



AU AstroNews

The Newsletter of the Astronomical Unit

July 2014

Sponsored by the Santa Barbara Museum of Natural History



Paul Winn helps at a recent mirror-making workshop. Photo: Bruce Murdock.

OUTREACH SUMMARY

Since the last newsletter, AU volunteers Angela Bates, Tim Crawford, Joe Doyle, Mike Farris, Daniel Godinez, Ruben Gutierrez, Art Harris, Audree Hashibe, Jared K, Sean Kelly, Chris Larson, Pat & Chuck McPartlin, Janet & Martin Meza, Bruce Murdock, Max Neufeldt, Edgar Ocampo, Yvonne & Tenaya & Craig & Kenyon Prater, David Salvia, Tom Totton, Tom Whittemore & Sam Goodwin, and Linda & Harold Yarbrough showed good stuff in the sky to 857 visitors.

OUTREACH FOR JULY

Here are the AU events scheduled so far for July. 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

WEDNESDAY, JULY 2, SETUP 8 PM

Telescopes for summer students at the the Music Academy of the West, on the soccer field at Cate School, 1960 Cate Mesa Rd, in Carpinteria.

THURSDAY, JULY 3, SETUP 7 PM

Telescopes for Bacara Resort and Spa. We set up on the Miro Lawn, on the bluff overlooking the ocean. Contact Chuck for access if you haven't come before.

SATURDAY, JULY 5, SETUP 8 PM

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

MONDAY, JULY 7, SETUP 8 PM

Telescopes for kids at Camp Whittier, 2400 Highway 154, a left turn at the curve just before the Cachuma Lake Campground entrance.

TUESDAY, JULY 8, SETUP 7 PM

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

THURSDAY, JULY 10, SETUP 7 PM

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

FRIDAY, JULY 11, 7 PM

AU meeting in Farrand Hall at SBMNH. We've decided to try meeting every month! Hear about "Meteorites, Tektites, and Comets" by David Feinberg, a past Federal Parks naturalist and current SBMNH docent.

FRIDAY, JULY 11, SETUP 8 PM

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

SATURDAY, JULY 12, 6 PM.

Planning meeting in the classroom next to Javier's office at SBMNH. Come plan your club's activities. All are welcome.

SATURDAY, JULY 12, 8 PM.

Monthly Public Star Party, next to Palmer Observatory at SBMNH.

TUESDAY, JULY 15, SETUP 8 PM

Telescopes for kids at Camp Whittier, 2400 Highway 154, a left turn at the curve just before the Cachuma Lake Campground entrance.

THURSDAY, JULY 17, SETUP 7 PM

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

FRIDAY, JULY 18, SETUP 7:30 PM

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

SATURDAY, JULY 19, SETUP 8 PM

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

WEDNESDAY, JULY 23, SETUP 8 PM

Telescopes for summer students at the Music Academy of the West, on the soccer field at Cate School, 1960 Cate Mesa Rd, in Carpinteria.

THURSDAY, JULY 24, SETUP 7 PM

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

SATURDAY, JULY 26, SETUP 8 PM

Telescopes for Carpinteria State Beach. We set up in the grassy area between the RR tracks and their ranger station.

THURSDAY, JULY 31, SETUP 7 PM

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

SO YOU WANT TO PHOTOGRAPH THE STARS? – Part IV

Dr. Bob Richard.

In last month's column I mentioned hanging a camera on the end of a telescope. But what kind of camera? Digital cameras come in a bewildering number of shapes and sizes with widely varying cost. You can begin very inexpensively with snapping photos of bright objects through an eyepiece with a cell phone camera, or you can purchase very expensive cameras totally dedicated to use with a telescope. In the world of more serious astrophotography cameras are usually limited to three types: CCD, DSLR, and video cameras. CCD (Charged Couple Device) cameras were initially developed for the professional

astronomical community, especially in connection with the Hubble telescope, and are now in wide use in the amateur community. They are the most expensive and complicated to operate, but can give very satisfying results. DSLR (Digital Single Lens Reflex) cameras have come on the scene relatively recently, but advances in technology have made them a viable choice for getting some excellent astrophotos. They are considerably easier to use than CCD cameras, are much less expensive, plus they can be used for terrestrial photography. They are suitable for taking photos ranging from the moon to distant galaxies and so are very versatile when carefully partnered with a telescope. Video cameras are especially useful for getting many frames of the moon and planets, the best of which are stacked to produce a detailed, high-resolution image. My choice has been Canon Rebel DSLR cameras, which I use exclusively. These cameras are relatively light weight, inexpensive (body only), and very versatile. Please see my website, www.imagesfromthecosmos.net, for more on using these cameras and the photographic results. However, if your bent is toward doing primarily deep-sky photography, CCD cameras hold an edge in terms of the ability to capture fine details in nebulae and galaxies.



Getting ready for an outreach at Lake Cachuma. Photo: Bruce Murdock.

From the Workshop...

Tim Crawford

I believe we are at a point where we talk about polishing and testing. Before we do, I am going to take a brief aside and tell a good story - the story of the Hubble Space Telescope and what happened to it. I will not go into specifics of how the testing was done. Instead, I'm going to tell you what happened and how a "shower" solved a giant problem. The Hubble telescope became a political football for a time as the huge cost was viewed as

wasted money because the main mirror was flawed, and seemingly beyond correction.

The Hubble mirror was finished and figured on a ground floor room. Above this was a small, rather awkwardly situated room. This small upper room housed the testing equipment. This design made it possible to test the mirror in place, so there was no need to pick up the heavy mirror and put it on a testing rack. Instead, they only needed to open access to the test apparatus. The "Null Corrector" was an arrangement of mirrors and lenses held to each other with specific-length rods. The only problem was the "field caps" covering the ends of the rods. Reflections from these field caps introduced a 1.3 mm error into the optics. This error was overlooked due to pressures to finish the mirror. The damage was done. The outer edges of the mirror were over-corrected or too flat.

So, when the Hubble Space Telescope saw "first light" there was much consternation as to what happened. The views were terrible. How do you go about fixing something like this? Replace the main objective, or replace the corrector mirror, or use a series of corrective mirrors with the instruments on board? Any of these techniques should work but there was no way to get it done. Think of the spacesuits of the astronauts with their big bulky gloves. In principle there was no way to delicately replace the mirrors.

In Europe a Strategy Panel met to address the different ways of fixing the problem. Jim Crocker, an engineer by training, thought if they could fix the cameras it would solve the problem. Maybe they could place corrective mirrors in front of the camera? But there were several instruments on board. One mirror would not fit all of the instruments' needs. He went back to his room one night thinking hard on the subject and went to take a shower. The European shower system was unlike those found in America. A rod holds a showerhead in place. The showerhead can slide up or down to adjust to the height of the person in the shower. During the day, the maids slid the showerhead all the way to the bottom of the rod. As Crocker slid the shower head up and pivoted it outward to be over his head, he had a vision of several different "showerheads" swinging into position with their corrective mirrors in the light path between Hubble's secondary and the science instruments. If

they sacrificed one of the first generation instruments in place and plugged in this corrective mirror unit, it would fit the simple kind of maintenance the Hubble team had planned for decades. It would work. In fact, and as you may recall, it worked perfectly. Moral of this story: you just never know when or where a solution to a problem will present itself!

AU Information Box

President: Mike Farris 637-3300
president@sbau.org

Vice President: Tom Totton 562-8795
vicepresident@sbau.org

Secretary: Colin Taylor 967-8140
dancingmagpie@cox.net

Treasurer: Tim Wittenburg
treasurer@sbau.org

Equipment: Art Harris 968-4017
n6is@cox.net

Outreach: Chuck McPartlin 964-8201
outreach@sbau.org

Newsletter: Tom Whittemore 687-2025
kometes@aol.com

Refreshments: Janet & Martin Meza 450-8383

Webmaster: Paul Winn 886-2319
webmaster@sbau.org

SBMNH Astronomy Programs Manager

Javier Rivera 682-4711x173
jrivera@sbnature2.org

AU AstroNews, the monthly publication of the **Astronomical Unit (AU)**, is mailed to the AU membership. For publishing consideration for the next month, submit astronomical items by the 20th of the current month!

AU annual membership rates:
Single = \$15 Family = \$25

AU mailing address:

Astronomical Unit
c/o Santa Barbara Museum of Natural History
2559 Puesta Del Sol Road
Santa Barbara, CA 93105-2998

On the Web: <http://www.sbau.org>

July 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1	2 CATE SCHOOL: MUSIC ACADEMY STUDENTS 8 PM	3 BACARA RESORT 7 PM	4 	5 CACHUMA LAKE 8 PM
6	7 CAMP WHITTIER 8 PM	8 CAMINO REAL MARKETPLACE 7PM	9	10 BACARA RESORT 7 PM	11 SBAU MEETING 7PM REFUGIO 8 PM	12 PLANNING MEETING 6PM STAR PARTY 8 PM SBMNH
13	14	15 CAMP WHITTIER 8 PM	16	17 BACARA RESORT 7 PM	18 WESTMONT COLLEGE 7:30 PM	19 CACHUMA LAKE 8 PM
20	21	22	23 CATE SCHOOL: MUSIC ACADEMY STUDENTS 8 PM	24 BACARA RESORT 7 PM	25	26 CARPINTERIA STATE BEACH 8 PM
27	28	29	30	31 BACARA RESORT 7 PM		

The Astronomical Unit

c/o Santa Barbara Museum of Natural History
2559 Puesta Del Sol Road
Santa Barbara, CA 93105-2998