



AU AstroNews

The Newsletter of the Astronomical Unit

August 2014

Sponsored by the Santa Barbara Museum of Natural History



The SBAU is honored to have Daniel Godinez, one of our high school club members, excel in the field of astronomy. Among his accomplishments are: an honor student in the challenging Baccalaureate program at Dos Pueblos High School, a member of UCSB's Research Mentorship Program, an astronomy tutor at SBCC, and an Astronomy Programs Assistant at the SB Museum of Natural History. Daniel was recently presented with the Distinguished Scientist-Scholar Award (a full 4-year tuition) to Bard College, Annandale-on-Hudson, New York. In a show of support and appreciation, the SBAU has awarded Daniel a \$750.00 grant. Congratulations, Daniel!

OUTREACH SUMMARY

Since the last newsletter, AU volunteers Angela Bates, John Boyd, Tim Crawford, Zak Dafaallah, Coni Edick & Joe Doyle, Mike Farris, Daniel Godinez, Ruben Gutierrez, Art Harris, Ken Kihlstrom, Pat & Chuck McPartlin, Janet & Martin Meza, Bruce Murdock, Max Neufeldt, Edgar Ocampo, Javier Rivera & the Quasars, Colin Taylor, Tom Totton, Chris Ulivo, Tom Whittemore,

and Linda & Harold Yarbrough showed cool astronomy stuff to 1855 visitors.

OUTREACH FOR AUGUST

Here are the AU events scheduled so far for August. Events are subject to change, so to get the latest information on schedules, or directions, just contact Chuck at 964-8201 or macpuzl@west.net

FRIDAY, AUGUST 1, 7 PM

AU monthly meeting in Farrand Hall at SBMNH.

SATURDAY, AUGUST 2, SETUP 8 PM

Telescopes for campers at Cachuma Lake Campground. We set up on the grassy field at Dakota Plains.

TUESDAY, AUGUST 5, SETUP 8 PM

Telescopes for Carpinteria State Beach. We set up on the bike path between the RR tracks and their ranger station.

WEDNESDAY, AUGUST 6, SETUP 8 PM

Telescopes for the UCSB Associated Student Body, in the courtyard of the Manzanita Residence Hall. Contact Chuck if you want to come, since we need to arrange parking permits.

THURSDAY, AUGUST 7, SETUP 7 PM

Telescopes for Bacara Resort and Spa. We set up on the Miro Lawn, on the bluff overlooking the ocean.

FRIDAY, AUGUST 8, SETUP 8 PM

Telescopes for a Boy Scout troop at the Figueroa Mountain campground.

SATURDAY, AUGUST 9, SETUP 9 AM

Astrovaganza all day at SBMNH. Booths for general astronomy information, mirror & telescope making, meteorites, equipment & AU accessories sales during the day, and star party in the evening. Come out and help, and the AU will subsidize your lunch up to \$10. Come in an astronomy-related costume!

TUESDAY, AUGUST 12, SETUP 7 PM

Telescope Tuesday at the Camino Real Marketplace in Goleta. We set up in the plaza next to the theater.

WEDNESDAY, AUGUST 13, LEAVING SBMNH AT 7:30 AM AU BUS TRIP TO THE CALIFORNIA SCIENCE CENTER.

THURSDAY, AUGUST 14, SETUP 7 PM

Telescopes for Bacara Resort and Spa. We set up on the Miro Lawn, on the bluff overlooking the ocean.

FRIDAY, AUGUST 15, SETUP 7:30 PM

Monthly Public Telescope Night at Westmont College, at the observatory, next to the baseball field.

SATURDAY, AUGUST 16, SETUP 8 PM

Telescopes for campers at Cachuma Lake Campground. We set up on the grassy field at Dakota Plains.

MONDAY, AUGUST 18, DAWN

Venus and Jupiter in a very close pairing low in the east.

THURSDAY, AUGUST 21, SETUP 7 PM

Telescopes for Bacara Resort and Spa. We set up on the Miro Lawn, on the bluff overlooking the ocean.

SATURDAY, AUGUST 23, SETUP 7 PM

Telescopes for Refugio Beach State Campground, in the day use parking lot, southwest corner.

THURSDAY, AUGUST 28, SETUP 7 PM

Telescopes for Bacara Resort and Spa. We set up on the Miro Lawn, on the bluff overlooking the ocean.

SATURDAY, AUGUST 30, SETUP 8 PM

Telescopes for campers at Cachuma Lake Campground. We set up on the grassy field at Dakota Plains.

SO YOU WANT TO PHOTOGRAPH THE STARS? – Part V

Dr. Bob Richard.

After looking at how to develop a positive attitude of patience and perseverance toward

astrophotography, looking at the basics of telescope optics as they affect making good images, and most recently taking a brief look at the cameras available to amateurs, we'll now look at another essential cog in the astrophotography wheel: the telescope mounting. With the exception of taking short exposure images of bright objects (like the moon or brighter planets) only an equatorial mounting will do since only it can track celestial objects accurately. This accuracy is absolutely necessary for long exposures of several minutes or more. Furthermore, few but the most expensive and rigid mountings are capable of guiding for extended periods on their own and need the assistance of a guidance system, often a secondary telescope mounted piggy-back on the main scope with its own camera centered on a guide star. Using the guide star, the minute variances in the telescope's drive are detected by the guidance system and corrections are fed to the drive system via a computer program to automatically correct these variances so that all images in the field remain crisp with no trails. Equatorial mountings come in two basic designs: German equatorial (GEM) and yoke. Of the two, the GEM is preferred for its rigidity. However, an advantage of the yoke is that objects can be continuously imaged through the meridian to the horizon without stopping, something not possible with a GEM. Equatorial mountings vary widely in price from a few thousand to many thousands of dollars. Generally speaking, the more expensive the mounting the more precise and sturdy it is. However, good results can be had with relatively inexpensive mountings found on many commercial scopes produced by Celestron, Meade, Vixen, and others. Very helpful is a Go-To mount that allows faint objects to be placed in the center of the field ready to be imaged. This option should be seriously considered when selecting a mounting.

From the Workshop...

Tim Crawford

I may have mentioned it before, but I will say it again: crafting a telescope mirror is an elegant process! It will test every part of your dexterity, knowledge, and imagination. No matter how large the mirror, its figure is finished by hand. These are the best tools you will ever use! As a case in point check out the article,

<http://www.astro.caltech.edu/palomar/images/mirror.polish.jpg>.

I hope that I don't sound like a broken record, but you will never make anything more precise than a telescope mirror!

Question: how do you test your mirror as you are polishing it out? In the workshop we use two tests. The first is a qualitative one called the Ronchi test. The second test is quantitative, known as the Foucault or knife-edge test. Each test is conducted at the radius of curvature of the mirror where a point source of light from the tester returns to the tester. You can think of the light source as the hub of a bicycle wheel and the returning light as the spokes on the wheel. The tester should also have the capability of allowing the light source to move toward and away from the mirror. In the case of the Foucault test, this advance or retreat of the source should be measurable in thousands of an inch where the measurement is read with the aid of a micrometer. What is fascinating about each of these tests is the fact the virtual image of the mirror – located at the position of the mirror – is amplified some 60,000 times. Because of this, small features on the surface of the mirror can easily be diagnosed with the movement of the micrometer!

For this article, though, let's concentrate on the Ronchi test alone, where a small lined screen intercepts the returning light. For most small mirrors a screen with a frequency of 100 lines per inch is sufficient. The figure below shows the returned light pattern for a perfectly spherical mirror. The vertical lines should make sense since a spherical surface will return all the light from the source back to the source. In short, parallel lines return as parallel lines.



Of course, we don't want to produce a spherical mirror since we are designing an astronomical mirror whose targets lie at infinity. We want a

parabolic mirror. And this fact throws a wrench into the works. To be brief, the returning light from our source will have curved shapes whose curvature is determined by the focal ratio of our mirror and the position of the tester. More about this in the next issue!

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August 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1 SBAU MEETING 7PM	2 CACHUMA LAKE 8PM
3	4	5 CARPINTERIA STATE BEACH 8PM	6 UCSB 8 PM	7 BACARA RESORT 7PM	8 FIGUEROA MOUNTAIN CAMPGROUND 8PM	9 ASTRO- VAGANZA 9AM SBMNH
10	11	12 CAMINO REAL MARKETPLACE 7PM	13 BUS TRIP! 7:30AM SBMNH	14 BACARA RESORT 7PM	15 WESTMONT COLLEGE 7:30PM	16 CACHUMA LAKE 8PM
17	18 AT DAWN: VENUS DATES JUPITER!	19	20	21 BACARA RESORT 7PM	22	23 REFUGIO STATE BEACH 7PM
24	25	26	27	28 BACARA RESORT 7PM	29	30 CACHUMA LAKE 8PM
31						

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