

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

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

June 10th SMAS MEETING

PSTCC, Main Campus,

Hardin Valley Road

7 pm, Alexander Bldg, Room 223



From The President—Mike Littleton

Rebuilding Sasquatch

Spring is my favorite observing time of the year. Prominent in the sky are bright galaxies in Virgo, Coma, and Canes Venatici, like M-51. These green ghosts fascinate me in that they are so remote from us in time and space. A few weeks ago, at the SMAS at Unicoi Crest, the spiral structure and satellite galaxy of M-51 was clearly visible in my 8" SCT. Then with some trepidation, I climbed the ladder to view M-51 from our 20" dobsonian, Sasquatch. What a spectacular view! M-51 was bright with visible detail in the spiral structure. This was so much better than the fade in/fade out image in my 8" SCT. After doing the math, it was obvious why the view was so much better- Sasquatch has more than six times the light gathering power of my 8" SCT. This means Sasquatch can reach objects two magnitudes fainter than my 8" SCT.

Sasquatch has not been used very often at our star parties. It is difficult to transport in one vehicle. Assembly of the telescope is difficult for the inexperienced especially in the dark. During the star party at Unicoi Crest, which I observed M-51, it took three novice users about an hour to assemble Sasquatch. A committee chaired by Bob Arr evaluated the telescope. The committee found Sasquatch's optics were good, except the primary mirror is not fully polished. This has only a minor impact in deep-sky observing. It has major mechanical problems. (See The Wiz for this month.) The committee recommended a major rebuild of the telescope mechanically. This rebuild should have the following objectives:

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- The telescope should produce images as good as possible with the current optics.
- The telescope should be easily assembled by one person, loaded and unloaded by two people.
- The telescope should be transportable in a single reasonably sized vehicle.
- The rebuild should only have a minor effect on the current telescope's availability for observing.

Sasquatch is SMAS's property. A rebuild requires club approval. Additionally, funds are needed to purchase material for the rebuild. We will put forward a motion at the June SMAS meeting to authorize the conceptual design for the rebuild and solicit donations from the members for the same. I urge you to approve this motion and donate funds, as you are able. Look through the telescope at the next star party on June 4th at Unicoi Crest. I am sure you will see what a great asset Sasquatch is to SMAS.

Minutes SMAS May 13th, 2005—Lee Erickson

We came to order at about 7:10 PM in room 223 of the Alexander building of Pellissippi community college.

There were approximately 13 persons, three of whom were guests, in attendance.

President Mike Littleton quickly turned the meeting over to a report by Erick Iverson on the May 7th appearances of Sasquatch, the 20 inch club telescope, at Unicoi Crest. *(Please see the following article by Erik for details.—Editor)*

There will be a committee formed to meet at Bob Arr's house, and the members might get around to generating ideas and, who knows, perhaps even a plan for improving Sasquatch so that the big foot of light will attend more SMAS Star Parties.

Angela presented the constellation, Ursa Major or the Big Bear. Although the big dipper asterism in Ursa Major is familiar to most of us, Angela's thorough description of the full constellation from several different mythologies and the way to use Ursa Major to locate other constellations had tidbits of information that probably brought something new to everyone. Your secretary especially liked the information about the "3 leaps of a gazelle" also known as the feet of the bear.

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Mike Naney presented a power point show of Linda and Mike's Excellent Adventure, their recent visit to the telescope complex on Mauna Kea and also to volcanically active regions of the island. You must be careful to watch what you are doing at high altitude as you visit the telescopes. At this high altitude, where the telescopes live, walking even up small hills can be trying and you do not want to find yourself unexpectedly contemplating the sky from a prone position. And for very different reasons you must watch your step at lower altitudes when you get near the hot lava. The helicopter ride over fresh, red, hot lava seems a rather extreme adventure to your club's secretary.

We ended the meeting with discussion and a vote on the proposal revising the usage policy of the smokymtnastro Yahoo group. The motion was adopted by a majority of those members present.

As the formal meeting was ending, at about 9:30 or so, a committee was formed to immediately entertain some gastronomy at Chilies on Kingston Pike

Sasquatch Sighted—Erik Iverson

On Saturday, 7 May 2005, Lee Erickson and I (Erik Iverson) took out Sasquatch, SMAS's 20-inch Dobsonian-mounted reflector. We did so with two thoughts in mind – get this resource back into operation after a medium-long hiatus (as much due to our wonderful Tennessee viewing conditions as anything else), and “test” the telescope; not just the views through it (although that was important), but its usability. How hard is it to transport? How hard is it to set up? How hard is it to collimate, use, take down, etc.? This is more than just our own curiosity, it's an immediate topic within SMAS – what should be done, if anything, with the 20-inch to get it back into regular use and attendance at SMAS star-parties? Suggestions have ranged from “nothing, it's ready to go as is” to “completely rebuild it, refinish the mirror, and buy a trailer.” Rumors and anecdotes from various members of the club covered the gamut from “best planetary views I've ever seen” to “what a beast” to “really hard to collimate” to “WOW; that's what they mean by a spiral galaxy!” Recent communication with George Weems, one of the original makers of the optics, even indicated that the mirror was not fully polished before it was coated. Well, there's nothing like personal, direct, deliberate experience to give us our own set of completely subjective anecdotes to add, so Lee and I joined Bob Arr, Michael McCulloch, Angela Quick, Mike Littleton, and Ray (a visitor) at SMAS's May Unicoi Crest star-party to check it all out.

I have to confess; I had medium-to-low expectations. I've long heard horror stories of how difficult big dobs can be to set up and use. I've never been fond of using an alt-az telescope of any sort, and I can't possibly imagine how anyone can even try to star-hop without the convenience and ease of an equatorial mount. Just looking at the secondary, I

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couldn't see how collimation could be anything but a crap-shoot. And ever since a bad fall a long time ago, me and ladders have just agreed not to get along. Ladders in the dark, while sleep-deprived, with expensive eyepieces in one hand? Not me!

Let me get one thing out of the way first: I had a wonderful night of observing. Just plain fun. More fun than I've had with astronomy in a long time. The views were wonderful. The telescope wasn't too bad to use. Transportation and setup, while difficult, were not impossible. But most of all, using this telescope was a collaborative, cooperative, CLUB activity. It really was a group endeavor, and I'd really like to thank the rest of the people who were up there for reminding me why observing with a club is different than observing by myself.

But enough gushing – on to the details. First of all, the transport. Lee and I were able to pack all of Sasquatch into Lee's Ford Ranger truck, with the exception of the 8-foot stepladder, which we strapped to the top of my SUV for the drive up to Unicoi. The truss poles in their carrier stuck out of the back of Lee's truck by just a little, but we strapped them in well enough we weren't too worried about them. That said, they were the biggest single problem component of the telescope itself, and they're the component most likely not to fit in any individual vehicle, just because they're so long. While it might be tempting to strap them onto the top of a vehicle with a luggage rack (as we did with the ladder), DO NOT DO IT. The truss poles do not have any cross-members (as does the ladder) to allow you to secure them against forward and backward motion. The concern Lee and I felt regarding this problem lead us to propose that the truss poles and carrier be officially renamed “The Flying Javelins of Death.” 'Nuf said.

We got up to Unicoi shortly after dark, and thus we got to test our skills at following assembly instructions by red-light! Neither of us had ever assembled or collimated Sasquatch before, so I think we were a pretty good test to see how easy (or not) those tasks might be for a new user. The rocker-box and truss-poles went together fairly well, but we had quite a bit of trouble getting the secondary on, and we were never able to get the insertion of the truss poles to match the description in the directions. Collimation was everything I had feared – it involved warping the spider in such a way as to get the laser-spot “about” aligned with the center of the primary. When we then changed the altitude of the tube, there was quite a bit of flex. Getting the secondary on consumed three-fourths of our assembly time, which was probably about half an hour. Fortunately, we had lots of help from the others present! (No, two people are NOT really enough to do it, at least not when they're new to the task.)

Then the fun began. We used Jupiter to get the telrad and the finder aligned to the main telescope. We had quite good views of the planet! While there was a lot of light scatter (perhaps due to the mirror roughness, or maybe just because it's REALLY BRIGHT with that much aperture), the resolution was quite good, and the detail seemed exceptional in the

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moments of good seeing. We moved on to Polaris to do a Ronchi test (Polaris doesn't move so fast, and that's kind of important when star testing an un-motorized telescope of this focal length.) Using the relatively low-density Ronchi eyepiece I showed at the April SMAS meeting, none of us could see any sign of astigmatism or spherical aberration. There may be a very slight turned-down (or up) edge, and the shadow-gram did seem to indicate a fairly rough mirror as these things go.

Enough of the testing; let's do some observing! We moved on to a boatload of everyone's favorite objects, which included (according to our best efforts to remember):

- M81
- M82
- M51 (the Whirlpool Galaxy)
- M97 (the Owl Nebula)
- M108
- M65/M66/NGC 3628 (the Leo Trio)
- NGC 2903
- M11 (the Wild Duck Cluster)
- M4
- M13
- M57 (the Ring Nebula)
- M27 (the Dumbell Nebula)
- M56
- Alberio
- NGC 6992/6995 (the Eastern Veil)
- NGC 6960
(the Western Veil/Witch's Broom)
- NGC 6871
- NGC 6910
- M22
- M8 (the Lagoon Nebula)
- M20 (the Trifid Nebula)
- M6 (the Butterfly Cluster)
- M7
- Cr 399 (the Coat-hanger)
- NGC 6802
- M24 (the Sagittarius Star-cloud)
- NGC 6603
- B86 (the Ink-spot)
- NGC 6520



Illustration—Although this photograph was taken with a 4” refractor, the image closely matches the “real time” visual impression of the Western Veil through the 20” reflector with a Lumicon UHC filter.

Photograph by Michael McCulloch

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We ended the night with Jupiter again at just about 3:00 am. Jupiter, through a twenty-inch aperture, is bright. Very bright. Almost painfully bright. Do NOT do this if you want to keep any semblance of night adaptation!

The views were simply wonderful. Maybe the mirror isn't the smoothest in the world. Maybe the collimation wasn't perfect, and wasn't consistently imperfect. These were beautiful views. Among the comparisons we did were back-to-back comparisons of the same object in Sasquatch and in Bob's 14.5-inch Starmaster "Emily." In every case, I felt that the views between the two telescopes were comparable. Maybe (certainly?) the Zambuto optics in Emily are better, but a factor of two in gathered light sure seemed to make up for a good bit of the difference.

That said, there are four major drawbacks to using the telescope (with its accessories) in the current configuration:

- Transportation
- Assembly
- Collimation (and stability of collimation)
- Safe use

It's hard to transport. That is less a matter of sheer size (that is, volume) than it is the lengths of some of the major pieces, I think. We got the whole thing in Lee's (small) truck except for the 8' ladder. If we could replace the existing ladder with something more compact, and replace the existing truss poles with collapsible truss poles, I think that the entire telescope, with its accessories, could be transported in a reasonably sized truck, SUV, van, or station wagon. (Steve; you're still out of luck!)

It's hard to assemble. This is due to two things – the nature of the connections between the truss poles and the secondary cage, and the lead weights required to counterbalance the thing. If we replace the secondary cage, or substitute a different mounting mechanism with the existing cage, we should be able to make it much easier to assemble. The big counterweights are needed to balance the heavy steel truss tubes. The tubes we've got now are about 1.6 pounds each. Kreig and Berry recommend 1.25" or 1.50" OD aluminum tubes with 0.049" walls. If we went with new truss poles of 1.25" OD Al, we'd save over 14 pounds on the truss poles alone. While that doesn't sound like much, it means we can remove nearly 40 pounds worth of counterweights, which is half the lead!

It's hard to collimate and keep collimated. The existing spider does not enable controlled motions of the secondary mirror. It requires that you bend/warp the spider into the appropriate position, and it's flexible enough that the collimation changes (significantly) depending on altitude. The only way to fix this is with a new spider. Making the assembly easier,

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though, will also help the telescope require less collimation adjustment, so that's also good.

It's too easy to fall off of the ladder. We've got a good, sturdy stepladder. But people will be going up and down in the dark, with expensive eyepieces in their hands, when they're staggering from sleep-deprivation. While Michael was thankfully not injured in his slip this past Saturday, I think that it was a real confirmation that we should have some sort of a stair and rail system if at all possible. We also need to do so in a way that doesn't preclude the above transportability argument.

After that long-winded exposition, here's what I think should be done as the top priorities:

- The ladder should be replaced with a new stair/rail system.
- The secondary cage should get a new spider and new truss pole mounts.
- The truss poles should be replaced with larger-diameter aluminum.
- The counterweights should be resized or removed as possible.

I'm sure others will have their own opinions, and their own suggestions. I'm also sure that we as a club can come up with a reasonable, practical course of action resulting in the full use of this wonderful club resource. I look forward to joining the rest of the club in making Sasquatch even more wonderful, and getting it back to more club star-parties!

2005-2006 SMAS Officers			
Michael Littleton	<i>President</i>	Erik Iverson	<i>Vice President</i>
Ron Dinkins	<i>Treasurer</i>	Lee Erickson	<i>Secretary</i>
Mike Fleenor	<i>Webmaster</i>	Peter Bush	<i>Editor</i>

The Wiz

Dear Wiz,

What's the skinny on Sasquatch?

A. N. Mouse

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Dear Noni,

Its images are wonderful, but it is a nightmare to transport and assemble.

Big is not a character flaw, but if big won't fit in your vehicle, Sas stays at home. That's Problem One. Its gigantic weight requires two really strong guys to handle (you can't put it in your car by yourself). That's Problem Two.

The truss poles are steel conduit, not aluminum. Why? They couldn't afford aluminum when it was first built, and conduit was very cheap. It's also very heavy, and they wound up packing 100 pounds of lead weight below the mirror for counter balance. The poles are 91 inches long, necessitated by a rather primitive design. (Can you fit eight 91-inch poles (plus two more inches for their container) in your car?)

The secondary won't hold collimation, especially if you touch the telescope. The mirror sling occasionally falls off, and the mirror then rests on the side pins (things it's never supposed to touch).

The spider (which is supposed to lock in collimation) is wobbly. Twenty-inch telescopes are supposed to have strong 4-vane spiders, anchored in strong frames. Hah! Sas will bring tears to your eyes.

The altitude bearings and rockers are thin and flex, when they should be thick and rigid. The base of the mirror box is sealed, preventing any airflow for cool down. (This was done in order to accommodate the 100 pounds of lead.) The floors of the rocker box and base are unnecessarily thick and heavy when they don't need to be, adding to the hardship of transport.

All those are design flaws. In addition, there is 23 years of weathering and knocking around, being stored outdoors, exposed to seasonal temperatures and humidity. The plywood is scarred and delaminating, and wooden clamp blocks (which secure the truss poles) have shrunk and no longer clamp tight.

The good news is, that the mirror, despite numerous chips around the edge, is pristine and delivers tons of photons. Even lowly M4, that fuzzball just west of Antares, will dazzle you in Sasquatch.

If you haven't looked through Sas, go up to the next UC star party and see for yourself. We own a treasure, just waiting to be restored.

Da Wiz

Comments on John Dobson's recent visit to Knoxville, 2005 by David Fields & Roger Macklin

ORION and SMAS people met with John Dobson on Wed. May 25 for dinner in Knoxville. The word went out on the net to both ORION and SMAS about 5:00 PM, as soon as it was determined that John's hosts would indeed bring him out to dinner. We could use a telephone tree for fast-breaking news such as this, since only 10 people were there.

Anyway, John is a fast moving 89.5 year older, with a puny appetite and some new quotable remarks. For example, his love for eye-to-the telescope viewing, as opposed to astrophotography, was summarized by something to the effect of: "I like natural photons... If I wanted man-made photons then I'd throw a switch."

I showed John the little book that we put together about his visit in 2004 and he enjoyed it. When I asked him to write something in the book, he turned to one of his most-enjoyed photos and wrote, "What one does for others is holy. What one does for oneself is a waste."

I still remember John's favorite question: "Why did your parents name you after a Telescope?"

David

Back from a wonderful dinner and conversations with John Dobson of San Francisco-based Sidewalk Astronomers, perhaps America's most famous amateur astronomer/cosmologist as well as former Vedantist monk, born in China. He invented a type of telescope mount (called the Dobsonian, after him). A few astronomy friends and some other new friends showed up as there was very short notice - I got an e-mail at 5:10 (after I have usually left work) to meet Dobson at 5:30 PM at a Ryan's out in West Knoxville...he has to fly back to SF at 7:10 AM...

He is 89 1/2 and still vitally alive and curious.

I recall there was some banter concerning "rascals," "trouble-makers," and "monkey wrenches" - several agreed that the Universe had monkey wrenches for them to be thrown by rascals and trouble-makers...[but why weren't there more left-handed monkey wrenches? he asked]....

John challenged us with questions like "Why is the full moon 9-times brighter than a quarter moon?" Dave Fields, Roane State CC Astronomy professor and director of its observatory, mentioned something about the increased area of the full moon (as opposed to the quarter Moon). John Dobson suggested that was incomplete [this would only get a factor of ~ 4 (?)] and to think from the perspective that "the Sun never sees a shadow" (i.e., the illuminated

object always blocks its shadow from the Sun's viewpoint). So part of the answer is that there are essentially no shadows on the surface of the full Moon whereas a higher fraction of the surface of a quarter Moon is shadowed.

John suggested the other piece of the puzzle is that meteoritic or asteroidal impacts create molten stone [lots of silicon dioxide content] which is thrown up into the atmosphere and which re-condense and settle as spherical glass beads - which he says cover a third of the Moon's surface. When sufficiently "young" they reflect light essentially straight back at the source. Over time, micro-meteoritic impacts would make the glass bead surfaces more imperfect so that light is not reflected directly back and more light would scatter in other directions.

Lastly John put forward an explanation for the slightly brighter "doughnuts" seen around crater rims [at full Moon?] - impacts may have caused some of the glass beads around these roughed-up surfaces to roll down slope, uncovering newer beads, and resulting in the glass beads turning a fresh [more perfectly spherical] surface toward the viewer and more strongly reflecting back the sunlight again...

Roger

June 2005

SUN	MON	TUE	WED	THU	FRI	SAT
			1	2	3	4
UTK—roof of Neilson Physics Building on The Hill at UT 1st & 3rd Fridays TAO —Tamke-Allan Observatory Public Stargaze Watts Bar Lake, Roane County 1st & 3rd Saturdays					UTK	SMAS Star Party Unicoi Crest TAO
5	6 <i>New Moon</i>	7	8	9	10	11
					SMAS Meeting PSTCC Rm 223 7 pm	SMAS Star Party TAO
12	13	14 Pluto at Opposition Best time to view	15	16	17	18
					UTK	TAO
19	20	21 Summer Solstice	22 <i>Full Moon</i>	23	24 Heritage Planetarium 7:00 PM Galaxies	25
26 Mercury, Venus & Saturn within 1.37°	27	28	29	30		