



# San Francisco Amateur Astronomers

The Randall Museum  
199 Museum Way, San Francisco 94114

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## BULLETIN FOR AUGUST 1990

Date: WEDNESDAY, AUGUST 15  
Time: 8:00 P.M.  
Place: Auditorium, THE RANDALL MUSEUM  
Speaker: LARRY MCCUNE  
SONOMA COUNTY ASTRONOMICAL SOCIETY  
Topic: "STRIKING SPARKS"

Larry McCune is a safety engineer with PG&E and a member of the Sonoma County Astronomical Society (SCAS), the Mount Tam Observers and the Sacramento Valley Astronomical Society. He is an active participant in SCAS' "Striking Sparks" project to build telescopes and promote astronomy among school children in Sonoma County.

The SCAS awards 10-15 telescopes every year to elementary and junior high students nominated by their teachers and who submit short essays on why they want a telescope. Club members fabricate all telescope parts except eyepieces and viewfinders. Larry himself designed and builds the Dobsonian mounts. Other members do fundraising, secure sponsors and hold rummage sales to help finance the project.

Larry will be talking about the Striking Sparks project, which received a special award for outstanding achievement at the Riverside Telescope Makers' Conference this year.

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CONGRATULATIONS to the Bernal Hill Sidewalk Astronomer, Tom Kellogg, whose article, "Sidewalk to the Stars", appeared in the August issue of Sky & Telescope. Don't miss it!

## STAR PARTY AT ROCK SPRINGS AUGUST 18

Don't miss the club's next star party at Rock Springs on Mount Tamalpais on Saturday, August 18. Beginning at 8:00 pm in the nearby Mountain Theater, Dr. Damon Simonelli of NASA-Ames Research Center will be speaking on "Planetary Exploration on the Rebound-Magellan, Galileo, and Beyond". Afterwards we'll be exploring the splendors of the Summer Milky Way. Join us!

## FIELD TRIP TO LICK OBSERVATORY

Plans are being finalized for the club's field trip and star party at Lick Observatory on August 25. For the latest information, call Bob Levenson at 468-3592.

## MT TAM STAR PARTY REPORT - by Ray Cash-Le Penne

If you attended the June 23rd Star Party, I don't have to tell you what a great night it was! The weather was ideal : warm, no wind - seeing was very good -- probably the best I've seen it up there. The City was covered in fog, so we were treated to much darker skies than usual. Best of all, the turnout was excellent : lots of enthusiastic observers and a wide variety of equipment to gaze through.

June is a particularly good time to observe : the Western sky is still full of the wonders of Spring (mainly Galaxies), while the Summer skies rise with enough variety to knock your socks off! Excellent Open Clusters, Globulars, Planetaries, Double Stars, Diffuse Nebulae, Galaxies and Planets (Saturn, Neptune, Uranus) are beautiful to behold. Indeed, instead of hunting down some fainter, lesser known bodies, I found myself gazing longer at (and helping others locate) the well known ones!

## SFAA MEMBERSHIP BENEFITS

Membership dues increase to \$20 per year this month. SFAA members receive the monthly Bulletin and are entitled to free admission to all club activities, including monthly lecture meetings and star parties, field trips and the annual picnic. In addition, they may subscribe to various astronomy magazines at greatly-reduced rates. For more information, contact Chelle Beard, 32 Penhurst Avenue, Daly City 94015. Telephone 878-4965 evenings.

## BOARD MEETING

The next meeting of the SFAA Board of Directors is on Wednesday, August 8, at 8:00 pm in the library of The Randall Museum. All club members are invited to attend Board meetings.

Joel W. Goodman

This is a new column which will appear more or less regularly to keep readers abreast of the comings and goings of our solar system neighbors, and to provide some useful information about what can be seen on the planets with amateur telescopes. Saturn is prominent in the evening sky in eastern Sagittarius this month, having reached opposition on July 14, and thus offers a logical launching point for us.

The ringed planet (something of a misnomer since we now know that Jupiter, Uranus and Neptune also have ring systems, though not nearly as conspicuous as Saturn's and invisible visually from Earth) is undisputedly one of the most beautiful and awe-inspiring telescopic objects in the heavens. The ring system changes its aspect from year to year because the orbits of Earth and Saturn are inclined to one another. This means that the rings widen and narrow with a regular periodicity as seen from Earth, and twice during each revolution of Saturn around the sun (29.5 years) we pass through the plane of the ring system, at which times they briefly disappear even in large telescopes due to their extreme thinness. The next such ring passage will take place later in this decade, but this year the rings are moderately open, presenting a striking appearance in telescopes of all sizes.

A few vital statistics about Saturn will help us to better appreciate the planet when we view it through a telescope. Saturn is the sixth planet out from the sun, orbiting at an average distance of more than 750 million miles from Earth and completing one revolution (Saturnian year) every 29.5 years. It is nonetheless a conspicuous object in the night sky because it is the second largest planet (after Jupiter), with an equatorial diameter of about 75,000 miles (compared to Earth's 8,000 miles!); the span of the ring system is about twice that figure. Saturn has much less mass than its great size would lead one to expect. Its density is less than that of water, so if it could be placed in a great sea, it would float on the surface like a cork. Earth, on the other hand, with a density about 8 times that of Saturn, would sink like a stone.

What can we expect to see when viewing Saturn through a telescope? Any instrument of tolerable quality will show the rings encircling a small cream-colored globe, as well as the planet's largest satellite, Titan. Indeed, Galileo, with his crude non-achromatic refractor of 30 power, described "knobs" on either side of the planet, which he thought to be a system of three separate bodies. In the latter part of the 17th century, Cassini used a telescope of similar size, but bearing 90 power, to discover the division in the rings that bears his name. A small refractor of 2.5-3 inch aperture will show Cassini's Division clearly when the rings are open, as they are now. Such instruments may also reveal subtle shadings on the globe of Saturn under good seeing conditions, but surface (actually atmospheric) features are much more difficult to discern on Saturn than on Jupiter. Just compare the Voyager pictures of the two planets to appreciate the differences in surface contrast and detail.

When we move up to larger telescopes in the 4-6 inch range, views become dramatically more detailed. My 6-inch Newtonian reflector reveals belt detail on the globe of Saturn, in addition to resolving Cassini's Division completely around the visible portion of the rings. Cassini's is by far the most prominent division in the ring system, dividing it into outer ring A and inner ring B, but by no means the only one, as the Voyager pictures have shown us in

dramatic fashion. However, other divisions are too fine to be clearly resolved telescopically from Earth, although a division in ring A (Encke's Division) has been repeatedly described by many observers, who were vindicated when Voyager confirmed its existence. Differences in brightness across ring B are easily discernible under good observing conditions with a 6-inch telescope, as is the gossamer inner Crepe Ring, also called ring C. All in all, Saturn is indeed a uniquely breathtaking sight in telescopes of 6 inches aperture or larger.

As for Saturn's satellites, Titan dominates at magnitude 8.4, but 3 other moons, Rhea, Tethys and Dione, are brighter than magnitude 11 and within the grasp of 3-inch telescopes. Again, richer, more satisfying views are obtained with larger instruments. I have glimpsed Iapetus and Enceladus (magnitudes in the 11-12 range) with my 6-inch, giving a total of 6 satellites visible in instruments of that modest size. It can be difficult to distinguish faint satellites from background stars unless exact positions are determined from ephemerides, so some care is needed for definite identification.

I hope this gives you some appreciation of Saturn, and, particularly, an urge to get out there and see it for yourself.

OTHER ATTRACTIONS: For early risers, there will be an unusual conjunction of Venus and Jupiter in the pre-dawn sky on the mornings of August 12 and 13. On both dates, the 2 planets will be separated by about 30' of arc, or one lunar diameter. Actually, the pair will get as close as 3', at which point they will be difficult to resolve without optical aid. Unfortunately, this remarkable sight will not be visible from North America, because at that time the planets will be in the morning sky over India, Tibet and Russia.

#### CAMPBELL'S STAR - by Gordon Ridley

A surprisingly bright planetary nebula in Cygnus, is located about  $2.5^{\circ}$  north of Albireo, but few people have ever seen it. As well, few, if any, of the old-time astronomers have ever seen it. It is not listed in the NGC. Its position is plotted on Chart No. 8 of Sky Atlas 2000 and also on the older Skalnate Pleso Atlas of the Heavens, but is unlabeled on both.

Burnham's Celestial Handbook, the Webb Society's Deep Sky Observer's Handbooks and most other modern observing guides let it pass without notice. What is this planetary?

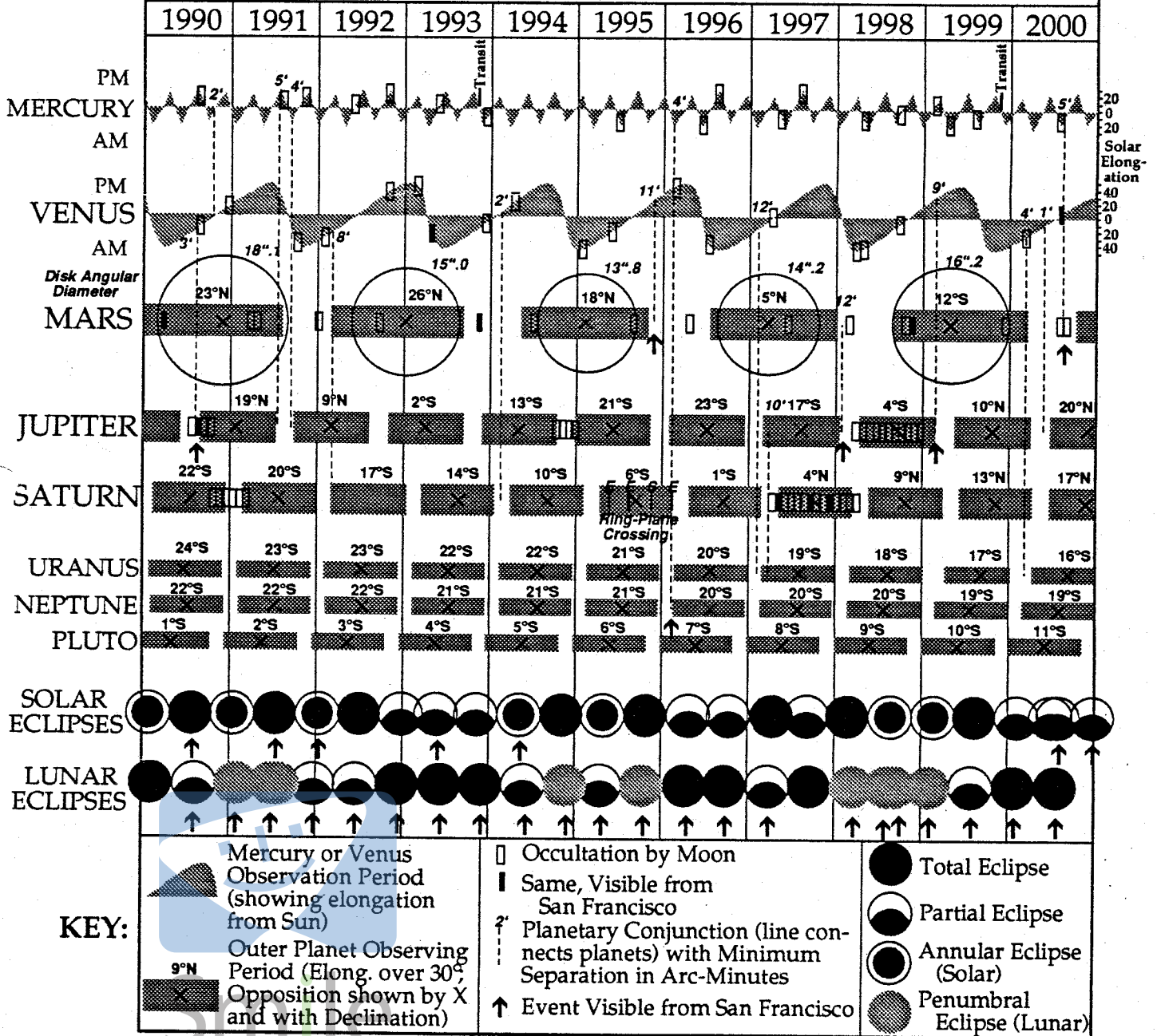
In 1893 the American astronomer William Wallace Campbell was observing through a visual spectroscope at Lick Observatory when he happened on this strange object in Cygnus. From its spectrum it was clearly not an ordinary star, but rather a tiny planetary nebula. Today we know it as Campbell's Star, although it is labeled on page 118 of Uranometria 2000 as PK 64+5.1, a designation from the Catalogue of Galactic Planetary Nebulae by L. Perek and L. Kohoutek.

Measuring only a few arcseconds across and set in one of the richest star fields around, it is easy to understand why so many have mistaken it for a star. Look for it at R.A. 19h 34.8m, Dec.  $+30^{\circ} 31'$ , Magnitude 9.6p, and size: 8".

#### BULLETIN CONTRIBUTIONS

The SFAA Bulletin is a forum in which club members may share their ideas and experiences in astronomy. We encourage you to participate and welcome your letters to the editor, announcements and articles on astronomical topics. Please send them to SFAA Bulletin, C/O Jim Shields, 190 Chilton Avenue, San Francisco 94131. Deadline is the 18th of the month.

# Solar System Events for the 1990's



COURTESY OF DR. JOHN WESTFALL

We've been talking about the 28-day revolution of the Sun. Actually, since the Sun is a gigantic ball of gas, parts at different latitudes travel at differing speeds - about 30 days near the poles and about 27 days nearest the equator. (25 days with respect to the stars.) Back in the 1850s Richard Carrington realized that some of the spots were appearing at approximately the same latitudes as had similar spots which had disappeared over the west rim many days earlier. Additionally, the time intervals between those disappearances and reappearances were the same.

This data meant nothing other than that the Sun is turning on its own axis; accordingly, official counting of the Sun's rotations began January 1, 1854. Since that time, each rotation has been thoroughly cataloged - each spot/region classified and position-recorded. (Latitude and longitude on a 360° ball with 0° being the central vertical meridian at noon every 27.3 days, counting from that magic January 1, 1854. The Sun is now in Carrington Rotation Number 1831, will be until August 4, 1990.)

But another matter of perhaps greater interest pertaining to sunspot observing was the discovery, by Hendrick S. Schwabe, that our Sun manufactures many sunspots some years and very few sunspots in other years. On careful analysis, scientists have found that throughout history our Sun has undergone cyclical changes on a fairly regular basis. We've all heard of these Solar Cycles. Now it's time to talk about them in depth.

Indeed, the solar cycle is the name given to the fall, rise and fall again in the number of sunspots. As I mentioned earlier, people seem to have been intrigued with sunspots for centuries. Nevertheless, those spots recorded before the advent of the telescope couldn't have been incorporated in the study of definite cycles because those spots had been viewed only through fogs, mist, or smoked glass. And those would only have been the very few gigantic ones which can be seen without enlargement. When Galileo turned his "optic tube" toward the Sun in 1609, he ruined his (left) eye; but he certainly gave Astronomy a jolt! By 1755, the observing and recording skills had become so exact that studies of the solar cycles back to (and including) 1854 are completely reliable. And the best part is that our small (3 and 1/2 inches-and-up) telescopes are excellent since we are able to observe all the spots necessary.

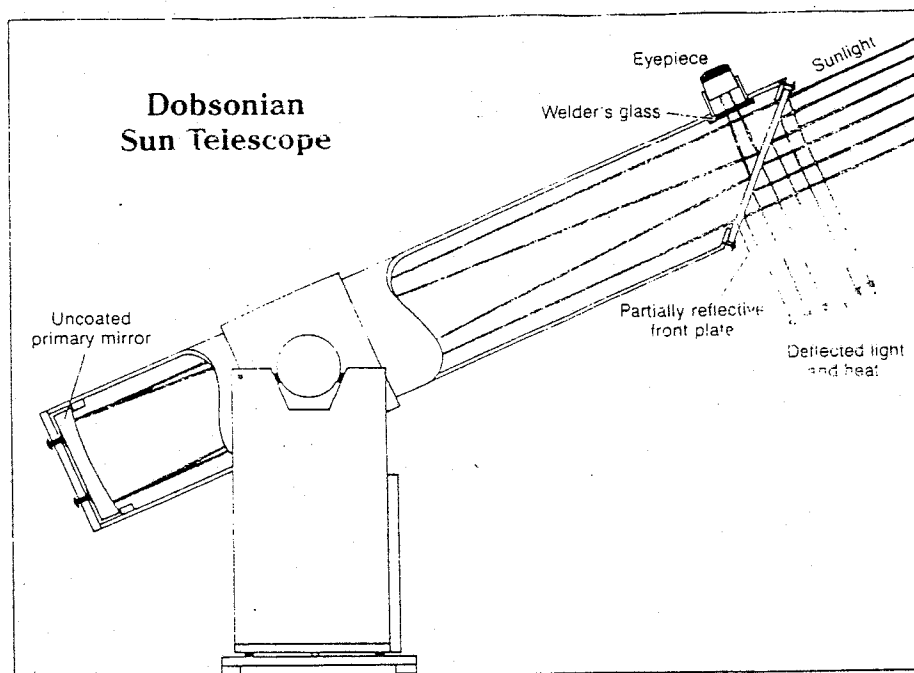
As was mentioned, the average length of the cycles is 11 years. Cycles vary between 9 years and 13.7 years. Right now, we are in Cycle 22 which began in September 1986. The scientists at the Space Environment Services Center in Boulder, Colorado predicted this would be the largest cycle in recorded history because new spots began to appear faster and in greater numbers than ever before. But, alas, it looks like we have already reached the peak two months earlier than the shortest rise ever recorded. This Cycle 22 may break a record - yes - but that may be a record for being the undisputed shortest. Although the Sun produced a respectable sunspot number - 158, fourth highest over the 22 cycles, the possibility of a speedy collapse may lend us a little more zest in the spot-watching department.

Funny thing, though; more spots have been developing lately than had appeared since last November.

Next time, we'll talk about calculating the sunspot number; there's quite a procedure. Meanwhile, you might be interested in the daily sunspot counts recorded in Sky and Telescope, at the bottom of nearly the last page of each issue - page 214 in this August issue.

## BUILDING A SUN TELESCOPE - by Ray Cash-Le Pennec

Having been intrigued by the Dobsonian Sun telescope design for some time, and desiring a safe way to observe our closest star (especially since 1990 is the peak of sunspot activity in an eleven year cycle), I decided to make a Sun telescope. John Dobson, the inventor of this design and master of simplicity, answered my questions as they arose. Sky and Telescope's (August 1989) article on the same design was also of great assistance. Below is a sketch from the above mentioned article illustrating the "guts" of a Sun telescope:



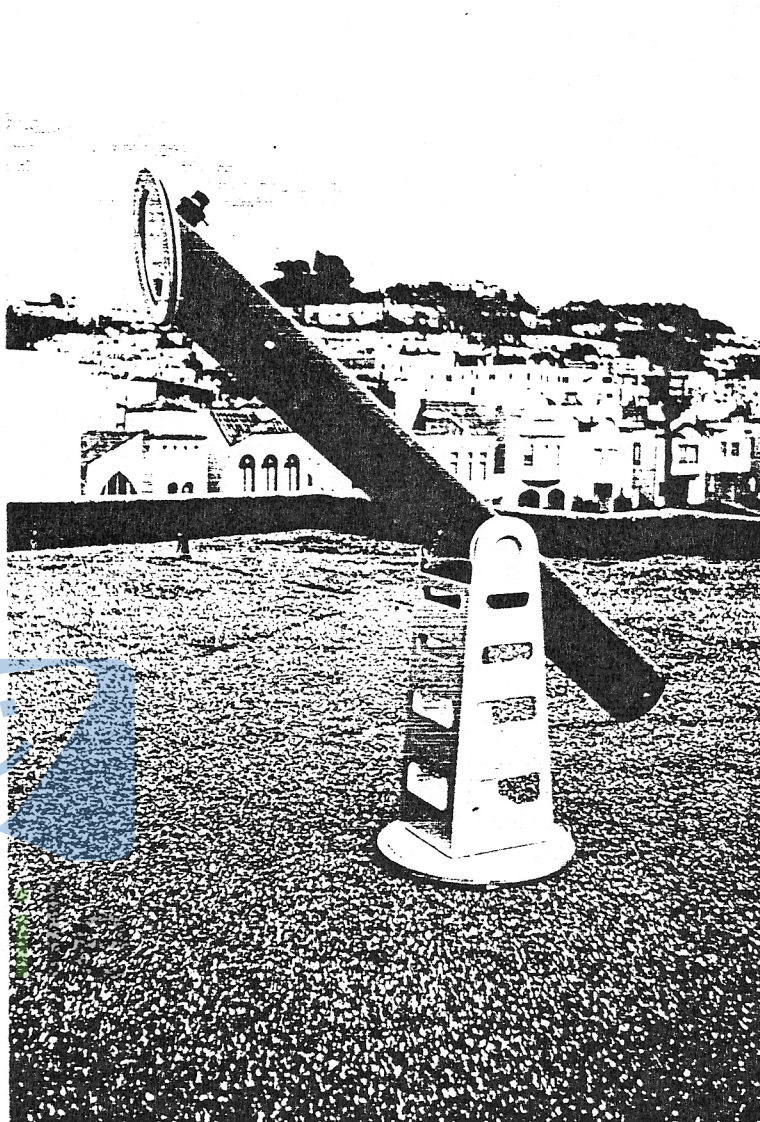
Along the way, I made a few improvements to the design myself: Instead of the usual green welder's glass, I used a plastic (non-breakable) welder's plate that is gold-coated on one side -- it does the same job as the green glass -- namely eliminate any harmful infrared or ultraviolet radiation, but the light transmission is more "natural" in color -- yielding a brownish-white Sun instead of a green one. After grinding and polishing a 6" mirror blank to a focal length of 59" and leaving it unaluminized (and unfigured, I might add), I tried to devise a way to mount it inside a 6" inside diameter sonotube (one doesn't have to worry about tube currents, since all infrared radiation -- the cause of tube currents -- comes from what you're pointing at -- the Sun). Since there is no room for a sling or "sticks" to elevate and aid the mirror in resting squarely on the collimating screws, collimation and keeping it, was a nuisance. I found a solution by making a  $\frac{3}{4}$ " circular mask that I glued in front of the mirror. I then drilled three shallow holes and glued three small springs to the mask. The front of the springs are padded with leather which press on the front of the mirror. Once collimated, I haven't had to fiddle with it since.

It is important in a Sun telescope to have your eyepiece close to both the welder's glass and to the front plate to minimize any optical

defects in either. A rack and pinion focuser usually travels too far from the welder's glass -- it is also expensive and heavy. A simple cardboard friction focuser is light and cheap, but often frustrating and fragile. I used a 2" to 1½" adapter from a Lumicon helical focuser that I wasn't using ( a \$20 replacement item). Focusing is a two-hand operation (push-pull, tighten a knurled knob), but it is low-profile and sturdy. The focuser even provides a place to securely glue the welder's glass.

Although I've done my best to make an attractive instrument -- an instrument which reflects a labor of love -- I still receive that all too common observation which every proud Dobsonian owner is, or should be, accustomed to: "it looks like a cannon!"

I'm very pleased with the optical quality, by the way. Sunspots - umbra and penumbra are sharply evident. Faculae, or plages (lighter areas visible near the limb), and granulation ("salt & pepper" effect) over the entire disk are also easily seen. The Sun is an active place, the surface details change daily. I must begin drawing what I see. The jam jar lid approach as suggested by Eppler Nowell in April 1990's bulletin will get me started!





Over the weekend of June 23-24 while some of you made the monthly observation trip to Rock Springs or Fiddletown, I fulfilled a promise I had made to myself 18 years ago.

In 1972 I made a camping trip to the White Mountains and the Bristlecone National Forest. Located at 8600 ft. altitude east of the Sierra Nevadas the nighttime skies so impressed me that I vowed that when I acquired a good telescope, I would have to return to do the site justice.

While less dramatic than MacArthur's return to the Phillipine's I did keep my promise last weekend a couple of years after acquiring my Celestron C-8.

I had planned this trip for the Memorial Day weekend to be able to observe Comet Austin, Pluto and add to my collection of Messier objects, but the weather sent those plans awry.

So at the next new moon I rescheduled the trip. The approximately 700 mile round trip is a lot of driving for a two day weekend, so I took off Friday afternoon, planning to stop off around Lake Tahoe for the first night then continuing on to Bristlecone Pines National Forest the second night.

When I arrived in the Tahoe area the skys were heavily overcasted so I continued driving south, eventually ending up by Mono Lake. While driving I noticed people looking and taking pictures of the spectacular sunset behind me. Rather than risk an accident by looking in the rearview mirror, I stopped and watched for a while myself even though I was in a hurry to find a camp site for the night.

I pulled off onto a dirt road just south of Mono Lake (alt. 6500 ft.) and set up my C-8 under a darkening, clear sky. The main objective for the weekends observations was to add to my list of observed Messier objects. I had only logged three galactic objects (easy M31, M32 and M110) and none fainter than the 10th magnitude, so I hopped that the dark skies would help me add to my list.

Right away I was able to pick out M95, a 10.4 mag Sb. From there I worked my way through a good part of the Virgo cluster, and when the observing position became uncomfortable, switched to the Ursa Major area. Some of the nice finds were M105 with its companion NGC 3384 and M97, the Owl planetary nebula. All in all I was able to locate 25 object that evening in 5 hours before turning in at 3am.

The next morning I rose early and set off for the White Mts. Since I had plenty of time a decided to do some back roads exploring on the way. Continuing on Hwy's 120 and 6 took me through the town of Benton, with its collection of old buildings and early wagons, and a drive pass the western slopes of the White Mts.

The White Mts are located east of the main Sierra Nevadas and north of Death Valley. Situated towards the southern end of the range are several groves of Bristlecone Pines, reputed to be the oldest living things on earth. These trees have been measured at over 4000 years old. They are only found in a few of the western states at very high altitudes close to the timber line. They have a very gnarled, driftwood like appearance which makes them very picturesque.

The White Mts themselves are over 14,000 high. The Univ. of California has a research station to do high altitude studies. Camping facilities are located at the Grandview camp grounds just outside of the National Forest. There are about 30 camp sites, and except for picnic tables, fire pits and pit toilets, there are no other facilities.

From Hwy 6 I connected back to Hwy 395 at Bishop, there to Big Pine then east on Hwy 168 up the Westgard pass (alt. 7271') to Bristlecone.

The observation site/camp grounds are located at 8600'. There is an unobstructed view for 360 deg's to within 5-10 deg's of the horizon. Only about 1/3 of the camp sites were occupied and no glaring Coleman lanterns or late night headlights to impair dark-adapted eyes.

I got setup early that night and had another good night of observations. Some highlights - M61 (12.1 mag Sc), M60 (8.9 mag E) with its companion NGC 4647 (12 mag), M104 the Sombrero (8.7 mag Sb) with the "hat band" clearly visible, M64 the Blackeye galaxy (8.8 mag Sb) with the blackeye visible.

After completing my observation list I just scanned the skies with naked eye and binoculars enjoying to glories of the milky way for another hour before turning in at 1am.

Final results of the trip - all 38 Messier objects I had on my list were observed. Over 10 were 10 mag or dimmer, found 3 12+mag objects. After any such session, I find that my observations skills increase. I can now recognize galactic objects with some degree of confidence and am getting quite proficent at locating things with setting circles. Although I had a specific list to find, given the time I estimate that I could have observed 80-90 of the Messier object which were in the sky at this time of year.

Dennis Tye



CALL FOR VOLUNTEERS

Each year the AANC Conference and Starbecue provide Bay Area amateur astronomers the opportunity to socialize and catch up with the latest astronomical developments. This year the Starbecue will be September 22 at Fremont Peak. The Conference will be October 27 & 28 at Lawrence Hall of Science in Berkely.

The AANC is looking for volunteers and presenters. At both events, we need help with planning and on location. Volunteers get free admission to the conference, and the priceless satisfaction that comes from - well, you get the idea.

Both events are produced by and for amateur astronomers, and presentations by amateurs have always been an important part of the Conference. If you have a special project or point of view which would be of interest to other amateurs, don't hesitate to submit it for possible inclusion on the program. There is an application in this issue of the Bulletin.

The Starbecue includes a Telescope Makers Contest each year. If you have a useful or inventive astronomical device to share with us, by all means bring it to Fremont Peak on Sept. 22. There is no entrance fee, and I can tell you from happy experience that the prizes don't automatically go to the biggest scope on the hill.

If you are able to participate or have any questions please contact me.

Douglas Wolfe  
AANC Representative

386-1876  
447 25th Ave  
SF CAL 94121

**Call for Papers**

**1990 AANC Annual Astronomical Conference**

If you would like to make a presentation at this year's AANC Conference on October 27 or 28 at Lawrence Hall of Science, University of California, Berkeley, please fill out the following and send to AANC 1990 Conference Papers Chairmen, Chabot Science Center, 4917 Mountain Blvd., Oakland, CA 94719.

Name \_\_\_\_\_ Address \_\_\_\_\_

Telephone (\_\_\_\_) \_\_\_\_\_ Preferred day (circle one)    Saturday    Sunday    Either

Audio-visual Needs:

Slide projector \_\_\_\_\_ Overhead projector \_\_\_\_\_ VCR and Monitor or Videoprojector \_\_\_\_\_

Other (specify) \_\_\_\_\_

Normal length of presentations: 20 min. with an additional 10 minutes for Q & A.

Special requests, concerns, or unusual presentation length:



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This service is provided monthly on a space-available basis.

CLASSIFIED ADS



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