Clark & Sons of Cambridgeport, Massachusetts. John A. Brashear was more active in the production of large bulk optical orders for the Warner & Swasey Company in Cleveland. Warner & Swasey was well known for making the mounts and tube assemblies for some of the world's largest telescopes, such as the 36-inch Lick refractor, the Yerkes 40-inch refractor, the Dominion Astrophysical Observatory 72-inch reflector, the Perkins Observatory 69-inch reflector, and the McDonald Observatory 82-inch reflector, among others.

Although John A. Brashear didn't build the optics for any of these great behemoth telescopes for Warner & Swasey, he did build several very large refractors, including the 30-inch Thaw refractor at Allegheny Observatory. He is also better known for making many medium sized refractors for schools, universities, and wealthy amateur astronomers, as well as many smaller sized telescope optics for Warner & Swasey.

Later, Warner & Swasey built the largest Schmidt telescope in the world at the time, including the optics in 1939, when they completed the famous 24-inch Burrell Schmidt. A few years later it was equipped with a unique 24-inch objective prism, which was great for low dispersion spectroscopic surveys that looked for peculiar astronomical objects over a wide 4 degree field of view. It stayed at the Case Institute of Technology's Warner & Swasey Observatory from 1941-1957, before moving to darker skies in Montville, due to the increasing light pollution. It was reinstalled at the new Case Nassau Station, 30 miles east of Cleveland in 1957.

While the Burrell Schmidt was located at the darker skies of the Nassau Station, during a wide field objective prism survey of the Northern sky carried out by Case astronomers Nicholas Sanduleak and C. Bruce Stephensona, it recorded the first microquasar SS-433 in 1977, as well as discovering several new Am and Ap type stars. It was moved to Kitt Peak Observatory, Arizona in 1978, because of light pollution again. The 36-inch Warner & Swasey cassegrain, which replaced it at the Warner & Swasey Observatory on Taylor Road in Cleveland, was then moved to the Nassau Station, where it is now a part of the Geauga Park District's newly constructed Observatory Park.

I had become very interested in the John A. Brashear, Warner & Swasey connection, when I recently purchased a 2-inch Warner & Swasey terrestial telescope, complete with birch wood tripod, and brass altazimuth mounting. During my research, mostly using google on the internet, I found that by the time of World War I, Warner & Swasey was making its own optics, mostly to support the war effort, with large contracts for the U.S. Army and U.S. Navy. I also found out that John A. Brashear provided Warner & Swasey with many porro prisms and smaller objective lenses, which peaked around 1900. This was of interest to me because my small Warner & Swasey refractor has a date of 1902; so it probably has Brashear optics.

Another interesting adjunct bi-product of my research into the Brashear/Warner & Swasey partnership was that I discovered that I was wrong about a couple of assumptions I had made about three famous Warner & Swasey refractors with John A. Brashear objectives. In a Valley Skywatcher article a few years ago when I was recalling the early days of CVAS, I referred to observing with the twin 9.5-inch Warner & Swasey refractors with Brashear objectives at the Warner & Swasey Observatory on Taylor Road, and at the Ralph Mueller Observatory at the Cleveland Museum of Natural History, both in Cleveland. It turns out that I was wrong about the telescope apertures. The Ralph Mueller Observatory has a 10.5-inch Brashear Objective, and the twin of the 9.5-inch refractor that was at the Warner & Swasey Observatory is the 9.5-inch refractor at Stephans Observatory at Hiram College, Ohio instead.

When I checked for more information on the Warner & Swasey Prism Terrestrial Telescope I recently bought

on eBay, I found that a nice little book explaining how to use this telescope to make some easy astronomical observations was printed, and that this little booklet has become a classic beginner's guide to observing with a small telescope. Although the original of this book couldn't be found, I discovered that it has been reprinted several times and these reprints are still widely available for a reasonable price. The book has a great set of Moon pictures and even a small star atlas of the northern sky down to about 4th magnitude. There are also several pictures of this nice telescope in the book, which I recently got for Christmas. The book is titled: "By Starlight and Moonlight with the Warner & Swasey Prism Terrestrial Telescope".

Happy New Year and CVAS 50th anniversary!

My Journey Back to the Best Hobby I Have Ever Known

By Mike Hambrecht

Approximately 30 years ago, I was bitten by the stargazer bug. I used to go out every night with binoculars and a constellation chart from a National Geographic World. I enjoyed just looking at each of the constellations. My father and I even went to a star party at Swine Creek Park hosted by CVAS. We went to a meeting and my dad joined. I can even remember that the observatory was at Indian Hill. My dad got really busy at work and I ended up taking an interest in computers, which is now my profession. So until about a year and a half ago, I had not thought much about stargazing or astronomy. In high school I took an astronomy class and many years later became a huge Star Trek fan but that was the extent of my stargazing, until a year and a half ago when I got my iPad. What does this have to do with stargazing? Well, let me take you along on my journey back to stargazing and hopefully amateur astronomer and astrophotographer.

The adventure began a little more than 2 ½ years ago when my wife first got an Android phone and showed me an app that used GPS to show the constellations and move with you as you shift the location that you are looking at in the sky. It peaked my interest but still hadn't drawn me in. I got my iPad2 through my job about a year ago, and found the app called The Night Sky. Wow I was really impressed. I could aim my iPad anywhere and it would show me what constellation was there in that part of the sky. My 14 year old daughter was impressed as well. Soon I was borrowing binoculars from my parents. But that wasn't enough for me. I had heard about a new park that had been built in Montville, a "Dark Skies" park. I had no idea what that meant but the fact that they would have a giant telescope and places for other observers to setup telescopes sounded cool. In fact all of this sparked my interest and memories.

Having remembered how much fun I had at a Star Party at Swine Creek Park in Middlefield, I decided to look for Chagrin Valley Astronomical Society. I found the website and looked up the schedule of meetings and star parties. I attended a star party at Riverside Cemetery in Painesville on April 27th, the night before Astronomy Day. I attended my first meeting on May 5th. I was so excited, I had been shown, with about 3 or 4 other newer members, how to operate the telescopes by Russ Swaney. Later I asked Russ to show me again how to use the 8 inch refractor. I also let Russ know I'd be glad to work on PCs around the place as I am IT guy. He told me they could definitely use some work.

I began spending several evenings up at the hill using the dome telescope and having a great time. I brought my wife, my daughter and my wife's good friend Cherie up on occasion showing them stuff that the computer could find for me. It was a lot of fun.

I spent an interesting afternoon at Observatory Park for the Venus Transit. I brought my mom and daughter with me. I brought a regular digital camera with built-in zoom telephoto and taped welding glass across the lens and took pictures of the transit.

I don't think they were too bad for a total amateur who had never even looked up at the sun before then. I was also interviewed by channel 3 news and got on TV http://www.wkyc.com/news/story.aspx?storyid=247311 All in all, I think it was quite an exciting day. We got to

Consecutive images of Venus transiting the Sun in June 2012.

see one of those incredible once in a lifetime events. I remember I was disappointed in myself for not looking for Halley's Comet or Hale-Bopp.

Eventually another club meeting came and went. I came up on a Saturday to do some PC work and that is when I met Ken Fisher and Marty & Andy Mullet for the first time. I had a good long talk with Ken about PCs, donating laptops from Kinetico, my employer, security and the telescopes. Ken told me I could borrow the Dobsonian and I took it right home. Russ supplied me with some eyepieces and I was off and running. I was checking out nebulas, galaxies and planets, mostly planets from my backyard.

Now that is how my membership to CVAS began and my reintroduction to stargazing/astronomy. I have spent the last several months purchasing my own telescope, a Galileo FS125DX, 120mm X 1000mm reflector. It came with an altazimuth mount and I was having a great time with this. I was still spending an evening or two at Indian Hill. At some point someone mentioned using a webcam to take planetary pictures and being an IT guy, I knew what a webcam was and how to make it take pictures. So I got a cheap one and began trying that out at home. I even used my iPhone to some effect but not what I would I call great. However, I'll let you judge for yourself.

I have never been one who could just quit because I could take a picture with my phone. I wanted to get better. I have learned so much more than I came in with regarding webcams. I discovered that there are only a few standard webcams that can be used for Astrophotography. They are Philips Vesta, Toucam and SPC(890 or 900)NC, the Logitech quickcam 3000 is also supposed to be pretty good but hard to find. I found SPC900NC going for anywhere from just over $100 to $300 on ebay. The $300 one was also modified for long exposure. What all of these webcams have in common is they have a CCD chip as opposed to CMOS which is what most webcams have nowadays because they are cheaper to make.

What I have spent my time doing, when I can't stargaze, is getting more applications for my PC and Apps for my iPad regarding astronomy. I have found many that are free that are nearly as good as that have a cost. I have approximately 10 PC planetariums, charts, planning or goto applications, approximately 15 iPad planetarium, chart, planning or goto apps. I have evaluated several of these and found my favorites.

Starry Night Pro 6 Plus is my clear favorite for my PC to use as goto software. It is easy to use. It is easy to connect to the telescope, assuming you get all of the correct drivers. My next favorite planetarium software, which would also apply for my iPad apps, is Redshift. It can be used for quite a learning tool with information about objects in our solar system as well 3-D flights to those objects to see them up close. After these would be Microsoft Worldwide telescope. Like the others it is a pretty good goto planetarium but again it is quite a 3-d planetarium. It is web based and tours of the universe can be created by anyone around the world.

I am not going to go on giving reviews of the applications I am still trying out. It is too early to make such judgments and I have not fully test the apps and applications and as for apps used for planning and logging observations, I have not put them to enough use. My plans in the future are to offer reviews of each of the different iPad apps and applications for publication in *The Valley Skywatcher*.

In thanks for the welcome I have received and the use of telescopes from CVAS, I have arranged for the donation of 3 laptops and their docking stations from my employer, Kinetico Incorporated, to be used at Indian Hill. I am also donating 3 desktops from my personal stock. I will set them all up with useful operating systems and planetarium goto applications. They will also have software for webcam capturing and then stacking and processing of astrophotographs. I even hope to set one of the desktops up to connect to the 16 inch telescope and use goto feature.

This article has been an introduction of sorts and I hope to offer more in the future.

IPhone 4 and Galileo telescope with Moon filter.

IPhone 4 and 8-inch Dobsonian telescope.

IPhone 4 and Galileo telescope with Moon filter.

Sun Pillars

By Steve Fishman

Now that winter weather has finally set in, here's an opportunity to observe a unique atmospheric event, a sun pillar. My daily work commute takes me on I-271 south from Solon to I-77. Along that route are several miles of horizon that's fairly flat or with a 5 to 10 degree obstruction.

During the December to early March period, on partly cloudy mornings, as the sun is rising in my 7:30-8 AM drive, I've seen a sun pillar, a shaft of light extending about 5 to 10 degrees above the sun. Sun pillars form when sunlight reflects off the surface of millions of ice crystals associated with thin high clouds. What I've found unique about this event is it being more noticeable during the colder winter months. I don't recall any or very few observations at sunset during the warmer months. I'd be interested in hearing of other CVAS member's observation of this event and if they also confirm that it is more prevalent during colder months.

Rotation Period for NEA 2012 QG42

By Ron Baker

These notes are a follow up to the article "Observing NEA 2012 QG42" which appeared in the Fall 2012 issue of *The Valley Skywatcher*.

The near-Earth asteroid 2012 QG42 was discovered by the Catalina Sky Survey on August 26, 2012. In September, a team led by Brian Warner from Palmer Divide Observatory near Colorado Springs determined its rotation period using lightcurve photometry.

As part of the team, I observed this asteroid at Indian Hill on September 11th and 13th. Fainter than Pluto, the object proved to be a challenging photometric target for the 12-inch SCT. The main difficulty arose from the asteroid's fast motion. The exposure length of the images had to be short to prevent excessive trailing. This caused the signal from the asteroid and comparison stars to be lower than optimal, and the scatter in the data correspondingly high.

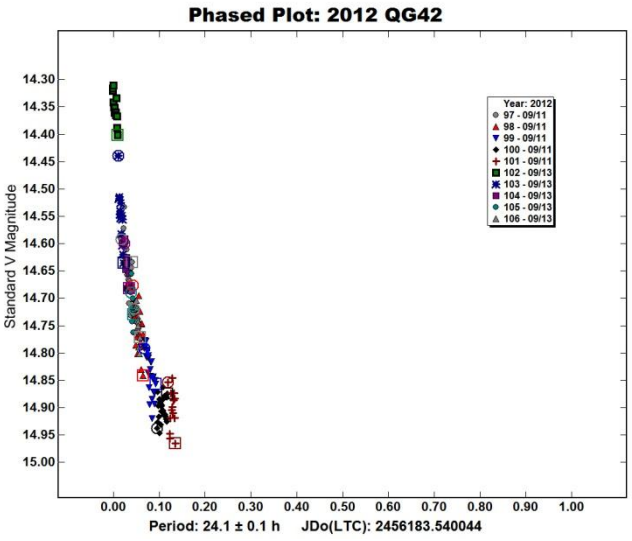
Each night, the object moved through 5 separate but overlapping CCD fields. To help with the analysis, the magnitude measurements were placed on a standard system. Small corrections to the asteroid photometry were needed due to the varying colors and magnitudes of the comparison stars selected in each unique field.

It turned out that the period was too long to determine accurately with just the data from Indian Hill. But one lightcurve minimum was captured on the first night, and since the object was already fading at the start of that 3 hour observing session the period appeared to be at least 12 hours in length. Later, when the data from all team members were combined, we found that the asteroid's period coincidentally matched the Earth's rotation of 24 hours very closely. The measurements provided by astronomers in Poland and Italy were particularly important because the longitude of their locations allowed observations at points in the lightcurve not accessible from North America.

A full report of our findings is published here: Minor Planet Bulletin, Jan-Mar 2013, Vol 40-1, 25-26.

Aided by lightcurves, and especially by the astrometry provided by MPC observatories, astronomers at NASA's Goldstone Planetary Radar (part of the Deep Space Communications Complex in California) successfully detected the asteroid on September 13th and 15th. An image from the Goldstone observations can be found here: 2012 QG42 Radar Observation.

Goldstone and the Arecibo Observatory in Puerto Rico are the world's two primary facilities used for planetary radar astronomy. Asteroid Radar Research.



Partial lightcurve from the Indian Hill observations

NOTES & NEWS

CVAS Fiftieth Anniversary

Our feature article, "Cosmology, in the CVAS Era", is the first in a series by Tony Mallama written for the club's fiftieth anniversary. The articles will appear this year in consecutive issues of *The Valley Skywatcher.*

The CVAS was founded by Tony Mallama and George Gliba in 1963. Details about the club's growth in the early days, and the individuals who shaped its development, can be found in Tony's 1988 article We Observe, available on our website. Though Tony moved to Maryland long ago to work at NASA's Goddard Space Flight Center, and George followed some years later, today they both continue to maintain a strong interest in the CVAS.

Over the years, Tony has written many articles which have been published in scientific journals such as *Icarus, The Astrophysical Journal,* and *Journal of Geophysical Research*, as well as *Sky & Telescope*. Covering a wide range of topics, some of these studies have been based in part on observational data obtained by other CVAS members. George is an avid meteor observer and an active leader in the Goddard Astronomy Club, and is currently the editor of *Nebula* the club's newsletter. For many years he has been a regular contributor to *The Valley Skywatcher,* and other publications.

As the membership in the CVAS continues to grow, our group displays an increasing array of interests and skills. We continue to work hard to meet the goals which were established with such remarkable vision so many years ago. These include the promotion of public education in astronomy, the continuation of useful research, and the preservation of unpolluted skies for future use of both the astronomer and the general public.

The Start of The Valley Skywatcher

The Valley Skywatcher has been the official publication of the CVAS throughout the club's history. While we celebrate our fiftieth anniversary this year, it is interesting and fun to look back to the first few issues. An excerpt from Tony Mallama's article We Observe describes how the publication got started.

> **"The club newsletter first appeared in September 1964, under the title Official CVAS Bulletine (sic). This was a one-page editorial marvel that was typed and re-typed with two carbons until there were enough copies for all the members. George wrote the feature article entitled "Comet Fear?" for issue number 2 in October. Then we combined on a five-page extravaganza Christmas issue, and changed the name to the Valley Skywatcher. In January 1965, Don Henning's older sister began mimeographing the Skywatcher, and it jumped to 14 pages in length."**

The first four issues described above have been preserved on our website and can be found here:

Volume 1-1 (Sep 1964)
Volume 1-2 (Oct 1964)
Volume 1-3 (Dec 1964)
Volume 2-1 (Jan 1965)

Talks and Presentation

Tom Curtin, Executive Director of the Geauga County Park System, spoke at our November membership meeting about plans for the Nassau Station, and provided information about the park district's levy which appeared on the November ballot.

Also at our November meeting, Matthew Dolloff, Lead Project Engineer with NASA's Electrical Power Systems, discussed radioisotope power systems and how this technology is being used in the exploration of the solar system. He showed videos and pictures from missions which have used this type of power.

NOTES & NEWS (CONT.)

Recent Articles Published in Peer Reviewed Journals

Two new articles by CVAS member Tony Mallama were published in *Icarus* during 2012. "Improved luminosity model and albedo for Saturn" appears in volume 218, and "Cloud band variations and the integrated luminosity of Jupiter" appears in volume 220.

The Jan-Mar 2013 issue of *The Minor Planet Bulletin* includes the article "2012 QG42: A Slow Rotator NEA" which is based in part on photometry obtained from images recorded at Indian Hill Observatory.

Full references to these articles (and many others) can be found on our Scientific Activities webpage.

Special Observing Opportunities in the Winter Sky

- Jupiter will be 0.8° from the 9-day old Moon on January 22. The Moon occults the planet for observers in parts of South America. 2013 is one of the rare years during which Jupiter does not reach opposition. The last opposition was in December 2012, and will not occur again until January 2014.
- Near-Earth asteroid 2012 DA14 will pass the Earth at only 28,000 miles on February 15 around 20 UT. At that time the asteroid will be 8th magnitude and zipping along at a rate that covers the diameter of the Moon each minute. Unfortunately, North American observers will have to wait a few hours for the asteroid to rise, and by then it will have faded to roughly 11th magnitude, and slowed considerably. It will still be very close, however, so topocentric coordinates will be an important observing reference, especially when the object is at low altitudes.
- The Moon will be very close to the first magnitude star Spica on March 1. An occultation occurs for Latin American observers.
- A potential Great comet, C/2011 L4 Pan-STARRS, will move into our skies in March. It reaches perihelion on March 10, and continuing north, it crosses the celestial equator on March 12 and the ecliptic on March 13. The comet could become as bright as magnitude 0, but that is far from certain. Fading rapidly, the comet will move through the Milky Way in Cassiopeia, and will pass within 5° of the north celestial pole in late May. But by that time, a telescope will probably be needed to see it.

REFLECTIONS

When I Heard The Learn'd Astronomer

When I heard the learn'd astronomer,
When the proofs, the figures, were ranged in columns before me,
When I was shown the charts, the diagrams, to add, divide, and measure them,
When I sitting heard the astronomer where he lectured with much applause in the lecture room,
How soon unaccountable I became tired and sick,
Till rising and gliding out I wander'd off by myself,
In the mystical moist night-air, and from time to time,
Look'd up in perfect silence at the stars.

By Walt Whitman, 1865

Editor's note: This famous poem was written one hundred years before the CVAS began, and appeared in the January 1965 issue of *The Valley Skywatcher.* It is reproduced here in recognition of the club's anniversary.

Constellation Quiz

By Dan Rothstein

This month's questions:

1. The nebula surrounding this star, which was first observed by Sir John Herschel, he called the Keyhole. What star is it?
2. What is this modern constellation that Aratus called Deltaton?
3. "Napoleon's star" is not actually a star. What is it?
4. Which two Greek constellations formed the outstretched right hand (along with the shoulder and arm) of the Pleiades? The left hand is found in Cetus.

Answers to last issue's questions:

1. The northern and southern gates are the constellations of Cancer and Capricorn, the locations on the ecliptic where the sun was located on the summer and winter solstices in ancient Greek times. These were the sun's extreme northern and southern declinations, indicating the entry of the northern hemisphere into the summer and winter seasons, thus the designation as gates.
2. The second knot (of four) translates into Latin as Nodus Secundus, the star designated as δ Draconis, the star at the second convolution of Draco.
3. As far back as Roman, and at least until Elizabethan times, it was common to invoke the twins of Gemini. This has been corrupted into the saying of "By Jiminy."
4. The region which we know as Grus, the Crane, was originally included in Piscis Austrinus by the Arabs. It was renamed by early Spanish explorers as the Flamingo (Phoenicopterus), whose bill was striking at the fish. In England it was known as the Bittern. Grus formed a gentle curve southwest from Fomalhaut. In the 1590's, the early Dutch explorer Peter Dirckszoon Keyzer renamed much of the south polar regions after birds, many of which were accepted into Bayer's list of constellations published 20 years later, including Grus. The star which became α Grus bore the name of "The Bright One," is a conspicuous 2.2 magnitude red star marking the body of the bird.

The CVAS Today

The CVAS website has information about upcoming astronomy events and activities in our area. There is a host of astronomy related information, and links to interesting and useful sites. Send comments and suggestions to the webmaster, Russ Swaney, russ_swaney@ameritech.net

The Valley Skywatcher has a long tradition as the official publication of the Chagrin Valley Astronomical Society. All material in this issue has been written and provided by individuals within our membership community. CVAS welcomes astronomy related contributions from all members and friends, and this journal provides a unique opportunity to share interests. Published quarterly, the next issue will be available near the end of March. If you would like to contribute material to the publication please contact the editor, Ron Baker, rbaker52@gmail.com

Recent issues of *The Valley Skywatcher* are available on our website here.