

East Valley Astronomy Club

July

Newsletter

1995

EVAC MEETING HIGHLIGHTS

The June Club meeting got off to a rocky start when our normal classroom at SCC was found to be in use. Robert Kerwin quickly obtained another, but it was standing room only as over fifty members and guests squeezed into the smaller room.

MEETING ROOM CHANGE!!

Due to SCC's summer session, the EVAC Club Meetings for July and August will be held in **Room PS 170** (right around the corner from PS 172), on the south side of the Physical Sciences building. This will probably change back when the fall session begins.

Carefree Local Site

The site for local EVAC observing sessions in the northeast Valley has fallen out of favor. Bad experiences there (such as target shooters) make it unsuitable for our use. Any members having other ideas on where to observe in that part of the Valley, please contact a Club Officer. In the meantime, all local EVAC star parties will be held at the Florence Junction site. Attendance at that site has been outstanding, by the way.

EVAC Party Line

Please, whenever attending an EVAC star party, call the Party Line and tell people your plans! Many members don't like to observe by themselves at our desert sites. When they know others will be attending, they too make plans to attend. The Party Line is currently being answered by Robert Kerwin. Give him a call before heading out to the next star party.

EVAC Kitt Peak Tour Sold Out

All 48 seats on the bus to Kitt Peak National Observatory are now paid for. Please do not send any more checks to Tom Polakis, as the tour has reached its capacity. Tour guides have indicated that 48 people is the upper limit for the facilities. Tom will establish a

waiting list on a first come, first served basis. If you wish to get your name on this list, call him at 967-1658. For those who will be doing the tour on August 12, there will be more details, including a map of the meeting place, in the August newsletter.

Spica Graze

Next up were four videos of the Spica Graze in May. Gerry Rattley explained that 29 people were at the Gila Bend site and manned 21 stations. All stations saw at least one disappearance and Station I (the letter) saw SIX, which Don Wrigley captured on an excellent video. We can expect an analysis of the data and the resulting profile of the Moon at a future meeting. Gene Lucas also spoke on the important contribution amateurs can make to astronomy by recording asteroid occultations.

Featured Presentation

James Jacobs gave an interesting lecture on archeoastronomy and the research he is pursuing on this subject. He began with definitions, a chronology of pictographs and other ancient records, and finally extensive slides and data collected at sites throughout the World. His careful analysis of many prehistoric sites leads him to believe that numerous ancient astronomical sites have so many things in common, some of these sites required knowledge of each other. These are sites separated by oceans and/or thousands of miles! The talk lasted until 9:45 PM and many members stayed afterward to sample brownies from Sheri Cahn's bakery and the refreshments provided by Robert Kerwin.

UPCOMING CLUB EVENTS

EVAC Club Meeting, July 12, 7:30 PM
SCC, Physical Sci. Bldg, **Room PS 170**

Local Star Party, July 29, Sunset 7:31 PM
Florence Junction Site

JULY GUEST SPEAKER

Our speaker for the July 12th meeting will be veteran amateur Steve Coe of the Saguaro Astronomy Club. Steve is an avid deep sky observer and has published numerous articles on observing. His presentation is entitled "Eyepieces—Your Porthole to the Universe." Steve is an entertaining speaker—don't miss this.

WATCHERS OF THE SKIES

One of the problems of human knowledge is that the world which we see from the surface of this planet on a sunny day bears almost no resemblance to the Universe at large. Our Earth is made of iron and rock, but the Universe as a whole is mostly hydrogen. The actions which we see on the surface of this Earth run mostly on sunlight, but the Universe runs on gravity. What we see here are continents, oceans, rivers and lakes, mountain ranges, forests, tundra and prairies. But the Universe at large is mostly gas, partly condensed by gravity to galaxies and stars, and lightly sprinkled, here and there, with interstellar dust. The dust is made from hydrogen in the bellies of the stars, and is scattered through the galaxies by the explosions and the stellar winds of the stars much bigger and much hotter than our Sun. But the dust is scarce, and, like our bodies, the rock on which we live is made of these dusts. It is a collector's item. The heavier elements, such as iron, have sunk to the center, overlaid with the rocks of the mantle and the crust and a thin veneer of water and gas. Since the age of this museum piece is pushing five billion years, by now the water-soluble compounds of the surface rocks have leached into the water layer, making the oceans salty. The saltiness of our blood is the saltiness of the ancient sea, some four hundred million years ago. That is when our scaly ancestors, on stumpy fins, crawled out across the land in search of other water and the sight of other fish. Descended as we are from them, we can think of our bodies, even now, as little bags of sea water, hung out on clotheslines of bone, gulping oxygen directly from the gas layer above us, and shambling out across the rocks to gaze with starry eyes, through the blackness of night, at the vast expanse of the Universe beyond.

Even the oxygen that we breathe is freed by sunlight through the instrumentality of our photosynthetic relatives, first by the blue-green algae in the sea, and now by the green leaves of the rain forest. Even the rain is driven by sunlight. But the Universe at large has a reducing atmosphere, and it is without rain and without sunlight. It is very cold, very dark, and very lonely, trying desperately to fall together by the seemingly inexplicable attraction of the particles for each other. Even the radiation of the Sun is driven by this attraction which has pushed the central temperature of the Sun up to some fifteen million degrees Celsius. And it is only because its gravitational

collapse has been slowed by the nuclear fusion at its core that the Sun has bathed our Earth with its warming rays for nearly five billion years. Only this delay has made possible our long genetic development till we were able to climb out of the water and gaze in wonder at the starry sky of night. Although we, as living organisms, owe both our existence and our long genetic development to the Sun, its dazzling brightness prevents us from seeing the Universe by day. The blueness of the daytime sky is not the color of the air, but simply the shorter wavelengths scattered from the sunlight by the gas layer above us. And that gas layer by night, unlit by the Sun, is sufficiently transparent so that through it we may gaze into the far reaches of the Universe.

But seeing alone is not enough. It is only the beginning. We must also understand what we see, and that has a history. Understanding rests on a foundation of concepts and information coming down to us from the past, albeit not the very distant past. It is not from the first few hundred million years after we came ashore in the swamps to look around, because in those distant days and nights the concepts which we framed, and the information which we gained, could not be transmitted from generation to generation. We lacked a mechanism to transmit it. It is not transmitted genetically, and there were then no words. The written word, by which concepts and information are largely transmitted in what we proudly think of as the "Age of Science," are only a few thousand years old. And vocal speech itself is fairly new. It was probably forced upon us by the failure of our body language in the surf when we, as brachiating primates, marooned on an island in northeast Africa, were driven by drought from the jungles to the beach, not more than ten or fifteen million years ago. And even the body language common to the great apes, and easily understood by the orangs, the gorillas, the chimps and ourselves, is less than fifty million years old. Our great gain in those earlier times was in our genetically transmitted capabilities. By the early demise of those with poorer eyes, we gained our visual acuity, and by the early demise of those with smaller brains, we improved our capacity to understand. It is that capacity which sets us apart amongst the watchers of the skies.

John Dobson

The poem "Watchers of the Skies" by Alfred Noyes appears on page 86 of the July Sky&Telescope.

GRAND CANYON STAR PARTY '95/96

by Dean Ketelsen

Tucson Amateur Astronomy Association

The 5th Grand Canyon Star Party (GCSP) was held last week and what a week it was! It started out with a snow blizzard on the 17th, making for treacherous driving on the trip up from Flagstaff. It was mere rain by the time we got to the Canyon, but it was no fun

making camp in it. Anyway, since it was the GCSP, it of course cleared by sunset, and John Dobson himself treated us to a twilight talk. The night was spectacular, though with the recent rain it was very humid. The SCTs all dewed up early. It was an omen though as we were treated to another 8 clear nights in a row. That makes 24 straight clear nights over 3 years! There were a memorable cast of characters this year, and two major cookout/get-togethers to swap stories and meet new folks. Also, Chuck Wahler handed out Canyon videotapes and volunteer T-shirts this year as rewards for helping out.

We always had a 20" scope there (brought by two different owners) and we had a good variety of daytime scopes set up as well to catch people's attention. There were 42 volunteers over the 8 nights, and on Saturday the 23rd, someone counted 28 scopes! It was a great time and I hope you all consider attending someday. Look for an in-depth article and some photos in the August Desert Skies.

This e-mail was received from Dean Ketelsen, member and previous president of the TAAS. Dean and the TAAS sponsor this terrific star party each year. Anne and I participated two nights and are already making plans for five nights next year! Don't miss out—the dates are June 8-15, 1996. (Desert Skies is the newsletter of the TAAS).

FINAL NOTE: GCSP 1995

by Sam Herchak

To hear John Dobson's presentation, and later to sit and chat with him made the long drive to the GCSP insignificant. The inventor of the Dobsonian style telescope is an interesting person. Our conversations only touched on telescopes one night when John star tested Anne's mirror. Instead, he prefers to open people's eyes to the latest information on our Universe and some of his own ideas.

My favorite was his belief that Jupiter and Saturn are stars, not planets. When asked for an explanation, he started with a question: "What is a mushroom? A plant or animal?" His point is mushrooms don't fit either category (plants produce energy through photosynthesis; mushrooms don't). If you have one of two choices, star or planet, John chooses star to categorize the gas giants. According to him, these two objects contain most of the angular momentum in the Solar System. Unlike the planets, these two are mostly composed of stellar matter, that is hydrogen and helium. His proposition; Jupiter and Saturn formed when our Sun did and resemble it more than the other planets, which came later.

John also has a different perspective about energy. Gravity, not fusion (or anything else) powers stars and the Universe for that matter. In fact he says fusion is

what keeps stars cool! His point is a good one though; without fusion to offset gravitational collapse, stars would quickly heat up and destroy themselves supernova style. I'm sure you can see the beauty of his perspective.

John Dobson and the San Francisco Sidewalk Astronomers have been absent from the Grand Canyon for many years now because the Park asked him not to come back, when a creationist complained about his talk of evolution. Because he's approaching eighty years old and often looks at the World from different perspectives, some call him arrogant and eccentric. Someday in the future, people may instead call him genius. Go listen to him if you ever get the opportunity.

SATELLITE TRACKING INFORMATION

by Frank Honer

I have found a home page on the Internet for those interested in observing bright satellites. The URL "http://ssl.berkeley.edu/isi_www/satpasses.html#intro" provides information regarding four satellites for 50 cities (including Phoenix) in the United States. Type the URL without the quotation marks. The four satellites tracked are the Space Shuttle, Mir Space Station, Hubble Space Telescope, and the Upper Atmosphere Research Satellite. Predictions are updated shortly past midnight Pacific time for Mir, HST, and UARS and more often for the Space Shuttle during their missions. Predictions typically extend six days in advance. The information provided includes the date, time of Acquisition of Signal (AOS), Maximum Elevation (MEL), and Loss of Signal (LOS), the duration of the pass, the Azimuth at AOS/MEL/LOS, the maximum elevation in degrees, a visibility code that indicates the "quality of the pass," and the Orbit number. Times given are local (MST for Phoenix). I found this very useful in observing the recent Shuttle/Mir passes.

I would recommend starting to observe a few minutes before the posted times. While the Shuttle and Mir were linked, I downloaded observing data for both objects. For the July 2 evening pass, although the AOS/MEL/LOS information was identical, the data said that the Mir would lag the shuttle by approximately 45 seconds. Quite a trick!

ATTENTION ATMs

Amateur Telescope Makers that is. Steve O'Dwyer is finishing a project and needs a small amount of 5 micron polishing compound. He's got a gallon of cerium oxide among other materials—anyone interested in a swap with him? This kind of "pooling" of ATM resources would really be beneficial to all Club members. Contact Steve if you have something extra or would care to stockpile a particular item to make available to other members.

STARS OVER SILVER CITY AND MT. GRAHAM

by Bill Dellenges and Lora Shank

Having read about Bear Mountain Guest Ranch (BMGR) in the Arizona Republic, my wife and I decided to spend several nights there and explore the Silver City, New Mexico area. A scenic 320 mile drive brings you to this small town of 10,000 people nestled in the rolling Rocky Mountains at an elevation of 6,200 feet.

BMGR is located 3 miles north of the city. It's a 2 story southwestern structure built on 160 acres in 1928. There are 8 rooms in the main house and 3 cottages nearby. The cordial and accommodating Mrs. Myra McCormick has been operating this bed and breakfast hideaway for 36 years. Using BGMR as our base camp, we took day trips out into the countryside. A must-see are the Gila Cliff Dwellings, 45 miles north. My favorite though, was our hike on the "Catwalk," a mile long trail up a narrow gorge along catwalks above a river! Absolutely breathtaking!

At night I set up my 5" refractor and gave guests little star parties. After they retired, I had the dark skies and clear southern horizon to myself. There is a bit of skyglow to the southeast from town, but otherwise I'd say the starry sky was on par with what you'd find at the Star Hill Inn that you see advertised in *Sky&Telescope*.

The ranch is a magnet for bird watchers and Mrs. McCormick would like to attract stargazers as well. In this regard, she was kind enough to keep the porch light out during our stay, even though this meant guests had to sometimes use a flashlight to get inside! She plans on installing red lights where necessary to facilitate gazers and has set aside an area for observing.

We had many interesting conversations with guests over breakfast, fun star parties, great hiking, and just a generally wonderful time in New Mexico. It was a wonderful, relaxing time at BMGR and we hated to leave. Rates at the Ranch start at \$67.00 for two people. Contact: BMGR, 2251 Bear Mountain Road, Silver City, NM 88062, phone: (800)-880-2538 or (505)-538-2538.

On the way home we spent a night in Arizona at a campground on Mt. Graham. I've been curious about the mountain because of the controversy surrounding the observatory and the red squirrels. Let me just report on our visit without getting into that. A short drive south on Highway 191 out of Safford, Mt. Graham rises to just over 10,000 feet. Take Highway 366 off of 191 and you'll be looking at a long straight road leading directly to the mountain. Just before it begins to go up (and across the road from a federal prison!), there is a small visitor center where you can get a free information pack loaded with everything you'd ever want to know

about Mt. Graham and its observatories. This is also the place where you meet to take tours up to the facility. Once or twice a month (by prior arrangement), a van takes visitors for \$20.00 per person up to the site. Reservations are handled by Discovery Park, a science center being built in Safford. Among other things, this center will have a 50' planetarium and 20" telescope. Apparently it will be the new visitor center for Mt. Graham Observatory when completed in late 1995. Phone (520)-428-6260.

There are six more campgrounds on the mountain, located at 10.7, 21.1, 22.5, 22.7, 30.2 and 34.6 miles from the visitor center. The road is steep and winding, so be patient. We stayed at the second campground, Shannon, at about 9000 feet. Past this point the pavement ends. For gazers, I'd recommend going further up, as the trees at the first two campgrounds would be a problem. The higher you go, the fewer trees you'll find.

You cannot see the observatory from below or any other place for that matter. It's obscured by trees. The turnoff is not marked, but is located at the 27.7 mile point. At this time, two telescopes are in operation on the peak: the 1.8M (Meters or 71") Vatican Advanced Technology Telescope and the 10M (394") Submillimeter Radio Telescope. Various problems have delayed the 12M Equivalent Binocular Telescope, a 5M Submillimeter Radio Telescope, the SAO Submillimeter Interferometer, and two 8M infrared/optical telescopes. Still, it looks like someday we may have another "Kitt Peak" out to the East.

The alpine atmosphere of Mount Graham brought back fond memories for us of previous astronomical outings in the Sierra Nevada mountains of California. Our journey to the eastern territories was a most enjoyable trip.

EVAC SHOW & TELL NIGHT

by Robert Kerwin

When: August EVAC Meeting—August 9th at 7:30 PM

Where: Scottsdale Community College, Room PS 170

Why:

- Presentations by EVAC Members
- Swap Meet
- Refreshments and Snacks

Come prepared for a fun, informative meeting. Find out what others in the Club are up to! Participate by giving a short (5-10 minute) talk! Look for bargains at the swap table! For more information or to sign up for a presentation, call Robert Kerwin at 837-3971.

BOARD MEMBERS please note: a Board of Directors meeting will precede the Club meeting at the College, Room PS 170, at 6:30 PM. Contact Don Wrigley (982-2428) about any items you would like to discuss.

AMATEUR TELESCOPE MAKER'S RESOURCE LIST

Maintained by: Bob Lombardi; blombard@iu.net

Last revised: 5/2/95. Now in it's Fourth year.

Forwarded by Robert Kerwin

Fellow sci.astro and sci.astro.amateur readers. Here is the latest version of the ATM Resource List. It's archived in the following WWW sites: <http://garnet.acns.fsu.edu/~swingree/atmres.html> and <http://www.rahul.net/resource>. It is also now available via ftp from the following: <ftp://ftp.rahul.net/pub/resource>. It may be obtained via email from: resource@rahul.net. Changes in this version include:

- Several suppliers for telescope parts, etc.
- Corrected phone numbers in California for Orion Telescope Center
- Addition of Ceravolo Optical systems as a supplier of interferometry testing kits and info. This is under part V., telescope parts. It may not be the most logical group for this entry, but the only other place I know that sells mirror testers is here.

If you have any experience with these companies, new addresses or phone numbers, or any other feedback, please email me to get your updates included. Good, as well as bad, experiences are always welcome. I must issue the standard disclaimer: I have nothing to do with any of these companies, other than being a satisfied customer of a few, and an ex-customer of some others.

The list is not complete, but does cover the most needed things. Here goes.

I. MIRROR MAKING KITS AND SUPPLIES:

The following companies sell telescope making supplies, including mirror blanks, lens blanks, abrasives, polishing agents, and other helpful accessories.

- Glass Fab Inc., 257 Ormond St, Rochester, NY 14605, (716) 262-4000. Blanks, including Sitall.
- Newport Glass Works, Ltd., 2044-D Placienta Ave., Costa Mesa CA, 92627, (714)-642-9980. Consistently poor opinions on the net. Often slow, often poor service, but some reports are favorable. Supplies pyrex blanks, tapered (SCT) blanks, lens blanks, colored filter blanks, plus abrasives and pitches.
- Palomar Optical Supply, PO Box 1310, Wildmar, CA 92395, (619)-631-2835 voice, (619)-631-2957 fax. Mirror kits and abrasives. Sells the old standard pyrex blank/plate glass tool kits. Abrasives, pitch. See their listing under commercially made optics (below) for more info.
- Salem Distributing Company, Inc. Box 25566 Manor Station, Winston-Salem, NC 27114, (800)-234-1982. Originally the source of the ophthalmic polishing pads discussed in *S&T's* ATM column, they now sell a complete line of grits and polishing agents. Very friendly. These folks sell primarily to the eyeglass industry.
- United Lens Co., Inc., South Bridge, Mass. 01550, (617)-765-5421. United is a major producer of optical glass for industry. They have been reported as a source of pre-rough shaped blanks in unit quantities, and refractor objective blanks.
- Willmann-Bell, Inc. PO Box 35025, Richmond, VA 23235, (804)-320-7016. Catalog \$1. Consistently good recommendations on the net. Pyrex blank/pyrex tool kits, ceramic tiles for tools, plus a complete line of pitch and abrasives.

II. MIRROR COATING SERVICES:

- Denton Vacum, 1259 N. Church Street, Moorestown, NJ 08057, (609)-439-9100. Fast turnaround. Can do up to 30".
- Evaporated Metal Films, 701 Spencer Road, Ithaca, NY 14850, (607)-272-3320.
- P.A.Clausing, Inc. 8038 Monticello Ave. Skokie, IL, 60076, (312)-267-3399 Beral coatings.
- Precision Applied Products, 418 Rumsey Place, Placentia, CA 92670, (714)-738-4775. In addition to standard and enhanced mirror coatings, they offer MgF₂ for refractor lenses and windows.
- QSP Optical Technology, 1712-J Newport Circle, Santa Ana, CA 92705, (714)-557-2299.

III. TELESCOPE MAKING BOOKS AND PUBLICATIONS: PERIODICALS

- *ATM Journal*. The Amateur Telescope Makers Association (ATMA) 17606 28th Ave. S.E., Bothell, WA 98012. This has the "look and feel" of the old TM magazine. Membership is \$20.
- *Astronomy*. Occasional material for TM's. Again, your bookstore or newstand
- *Sky&Telescope*. Monthly column for TMs. Check your newstand, or mall bookstore.

BOOKS

BEGINNER:

- "*Build Your Own Telescope*", Richard Berry, Pub by Kalmbach Publishing (pub. of *Astronomy*) ISBN 0-684-18476-1, \$24.95 + \$1.50 S&H. Sometimes seen in bookstores.
- "*How to Make a Telescope*", Jean Texereau, 2nd ed., Pub and sold by Willmann-Bell, ISBN 0-943396-04-2, \$19.95 +\$1 S&H, address above (under TM supplies).

ADVANCED:

- "*Advanced Telescope Making Techniques*," Volumes 1 and 2, ISBN 0-943396-11-5 (vol 1) and 0-943396-12-3 (vol 2), pub by Willmann-Bell, address above.
- "*Telescope Optics: Evaluation and Design*," Rutten and Van Venrooij, ISBN 0-943396-18-2, Willmann-Bell, companion software available.
- "*Microcomputer Control of Telescopes*," Trueblood and Genet ISBN 0-943396-05-0, Willmann-Bell
- "*Prism and Lens Making*," F. Twyman, ISBN 0-85274-150-2, pub by Adam Hilger, NY, 1988 (corrected reprint).
- "*Astronomical Optics*," Daniel J. Schroeder, Academic Press, 1987 ISBN 0-12-629805-X. Advanced undergraduate text with loads of info. Available from Willmann-Bell.

VIDEOS

- "How to Make a Telescope," John Dobson, 2hr Video. Dobson Video, PO Box 460915, San Francisco, CA 94146-0915. Make check to "Dobson Astro-Initiatives" Cost: \$43 (includes postage and handling—Calif residents add \$3.40 sales tax). From the ad, "For the first time on video, John Dobson shows how you can build your own high-power, low-cost telescope. The 2 hour video is a complete step-by-step guide, covering telescopes 8" to 16" and larger."

IV. COMMERCIALY-MADE OPTICS

- A. Jaegers, 6915 Merrick Rd., Lynbrook, NY 11563 -or- 11 Roosevelt Ave. Valley Stream, NY 11581 (516)-599-3167. Specializes in refractor lenses and reflector mirrors up to 6". "Lowest national price." It is best to send them a fax of your requirements for a lens, as they have no current catalog. FAX 516-872-8112.
- Clear Star Optics, 4193 Tallmadge Road, Rootstown, OH 44272 (216)-325-1722. Newtonian Mirrors, also flats.
- Coulter Optical, Inc. P.O. Box K, Idyllwild, CA 92349-1107. Sells the mirrors they use in their own line of Dobsonians.
- D & G Optical, 6490 Lemon Street, East Petersburg, PA 17520, (717)-560-1519. Refractor objectives, apochromatic (5.1") and achromats (5 -12") Refractor Tube Assemblies (OTAs) 5" to 12." Classical Cassegrain sets and OTAs. Also parabolic mirrors through 20". Refigures finished mirrors.
- E & W Optical Inc. 2420 E. Hennepin Ave., Minneapolis, MN 55413, (612)-331-1187.
- Edmund Scientific, Dept 10B1, N919 Edscorp Bldg, Barington, NJ 08007. Edmund is not the astro company they once were, but they do carry a lot of lenses and some other optical components.
- Enterprise Optics, PO Box 413, Placenta, CA 92670, (714)-524-7520. Newtonian and Cassegrain Optics, 6" to 24". Elliptical flats to 6".
- Galaxy Optics, P.O. Box 2045, Buena Vista, CO 81211 (719)-395-8242. A very well respected name in finished mirrors.
- Iowa Scientific Optical, 4231 Northwest Drive, Des Moines, IA 50310, (515)-255-0166). Newtonian and Schiefspigler Optical sets, flats, mounts, tube assemblies and complete telescopes.
- J.C. Wilkinson Optics, (Boulder, Colorado). (303)-499-7662. Jerry Wilkinson, senior optician for seven years for Galaxy Optics. Primarily refiguring services, but will also quote finished mirrors. He will figure mirrors from 6" to 14.5".
- JSL Perpetual Technology, Inc., 275 East 100 North, PO. Box 51 Willard UT 84340, (801) 723-5568. Primary mirrors 6-30", focusers, eyepieces and mounts.
- Lumicon, 2111 Research Dr., Suite 5, Livermore, CA 94550, (510)-447-9570.
- NOVA Optical Systems, PO Box 80062, Cornish, UT 84308, (801) 258-5699. 6 to 25" mirrors, f4-10.

- Orion Telescope Center, 2450 17th Avenue, PO Box 1158, Santa Cruz, CA 95061, (800)-447-1001, Newtonian primaries, 6 - 12.5", & secondaries.
- Palomar Optical Supply, P.O. Box 1310, Wildmar, CA 92395, (714) 678-5393. In addition to their mirror kits, they also supply parabolic mirrors, "planetary optical sets" (long f-ratio primaries) elliptical secondary flats to 6", and round flats to 8".
- Parks Telescope Co., c/o Scope City, 679 Easy Street, Simi Valley, CA 93065, (805) 522-6646, Newtonian primary mirrors 4.5-16", secondaries. These are the mirrors used in Parks' telescopes.
- Pegasus Optics, 2301 W. Corrine Drive, Phoenix, AZ 85029, (602) 943-3279. 16 to 28". Mirrors, lifetime warranty, test/certs for all mirrors sold.
- Precision Applied Products, 418 Rumsey Place, Placentia, CA 92670, (714)-738-4775 or (800)-575-4775. Refractor lenses, 5" to 12" (this is the same company listed in coatings, above).
- Star Instruments, PO Box 597, Flagstaff, AZ 86002, (520)-774-9177.
- United Lens Co., Inc., South Bridge, Mass. 01550, (617)-765-5421.
- University Optics, P.O.Box 1205, Ann Arbor, MI 48106, (800)-521-2828, sells a small line of mirrors in addition to the other supplies listed in part 5.

V. TELESCOPE PARTS: (finders, focusers, eyepieces, etc., etc.)

- AstroSystems, Inc., 5348 Ocotillo Ct., Johnstown, CO 80534, (303)-587-5838, Primarily parts for big Dobsonians. Truss tubes, mirror cells, formica, secondaries, focusers, huge elevation bearings (like on the Obsession scopes), and more.
- Ceravolo Optical Systems, Peter Ceravolo, Box 1427, Ogdensburg, NY 13669, (613) 258-4480. Supplies for Interferometry, testing for ATMs, instruction booklets, interferometer parts and analysis software.
- Crazy Ed Optical, P.O. Box 110566, Campbell, CA 95011-0566. Phone or Fax: (408) 364-0944. Dobsonian parts: Ebony Star formica, teflon, tube trim. Spiders, diagonal holders and mirrors, focusers, finder (Telrad and Conventional), LED lamps and flashlights, charts, and even more.
- Edmund Scientific, address above.
- Equatorial Platforms, 11065 Peaceful Valley, Rd., Nevada City, CA 95959. Catalog \$2. Poncet platforms.
- Hollywood General Machining (Scott Losmandy) Hollywood, CA. (213)-462-2855. Losmandy mounts are sold by Celestron and other big companies. He reportedly sells direct as well.
- Kenneth Novak & Co., Box 69T, Ladysmith, WI 54848 (715)-532-5102. Generally regarded as one of, if not the best makers of cells, spiders, and other mechanical parts.
- Jim's Mobile Inc., 810 Quail St. Unit E., Lakewood, CO 80215. Orders (800)-247-0304, info (303)-233-5353. Better known as JMI, the makers of the NGT-18 telescope. They carry one of the largest lines of focusers on the market, including motorfocusers. All JMI focusers are Crayford type, often considered the best. They also carry NGC Max computers.
- Lumicon, address above
- Motion Control Systems, P.O. Box 19632, Portland, OR 97280, (503)-244-0503. Telescope mounts and accessories, catalog \$2.
- Opti-Craft Machining, 33918 Macomb, Farmington, MI, 48335, (810)-476-5893. "Quality clock drives and telescope accessories", according to the catalog. Highly precise gears, worm drives.
- Orion Telescope Center, same address as above. Focusers, filters, eyepieces, barlows, etc.. One of the America's largest dealers.
- Parks Telescope Co., same address as above. Markets parts used in their telescopes; mirror cells, spiders, focusers, mounts, clock drives & correctors, eyepieces, etc.
- Stardrive Systems, 233 Bannock St., Denver, CO (303)-722-4104. Mirror cells, 4-1/4 to 20."
- Tech2000, 3349 SR99 S, Monroeville OH 444847, (419) 465-2997. Dob Driver II computerized drive systems for commercial or homemade Dobsonians.
- Tectron Telescopes, 211 Whitfield Park Avenue, Sarasota, FL 34243, (813) 758-9890. Parts as well as complete instruments
- Televue, 20 Dexter Plaza, Pearl River, NY 10965, (914)-735-4044.
- University Optics, P.O.Box 1205, Ann Arbor, MI 48106, (800)-521-2828. Focusers, finders, mirror cells, CCD camera kits for the Cookbook Camera, telescope tubes.

VI. MISCELLANEOUS:

- American Surplus, Inc. 601 Linden Place, Evanston, IL 60202 (copier lenses for finder scopes, heat ropes for dew-removal, and lots of weird stuff). Formerly Jerryco.
- Hastings Irrigation Pipe Co., PO Box 728, Hastings, NE 68902, (402)463-6633. Supplier of aluminum irrigation tubing . One reader "obtained some that's .064" wall thickness and comes in 12, 10, 8, 7, 6, 5, 4,

3" diameters. The tubing is pretty cheap (the 6" by 4' was \$12.24 + shipping (8/94)) and the company ships COD."

- Small Parts, Inc., 13980 N.W. 58 Ct., PO Box 4650, Miami Lakes, FL 33014-0650, (305)-557-8222. Small gears, tubes, nylon, teflon, screws, setscrews, taps, tools and enough other small mechanical parts to glaze over the eyes of any model builder. If you can't find it here, it doesn't exist!

Summary and Advice for the Beginner

Before you start, get the Willmann-Bell catalog. It's a small newspaper filled with interesting books, and they sell mirror making supplies. Get Richard Berry's book "*Build Your Own Telescope.*" Check out the chapters on homebrew optics. If you can't find an experienced telescope maker to help you, start small. It will take you less time to grind and polish a 6" f7 or f8 mirror and then do your fantasy 12" (or 17, or whatever) than to start with the big one, even if you finish your 6" scope and then never use it. If you have someone to turn to for help, an 8" f7 or 8 makes a good starter scope. If you're going to work on your own, get Texereau's book. Between the two of them you can figure out what is going on.

Use a template to judge your rough curve. Cardboard is ok. You'll learn where the uneven spots are in its shape. As you progress through the grinding stages, spend more time with the tool on top. In the finest grades the tool is almost always on top. Say one wet with mirror on top to 10 with tool on top. This concentrates the work on the edge, where you need it most. The outermost edge contains most of your mirror's area, the innermost circle is covered by the diagonal. Source for this idea; *TM#6*.

I like mats for molding the pitch lap. John Dobson uses a thin wooden dowel pressed into the hot pitch. One of the most common flaws in a first mirror is inadequate polish. Either of these techniques will help you get a better lap. In addition, you should micro-facet your lap with fiberglass screen (I got mine at the local building supply house). It can save you an hour on even a 6 inch mirror.

The ophthalmic polishing pads that have been mentioned in *S&T* and other places polish extremely fast. I would recommend them only for someone who has already polished out a mirror on pitch. On the other hand, I wouldn't dream of doing a mirror over 10" without them. You will need to monitor the surface with frequent Ronchi tests (just as they polish fast, they can also turn an edge extremely fast) and then follow the pads with a half hour to an hour on pitch.

You should test your mirror more than one way. The Ronchi test, using a grating of 85-100 lines/inch, is excellent for checking the surface during polishing to ensure you're not turning down your edge. It's also bright enough to do in normal room light, unlike the Foucault test. The star test can be a very sensitive way to determine the overall figure of your mirror, but requires a tube and all of your other components to test with. It may be even more important than the Foucault test, but do the Foucault or similar test anyway; it's the most accessible way to get the overall correction in waves that you want.

If you plan to buy commercial optics, learn to test a mirror anyway. You can use the star test or a Foucault tester. University Optics sells a nice kit, if you don't want to make one. One of the advantages of grinding your own mirror is that you build a tester and learn to use it as part of the process. Of course, you also have control of when it's "good enough," and are not under the production pressures that a commercial mirror maker is. Commercial mirrors vary in quality quite a bit, and even the best companies will occasionally let one slip by. So make sure you test your mirror and make sure you understand the test. Don't expect an f4 Dobsonian mirror to be optical perfection; it is quite difficult to achieve diffraction limited performance from an f-ratio this short.

There you have it. Enough references to get the beginner started. If you find this list useful, or if you find it lacking, I'd appreciate feedback. Clear skies...Bob. (Microsoft just notified me that they are suing me for using the name "Bob," which is their registered trademark. You'll have to call me by my new name, "Windows.")

EDITOR'S NOTE: Bob obviously is not aware of the fine suppliers in our area. Don't forget:

- The Astronomy Shoppe, 15836 N. Cave Creek Rd, Phoenix, AZ, (602)-971-3170. New and used telescopes. Custom optics and "Bigfoot" mounts by Pierre Schwaar.
- Photon Instrument, Ltd., 122 E. Main St, Mesa, AZ 85201, (602)-835-1767 or (800)-574-2589. Restorations, optical testing, unobstructed reflectors, and other telescope manufacturing.
- Southwest Optical Technologies, PO Box 65867, Tucson, AZ 85728, (520)-881-0863. Vacuum coatings.

East Valley Astronomy Club August 1995

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
30 	31 *Moonset 9:45 PM *12:49 AM Rhea Disappears	1 *Moonset 10:21 PM *ALL MONTH NOTES	2 *Moonset 10:59 PM	3 *Moonset 11:42 PM	4 *Moonset next day *7:30 PM SAC Mtg	5 *Moonset 12:31 AM
6 *Moonset 1:24 AM *5:08 AM Titan Shadow	7 *9:55 PM Occ Sunset 7:23 PM Sunrise 5:45 AM	8	9 7:30 PM EVAC Mtg	10 *2:00 PM Saturn Ring Plane	11	12 *7:00 AM Kitt Pk Tour *11:00 PM Perseids
13	14 *2:09 AM Titan Disappear *4:48 AM Occ	15 *Moonrise 10:17 PM *10:30 PM Neptune Conj	16 *Moonrise 10:55 PM	17 *Moonrise 11:35 PM	18 *Moonrise next day	19 Local Star Party *Moonrise 12:19 AM
20 *Moonrise 1:05 AM *4:26 & 5:00 AM Occ *5:00 PM Venus Sup Conj	21 *Moonrise 1:53 AM Sunset 7:09 PM Sunrise 5:55 AM	22 *Moonrise 2:44 AM *4:09 AM Titan Shadow *4:43 AM Occ	23 *Moonrise 3:38 AM	24	25	26 Deep Sky S P
27	28	29 *Moonset 9:01 PM	30 *Moonset 9:42 PM	31 *Moonset 10:27 PM	1 	2

All times are LOCAL - add 7 hrs for Universal Time

Flip over for event details

Date	Start	Title	Description
8/1/95	12:00 AM	ALL MONTH NOTES	<p>CALENDAR NOTES: Due to time constraints again, no Galilean Moon events are listed this month. Consult Sky&Telescope or Astronomy magazines for these and Saturn's satellite event details. See the "1995 Occultation Predictions for Phoenix" in the Feb EVAC Newsletter for lunar occultation (Occ) details.</p> <p>PLANETS: MERCURY is back in the evening sky but very low in the West after sunset. VENUS reaches superior conjunction in August and is not visible. MARS is very low in the West-Southwest at sunset and inconspicuous at +1.4 magnitude. JUPITER dominates the sky at sunset in the South and is impressive in any telescope. SATURN steals the show however, as Earth crosses North of it's ring plane on the 10th, making detection of the rings very difficult. URANUS and NEPTUNE lurk East of Sagittarius in the southern sky after sunset. NEPTUNE passes close to several stars in August—dig out your findercharts. PLUTO is high in the evening sky but stationary on the 11th. Don't look for much motion of this star-like object near that date.</p> <p>OBJECTS OF INTEREST: The nights are getting longer!</p> <p>ASTRONOMICAL TWILIGHT TIMES: 1st: 9:03 PM and 4:06 AM 27th: 8:30 PM and 4:29 AM</p> <p>LUNAR LIBRATIONS: Good southern libration around time of Full Moon.</p>
8/4/95	7:30 PM	7:30 PM SAC Mtg	Saguaro Astronomy Club meeting, Grand Canyon University, Fleming Bldg, Rm 105. Camelback and 33rd Ave.
8/6/95	5:08 AM	5:08 AM Titan Shadow	Titan's shadow visible on Saturn's disk. Dawn may interfere. See magazines for details on Saturn and satellite events.
8/10/95	2:00 PM	2:00 PM Saturn Ring Plane	As viewed from Earth, Saturn's rings are on edge as we pass from below the ring plane to above (North) it. See magazines for excellent coverage.
8/12/95	7:00 AM	7:00 AM Kitt Pk Tour	Details to follow (for those signed-up) in the August newsletter
8/12/95	11:00 PM	11:00 PM Perseids	Moon interferes somewhat but be sure to look anyway. ZHR of 100 meteors/hour if conditions were ideal.
8/15/95	10:30 PM	10:30 PM Neptune Conj	Neptune passes within 2 arc minutes of 8th magnitude star SAO 188433.

The President's Corner by Don Wrigley

Anyone who has tried to reach me by phone during the past few weeks knows that I have been out of reach. Actually, I've been out of town, or more accurately, out of state. In fact, I have been about as far out of this state as you can get and still be standing on U.S. soil! I have been back to my old stompin' grounds near Salem, New Hampshire, where the air is clear and the skies more horribly light polluted than ever. Even as far as 40 miles north of Boston the skyglow is horrendous, with the brightest part of the summer milky way just barely visible. No wonder I once considered M-81 to be a "difficult" object in my 3 inch refractor!

It rained the first few days, but when it cleared up I went out for some naked eye observing, and couldn't help but notice how differently the sky appears just 10 degrees further north. Polaris was noticeably higher in the sky, at nearly a 45 degree angle, and quite easy to see even over the imposing treeline facing me to the north. The southern skyline had fewer obstructions, and Scorpius was just as I remembered it: low on the horizon, with the southernmost stars of the tail lost in the skyglow of Metropolitan Boston. I had to move to Arizona before I could see the entire constellation!

Other differences occur to me. In New England you can lie in a pasture at night and watch the stars as from a giant mattress of hay. The only thing likely to be rustling in the grass would be a field mouse, or a cat hunting for one, neither of which poses much of a threat, or is likely to impinge upon your viewing pleasure. One soon learns that such is not the case down this neck of the woods. Anything that might creep, crawl, or slither through the Arizona desert is not taken so lightly and is just cause for alarm.

In recent weeks I've talked with several potential new members who have recently moved to Arizona, and who are not yet acquainted with the hazards of our local deserts, although they seemed quite intent on hearing about them. While discussing this topic with potential new members (P.N.M. s?) I am quick to point out that one of the benefits of belonging to a club is the inherent safety involved with being part of a large group. The shear numbers tend to keep trouble away, and if there is a problem, its nice to know there is plenty of help nearby.

We have, and publish on a regular basis, rules of etiquette for behavior at star parties. Included among them is a brief statement on personal safety which everyone should read on a regular basis, for the brevity of the statement belies its importance to the safety of all venture forth into the desert at night. The rule bears repeating here: "When walking between groups of observers, illuminate your path with a red flashlight

and be aware of snake bite. Do not walk thru tall grass or brush after dark. To this I would add the following little set of "rules" or suggestions for personal safety:

- Dress appropriately. Sandals may be comfortable in hot weather. but offer little protection from some of the ground hugging vegetation which can be quite prickly, and is nearly invisible at night. Also nighttime is when scorpions come out to hunt.
- Avoid trees and bushy vegetation. I've seen people nearly take out an eyeball by walking into an unseen tree limb. Also, that innocent looking bush that looks about the size of a Rhododendron might turn out to be a Cholla!
- Bring lots of water. I think you know why!

Well, that's about all I can think of. Perhaps some of the more experienced members can think of some pointers that I haven't covered. I look forward to hearing your comments on the topic, as it concerns the health and safety of everyone in the club.

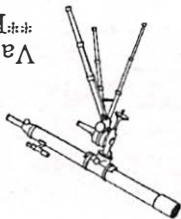
UPDATE YOUR COLLIMATION DOT by Sam Herchak

In the Summer 1995 issue of *Amateur Astronomy*, Jack Loewenstein of Miami, Florida describes a different way to use autocollimator eyepieces. It uses a simple idea that also makes the cheshire collimating tool much easier to use.

Normally owners of reflecting telescopes place a dark dot at the center of the primary mirror to use with a peep hole or cheshire eyepiece to get accurate collimation of the primary. It works fine, but often centering this dark dot over a dark hole can be difficult. Jack's idea; use a luminous one! Almost any store that sells bicycle accessories carries reflective tape for a few dollars. Take this tape, use a hole punch, and make some luminous dots for your mirrors. Now with any ambient light (or a cheshire), this dot will glow and becomes easy to see against a dark hole. With an autocollimator eyepiece, multiple reflections are seen and it's a snap to fine-tune your collimation. This is far more accurate than "laser collimation" because you are aligning twice as many passes of light through your optical system.

As with any dot centered on your mirror, it lies within the shadow of the secondary and off axis light from the sky isn't enough to cause unwanted reflections. If you want further details, I'll have copies of the article at next the upcoming Club meeting.

Valued EVAC member since 1/17/92!
Hope to see you at the next star party!



EAST VALLEY ASTRONOMY CLUB
Sam Herchak, Editor
145 S. Norfolk Circle
Mesa, AZ 85206-1123

EAST VALLEY ASTRONOMY CLUB

President: Don Wrigley 982-2428	Vice-President: Robert Kerwin 837-3971	Treasurer: Sheri Cahn 246-4633	Secretary: Sam Herchak 924-5981	Properties: Steve O'Dwyer 926-2028
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MEMBERSHIP&SUBSCRIPTIONS: \$20.00 annually. Reduced rates available to members for *Sky&Telescope* and *Astronomy*. Contact Sheri Cahn, 4220 W. Northern #116, Phoenix, AZ 85051, phone (602)-246-4633.

CLUB MEETINGS: Second Wednesday of every month at the Scottsdale Community College, 7:30 PM. Normally Room PS 170 or 172 in the Physical Sciences Building.

NEWSLETTER: Published and mailed out the week before the monthly Club meeting. Send your thoughts and stories for publication to: Sam Herchak, 145 S. Norfolk Cir, Mesa, AZ 85206-1123, phone (602)-924-5981. Email to: 76627.3322@compuserve.com. Faxes welcome with prior notice.

CHANGE OF ADDRESS: Notify Bill Smith, 1663 S. Sycamore, Mesa, AZ 85202, phone 831-1520.

BOOK DISCOUNTS: Great savings for members through Kalmbach and Sky Publishing Companies. Contact Sam Herchak, 145 S. Norfolk Cir, Mesa, AZ 85206-1123, phone (602)-924-5981.

EVAC PARTY LINE: Let other members know in advance if you plan to attend a scheduled EVAC observing session. Contact Robert Kerwin, phone (602)-837-3971.