

Smoky Mountain Astronomical Society

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

Society's **Ch**Ronological **A**stronomical **P**aper**S**

From the President - Michael McCulloch

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No SMAS Meeting at PSTCC until October

Members, please note that there is no SMAS meeting scheduled for August or September at PSTCC. This is due to two special events: the SMAS club picnic on August 21 at TAO and the Big South Fork/Bandy Creek Group Camp on September 10-11. We also have meteor observing and star parties mixed in as well. There are plenty of SMAS events to participate in over the next two months!

Foothills Parkway Reopened

The southern end of the Foothills Parkway has now been reopened. This is good news for SMAS as it provides another observing site that provides both reasonably dark skies and good public access. The washout on Foothills Parkway has revealed a silver lining for SMAS.

Bob Arr and I reconnoitered the area July 23-24 just to be sure the "Traditional" Look Rock site (which we'll now call LR #1) had not been altered. It had not been, it's as good as ever. The grass has been cut, the pavement swept, a fresh liner in the garbage can — it's clean, green and pristine. Please note that LR #1 is actually the **second** overlook past the Top of the World intersection. It is about 1.2 miles from the intersection.

The silver lining is the discovery of LR #2, LR #3, LR #4 and LR #5, additional sites southwest of LR #1. We found these when we went to view the site of the washout, which itself is 3.7 miles from LR #1. Each overlook has its own special characteristics.

LR #2 (1.8 miles from LR #1): Small, ideal for two observers. It is particularly dark because the towering ridge to the north blocks most of the Maryville light dome. It faces east through south.

LR #3 (2.0 miles from LR #1): About the size of LR #1, facing primarily southeast through southwest. It has high woods east, north and west, and has several large trees blocking much of the southern horizon. Light dome is moderate, similar to LR #1.

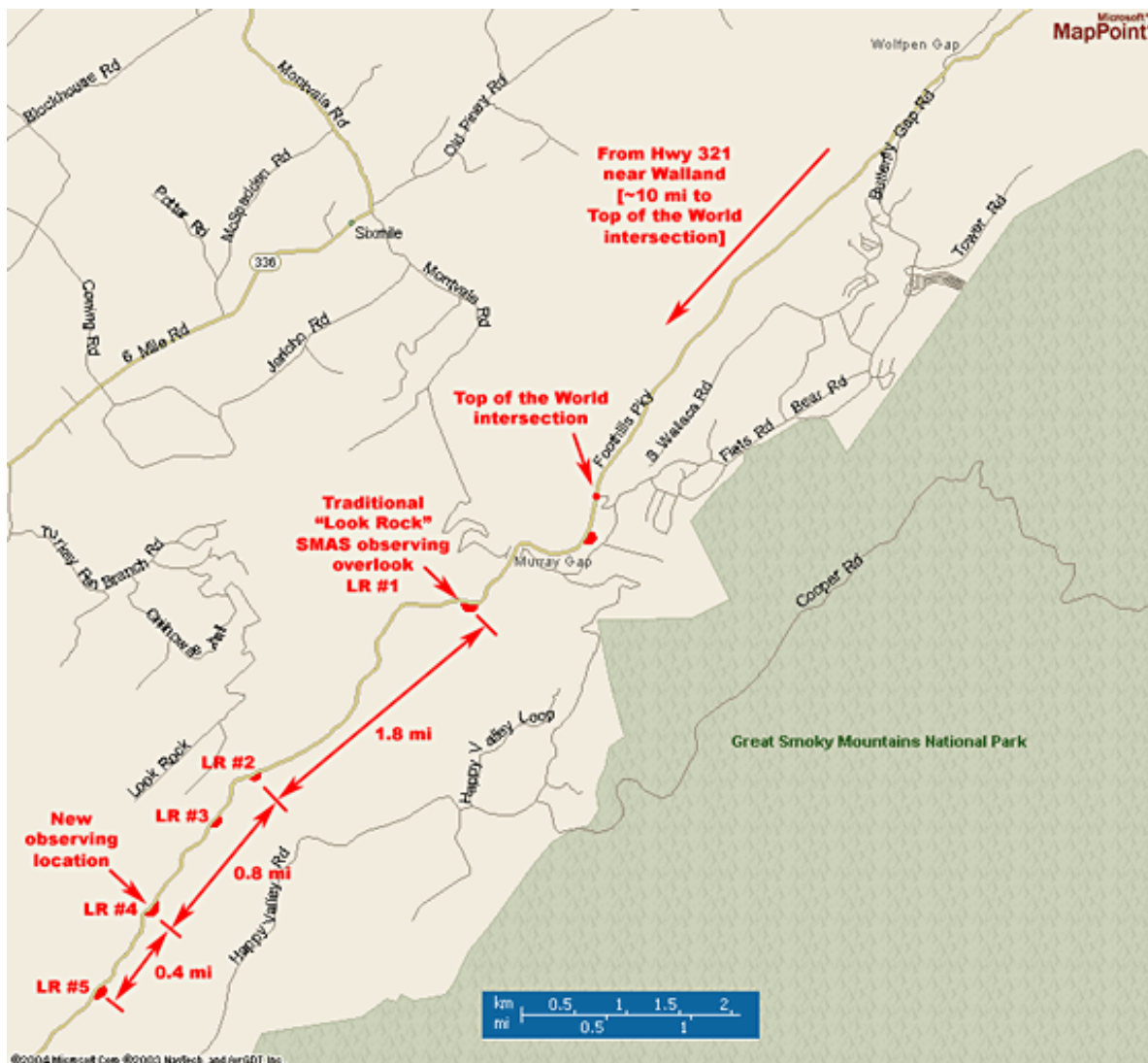
LR #4 (2.6 miles from LR #1): Twice the size of LR #1, essentially two parking lots divided by a grass median. It is spacious with plenty of room for everyone to spread out. SMAS members could easily park their vehicles so as to isolate the parking area farthest from the road, preventing visitors from wending through the equipment. It has good horizons

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with a moderately-sized opening to the south (Scorpius was fully visible early evening). Light dome moderate to the north, but the site is darker overall than LR #1.

LR #5 (3.0 miles from LR #1): Slightly smaller than LR #1, and faces the southeast unobstructed. Southwest through north is obstructed by tall trees, but not bad to the northeast and east. Maryville light dome is obvious.

Well, what to do about these new goodies? We'll show them on a new website map (displayed below), and **move our remaining Look Pebble star parties for the year to LR #4**, since it is darker than LR #1 (far darker than Look Pebble) and better able to handle a large number of visitors. All of the overlooks can be used by anyone at anytime. Furthermore, LR #4 was clear two nights in a row, which is something Look Pebble could never seem to accomplish!



Perseids Observing at Look Rock #4, Wednesday Night August 11th

The Perseids are predicted as possibly better than average this year and the moon will not interfere with observing. Therefore, SMAS will meet at Look Rock #4 (see new map above) on the night of August 11th. Feel free to bring your scopes, however meteor showers are best observed by lying on the ground or in a reclining chair and simply watching the sky. The best view before midnight on the 11th will be to look from zenith to the eastern horizon.

Meteor showers are usually best observed during the early morning hours. Therefore, if you only observe before midnight you may only see the so-called "earth-grazers". However, earth-grazers are often very bright and slow moving with long trajectories.

It is difficult to predict if and how many members might stay until the morning hours. If you desire to do so, perhaps plan to have a friend do the same so you will not be alone during the early morning hours on the 12th. Some members may actually prefer to wake after midnight to take advantage of early morning viewing.

For those of you that want to be more structured, please read the Perseids article from NAMN reprinted below and visit their sites for some resources to assist you in recording your observations.

August 14th Star Party at Unicoi Crest

Weather permitting, SMAS will host a star party at Unicoi Crest on the Cherochala Skyway on the night of August 14th. The summer Milky Way will be in prime viewing position early in the evening. Join us! *(Please see the maps on the SMAS web site located under the "2004 Star Party Info!" link or ask for help in finding Unicoi Crest if needed.)*

2004 Perseids (NAMN Notes: reused by permission)

The IMO, the International Meteor Organization, in their 2004 Meteor Shower Calendar, talks about the history of outbursts observed:

"The Perseids were one of the most exciting and dynamic meteor showers during the 1990s, with outbursts at a new primary maximum producing EZHRs of 400+ in 1991 and 1992. Rates from this peak decreased to 100-120 by the late 1990s, and since 2000, it has failed to appear. This was not unexpected, as the outbursts and the primary maximum (which was not noticed before 1988), were associated with particles accompanying the parent comet 109P/Swift-Tuttle passing perihelion in 1992. The comet's orbital period is about 130 years, so it is now receding back into the outer Solar System, and theory predicts that such outburst rates should dwindle as the comet to Earth distance increases."

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Basically, when the comet is closer to the sun (and us), the earth encounters more material shed by the comet, and we see more meteors. However, this is a great oversimplification. Why? Because each time the comet passes around the sun in its orbit, it sheds debris - and each of these dust trails assumes its own orbit, slightly different from that of the comet. In time, we end up with a whole series of dust trails, each trail in a slightly different orbit. To an amateur meteor observer, this means that different years can produce quite different numbers of meteors seen. To a professional meteor researcher, it means a computational challenge!

So, what are the meteor researchers telling us about *this year's* Perseid prospects? We still have the regular annual Perseid activity, but...

In the IMO Calendar, the International Meteor Organization suggests that we could get:

"a possible primary peak time around 11h UT on August 12 coinciding with the most probable maximum time of the traditional peak. Another feature, seen only in IMO data from 1997-1999, was a tertiary peak, the repeat time for which would be shortly before 21h UT on August 12."

Note the times here. UT, Universal Time, is the time at Greenwich, England. In other words, North America isn't dark at those times - so Europe and Asia are favored for a possible outburst.

The Perseids (PER) can be seen from about July 17th to August 24th. The radiant, the area in the sky where the meteors seem to come from, moves quite a bit over this period of time though, so it is best to check a map to see where the radiant is on a given night, before you go out observing. A map showing the radiant movement can be found on the IMO website at <http://www.imo.net/calendar/cal04.html#Perseids>. Many beginning observers think that the radiant is *always* just below the constellation Cassiopeia, near the double star cluster η & χ - but such is not the case!

These are fast meteors, with a velocity of about 59 km per second, and can be quite spectacular! Quoted ZHR rates for the Perseids are about 100 meteors per hour. ZHR refers to Zenithal Hourly Rate, and is the number of meteors, on the average, that an observer would expect to see if they were out under a dark country sky, and if the radiant of the shower is directly overhead.

How about the other meteor researchers? What do they say? What is this talk of a special outburst this year besides the regular 'annual' activity? What is all this news about the 'one revolution dust trail', the debris shed by Comet Swift-Tuttle in its pass by the inner solar system in 1862?

Researchers Esko Lyytinen and Tom Van Flandern discuss their predictions for this year's

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Perseids in the April 2004 issue of WGN, the Journal of the International Meteor Organization, in their paper "*Perseid one-revolution outburst in 2004*". Several selected excerpts are as follow:

"In 2004 August 11 at about 21h UT, the one-revolution dust trail of the Perseids' parent comet 109P/Swift-Tuttle is calculated to pass within 0.0013 AU of the Earth's orbit... a possible meteor outburst of mostly fainter-than-average meteors may be seen... with the optimum time occurring at 20h 50m UT... with a maximum ZHR of a few hundred. At best, activity might approach meteor storm levels (1000/hour) for a short time... we get the predicted half-maximum full-width... about 40 minutes..."

"The trail has been calculated using similar principles as in the Lyytinen-Van Flandern Leonids model... We have the ejection at perihelion and the ejection speed zero, as approximates the effect of solar tidal forces removing debris orbiting a comet nucleus. Radiation pressure is then applied to model particles, starting from zero for the largest particles and increasing in small steps for smaller particles. With this approach we can calculate where the center of the trail is situated... "

"We also discuss the possibility of enhanced annual rates because perturbations by Jupiter will now direct all incoming Perseid meteoroids about 0.01 AU closer to the Sun, which allows the possibility of the Earth passing through the densest core of the annual stream... If this enhancement happens, it does not mean increased rates for the whole four week time span when Perseids can be observed. Only the main maximum may be more prominent. The maximum may also be shifted in time from the annual peak or possibly appear as a peak distinct from the annual and the one revolution peak... "

"Another factor is that the situation can be different in different locations along the orbit. There may be a denser younger core (filament composed of several trails) that follows the parent comet for a number of years but then gets more weak and indistinguishable before the next return. This kind of encounter may be displaced from the annual maximum, more probably being earlier in time. This is also expected to be briefer than the traditional maximum but wider than possible encounters of single trails... "

Lyytinen comments, in his June 1st posting to the MeteorObs email list:

"The timing of the 1-rev. encounter is expected to be good within about 15 minutes or better. The prediction of strength is more uncertain than the timing... "

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"... increased rates... during the annual peak... may be of more interest in parts of the USA. There may not be existing conclusive historic evidence on the existence of ... this phenomenon that should repeat every 12 years (and every 30 years because the effect of Saturn, next time in 2009)."

Lyytinen gives some very interesting ideas in his July 6th posting:

"If you do see visually quite a lot of dim meteors (during the outburst time), testing telescopic observations (near the radiant) might give something interesting... Because the one revolution trail will pass a little inside the Earth orbit, we can get a view tangentially to this trail. There may be some possibility to observe the one revolution trail in space... and this MAY be more dense than Leonids one revolution trail... the most dense core may appear only some arc-minutes wide (or possibly even smaller)... CCD-equipment would best suit for this, but other photography and visual sightings could be tried. Because of the relatively small apparent size of the densest part, no very wide field instrument is recommended. I expect equipment that are good for cometary observations to be good for this purpose."

"I tried to derive the apparent location (of the tangential point of the trail center) from orbital elements of the trail particles around there and I got RA and dec (J 2000.0): 3h 39.0m, +84.86 deg. This is valid at the time of maximum of the outburst, that is expected to be the best time to get the trail visible. The movement is about half a degree in one hour. An hour before the maximum time, the location is 3h 36.2m 84.33 deg and an hour after the maximum it is 3h 42.5m 85.40 deg. I hope that I got this correctly... "

Jeremie Vaubaillon of France has done some simulations on the 2004 Perseid activity as well. His simulations can be found on the web at <http://www.imcce.fr/s2p/PER>. Vaubaillon comments:

"Our first results gave indeed an intersection with the Earth... but without that many particles. So we decided to include tinier meteoroids... We still do not find a "Perseid storm"... So maybe the 2004 Perseids <1862 trail> will be more detectable by radio devices (if their sensitivity is better than optical devices). The lack of model for the annual stream prevents us from giving a clear idea of the expected enhancement... However, we call for observers to be particularly vigilant between 11th and 12th August, and even before and after! "

Huan Meng of China has also given some predictions on the MeteorObs email list, on July 16th:

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"I have just completed my computation, and would like to let you know my results. Only 1-rev. trail was considered in my work. Finally, I found the whole dust trail has not been too much perturbed by giant planets. In 2004, there will be only one cross section of the trail encountering the earth in August... the Perseid comet 109P is an order larger than the Leonid comet 55P (diameter 15.6 km vs. 1.8 km), so the cometary nucleus may eject dust grains farther... However, I still expected this Perseid outburst as a very faint one for visual observers. More powerful observers such as telescopic, video, radio and radar may better catch the outburst... And the maximum time will be 20h 57m UT, August 11... "

Several other researchers in the U.S. and around the globe have made some comments as well, but the above are the main sources of comment for this year's Perseids, and are the sources we are quoting... If you want to follow some of the discussions on the Perseids, and hear about the results around the globe - consider subscribing to the MeteorObs email list, administered by Lew Gramer, our Coordinator of Public Outreach. Check out the details for MeteorObs at <http://www.meteorobs.org>

This is shaping up to be an interesting year for the Perseid meteor shower! Beginning observers can sit back and enjoy the best shower of the summer. Experienced visual observers have some interesting data to record. The technical gurus have some even more challenging results to capture by CCD, video and other means. It will be interesting to see what results are obtained - and great to further our knowledge of this shower!

As a reminder to visual observers, our NAMN Observing Guide provides information on what to record while observing. Check it out at <http://www.nammeteors.org/guide.html>. The information to record includes such items as the time the meteor occurred, its magnitude (brightness), the shower it belongs to, its speed, and other comments such as train left behind, or color. General information to record includes such things as how dark your perceived sky is (limiting magnitude), and comments on weather and cloud cover.

Forms to record your observations can be found at <http://www.nammeteors.org/>

What You Missed at the Last Meeting—Angela Quick

Minutes

SMAS Meeting
Friday, July 9, 2004
Main Campus, Pellissippi State Technical Community College

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The meeting began at 7:00 pm, with 16 members and one guest present. President Michael McCulloch welcomed new members and guests.

Michael then reminded members of the plans for upcoming star parties. In July, a Look Pebble star party is scheduled for Saturday, July 10 (tomorrow night), and a Unicoi Crest party is scheduled for Saturday, July 17. Watch the Yahoo! group for last minute discussion of viewing prospects! Second, SMAS plans to host a Perseid meteor shower observing party for the public on Wednesday, August 11. Members discussed the best location – Look Pebble has poor viewing conditions; Unicoi Crest or other sites on the Cherohala Skyway are too far to drive on a week night; TAO has eastern sky light pollution; Look Rock may or may not be available. Look Pebble received grudging approval as the most likely spot at this time; if a more suitable location becomes available, it will be announced via the Yahoo! group and in publicity for the event. (*see this month's calendar –Editor*) Finally, SMAS is hosting a weekend star party & camp out at group camping area E-2 at Bandy Creek Campground in the Big South Fork National Scenic River area Friday and Saturday, September 10 and 11. Reserve a camping space by contacting treasurer Erik Iverson at ebi_banana@yahoo.com or via SMAS, PO Box 53265, Knoxville, TN 37950. Reservations made on or before July 17 are \$10; reservations after July 17 are \$15. On Wednesday, September 8 all members who have made a reservation will vote on whether to hold or cancel this event.

Michael then presented a slide show of 3-D images from the Mars rovers Spirit and Opportunity. All donned paper 3-D glasses, and oohed and aaaahed as Michael explained the scientific significance of the different photos. The presentation also included an overview of the Spirit and Opportunity missions, a discussion of the different scientific tools on the rovers, and a look at some of the spectral analysis data returned by the mission and what it tells us about the geology of Mars.

Next, Erik Iverson and Angela Quick and Lee Erickson talked about their experiences viewing the transit of Venus across the sun on June 8. Erik and Angela traveled to Acadia National Park in Maine, where they viewed the event for a little over two hours from the top of Mt. Cadillac with a handful of other amateur astronomers. Angela showed the equipment used, and Erik showed pictures of the transit taken with a special eyepiece and digital camera. Lee observed the transit from a parking lot in Nashville, using projected images through his ETX90. Lee sketched the event. Both parties recorded the same times of contact and gave similar descriptions of their observations!

Lee Erickson, 2004 SMAS picnic coordinator, announced that the SMAS picnic would be held on Saturday, August 21 at Tamke Allan Observatory from 6 to 8 pm. Mike Littleton will be grilling a Boston butt (that's BBQ pork, folks), and the club will provide water, iced tea, and lemonade plus plates, cups, napkins, and utensils. Please tell Lee at leerickson@earthlink.net what dish you will bring, and remember to send a copy of the recipe! Ar-

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rive between 5 and 6 pm if you want to help set up. August 21 is a public observing night at Tamke Allan, so plan on bringing your telescopes and hanging around for some stargazing.

NO ONE answered the Wiz's puzzler on orbital mechanics that appeared in the July newsletter! So, the contest is still open. Submit your solution, if you dare!

The meeting concluded in the meadow by the pond with viewing through the 5 inch refractor donated to SMAS by Burgess Optical.

Chabot Space & Science Center—Angela Quick

While visiting San Francisco, I had the opportunity to spend a morning at the Chabot Space & Science Center in Oakland, CA. The Chabot is the most recent incarnation of a public observatory that has operated in Oakland since 1883. The current 86,000 square foot facility, located on thirteen acres on Skyline Drive on the rim of hills to the east of the bay, opened in August 2000. Features include the Tien Megadome Theater, which shows IMAX movies; the Ask Jeeves Planetarium, a state of the art star theater incorporating a sophisticated star projector, fiber optics, and laser displays; more than a dozen exhibit halls; an observatory complex with three domes housing 8" and 20" refractors and a 36" reflector; a teacher research center; and a café and gift shop.



I began my visit in the Tien Megadome, viewing the movie *Cosmic Voyage*, which began with a meter wide circle on the surface of the Earth, stepped out in powers of ten to the largest structures of the Universe, then stepped down from a meter in powers of ten to the sub-nuclear structure of atoms. The whole tour covered 48 orders of magnitude, which zoomed past at an order per second at the end of the show. *Cosmic Voyage* was nominated for an Academy Award® in the Best Documentary Short Subject Category.

Next, I saw the planetarium presentation *Dragon Skies*. *Dragon Skies* introduced the basic concepts and constellations of ancient Chinese astronomy through the plot device of a court astronomer teaching a boy emperor to observe the harmony of the night sky. It was cool to see projected video and computer animations combined with the traditional starry backdrop

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of the planetarium. The planetarium program was developed especially for a new traveling exhibit, Dragon Skies.

Naturally, I toured the Dragon Skies exhibit next! The exhibit tells the 5,000 year old story of ancient China's astronomical achievements. It included many ancient artifacts, such as giant armillary spheres resting on dragon pedestals, oracle bones, paintings on silk recording apparitions of comets, and a scale replica of a combined water clock and armillary sphere, that have left China for the first time. Wow! What incredible stuff! The exhibit also had cool interactive activities that invited visitors to predict the future based on comet shapes, interpret signs and omens, use an armillary sphere to record the positions of heavenly bodies, and measure time via the movements of sun and stars.

I briefly toured a second exhibit, One Giant Leap: A Moon Odyssey, where I fought grade school kiddies to take a simulated moon walk, sit in a Mercury capsule (not for the claustrophobic or broad of beam), and land a lunar module. There were also exhibits on Saturn, including a planetarium program on the Cassini mission; Mars, including a planetarium program on the current rover missions; Planetary Landscapes on the formation of the solar system; and the history of astronomy in California, but my companions grew restless for the charms of IKEA, and thus my visit ended.

The observatories were not open to the public on the day I visited, so I did not get to see the historic 8" Alvan Clark refractor called Leah or the 20" Brashear refractor called Rachel. I would return for that privilege alone. If you visit on a clear Friday or Saturday night, you are able to look through the scopes at the heavens as well. The Chabot Space & Science Center also hosts telescope-making workshops, trains teachers in science education, and offers local amateurs the opportunity to play with cool toys while volunteering their time.

So, if you find yourself in San Francisco, I highly recommend a trip to the Chabot Space & Science Center. If you can talk your traveling companions into it, plan on spending the entire day on a Friday or Saturday – there is more than enough to keep you fascinated for ten to twelve hours. Or take an on-line tour at <http://www.chabotspace.org>.



Colorado's Stonehenge – by Steve Rothschild

Two towering sandstone rocks visible for miles throughout Pagosa County, in the SW corner of Colorado, mark the location of an ancient Indian community and the mesa called Chimney Rock.

The Anasazi (ancestors to the Pueblo) occupied this area about 1,000 years ago (900 to 1125AD). They may have initially chosen the rock spires for practical reasons, but astronomy and ritual are believed the primary motives for the construction of the Chimney Rock Pueblo.



The spires were used as a calendar marking the summer and winter solstice and equinox. And the “Great House” of the Chimney Rock Pueblo, constructed in A. D. 1076 on the upper mesa, may never have been intended for permanent habitation, but primarily as a site for astronomical observation, community gatherings and regional festivals. (Think Ancient Star Parties!)

The High Mesa Group

The High Mesa Group contains the Chimney Rock Pueblo as well as the Great Kiva (a place of worship) and the bedrock basin (a depression in the bedrock approx 6”-10” in diameter and about 6” deep).

Calendar observations may have been made from the Chimney Rock Pueblo, the bedrock basin, and the “towers” (two rock spires in close proximity to each other). Spectacular sunrises can be observed in the gap between the double spires each vernal and autumnal equinox.

The first astronomical observations to establish a calendar at Chimney Rock may have taken place from the exposed bedrock - where some “basins” were located. The bedrock basins and their enclosing circle on the bedrock is a member of the class of artifacts identified as Chacoan stone circles. The meaning of these circles and basins in Chaco Canyon has not been clear, but each stone circle provides a view of the Great Kiva. The stone basins may also have marked the spots for ritual viewing of the sun and moon. While on top of the mountain, I saw the moon rise and the sun set at the same time. This vantage point made it possible.

Another remarkable feature of the site, which may have established its precise location, occurs as one moves from south to north. At the location of the basin, the double pinacles merge into a single tower!

Summer Solstice

The major function of the Chimney Rock Basin appears to have been to mark the exact spot for observing the summer solstice sunrise. As viewed from the basin, the first gleam of summer solstice sunrise appears along the north wall of the Chimney Rock

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Pueblo. If a coincidence, this is remarkable! Not only has the Pueblo been placed along the line of the summer solstice sunrise, but the entire building has been rotated so that its north wall is exactly parallel to the line of sight. The building could have been more conveniently constructed near the center of the upper mesa, but the location was apparently established by these astronomical conditions.

The tips of the east and west ends of the thirty eight meter “towers”, as seen from the basin, are only 2’ (minutes) from each other. The pueblo’s long north wall differs by only 2’ of arc from the line drawn from the basin to the summer solstice sun. The very best that the human eye can resolve is 0.75’ while the typical corrected eye (20-20 vision) is 1’ – 1.5’.

The precision of alignment of the north wall is impressive when compared with other structures of the ancient world. The Great Pyramid of Kufu in Egypt is aligned to the absolute cardinal directions within 5’. In south India, the axis of the largest ruined city of the world, Vijayanagara, is within 0.8’ of true north, making it the most accurate documented astronomical alignment before the use of telescopes.

Within the Chaco system, the dividing wall of one pueblo is within 15’ arc of true north-south. Its western south wall is within 8’ of true east-west. The roof supports of the Great Kiva of Casa Rinconda are aligned to within about 32’ of arc of true north-south. Pueblo Alto’s north wall is 1°6’ away from true east-west, while that of Tsin Kletzin deviates by 1°.

Summer solstice could have been anticipated from the basin by noting the sunrise along the southern wall of the Great House, which occurs close to May 26. The pueblo’s second-story room block could have been used for a shorter anticipation interval; the sun would have risen there about June 10, as seen from the basin.

Lunar Standstills

The changing position of the rising moon could also have been readily observed from the vicinity of the basin, and if the phenomenon of major lunar standstill had not been discovered by the ancestral Puebloans, it certainly would’ve been easily recognized in the decade of A. D. 1050 at Chimney Rock. During the proceeding decade, and continuing until A. D. 1051-1052, the monthly swing of the moon would never have brought the rising moon as far north as the position of the first gleam of the sun at summer solstice. During this period, the moon did not challenge the supremacy of the sun’s position in the Chimneys. However, the moon at its northern standstill steadily approached the solstice sun, and beginning in 1051-52 it surpassed the sun and proceeded northward toward the Chimneys – reaching its pinnacle in A. D. 1053.

The view from the basin, of the moon backlighting the rock towers, would’ve been spectacular at that time and during subsequent cycles of every 18-1/2.

The Taurus Supernova

The natives were in the throes of a long draught when, on the morning of July 4, 1054, another unexpected and perhaps shocking event would have been observable from the basin. It was then that the supernova in Taurus appeared above the upper mesa just ahead of

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the sun. It was the birth of the Crab Nebula. The third brightest object in the heavens when it first appeared, the supernova was exceeded in brightness only by the sun and moon; it remained visible in the daytime sky for some three weeks.

As may have been the case with the sight line to summer solstice, a cairn or a line of stone may have been constructed on the upper mesa to mark the rising position of the Taurus supernova. Both of these markers appear to have defined the edges of the Chimney Rock Pueblo when it was constructed some twenty-two years later.

Epilogue

Chimney Rock may not be as impressive as Stonehenge but it functions in much the same manner.

My timing to Colorado left a lot to be desired. Where were the dark skies I had heard about? I arrived during a full moon! The sky was comparable to our skies here in Tennessee. I couldn't even see the Milky Way.

Colorado can be a wonderful place to go camping and view the night sky IF you time it correctly.

Credits to J. McKim Malville for supplying me with material to plagiarize.

For more information visit: <http://www.chimneyrockco.org/standstill1new.htm>

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Please direct articles and pictures to me at: **865-453-8376** or pbush1@bellsouth.net. Also note the deadline for submissions posted on the calendar (attached). It's my goal to work on the newsletter the last weekend of the month so members will receive it by the 1st of the following. Any and all ideas regarding SCRAPS content are welcome, and will be given due consideration.

*** Special call for Pictures *** I'd like to include some of your pictures and drawings of celestial objects. If you have some you'd like to share, e-mail me a copy for an upcoming SCRAPS!

The Wiz

Dear Wiz,

I see all these grand descriptions of telescopes and eyepieces in the Orion catalog. Every one of them seems to be a masterpiece. What's some of the bad stuff about these gadgets?

D. Intahmus

Dear Dowd,

You're a brave man to ask a question like that, and risk an encounter with the astropolice at some dark and lonely observing site...

Here are some.

Any scope's star images may have lopsided bulges that change their position 90° as you move from one side of focus to the other: that is astigmatism. Could come from misalignment of optics (shoddy support) or from el cheapo glass.

Some achromatic refractors show colorful edges around bright objects (usually blue, sometimes yellow): that is chromatic aberration. The more color, the cheaper the glass. (Reflectors don't have this problem because they use a mirror instead of a lens for the primary.) Reflectors have a unique set of problems, the worst being coma -- star points elongate and become little concentric seagulls circling around the outer edges of the field of view. Good reflectors use a parabolic mirror, which by its nature has built-in coma, but at $f/7$ and higher, the seagull wings are so small our eyes cannot see them. As the f /ratio gets smaller ($f/5$ and less) they quickly grow and become disturbing. Still, some parabolic mirrors have it worse than others. You'll never know how bad it is until you get it out under the stars.

Some cheap fast reflectors have spherical mirrors: stay away from them, because they simply won't come to focus on bright objects! But in fairness, if their focal ratio is greater than $f/10$, they'll focus well enough to be acceptable.

The next worse reflector problem is that the darned things work themselves out of alignment every time you transport them, and require fresh collimation every time they're set up. But after a few tries it gets easy, and you learn to do it quickly. Refractors and SCT/MCTs seldom lose their collimation unless they're subjected to a really violent bang.



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When looking up near the zenith, you can look into the eyepiece of an alt-az reflector fairly easily (but you have a devil of a time maneuvering the tube -- the so-called 'Dobson's hole' - - unless you've got a PortaBall). Near zenith, refractors and SCT/MCTs will drive you nuts trying to get your eye close to the eyepiece: it's virtually impossible, because the eyepiece is either sitting inside the fork or down on the ground.

German equatorial mounts almost require GOTOs, because normal human beings cannot manually direct them. Pointing them by hand is infinitely counter-intuitive, perhaps absolutely impossible.

Internal light scatter can be a make or break issue. Contrast between any celestial object and its background is required, or you won't see the object at all. Therefore, a dark background is highly desirable. Internal light scatter inside the telescope can ruin this contrast. Unless the telescope is well-baffled internally, and protected from incidental light entering the tube, the best optics in the world will not deliver an excellent image, simply because the scattered light is too bright.

Equally important are the eyepieces. They must have good coatings or they'll produce a lot of internal reflections inside the eyepiece itself. Those reflections are literally light stolen from the object and converted to background brightening, a double loss.

A frequently overlooked problem is the mating of an eyepiece to a particular telescope. All eyepieces do not work well in all telescopes. This is because the eyepiece designer first sets a target price for his product, then works around different indices of refraction in different glass (which have different prices), plus decides what steepness of the incoming light cone his design will optimize (different telescopes have widely differing light cones). Kidney bean effect and vignetting are extreme examples of mismatches, but there are also subtle incompatibilities that simply result in a poor image. Nothing beats Try-Before-You-Buy.

- A. For superb prices, you can get superb optics.
- B. For high prices, you can get excellent optics
(but not as good as A)
- C. For reasonable prices, you can get reasonable optics
(but not as good as A or B)
- D. For low prices, you usually get junk.
Sorry, that's the way it is.



Everybody wants to save a buck. But you've got to know that good equipment is expensive. If the seller is honest, you get what you pay for.
(Have you heard about Bill Burgess?)

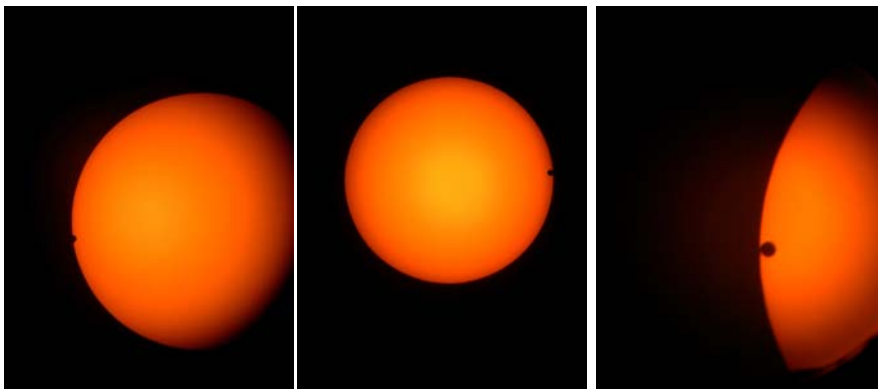
The best advice I can offer is to try other club members' equipment before you spend your

(continued)

money. If you can afford the best, go for it—you'll certainly enjoy it. If you're like most of us, you may decide that Astromart is the only way you can afford something superlative. Over half our members have used Astromart, and the success rate is excellent.

By the way, if you are studying modern advertising techniques, that Orion catalog is a seller's textbook.

Transit of Venus—By George Weems

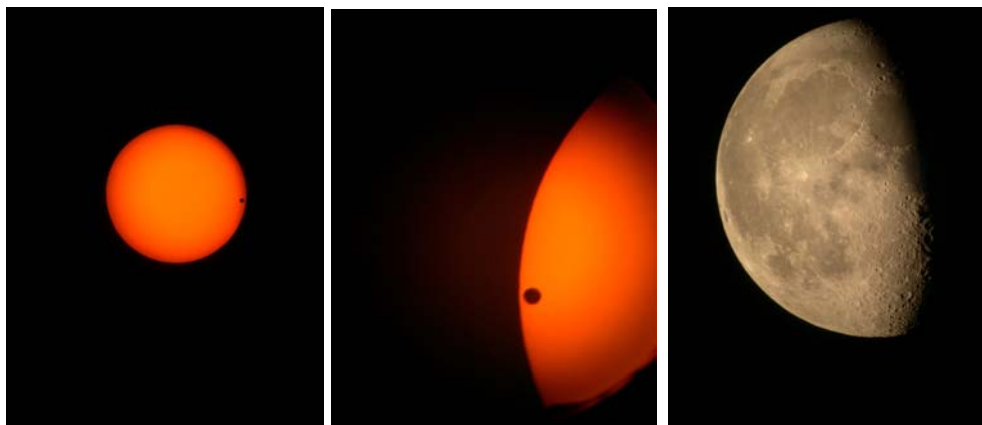


This is what I got from Lexington. I actually got 15 shots of the transit at various powers—30x to 87x. I Dob-mounted a Criterion RV-6 (44 years old with ORIGINAL coatings-I picked up for a song) with a Thousand Oaks full


AP filter for the shots. Eyepiece projection with a Nikon Coolpix 4300 and a custom adaptor for the eyepieces. (I need to get a cable release for that camera.) Basically, the adaptor was an 1.25 to .965 eyepiece adaptor that I had threads machined on to fit the Nikon accessories ring. The "eyepieces" were new surplus Olympus microfilm objectives that are 24 mm in diameter (slightly smaller than .965) and they fit very well. They range from 41.17 mm to 14.18 mm focal lengths. As you can see, I was getting over a half degree of field.

With my arrangement, I don't need a Philips Toucam! I literally could take 250 m-bytes of planetary images for Registax.

I took the moon photo from sheer boredom waiting for the sun to rise-and of course "it was there". Since our next Lexington star party is going to be moon observing, I think I'll get the club to advertise for people to bring floppies and take home an image!



August 2004

SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6 UTK	7 TAO
8	9	10	11 Star Party Perseids Observing @ Look Rock #4	12	13	14 Star Party Unicoi Crest
15 <i>New Moon</i>	16	17	18	19	20 UTK	21 SMAS Picnic @ Tamke- Allan 6 PM 
22	23	24	25	26	27 SCRAPS Submission Deadline *****	28
29 <i>Full Moon</i>	30	31	<div data-bbox="893 1806 1372 1984" style="border: 1px solid black; padding: 5px;"> UTK—roof of Neilson Physics Building on The Hill at UT TAO —Tamke-Allan Observatory Public Stargaze Watts Bar Lake, Roane County </div>			