Newsletter of the Pomona Valley Amateur Astronomers

We're in a giant car heading towards a brick wall and everyone's arguing over where they're going to sit.

David Suzuki

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Vice-President's Message

I would like to start off by reminding you that the opportunity to become President of this great Club for a year is still available to all members in good standing. Just let anyone on the Board know of your interest and they'll be glad to answer any questions you may have and start the wheels in motion so you can be considered by the membership for this post.

We have many events coming up during the next few months and hope to see many of you at many of them! Let's start with October. Saturday the 9th will be a Star Party at a brand new location and with a new set of people. We are joining the High Desert Astronomical Society at Afton Canyon. It should be a fun event at a dark sky site and a chance to meet more of the astronomically inclined. See an article on the event later in this newsletter.

Next up on Tuesday the 12th from 7 – 9 PM is our popular quarterly visit to the Main Branch of the Ontario Library. We regularly draw a large crowd of people who enjoy the views of the moon and planets we are able to show then even under the outdoor lights at the Library located just to the east of Euclid Ave.

We finish the month with a departure from our evening-centric habits. The Club will again be setting up solar scopes near the Claremont Metrolink Station on Saturday, October 23rd from 9am – 5pm during the city's Village Venture event. This Craft/Fall/Food/Halloween festival draws thousands of people to the Claremont Village area and it's a great opportunity to share details about our closest star with people of all ages. Join the Club with your own scope, your knowledge of the sky, or just your good company.

While still months away, we'd also like to get another item on your calendars since December can be a busy time of year. The Club's annual Holiday Party will be held at Sizzlin' Skillets restaurant on Foothill Blvd in Upland on Friday night, December 10th from 6 – 9 PM. You may order any item off their extensive menu at your own cost and guests are welcome. While details are still being ironed out, we usually have raffle prizes for all so please let Ludd or Bill Connelly know if you plan to attend and we will plan accordingly.

Lots of fun stuff coming up, in addition to our usual monthly lectures. Please join us!

Joe Hillberg

PVAA Officers and Board

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The World's Largest Telescopes, Part 4: BTA-6

This is the fourth installment in a series on the largest single-aperture optical telescopes through history, starting at the present and working backward. Part 1 (Nightwatch, May 2010) covered the 10.4-meter Gran Telescopio Canarias (GTC), and Parts 2 and 3 (Nightwatch, June and August 2010) covered the twin 10-meter telescopes at the W.M. Keck Observatory. The GTC and Keck telescopes all have a lightweight primary mirror composed of dozens of thin glass segments that are formed into single functional mirror by computer-controlled actuators. This month we travel back to another era of telescope construction, when the only option for constructing a big mirror was to cast a solid disk of glass.

The story of the BTA-6 began in the 1950s when the Soviet Academy of Sciences decided that they needed a new, large telescope for cutting-edge deep sky observation. The design committee settled on a 6-meter primary mirror, 20% larger than that of the 200-inch Hale telescope, then the largest in the world. Designing and building large observatory telescopes takes time, especially when a new telescope represents a major technological advance over anything that has come before. And the BTA-6 (Bolshoi Teleskop Alt-azimutalnyi) included two such advances: the primary mirror, larger than any that had been cast before, and much larger than anything that had been attempted in the USSR, and an alt-azimuth mount, the first of its kind for a large observatory telescope. The BTA-6 saw first light in 1975 and was declared fully operational in 1977.

From the beginning, the BTA-6 was a disappointment. The original mirror had cracks so large that they were covered with black cloth. Data are scant but it seems highly unlikely that a cracked surface could have been finished to a high degree of accuracy. A replacement mirror was installed in 1978, but it did little to banish the scope's gremlins. Like the original primary, the replacement mirror weighs an astonishing 42 tons, almost three times the weight of glass in either the Hale telescope (14.5 tons) or the Keck telescopes (14.4 tons apiece). The thermal inertia of this incredible piece of glass is so great that the mirror can only tolerate a daily temperature change of 2º C a day, and a temperature differential between the mirror and the outside air of 10º C, to retain an optically useful figure.

Temperature problems with the mirror are compounded by the thermal inertia of the vastly oversized dome. The telescope itself is 26 meters long and has a moving mass of 650 tons (roughly 1.3 times that of the Hale telescope, and more than double that of either Keck scope). Despite the compact alt-azimuth mount, the 1000-ton dome has a diameter of 48 meters and the gap between the end of the telescope and the inside of the dome is never less than 12 meters. Full-time refrigeration of the dome has been required for acceptable performance of the telescope.

The site of the telescope is also suboptimal. The great observatory centers of the free world are located on mountaintops on the eastern shores of oceans (Southern California, Chile, Australia) or on oceanic islands (Hawaii, Canary Islands). The former USSR did not encompass any such mountains. During the design process, the Soviet Academy of Sciences dispatched 16 expeditions to potential sites across the USSR. Some mountains in Central Asia were found to have excellent conditions for astronomical observing, but they were too remote for the construction of a major observatory. Logistical demands forced the Academy to choose a site closer to home. The final site, Mount Pastukhov in the Caucasus, is downwind of several higher peaks, which causes highly unpredictable turbulence. In general, observations can only be made on fewer than half of the nights in any given year. The telescope has occasionally achieved a resolution better than 1 arc-second, but 2 arc-second resolution is considered good. By comparison, the smaller Hale telescope has achieved resolutions close to its theoretical limit of 0.025 arc-seconds, almost 20 times better than the best resolution of the BTA-6. Accordingly, the scientific output of the telescope has tended toward spectroscopy and speckle interferometry, where resolution is less important than sheer light grasp.

Given the poor service record of the BTA-6 and its modest increase in size over the 200-inch Hale telescope, it is tempting to speculate that its design and construction was inspired more by Cold War one-upsmanship than by an earnest desire to advance astronomical science. But this is perhaps unnecessarily harsh.

George Hale's first telescope, the 40-inch Yerkes refractor, was only slightly larger than the 36-inch Lick refractor that came before it, but it had been a target of opportunity; Hale only bought the doublet objective because it was available. All of his later telescopes--the 60-inch and 100-inch reflectors at Mount Wilson and the 200-inch telescope on Palomar Mountain--represented an increase in aperture of 50-100% over the previous instrument. In each case, the increased light grasp was desperately needed by astronomers who were literally pushing back the boundaries of the observable universe. The same ambitious program of expansion has also been followed by later flagship telescopes built in the US--the twin Keck telescopes have twice the diameter of the 200-inch Hale telescope, and the Thirty-Meter Telescope (TMT), currently under construction, will triple the diameter of the Keck scopes. Why, then, had the Soviet Academy of Sciences opted for a 6-meter scope, only 20% larger in diameter than the Hale telescope, instead of the 7.5-10 meter instrument that large telescope evolution would have predicted? There are at least three potential reasons why the Soviets didn't build an even larger instrument, and why the BTA-6 has had such a troubled history: existing technological limits, lack of experience, and lack of support.

Technological limits: As early as the 1920s, Francis Pease at the Mount Wilson Observatory had sketched designs for a 7.5-meter (300-inch) telescope, and at one crucial juncture in the funding of "the big telescope" Hale had been forced to choose between a 200-inch telescope and 300-inch one. Hale went with the 200-inch design, which was already extremely ambitious and near the limits of what pre-World War II technology could accomplish. Six meters is about as big as a solid glass mirror can be without deforming unduly under its own weight as it is slewed to different altitudes. The numerous 8-meter (320 inch) and larger single-piece telescope mirrors built in the 1990s and 2000s are deliberately thin and deformable and rely on computer controlled active optics to maintain an accurate shape. That wasn't an option in the mid-20th century; computers were getting

How Does It Work?

There are only three bodies in our solar system which can present us with a crescent illumination image – Mercury, Venus and our moon. If one draws a line from the sun to the body, the angle from that point must be a right angle for the illuminated area to be exactly half of the body. A larger angle gives us a crescent. For Mars, asteroids, and the other planets the angle is too small to notice the dark edge when it occurs.

Eyeball astronomy has been one of my interests for many years. Around 300 B.C. astronomers were using the unaided eye in China, Egypt, Meso-America and elsewhere to discover many things that were rediscovered much later with sophisticated instruments. One example is the Greek astronomer, Aristarchus of Somos.

Apparently the original work has been lost and the story has been reconstructed from other works which we have from Archimedes and others who lived at roughly the same time. Other accounts might report different numbers. Details are conflicting.

First it was noticed that in southern Egypt a vertical pole did not cast a shadow twice a year when the sun reached the zenith. Then another vertical pole was placed in Alexandria, in northern Egypt. On the day when the southern pole cast no shadow, the pole in Alexandria produced a shadow whose angle was measured at 7 degrees.

Astronomers had suspected that the earth was round, just like the moon and sun. We aren't sure of the conversion factor, but the distance between poles was about 470 of our miles. Multiply by 360/7. That gives about 24,000 miles for the circumference.

Aristarchus observed an eclipse of the moon and postulated that it was caused by the earth's shadow. By carefully drawing the image, he concluded that the earth to moon ratio must be 3/8. The diameter of the moon would then be about 3,000 miles. According to Archimedes, Aristarchus estimated the angle of the moon to be ½ degree. Therefore the distance to the moon must be about 340,000 miles. Next he recognized that at the instant of a half moon, the angle from earth to moon to the sun was a right angle.

Pythagoras and other Greek mathematicians were having a wonderful time with the right triangle. If Aristarchus could only get the angle between the moon, earth and sun at the instant of a half moon, he could estimate the distance to the sun. But the time was critical. He apparently took many measurements and then selected a value.

He didn't believe his numbers, there were many sources of error. So he acted conservatively and concluded that the distance to the sun was about 18 to 20 times the distance to the moon, or about 6 million miles. This was the first record of a "heliocentric theory." The amazing thing is that he had only rudimentary equipment and his own eyes.

Knowing the distance to the sun, the same method can be used today to measure the distance from Earth to Venus or Mercury at the moment we see a "half Venus" or "half Mercury." Measure the angle from the planet to the earth to the sun using a clock.

Ken Crowder

The World's Largest Telescopes, continued

good enough to point a telescope on an alt-azimuth mount, but did not yet have the speed and processing power to continually adjust the shape of a mirror to the tolerances required for astronomical research.

Lack of experience: Hale and his team had a record of proven successes with the 60-inch and 100-inch reflectors at Mount Wilson when they took on the challenge of designing and building the 200-inch telescope. The Soviets had no similar experience to draw on. Hale had shown that it was possible to build a working telescope around a 5-meter mirror. The Soviets may have felt that a 6-meter telescope was an acceptable risk, whereas a 7.5-10 meter scope would be a true leap into the unknown.

Lack of support: The 200-inch Hale telescope was really the first "Big Science" project undertaken in the United States, comparable to a modern supercollider or orbiting observatory in terms of the national effort behind its construction. This is conjectural, but the Soviet Academy of Sciences almost certainly did not enjoy the same level of external commitment in building their big telescope. At the time the scope was designed, even the Soviet space program was limping along on a starvation budget, high-profile propaganda victories notwithstanding. Even after the telescope was operational, it rarely had up-to-date instruments that could have taken full advantage of its raw light-gathering power.

None of this is to say that the BTA-6 is useless, or has not done valuable work. But it has fallen far short of expectations. Conceivably the BTA-6 could have been a world-beating, generation-defining instrument, like the Hale telescope that preceded it or the Keck telescopes that came after. With better optics, better thermal performance, a better site, and better instruments, it might have become the world's premiere astronomical instrument. Instead it is little more than a historical curiosity, proof that a functional telescope requires much more than a piece of glass, a mount, and a dome.

For more information on the BTA-6 from someone who has actually used it, I can't recommend Bill Keel's webpage (http://www.astr.ua.edu/keel/telescopes/bta.html) highly enough. I also relied on J.B. Zirker's *An Acre of Glass: A History and Forecast of the Telescope*, published in 2005 by Johns Hopkins University Press. The Russian Academy of Sciences also maintains a page on the telescope (http://w0.sao.ru/Doc-en/Telescopes/bta/descrip.html .

Mathew Wedel

The current accepted sizes are:

Moon :
Diameter - 2160 miles.
Equatorial Circumference - 24,901 miles
Polar Circumference - 24,859 miles

Avg distance to Moon - 238,000 miles

Avg distance to Sun - 93,000,000 miles

What's Up? Percy And His Ghoul

The mythic hero represented by the constellation Perseus has recently been in two movies. As Perseus in Clash Of The Titans, and as Percy in Percy Jackson And The Olympians: The Lightning Thief. This shows Percy as a high school nerd who is delighted when Pierce Brosnan (as a Centaur) appears to tell him he's a demigod with superpowers and a quest. He jumps into his pickup truck with his girl Anna (Andromeda) to challenge Medusa the ghoulish Gorgon. Medusa (Uma Thurman) is quite the femme fatale with designer sunglasses to cover those eyes that turn you to stone. But, as legend demands, her snake covered head is chopped off by a sword which pops out of Percy's magic ballpoint pen. While Perseus is usually flying on Pegasus, the kid Percy revives the alternate transport of winged sandals (actually winged running shoes). Based on popular novels, this lightweight version is the first of Percy's adventures hoping to rival Harry Potter.

In astronomy, Medusa's severed head in the constellation of Perseus is represented by the "demon star" Algol (The Ghoul). Since ancient times Algol has always been the most obvious of all variables. Algol is usually a 2.1 magnitude star, but every two days it drops to 3.4 for 10 hours. This happens when a dim orange giant star passes in front of a smaller but very bright sun-like star. Long studied, it wasn't until 1881 that Harvard astronomer Edward Pickering presented evidence that Algol was an eclipsing binary. Matter from the larger dying giant passes to the small bright one since they are separated by only five percent of the distance between Earth and the Sun. This could lead to a supernova explosion. Although it has given its name to the Algol class of eclipsing variables it remains a "demon star" in all cultural myths. The Hebrews call it "Satan's Head" and the Chinese " piled-up corpses." Just below Algol is Rho Persei, another variable called a lesser "gorgon" star. Rho Persei is a different variable than the eclipsing Algol. It's a dying giant that varies irregularly as it burns up its own mass and collapses.

Near Algol, in the other foot of Perseus, is the dim California Nebula that appears in many astronomical calendars. Near Perseus' head are two other calendar favorites, the Little Dumbbell planetary nebula (M76) and the Perseus Double Cluster (NGC 869 & 884).

The Double Cluster is one of the brightest of open clusters. It was first catalogued in 130 B.C. by the Greek Hipparchus. When telescopes improved in the 19th century, astronomer William Herschel wrote a study of both clusters and praised their beauty. The clusters are about 7,000 light years away and are seen as the jeweled handle of Perseus' magic sword.

Perseus' brightest, but less notorious star is Mirfak (Alpha Persei). which means "elbow" in the Arabic language that names many stars. It sits in the middle of an another wide open cluster, Melotte 20.

Perseus is also the radiant for the famous Perseid meteor shower which falls from the debris path of comet Swift-Tuttle. This shower is visible from mid July to mid August each year. It has been observed for over 2000 years and is called the "tears of St. Lawrence" by Catholics who recognize his martyrdom in August. The rate of meteors can reach 60 or more an hour if you're lucky or pray to St. Lawrence.

Just below Perseus in Taurus is the very brightest of all open clusters, the Pleiades, or Seven Sisters (M45). This is the only cluster where all the naked eye stars have individual names. They are those of the Seven Sisters and their parents. The cluster also has at least 500 fainter stars and is spread over four times the diameter of a full Moon. It contains blue-colored reflection nebulae among the stars. Some of the Pleiades rotate so rapidly that they must be oddly oblate spheroids. Relatively close for a star cluster, the Pleiades are about 440 light years away.

The earliest known star map of the Pleiades is a remarkable bronze age "sky disk" from 1600 B.C. which also shows a sun and moon. The Pleiades are known in the legends of many cultures, usually as young women, birds or small creatures gathered closely together for self-protection. The Japanese call them Subaru, a name given to an auto company and a huge telescope on Mauna Kea in Hawaii.

Below Perseus is Aries (the Ram), always number one in astrological lists of Zodiac constellations. It is often associated with the legend of Jason and the Argonauts in their search for the Golden Fleece. Of interest is Mesarthim (Gamma Arietis) a wide double star and the foremost in the "Ram's Horn" of three stars. It was the first double star (actually a triple) to be carefully studied by an astronomer, Robert Hooke in 1664.

Close by in the foot of Andromeda is another dazzling double star. It's Almach (Gamma Andromedae), an orange giant with a blue companion like charming Albireo in Cygnus.

So while we breathlessly await the next Percy And The Olympians movie to be released, we can freely view the many star studded universal shows that shine around the constellation of heroic Perseus .

Lee Collins

Club Events Calendar

September 24, General Meeting - Dave Kary
"If It's Tuesday This Must Be Venus"
October 9, Star Party - High Desert Club at Afton Canyon
October 12, Star Party – Ontario Library, Main 7–9 PM
October 21, Board Meeting
October 22, General Meeting - Robert Piccioni -
"Einstein for Everyone"
October 23 Claremont Village Venture 9-5pm
November 6, Star Party
November 11, Board Meeting
November 19, General Meeting - Gene Serabyn of JPL
December 4, – Star Party
December 10, Holiday Party - Sizzlin' Skillets - 6-9pm
January 11, 2011 – Main Branch, Ontario Library, 7 – 9 PM
January 21, 2011, – General Meeting
February 18, 2011, – General Meeting
March 18, 2011, – General Meeting
April 15, 2011, – General Meeting
May 13, 2011, – General Meeting

Bind Individuals Continue To See The Universe

Since 2004 PVAA has conducted Project Bright Sky. This project brings visual and tactile astronomy to individuals who are blind

We are often asked how can an individual who is blind see and enjoy the universe. Here are some frequently asked questions that address some of those questions.

What is legally blind?

If your vision acuity with correction is 20/200 or worse; or if your peripheral field is limited to a diameter of 20 degrees or less you are considered legally blind.

How can a person who is legally blind see through a telescope?

The secret is the light gathering power of the telescope. Millions of individuals who are legally blind have some remaining vision. In order to see and enjoy the universe these individuals need the proper optics. Amateur astronomers have the optics needed, telescopes

Do you need special telescopes to provide star parties for individuals that are legally blind?

No, almost any telescope from 60 mm on up will work. Refractors, Newtonians, or Schmidt Cassegrains are fine.

Are there only certain astronomical objects which observers who are legally blind can see?

Yes and no. Through a telescope, those who are able to detect light, are able to explore the moon, make out Jupiter and some of its moons, and be startled by Saturn's rings. To see deep sky objects these observer need extra equipment.

Through a telescope people with normal vision see deep sky objects as "faint fuzzies." How can persons who are legally blind see these deep sky objects that are so faint?

The same way as a sighted person, with vision enhancing equipment. By projecting digital or video images of deep sky objects from a telescope to a TV monitor, you will find the results to be stunning.

By transmitting real time images of deep sky objects, from a telescope to a TV, what will a person who is legally blind, but can still detect light expect to see?

Recently a person with vision so impacted, that she could not read print on paper, was able to see and describe the dust lanes of the Sombrero galaxy. This observer was using an 8 inch SCT telescope connected with an astro video camera which was transmitting to a 12 inch black and white TV monitor. This observation took place in a city environment.

Are there any additional benefits for a person who is legally blind in using digital or video transmissions to a monitor when observing the universe?

Yes, the observer is much more comfortable. Some persons who are legally blind will find it very difficult to use an eyepiece. Additionally the observer is in total control of the brightness and contrast functions found on the monitor allowing him to adjust the image being observed to suit his vision acuity.

So what is best for Individuals who are legally blind? Observing through a telescope or observing telescope images transmitted on a TV monitor?

The connection one gets to the universe when observing through a telescope cannot be duplicated by observing on a TV monitor. Solar system objects are best observed through an eyepiece on a telescope. Deep sky objects are best observed as electronic images transmitted to a TV monitor. Both systems should be available at your star party.

How about totally blind individuals, should they be discouraged from attending a star party?

Absolutely not, although totally blind individuals cannot perceive light or movement, through hearing these individuals are able to create mental images of the objects being talked about at the telescopes. All our telescope operators are encouraged to use words rich in imagery when talking about astronomical objects.

Are there certain age individuals who will benefit from a star party for individuals who are blind?

Since 2004 Project Bright Sky has been conducting free star parties for individuals who are blind who ranged in ages from 6 – 80 years of age.

Contact Project Bright Sky for more information on how you can take part in this unique form of astronomy outreach.

Frank Busutil
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Project Bright Sky
Visual Astronomy For Blind Individuals

Top 10 Summer Objects to See Before Fall

There are still some cosmic objects that skywatchers equipped with a small telescope, binoculars, or their own eyes can see. The list is, of course, very subjective, but here is Joe Rao's top 10 list of summer sky objects to try and see before they are gone.

10) The Cowboy Boot: This star arrangement appears in the constellation Vulpecula, the Little Fox, which on most charts seems to be nothing more than a formless splattering of dim stars. The Astronomer Hugh Rice, who over more than a half century ago used to work at the New York's Hayden Planetarium, showed part of this group on his star maps which resembled a cowboy boot. The boot even boasted a spur like many cowboys wear.

9)The Dumbbell: Sighted in wide-field binoculars or a telescope's viewfinder, the cowboy boot pattern helps locate the beautiful Dumbbell nebula (M27) Picked up with very low power as a glowing bubble encompassing two hazy patches of light. It has a Dumbbell appearance in larger telescopes.

Point of interest, the name Dumbbell was given from the description of Rev. T. W. Webb (1807-1885) of two hazy masses in contact. Also looking in this area you can also find the Arrow (Sagitta) and Job's Coffin, a lozenge-shape pattern of four stars that represent Delphinus, the Dolphin.

8) A Ghostly Doughnut: The little constellation of Lyra is suppose to represent Apollo's Harp. Six fainter stars form a little geometric pattern of a parallelogram attached at its northern corner to an equal-sided triangle. Vega gleams at the western part of the triangle. Tucked in this region is the acclaimed Ring nebula.

The sky map shows the location of the Ring nebula in the Lyra constellation. The nebula shines at a magnitude of +8.8 and is far too faint to be seen with the unaided eye. Any good pair of binoculars will locate it, though it will look almost star-like in appearance because of its small apparent diameter.

The ring shape might just begin to become evident to most eyes in small telescopes using a magnification of 100-power, although at least a 6-inch telescope is recommended to see the ring clearly.With a larger instruments and higher magnifications, the ring appears distantly as a tiny ghostly doughnut.

7) Draco the Dragon: Draco, which during the late evening hours is riding high above Polaris, the North Star. The sky map shows the location of the constellation Draco in early September. Draco is a very ancient star grouping and the earliest Sumerians considered these stars to represent the dragon Tiamat. Later it became one of the creatures that Hercules killed. One of Draco's task was to guard the garden of Hesperides and its golden apples that Hercules was suppose to retrieve. As Draco coils around Polaris you can see Hercules standing upside down on Draco's head. The dragon's head is the most conspicuous part of Draco, which is an irregular quadrangle, not quite half the size of the Big Dipper's bowl. The brightest star is Eltanin, a second magnitude star which shines with an orange tinge. As of interest, a number of temples in Ancient Egypt wore oriented toward this star. Also the faintest of the four stars in the quadrangle is worth looking for is Nu Dranconis, which is a wonderful double-star for very small telescopes. The two stars are practically the same brightness both appearing just a trifle brighter than fifth magnitude and separated by just over one arc minute (or about 1/30th the apparent diameter of a full moon).

6) The "Double Double" Star: Back into the constellation of Lyra once again, this time for a look at another double-star. In fact, you could almost call this one "Nu Draconis squared." Epsilon Lyae better known as the "double-double" star is exceptionally good vision on a clear, dark night. Epislon as undoubtedly two tiny stars which are designated Epsilon 1 and Epsilon 2 that are very close together. The separation is approximately one-ninth the apparent diameter of the full moon. Binoculars will make the two stars clearly visible, but if you train a small telescope on them, then each of the tow stars are shown to be double stars. So what might appear as a single speck of light in the sky, we have a system of four stars, revolving about each other. The tow stars that make up Epsilon 1 take at least several hundred years or more to orbit each other. An even longer interval of nearly a thousand years has been given to the two stars that make up Epsilon 2. Both pairs of stars appear to be revolving about each other and have a common center of gravity with a period that probably is on the order of a million years or more.

5) The Wild Duck: Several clouds of stars surrounded by a few dark regions for contrast can be seen with binoculars in the bright area of the Milky Way, which is halfway between the star Altair and the constellation of Sagittarius. Four faint stars in a stretched out diamond are about all that is visible of Scutum, the Shield. One of the Milky Way's great star clouds is also within Scutum. Near the Northern star of the Shield is the 11th entry in Charles Messier's famous cataloged of "fuzzy" objects masquerading as comets. Messier 11 is one of the richest and most compact of galactic clusters, described by one experienced observer as resembling "a flight of wild ducks."

4) A Cosmic Chrysanthemum: This is most likely celebrated object in the summertime skies. This great cluster in Hercules, is also known as M13. Anyone who has visited the summer gathering of amateur astronomers near Springfield, VT., known as the Stellafane, know that this famous cluster is often displayed in the observatory that houses the Porter Turret Telescope. To locate the M13, look toward the four stars, known as the "Keystone," which supposedly forms the body of Hercules. It's between the two western stars of the keystone that we can find the Great Globular Cluster of Hercules about a third of the way along the line drawn from the stars Eta to Zeta. The sky map shows the cluster's approximate position.

Actually, it was not Messier, but Sir Edmond Halley (of the comet of fame), who first mentioned it in 1715, having discovered it the previous year. Halley made wrote the comment that is shows itself to the naked eye when the sky is serene and the Moon is absent. If you use good binoculars and look toward that spot in the sky where M13 is you likely will see a similar view. A roundish glow or patch of light. If you use a telescope, the view becomes even better, with a 4 to 6 inch telescope the patch starts to become resolved into hundreds of tiny pinpoints of light. In a larger instruments, M13 is transformed into a spectacular celestial chrysanthemum.

3) The Coat Hanger: Most amateur astronomers have heard of such beautiful open star clusters as the Pleiades, Hyades and

PATS 2010

Several PVAA members took advantage of the club's discount ticket offer to attend the 3rd annual Pacific Astronomy and Telescope Show. PATS is a great place to pick up telescopes, astro images, astronomy related clothing, and other astronomical equipment. Especially appreciated by PVAAer's were the bargains on eyepieces.

This year I was mostly interested in hearing the speakers. And the organizers of PATS did not disappoint. As in years past, the speakers were top notch.

We learned about the Cassini Mission to Saturn from Dave Doody, the Realtime Flight Operations Lead Engineer at Jet Propulsion Laboratory.

Wolfgang Promper showed and told us about his marvelous astro images and Gary Palmer presented his amazing Solar imaging work. If you've never seen these two gentlemen's work, you should go to their websites: http://www.astro-pics.com/ and http://thesuninmotion.com/. You are in for a real treat.

Mike Simmons spoke about the important work of his organization, Astronomers without Borders.

Robert Naeye from Sky and Telescope told us about the important contributions that amateur astronomers can and are making in the discovery of exoplanets. A few years ago, who would have thought that amateurs could do such cutting edge science.

Dave Jurasevich, Superintendant of the Mount Wilson Observatory spoke on the observatory's 100 year history of scientific discoveries. He also told us of its continuing contributions to science and plans for the future.

We learned about "Habitable Worlds and Life in the Universe" from the champion of exoplanet discovery, Geoff Marcy. He discovered 70 of the first 100 exoplanets and has more exoplanet discoveries under his belt than anyone else.

I enjoyed and learned from all the presentations, but if I had to choose just one, my personal favorite presenter was Alex Filippenko. His presentation was titled "Hearts of Darkness: Black Holes in Space." Some there compared Alex Filippenko to Carl Sagan in his ability to communicate the ideas of science to a general audience. While he is a brilliant scientist, Filippenko is funny and entertaining while getting his points across. I highly recommend that you jump at the chance if you ever have an opportunity to hear him speak.

Ron Hoekwater

Top 10 Summer Objects continued

the Beehive; yet few have ever heard of the "Coat Hanger." If you turn your binoculars to the region of the sky, roughly halfway between the bright stars Vega and Altair, you will find a group of stars not too far away from the cowboy Boot of Vulpecula that was in number 9 on the list. The Coat Hanger for some reason is rarely mentioned, if at all, in most popular astronomy books. Yet, it is the brightest of all the star clusters in this part of the sky. However, it only appears as a proper coat hanger only for the Southern Hemisphere observers, where it appears right side up. In a clear, dark sky you might even perceive it with the naked eye as a fuzzy patch of light. It is best with binoculars; even a small telescope with low power will provide too much magnification and will cause the stars to appear too widely spaced apart.

2) Albireo: Blue and Gold: Without question, this is one of if not the most beautiful double-stars in the night sky. It is located in the constellation of Cygnus, the Swan, Albireo supposedly marks the swan's beak. A small telescope or even a pair of steadily held binoculars will readily split Albireo into two tiny points of light of beautiful contrasting colors. The brighter one a rich yellowish-orange, the other a deep azure blue, both placed very close together. A really good can be had with a telescope magnifying between 18 and 30 power. Albireo is believed by astronomers to be a physical pair, although there has never been evidence of any orbital motion between these two colorful stars.

1) Our Milky Way Galaxy: Summer time is undoubtedly the best observe of the Milky Way. There appears to be a great black rift dividing it into to streams, beginning with Cygnus and extending down toward the south. Also in Cygnus is the black void known as the Northern Coal Sack, This Coal Sack and the Rift are not holes in the Milky Way, but rather are vast clouds of dust floating out in interstellar space which presents a solid and impenetrable curtain between us and the more distant stars. Even to the unaided eye, the view is one of beauty. Sagittarius Star Cloud, about 30,000 light years distant, seems to be the nucleus, with the sun and all the outer stars of the galaxy revolving around it at the rate of 155 miles per second. It apparently requires about 200 million of our Earth years to make one complete revolution, or one cosmic year around the center of our galaxy.

This article was found on SPACE.com written by Joe Rao, a Skywatching Columnist

Submitted by ***John Bratton Sr.***

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Dark Sky Quest in Afton Canyon

A deeply dark night sky is a wonder to behold. Diamonds on black velvet. Dim clouds of glowing gases wrapped around dead stars. Uncountable numbers of distant stars forming incredibly distant spirals. And the inky depths are calling HiDAS back to Afton Canyon for a blizzard of galaxies and the camaraderie of a weekend at a slightly further location than where we usually set up shop. Now while the Johnson Road site has many great things to recommend it, the skies just aren't as dark as we can find just a short way down the freeway. If the weather blesses our adventure, this will be the best skies many of us will come across all year, and make no mistake, Dark Skies Rule!

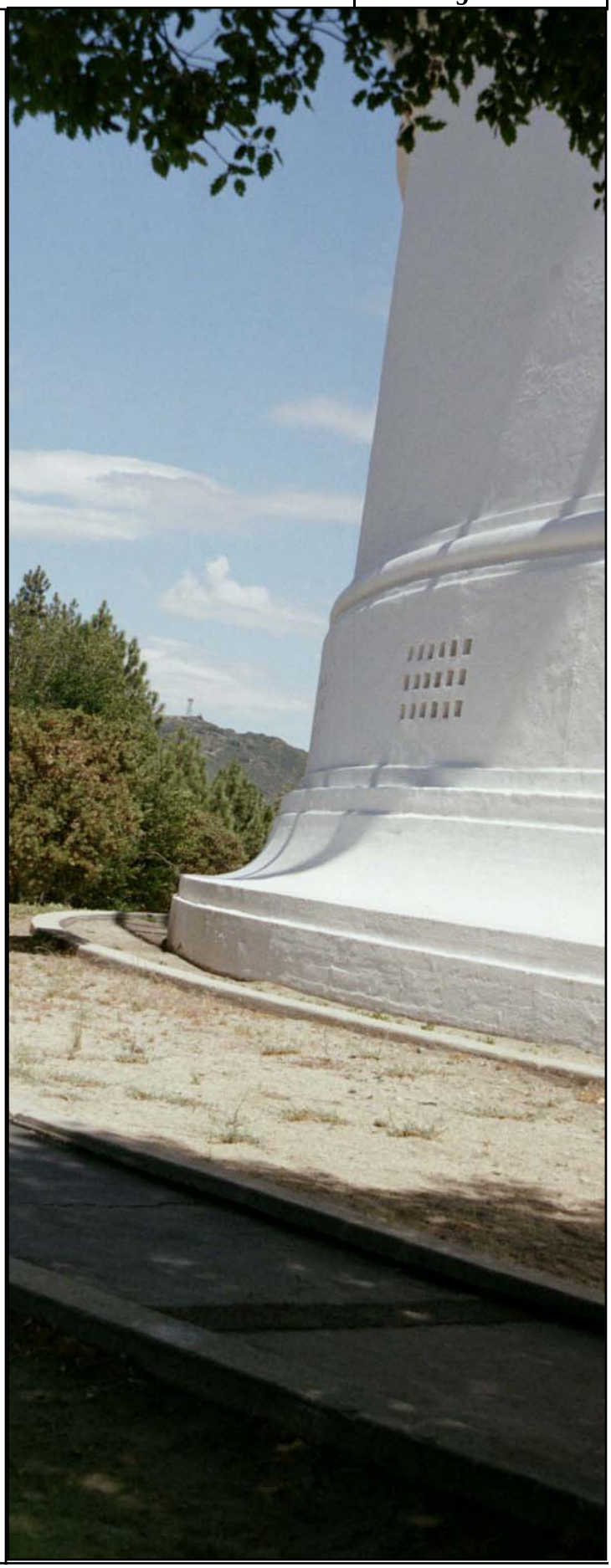
Last fall, when HiDAS was last there, the club membership was well represented. Lots of scopes, lots of good astronomy, but not as many staying the night. Well, this time come early and stay a little longer. It's well worth spending some extra time at such a fine spot, the depth of the darkness allows views with so much more brightness and contrast than we get closer to home. Think of all those springtime galaxies! And the days are perfect for exploring the canyons, napping, and planning the coming night's celestial assault. I love spending a couple of days and nights immersed in this with people of like minds.

Food? Did I mention the food yet? At least for Saturday night we are going to do some sort of hamburger feed, with everyone bringing along some chips, cokes, potato salad or something. Anyone for a bacon cheeseburger? Tony will have more ideas on this, I'm pretty sure. Maybe even breakfast Saturday morning, more incentive to come out for the Friday night observing. Scrambled eggs, bacon, pancakes...mmm!

Now I know camping isn't everyone's cup of tea, but this is a truly great spot for us. Bathrooms, firepits and grills, tables with a shade roof. And there's always some nice motels just back the road in Barstow for those that want to see some special views, but enjoy the creature comforts as well. These trips to Afton Canyon are becoming one of the highlights of our observing year, and you really need to make a plan on joining in on the fun!

Cliff Saucier

Note: Our upcoming Star Party with the High Desert Club is October 9 at Afton Canyon



ERRORS and CORRECTIONS

In adding the pictures in August's article on Afton Canyon, I left out the author's name. Sorry Cliff! - editor