

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

Society's **Ch**Ronological **A**stronomical **P**apers



July 8th SMAS MEETING

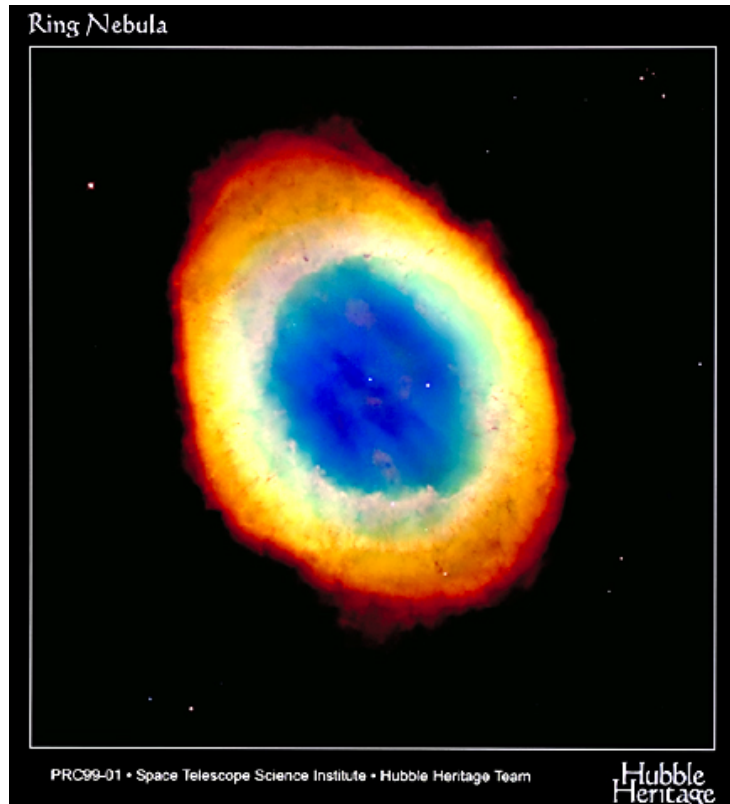
PSTCC, Main Campus,
Hardin Valley Road

7 pm, Alexander Bldg, Room 223

From The President—Mike Littleton

East Tennessee in July is not the best time for observing faint galaxies. Sky transparency is usually poor when we get a steady “diet” of hot, hazy, and humid days. OK, occasionally we get a cold front coinciding with a Moon-dark night in July, but that is the exception. The July sky does hold some fantastic sights that are not so dim. The Summer Triangle of Vega, Deneb, and Altair is in the East by dark. Scorpio and Sagittarius are rising with their globular clusters and emission nebula. Finally, there is the night jewel of the Ring Nebula.

The Ring Nebula (AKA M57 and NGC 6720) looks like a smoke ring in even the smallest of telescopes. It is easily located by sweeping



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from Beta to Gamma Lyrae and is about half way between the two stars. The nebula has an angular size of 1.4 x 1 arc-minutes and is about 2,300 light years distant. This makes the Ring a little less than one light year in diameter. The parent of the Ring is the hot central star visible in large telescopes. This star also powers the Ring by emitting copious numbers of ultraviolet photons, which in turn ionizes and excites the surrounding gas of the planetary nebula. Some of the light produced by the surrounding gas is from doubly ionized oxygen. Doubly ionized oxygen produces a green line. The human eye is most sensitive to green hence the Ring lends itself to visual observation using an O⁺⁺⁺ filter. (In the nomenclature of spectroscopy, O⁺ is the ground state.)

A planetary nebula is produced in the last stages of stellar evolution of a low-mass star. (Low-mass stars are those with initial mass less than about four times that of our Sun.) In this stage, the star is a red giant near the end of life. The star no longer burns hydrogen in its core. It is now layered like an onion with an oxygen and carbon rich core, a helium burning shell surrounding the core, and a hydrogen shell surrounding the helium shell. As the helium shell is depleted, the star cools and shrinks. The hydrogen shell in turn heats up and hydrogen burning begins anew. The helium produced in the hydrogen shell rains down into the temporarily dormant helium shell, the helium shell shrinks and heats up and explodes. The explosion propels the hydrogen layer outward, which escapes the star and becomes the planetary nebula. This cycle is repeated until only the hot stellar core remains. The time between cycles can be as short as 300,000 years. Astronomers estimate that there are 20,000 to 50,000 planetary nebulae in our galaxy. Their lives are short. In about 50,000 years after birth, the nebular gas is too diffuse and far from the parent star, the planetary nebula fades from view.

Summer also brings the annual SMAS picnic on August 20 at TAO. One of the main items on the menu is smoked barbecue. This was a hit at last year's picnic. Please attend. Food or monetary donations for the picnic are greatly appreciated. Please contact Angela Quick, who is coordinating the menu.

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>

June Minutes—Erik Iverson

The June 2005 SMAS Meeting started at 7:10 at PSTCC with members Michael McCulloch, Erik Iverson, Roger Macklin, Bob Arr, Mike Marcum, Joe Baldwin, Mary Watson, and David Fields present. Mike Littleton, Bill Dittus, and Scott Byers arrived shortly thereafter, having been unavoidably delayed by work (after all, they gotta keep paying for their astronomy addiction!).

Michael McCulloch gave a wonderful presentation on Deep Sagittarius, covering the “standard” stuff as well as some more unusual items requiring wider fields, larger telescopes, or more effort. Michael described the Greek mythology associated with the traditional archer centaur for which Sagittarius is named. As many people have noticed, the teapot asterism so readily seen does not readily map to anything resembling an archer centaur. Michael was able to find only one graphic on the web showing the teapot and the archer centaur together, but he did find that one graphic, and it was very helpful in visualizing the connection.

Sagittarius includes a huge number of deep sky objects, including NGC 6818, 6822 (Barnard’s Galaxy), M22, M25, M23, B312, M24, B92, B93, M8, M20, M21, B90, and B87, each of which Michael described in some detail. He showed a great wide-field deep image giving an introduction to how many of these objects are best seen in binoculars, and how looking for B92 and B93 in binoculars are the best way to start looking for dark nebulae. Bob and David both noticed strange curvilinear patterns in Michael’s wide-field view of M24. During the presentation, David asked if there were any noticeable features near the galactic center, which is in the general area that Michael described. Between Michael’s star map and Erik’s ephemeris program, we came to the conclusion that Cr 357, a small open cluster, is pretty darn close. After the meeting, Erik looked up the coordinates of Cr 357 (17h46m24s RA, -29:18 DEC) and the galactic center (17h45m33s RA, -28:58 DEC), so the galactic center is 15 arc-minutes North and 13 arc-minutes West (24 arc-minutes NNW) of Cr 347. So if you use an eyepiece with a one-



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degree (or a little smaller) field, and put Cr 347 at the SSE edge of your field of view, the galactic center will be centered in your eyepiece! Michael ended with a quiz based on an INCREDIBLE deep-sky wide-field image from Loke Kun Tan's trip to Chile (<http://www.starryscapes.com/chile/6-images.html>). It was a truly globulicious presentation!

Mike Littleton has been in touch with the park ranger at Cades Cove. The ranger is very interested in having a stargazing program. Mike proposes the first weekend in October as having a good weather prospect and being near new moon. The ranger suggested that there would be a stipend for this activity. We're not sure how we would deal with that, but we expect we could probably put that into a SMAS project fund. This event would likely take place in a parking lot, but the parking lot in question is not lit up. Mike is pursuing the activity, and will keep the club apprised.

Bob Arr described some of his ideas concerning a refurbishment of Sasquatch, the club's 20" dobsonian telescope. Bob started with a comparison between a 20" Obsession, a 20" Starmaster, and Sasquatch (as he proposes to upgrade it), including a detailed discussion of the primary mirror. *(Please see page 7 for a detailed comparison—Editor)*

Bob's proposed design involves:

- A new mirror box
- A mirror box cover with a cooling fan
- A new 18-point steel mirror flotation cell
- A new rocker box
- A new aluminum-tube truss assembly modeled after the Starmaster version
- A new secondary cage
- A new 4-vane spider
- A new 2" focuser

This design will involve the purchase of approximately \$500 worth of materials and components, although there may be some leftover material that could be used for other projects, or sold to club members, etc. Club members are donating many of the components, labor, and materials, and the value of these donations is therefore not included in that \$500 we will need to spend directly. These donations provisionally include a focuser purchased by Michael McCulloch, an 18-point mirror cell and a 4-vane spider made by Brent Holt, and the woodworking services of Bob Arr.

Possible additional features (depending on funding availability, and to be prioritized by consensus) include:

- A dew-heater for the secondary mirror holder
- A 2" filter slide for the focuser
- A portable "stair-case" to replace the currently-used step-ladder

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Bob's constraints in the redesign included shortening the effective length of the truss poles when the telescope is apart for transport, and keeping the mirror box (with altitude bearings) no taller than the current version, again for transport purposes. When the mirror box is not in the rocker box (as appropriate for transport), the tips of the altitude bearings will be 34" from the ground, the same as they are currently. The steel flotation cell will increase the weight of the new mirror box assembly from the current 60 pounds to 90 pounds.

Erik moved and Bill seconded that the club begin collecting funds for modifications and improvements to the 20", and that as soon as we have \$500 in hand (not just pledged), Bob can start the purchases, modifications, and construction. Bob will post a description of the design concept to the Yahoo Group. Any additional funds collected should be put toward additional features (a dew-heater for example) as available, and as prioritized by consensus. Small amounts of additional funding (e.g., \$23 leftover) would devolve to the SMAS project fund to be used for further and future upgrades. The motion was unanimously approved. Erik Iverson volunteered to coordinate pledges and take in donations.

The Wiz

Dear Wiz,

Sometimes I just get bored. New telescopes don't interest me, I'm not hardly interested in the ones I've got, and about the last thing I want to do is drag all that stuff out and go stand up all night. What's wrong with me?

C. Otluq

Dear Chitty,

Tired blood. My wife's second cousin, Tabatha, had it. She tried Alka-Seltzer to add fizz to her life, Special K to improve her looks, and Geritol to tune up her metabolism. Now she gets a lot of looks standing in the checkout lane at Winn-Dixie, as her body emits a low, barely audible humming sound. And she belches a lot.

But she eventually did recover, thanks to her astronomy club, the South Carolina Ulalating Fantasy Finders Astronomical Society, affectionately known as the SCUFFASes. They insisted she go to their July star party despite her ennui. They had a surprise for her.

It was their long-forgotten 20" dob, discovered in an old potato cellar, and fully restored. The mirror had been ground in 1850, using a converted millstone driven by a mule. Figuring had been done by bare, calloused skin, the hands of the descendants of that mysterious African tribe, the Dogons, whose mythology included astronomical lore about Sirius and the moons of Jupiter.

They blindfolded Tabatha, and led her to an observing stool next to the telescope. Then they surrounded her so that she could see nothing as they removed the blindfold, and

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told her to look in the eyepiece.

There were seconds of confused silence, as she fumbled with the focuser. Suddenly, she gasped (or belched big, there is some uncertainty) and fainted dead away. They carried her home.

When she awoke three days later, everyone knew she was a changed woman. Gone were the blahs, and her eyes had that steely aura of Tiger lining up a 30 footer. From then on, everything she did she did with gusto and enthusiasm, ever focused on returning to that instrument of liberation. And of course, blazoned in red across her forehead, was the message

M22!

Da Wiz

Deep Impact

Date of impact: July 4th 2005

Time of impact: 1:52 am Eastern time. Start watching early!

Comet magnitude: 9.3, predicted to brighten to magnitude 6!

S&T Guide:

http://skyandtelescope.com/observing/highlights/article_1522_1.asp

Charts:

<http://www.griffithobs.org/comettempel.html>

<http://neo.jpl.nasa.gov/news/news145.html>

Telescope Size:

<http://deepimpact.umd.edu/amateur/beginner/sec5.shtml>

Sketch of how comet looked back in May

http://deepimpact.umd.edu/amateur/view_gallery.cfm?obsnID=1322

How deep a crater:

http://www.planetary.org/deepimpact/di_crater.html

NASA FAQs:

<http://deepimpact.jpl.nasa.gov/faq.html>

<http://deepimpact.jpl.nasa.gov/faq1.html>

<http://deepimpact.jpl.nasa.gov/faq2.html>

<http://deepimpact.jpl.nasa.gov/faq3.html>

<http://deepimpact.jpl.nasa.gov/faq4.html>

<http://deepimpact.jpl.nasa.gov/faq5.html>

Who discovered the comet?

<http://deepimpact.jpl.nasa.gov/science/tempel1-discoverer.html>

Good hunting & enjoy the fireworks—Pete

**Sasquatch Comparison
Chart**

Comparison	Obsession	Starmaster	Sasquatch
Primary mirror manufacturer	Galaxy Omi-Torus	Zambuto	Geo. Weems SMAS, 1982
Type of glass	Pyrex	Pyrex	Pyrex
Thickness of glass	2"	1.6"	1.165"
Coating	Enhanced Alum	IAD	IAD
Reflectivity	96%	91%	91%
f/Ratio	5.0	4.3	5.3
Focal length	~100"	86"	106"
Secondary cage diameter/height	25"D x 13"	25"D x 13"	25"D x 14"
Eyepiece height at zenith	~96"	86"	96"
Truss pole length	~70"	62"	70"
Tubing	1.25"OD x .035"	1.25"OD x .049"	1.25"OD x .049"
Mirror box width/depth/height	31x29 x 27	29x29 x 27	31x29 x 26
Mirror box weight w/mirror & cell	100	100	90
Mirror cell material	Stainless	Stainless	Stainless
Flotation points	18	18	18
Tracking/Goto	None	None	None
Price (shipping additional)	\$5,995	\$7,495	\$500?

July 2005

SUN	MON	TUE	WED	THU	FRI	SAT
<div style="border: 1px solid black; padding: 5px;"> 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 </div>					1	2 SMAS Star Party Unicoi Crest TAO
3	4 4th of July  Deep Impact	5	6 <i>New Moon</i>	7	8 SMAS Meeting PSTCC Rm 223 7 pm	9 SMAS Star Party Look Rock #4
10	11	12	13	14	15 UTK	16 TAO
17	18	19	20	21 <i>Full Moon</i>	22	23
24	25	26	27	28	29	30
31						