

# S.C.R.A.P.S.

Society's Chronological Astronomical PaperS



## **A View from the Top of the World** **By Mike Littleton**

During a recent vacation to the Island of Hawaii (AKA The Big Island), Jean and I made the journey to the Mauna Kea Observatories. The Big Island is the youngest island in the 100+ Hawaii Island Chain. The islands in the chain were formed from lava flow from a geological hot spot formed by the collision of two tectonic plates. As one proceeds northwest from the Big Island, the islands are older and more weathered. The Big Island has an active volcano, Mauna Loa and a dormant volcano, Mauna Kea. The observatories near the summit of Mauna Kea are at about 14,000 ft.

To get to the observatories, you need a four-wheeled drive vehicle, which can be rented from all the big rental car companies for about an additional \$15/day over a compact car. The road to the summit is really not that treacherous, but solar glare is very bad near sunset. Alternately, there are commercial sunset tours to the summit with astronomical observing for about \$150 per person. You also need warm clothes because



**Subaru, Keck I & II, and NASA  
Infrared Observatories**

temperatures on the summit drop to below freezing shortly after sunset.

The commercial tours provide parkas and gloves. We opted for the commercial tour, but got the tour for only \$60 per person. In exchange for the reduced costs, we had to sit through one of those sales pitches for a timeshare on the island.



**Gemini 8-m Visual/IR Observatory**

The first stop was at the Onizuka Visitor Center at about 9,000 feet. (Ellison Onizuka was a native of Hawaii killed in the Space Shuttle Challenger explosion.) The center offers information on the observatories and public stargazing. We then drove up to the summit. Getting out of

the van, I was a bit lightheaded from the altitude. What a sight—we were above the clouds! The second impression was no

one was there. The domes were open and slewing, but the telescopes were being controlled remotely from lower altitudes via fiber optic cables. After seeing the most beautiful sunset, we crept down the volcanic ash road back to lower altitudes using only the turn signals to light the way. Observing was somewhat of a disappointment because of the presence of the moon. I did glimpse the Omega Centaurus Globular Cluster with binoculars. I would love to return at new moon and stargaze in one of the darkest skies on Earth. For more information on the observatories, visit their website at <http://www.ifa.hawaii.edu/mko/>. **Aloha!**



## **Annual Club Picnic**

Our annual club picnic will be held on Saturday September 8th at 7 PM. The rain date is Saturday the 15th. The picnic is at the Norris Dam State Park. The evening promises interesting discussions, good food and star gazing, if the weather cooperates. Contact Tom Rimmell to sign up to bring food or donating money for food at (865) 983-7834 or email (tomrimmell@cs.com). A map to Norris is posted on the SMAS website. Directions are provided on p. 3.

## ASTRONOMY CORNER ASTRONOMICAL TERMS-REDEFINED

Revived by Janice Erickson

### A "ditty" from past SCRAPs

**Absolute zero** - bank balance at the end of the month

**Apogee** - saying you're sorry

**Ascending node** - a naked person on an up escalator

**Atmosphere** - a dread of Atmos, syn. Atmosphobia

**Azimuth** - pen name of a famous science and science fiction writer

**Bolide** - what the southern belle cried when the groom failed to attend the wedding

**Cardinal points** - gestures made by high officials in the Roman Catholic Church

**Chromosphere** - a common occupational health hazard suffered by auto workers; fear of being chrome plated

**Convection zone** - erogenous area on a cloud

**Cosmic burster** - person dedicated to poking holes in Carl Sagan's theories

**Demos** - de biggest

**Density** - a metropolis of bears; literally a city of dens

**Diurnal** - double facilities in a public restroom

**Duration** (dew ration) - a set portion of moisture

**Dyne** - what you're doing when your heart stops

**Equinox** - equivalent knocks on a door

**Filament** - one of those candies with a soft center

**Fission** - popular past-time usually requiring a rod and reel

**Ganymede** - Beowulf's favorite brand

**Geomagnetic storm** - fantastic magnetic storm; such as, "Gee, Oh, Magnetic Storm"

**Graticule** - what you feel when someone does something for you

**Gravity** - mixture of gravy and tea

**Acceleration due to gravity** - the physical condition that occurs after you spill gravity all over the host's new carpet

**Gravity well** - place to store deep thoughts

**Great Red Spot** - kids call them "zits"

**Io** - intelligence quotient of a person at moron level

**Isobar** - job description of a hillbilly who makes fur coats

**Juno** - shortened version of "did you know"

**Jupiter** - an Israeli occupation dealing with the removal of the inner pits in cherries

**Librations** - vibes that tell you someone is not telling the truth

**Light year** - 347 days

**Lyman series** - a row of Sprite bottles

**Meteorite** - opposite of "me to your left"

**Meteor shower** - an invitation to shower jointly

**Mimas** - my mess and my mess only

**Moon** - popular college age fad

**Orbit** - small amount of crude metal

**Ozone** - the area occurring between N and P; or a basketball defense in which the opposition is encircled

**Parallax** - two deficiencies

**Path of totality** - similar to the Way to San Jose

**Photon** - how much your enemy weighs

**Photosphere** - fear of being photographed

**Planetarium** - place where a philodendron can recover from a nervous breakdown

**Protostar** - (Pro-toe-star) a professional soccer player

**Pulsar** - grammatical error, should be read as "pulse is"

**Quasar** - mentally unstable Russian Leader prior to the Bolshevik Revolution

**Saros cycle** - grief that occurs in show production two weeks before your new planetarium program opens

**Scarp** - stringed instrument that can be worn around your neck

**Semi-major axis** - the point of attachment between a tractor and a trailer

**Shadow bands** - popular musical group led by Lamont Cranston

**Sol** - rhythm and blues theory of astronomy

**Solar wind** - cosmic flatulence

**Space reddening** - cosmic blush

**Spectrum** - a very tiny musical instrument played with even tinier drumsticks

**Sunspot** - Lassie's firstborn; later became the pet of Dick and Jane

**Supernova** - a 6-door sedan planned by GM which never made the market

**Triton** - 3 tons or 6,000 pounds

**Turbulence** - new piece of jousting equipment produced by G.E. Aircraft Engine Division

**Umbra** - half a rain protecting device

**Volcanism** - a physiological state characterized by pointed ears.

## WANTED: AUTHORS FOR SCRAPs-NO EXPERIENCE NECESSARY!

Have you made a modification to your telescope that you are proud of? Find a piece of sky that is overlooked in *Burnham's Celestial Handbook*? Have you just attended the Cleveland Star Stare? Share your experience with the rest of SMAS and potentially anyone with access to the Internet by writing an article for SCRAPs. It doesn't have to be Shakespeare and the SCRAPs editor will clean up the grammar if needed. Contact Mike Littleton at (865) 671-1022 or email [littlen@ix.netcom.com](mailto:littlen@ix.netcom.com).

## CALENDAR

- 9//01 Full Moon
- 9/8/01 SMAS Picnic and star party at Norris State Park
- 9/10/01 Last Quarter Moon
- 9/15/01 Venus rises at 4:54 AM. Jupiter rises at 1:37 AM. Saturn rises at 11:43 PM. Mars rises at 3:35 PM and sets at 12:50 AM.
- 9/17/01 New Moon
- 9/22/01 and 9/23/01 Bays Mountain Starfest
- 9/24/01 First Quarter Moon

### Directions to the Picnic

Take I-75 North to Exit 128. Turn left from the exit and drive 3.5 miles. Turn left into the park and drive 1/2 mile to the second left and turn up the hill. The picnic tables are on the left side of the parking lot.

## September Star Party X2+Fun by John "Sparky" Sparks

Near the zenith lies the Summer Triangle made up of the stars Deneb, Altair and Vega. This area offers some of the best open clusters and nebula in the sky. The three most distant planets in our solar system are well in the sky at sunset. By sunrise, you will be able to see all planets. Rising from the east is Pegasus and Andromeda, giving us our first early views of the Andromeda galaxy and its companions. At the base of the Northern Cross of Cygnus is Albireo, one of the most colorful double stars in the sky. Cygnus also holds other great views for binoculars, telescopes and even naked eye viewing. Our own Shawn Grant discovered an object called Grant #1, it's an asterism of stars shaped like the Christian Fish. Cygnus also holds the Veil nebula, the Blinking Nebula, the North American Nebula and much more. Globular clusters like M13, M22, M8 and many others dot the sky in September but soon it will be difficult to find a globular cluster till next year.

There will be two planned starparties for the month of September and both are very special:

The first Starparty will be on the 8<sup>th</sup> at the Norris Dam observing site from sunset on. We will be near the pool and hopefully, we will get the park to turn off the lights. This is our picnic so if you want to eat, show up around 6:30 or 7:00 PM, RAIN OR SHINE! Paul Lewis will entertain the public and talk about the universe and astronomy for a while, and then it is our turn, weather permitting. This Starparty is centered on public observing and I feel SMAS has a lot to offer. This Starparty is closer to Knoxville Look Rock and is about a 30-minute drive from near downtown.

The second Starparty will be from the 22<sup>nd</sup> to the 23<sup>rd</sup> at Bays Mountain at Starfest 2001 near Kingsport. This is not a SMAS Starparty as much as a Starparty of most of the astronomy clubs within a couple hundred miles of Kingsport. I strongly encourage all of you to go as SMAS often has the largest turnout of any club at Starfest. Starfest is **FAR** more than a Starparty and you will meet a lot of interesting observers like Mike Benson. If you are working on a Binocular observing certificate from the Astronomical League, Mike and I are the ones reviewing your notes. Mike has also earned quite a few certificates himself and hasn't stopped yet. There are many other avid astronomers that attend Starfest and many experiences to share. I still learn something new at Starfest and this will be the sixth time I have gone.

Weather permitting; we will have plenty of opportunities to observe this month. If you can't make one Starparty, you can make the other one. I will try to plan a third Starparty for the Astrofreaks as well. What is important is that you start to learn of the wonders of the sky as well as the wonders of public observing. Most amateur astronomers see but a fraction of what their own telescope is capable of seeing and many never see half the Messiers. I say: "Wear it out, you paid for it!" If you don't wear it out observing hundreds of objects, it's just as good to wear it out while showing a few objects to others. What is important is that you have a good time and I promise you will have a good time attending both of these special events and hope to see you at both! **Clear skies: "Sparky!"**

**The Bays Mountain Starfest 2001: A Space Odyssey** happens September 22 and 23, beginning at 10 am on Saturday 9/22 and ending at noon on 9/23. The featured speaker will be Gayle Riggsbee, a renowned amateur telescope maker from Charlotte, with other presentations planned throughout the event. Pre-registration is by mail only and the \$35 fee must be sent with the registration form by 9/10/01. There are only 90 available slots, so urgency in registration is recommended and priority is assigned by the postmark date of your registration. The fee includes 3 meals and camping or sleeping facilities. And a tee shirt is also included! Solicitations are being made for short talks of 20 minutes or less.

Please go to [www.baysmountain.com/planetdept/planet.html](http://www.baysmountain.com/planetdept/planet.html) and look for the StarFest link for the registration form. There is also observing in Gray, TN on Friday night at the home of Mark Marquette. For more information, you may contact: Janice at [gemsandstones@earthlink.net](mailto:gemsandstones@earthlink.net) or 977-1242 or Mark Marquette, Starfest coordinator - regarding talks - at [marqq@prodigy.net](mailto:marqq@prodigy.net) or 423-477-9406 after 7 PM or Bays Mountain Planetarium Staff - regarding registrations - at [bmplanet@tricon.net](mailto:bmplanet@tricon.net) or 423-229-9447

## AUGUST CLUB MEETING BY LEE ERICKSON

The meeting was held on Aug. 11, 2001. There were 19 members in attendance. There were two guests, Paul Lewis and J. Rasnake. Tom Rimmell presented the New Club Logo, which won the voting at the last meeting. The date and location for the club picnic was announced. (See page 1 of the newsletter.) Tom announced that congratulations are due to the Fleenor Family, with the birth of Olivia Fleenor about two weeks ago. The August star party was set for the 18th at Look Rock. (Unfortunately, it was weathered out.) Brent Holt displayed the wonderful bearing and clutch he built for the declination axis of the telescope mount he is building. It is an 18" diameter work of art. It has a huge center shaft and the friction adjustment set against a plate of Plexiglas.

Shawn Grant displayed cameras good for astrophotography. Shawn advised the club on what characteristics are needed to use a camera for astrophotography. First, you need a camera with a "bulb" shutter setting to hold the shutter open and accumulate exposure. Second, look for a camera with a mechanical shutter that doesn't rely on a battery. Some camera batteries are so expensive that you will spend more on batteries than film for long exposures. Third, consider models with interchangeable focus screens. This lets you use a bright screen for astrophotography and a conventional screen for daytime use. Shawn recommended a few cameras with these desirable characteristics that are often available in used camera shops or on EBAY. The Olympus OM1 is the inexpensive choice, which is usually in the \$200 or less range. The Pentax LX is another good choice and is in the \$400 range. Another is the Nikon F2 in the \$500 range.

Additionally, get a remote shutter cable release. Choose a cable release with a locking mechanism so that you are not a prisoner of your camera during the exposure. Choose a lens with a 50 to 55-mm FL to start. Such lenses are often the best lenses made. For a second lens, select the 24-mm FL, which gives a wider field of view, and for a third lens select a 100-mm FL. The web site <http://www.photodo.com/> is a good place to look for lenses. Because of the unpredictability of development of print film Shawn recommended the use of Ektachrome 200, a slide film. He also recommended the book, "Astrophotography for the Amateur", by Michael A. Covington. A paper back version of this book is available at Barnes and Noble at [www.bn.com](http://www.bn.com) for \$35. If you have any camera with a bulb setting, you can begin with it and have some real fun and learn too.

Paul Lewis reminded us of the rule of thumb for unguided astrophotographs. You can expose up to a time, T in seconds, = 600/ (lens focal length in mm) without getting star trails. For example for a 50-mm lens,  $T=600/50 = 12$  seconds.

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## Venier Scales BY BOB ARR

Vernier (VER-knee-ur) scales are tiny markings alongside the edge of a larger scale that permit you to determine fractional amounts of the main divisions of the larger scale with great accuracy. For example, you may have a telescope with its azimuth ring calibrated in whole degrees. If the index arrow is somewhere between two adjacent degree marks, you would have to guess how many tenths. With a vernier, you could read exactly how many tenths. Vernier scales are an old invention, going back to the sixteenth century. Charles Messier used them cataloging the positions of his "non-comets".

Generally, whatever is the main division on the larger is used as the basis for incrementing the vernier scale. If your main division is millimeters, you would calibrate the vernier for tenths of a millimeter. However, if you are using whole degrees, it would be impractical to calibrate the vernier for 60 seconds, although it could certainly be done. Such a vernier would be extremely difficult to read. For whole degrees, the best compromise is to calibrate for tenths of a degree, realizing that each tenth equals 6 seconds. At least it would be easy to read the vernier.

Assume your main scale is marked in whole degrees, and moves with the telescope in azimuth. On the fixed ring surrounding the main scale, you have a vernier scale. It's exactly the same size as 10 whole degrees on the azimuth scale, but the vernier is divided into 11 equal spaces. (The vernier always has one more than the main.) In practice, the marks that define the spaces are important, not the spaces themselves. If you will align the first vernier mark (number zero) with a whole degree, you will see that it and the last mark are the only vernier marks aligned with *any* degree mark. All the other vernier marks are slightly misaligned with the degree marks; it is very apparent.

If you move the telescope one-tenth of a degree, the zero vernier mark no longer aligns with anything; neither do #2 through #10. But #1 lines up exactly with the degree mark one notch from the starting point. Move it another tenth of a degree, and only the #2 vernier mark aligns with anything (it will align with the 2<sup>nd</sup> degree mark.) Another tenth, and only #3 vernier mark aligns with anything (the 3<sup>rd</sup> degree mark, naturally.) By the time you have moved it nine tenths, only the #9 vernier mark will align exactly, it with the 9<sup>th</sup> degree mark. If you move the last tenth (that is, ten tenths) you will find that the zero vernier mark is now aligned with the next whole degree beside the starting degree. So just by glancing at the vernier scale, you can see which vernier line is exactly in line with one of the degree marks. The number of the aligned vernier line is the same as the number of tenths that have been moved. Judging the alignment of 10 lines is fairly easy. If you had to scan 60 lines (as in the case of measuring seconds) you could go blind in the effort.