



# AU AstroNews

## The Newsletter of the Astronomical Unit

May 2014

Sponsored by the Santa Barbara Museum of Natural History



*Tim Crawford captured this spooky image of the eclipsed Moon at Westmont through the eyepiece of an 11" telescope. 500 people were estimated to have attended this special "Blood Moon" outreach!*

### **OUR MAY MEETING**

Our guest speaker for May 2<sup>nd</sup> will be NASA/JPL scientist, George L Carlisle. George's talk is titled "Futures Past, Futures Present: The Past and Future of the Space Program." It promises to be a wonderful review of space mission possibilities using images from early science fiction and space science to the space programs of the future, actual and theoretical.

### **OUTREACH SUMMARY**

Since the last outreach report, intrepid AU astronomy volunteers Angela Bates, Adrian Conrad, Tim Crawford, Mike Farris, Ruben Gutierrez, Art Harris, Jürgen Hilmer, Zanna Lucy, Pat & Chuck McPartlin, Janet & Martin Meza, Bonnie & Bruce Murdock, Max Neufeldt, Edgar Ocampo, Bob Richard, Javier Rivera & the Quasars, David Salvia, Tom Totton, Chris Ulivo, John West, Barry White, Tom Whittemore & Sam Goodwin, Patricia & Jerry Wilson, Paul Winn, and Linda & Harold Yarbrough showed neat stuff in the sky to **1598 people**.

### **MAY EVENTS**

Here are the AU events scheduled so far for May. Don't forget Astronomy Day! To get the latest information on schedules, or directions, just contact Chuck at 964-8201 or [macpuzl@west.net](mailto:macpuzl@west.net)

#### **FRIDAY, MAY 2, 7 PM**

Monthly meeting in Farrand Hall at SBMNH. Start with a quick planetarium show by Javier, then hear about space exploration history.

#### **SATURDAY, MAY 3, 7:15 PM**

Lecture in Fleischmann Auditorium at SBMNH by David Seidel of JPL on 48 Years of Astronomy & Space Exploration, to send Fred Marschak off on his retirement. This event is free to the public, but does require a reservation, which can be made at: <http://www.sbnature.org/tickets/eventdetail.php?eventid=155>

#### **SATURDAY, MAY 10, SETUP 9 AM**

International Astronomy Day at Camino Real Marketplace, 10 AM to 10 PM. Come and help out at our biggest outreach of the year!

#### **TUESDAY, MAY 13, SETUP 7 PM**

Telescope Tuesday at the Camino Real Marketplace in Goleta. We set up in the central plaza by the theater.

#### **FRIDAY, MAY 16, SETUP 7:30 PM**

Telescopes for the monthly Public Telescope Night at Westmont College, at their observatory next to the baseball field.

#### **MONDAY, MAY 19, SETUP 8 PM**

Telescopes for Carpinteria Family School Science Camp, at El Capitan State Beach. Campsite is TBD.

### **THURSDAY, MAY 22 - MONDAY, MAY 26**

Annual RTMC Astronomy Expo at Big Bear Lake, and Starlight Festival in Big Bear. Hang out with 2000 or so of your favorite amateur astronomers at 7000 feet.

### **SATURDAY, MAY 24, EARLY MORNING**

Potentially good meteor shower from fragments of comet 2009/P LINEAR.

### **WEDNESDAY, MAY 28, SETUP 8 PM**

Telescopes for campout by Peabody School first graders at El Capitan Canyon Resort. Campsite is TBD.

### **THURSDAY, MAY 29, SETUP 4 PM**

Telescopes for a Science Fair at Franklin Elementary School, 1111 E. Mason Street in Santa Barbara, from 5 to 6:30 PM.

## **SO YOU WANT TO PHOTOGRAPH THE STARS – Part II?**

*Dr. Bob Richard.*

In the first article I shared some of my background in astrophotography and what I learned about developing a helpful mental attitude in order to be successful in this effort. Now we'll look at some of the ways this amazing universe can be photographed from our backyards. Perhaps the easiest place to start is by putting a digital camera on a fixed tripod, set the camera's ISO level at 1600 or 3200, manually focus the lens at infinity, and open the shutter for 15-30 seconds at F/1.8 to 3.5. In most situations, longer exposures will cause the stars to trail. Using a 10 to 20 mm wide-angle lens can provide in dark skies some beautiful shots of the Milky Way or a Lunar eclipse. And you'll also be able to photograph various constellations using shorter exposures that allow the brighter stars of the constellations to stand out against a less dense starry background. This photography requires only one shot for each sky area and no complicated processing. Give it a try! If you want to become more sophisticated with tripod photography you can buy a motor driven mount that will compensate for the earth's motion, allowing you to take long exposures without star trails. By using a Lumicon Deep Sky Filter, or similar, in front of the lens you'll be able to knock down a lot of the ambient city light and record fainter nebulae. Important note: To eliminate camera vibration, be sure to use either

a time delayed shutter opening or a remote shutter-triggering device.

Of course, if you want much more detailed views of everything celestial the only way to go is using a telescope. For those of you who are camera buffs, you already know a lot about how a telescope will perform connected to your camera. In truth, a telescope is nothing more than a huge telephoto lens. In every regard your telescope will follow the same optical laws and parameters as a telephoto lens. There is, however, a major difference between using a telephoto lens and a telescope. With few exceptions such as very bright objects (like the Moon), images made through a telescope are of faint objects and require exposures of many seconds and often minutes in order to collect enough photons on the camera's detector to show any detail. So, a mounting with a motor driving the telescope on an accurately aligned polar axis at exactly the same speed opposite to the rotation of the earth is an absolute requirement for long exposure astrophotography. In my next article I'll be looking at some of the basic photographic parameters you need to know to make great photos.



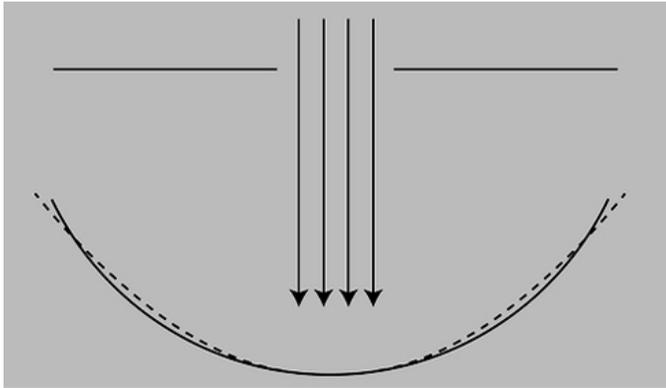
*Tim Crawford diagnoses the quality of a mirror at a recent mirror-making workshop. Photo: T. Totton.*

### ***From the Workshop...***

*Tim Crawford*

Starlight comes to our telescopes from afar – essentially from infinity. This means that light comes to our scopes as parallel light. So, if we finish with a spherical mirror, will this be good enough? It turns out that, since we need this parallel light to converge to a point, we need our finished mirror to have the shape of a parabola. In the figure below the solid line represents a sphere, and the dotted line, a parabola. Imagine that the

parallel rays of light fall onto the surface of these two figures. What happens to them after reflection? For the sphere, these rays do not come together at one point. But, in the case of the parabola, they do. Recall that in a previous article, you were asked to stand at the center of a sphere, holding a candle and to watch what happens to the reflected light. Since this light emanates from a single point (the radius of



curvature of the sphere), it returns to this point after reflection. Starlight doesn't enter our telescopes from one point. So, ultimately, we have to change our mirror's figure to that of a parabola. How do we do this in our optical shop?

It turns out we achieve different shapes for our mirror's surface by using different grinding patterns as we fashion our mirror. There are many resources you can go to that demonstrate these principles. One great one is the Stellafane website at [www.stellafane.org](http://www.stellafane.org). Let's get back to business: we have our 8" flat blank and our grinding tool. For simplicity let's assume our tool is a piece of plate glass covered with tiles glued to the glass. Begin by placing the tool face-up on the work surface. Spray a little water on it and sprinkle its surface with 60-grade Silicon Carbide. To preferentially grind the middle of your mirror, start with the chordal stroke. The mirror is always on top for this stroke. And the tool is always on the bottom. Much of the mirror "hangs over" the edge of the tool so that the center of your mirror will frequently pass over the outside of your tool. This will cause more wear on the center of your mirror and, likewise, more wear on the outer regions of your tool. Your mirror becomes concave as your tool becomes convex. Walk around your work as you grind. As you move

around your work in a clockwise fashion, turn your mirror counter-clockwise. This "organized randomness" is actually the secret to mirror grinding. To me, it is one of the processes that, although simple, makes this process so elegant.

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#### AU annual membership rates:

**Single = \$15 Family = \$25**

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**May 2014**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2 SBAU GENERAL MEETING 7PM	3 FRED MARSCHAK RETIREMENT TALK 7:15PM
4	5	6 	7	8	9	10 ASTRONOMY DAY 10AM- 10PM
11	12	13 CAMINO REAL MARKETPLACE 7PM	14 	15	16 WESTMONT COLLEGE 7:30PM	17
18	19 CARPINTERIA SCIENCE CAMP 8PM	20	21 	22 RTMC	23 RTMC	24 RTMC METEOR SHOWER!
25 RTMC	26 RTMC	27	28 PEABODY SCHOOL CAMPOUT 8PM 	29 FRANKLIN ELEMENTARY 4PM	30	31

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