

Jupiter

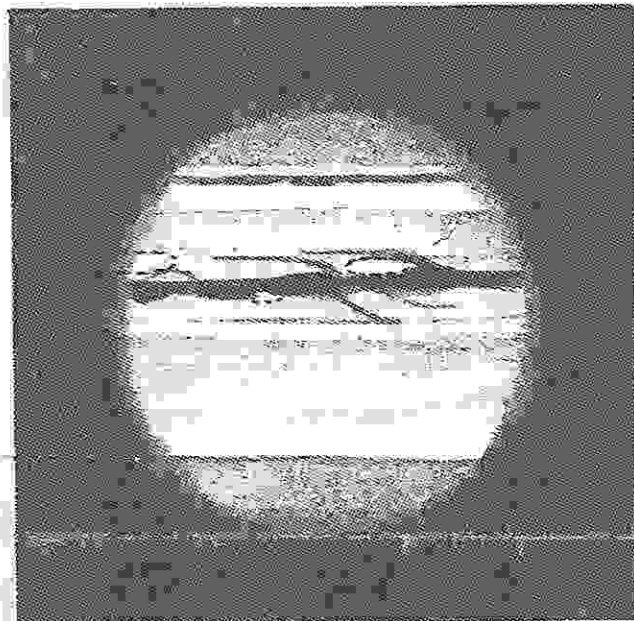


fig. 1

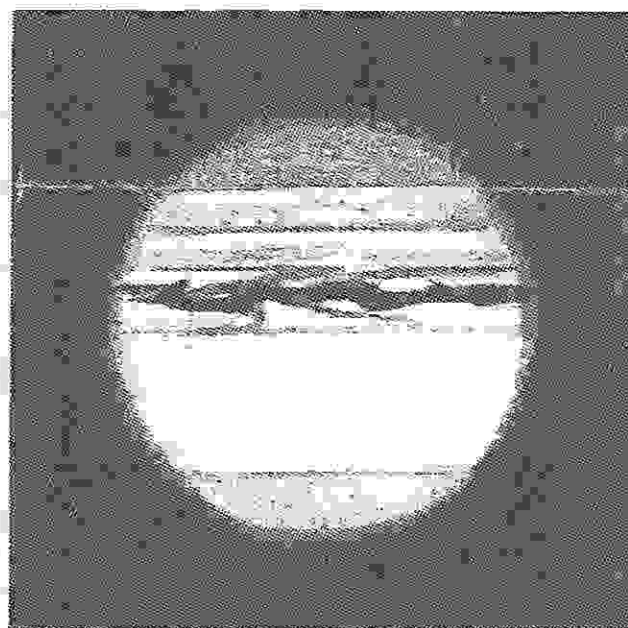


fig. 2

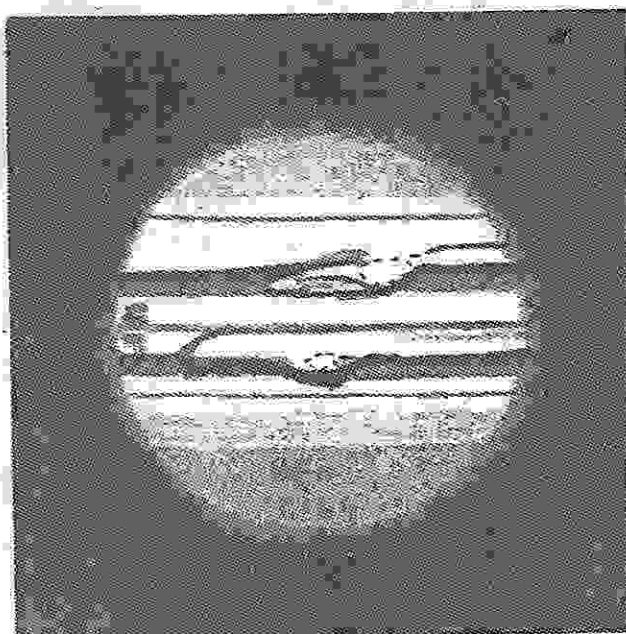


fig. 3

SWEETMAN 90

FIG. 1, 15cm F/10 refractor, 204x, no filter, Date 1-9-90
Time: 6h15m-6h53m ut, Seeing: 4-5 Trans. Gibb. moon

FIG. 2, 15cm F/10 refractor, 254-290x, no filter
Date 1-11-90 Time: 6h27m-7h11m ut
Seeing 5 Trans: full moon

FIG. 3, 102cm F/8.6 refractor, no filter, Date 5-17-82
Mag. 194x, Time: 7h33m-7h58m ut Seeing 7 Trans: 4m

ANNOUNCEMENTS!

MEETINGS

GENERAL MEETING - FRIDAY, APRIL 6, 7:30 P.M. at Flandrau Planetarium.
Dr. Bill Robinson, founder of International Dark Sky Association will speak on light pollution.

FRIDAY, MAY 4, 7:30 P.M. at Flandrau Planetarium.
Mr. & Mrs. Stewart will present a talk on the
"First Civilian Trip to Baikonur Cosmo drome
launchsite, USSR"

EXECUTIVE MEETING - THURSDAY, APRIL 12, 7:30 P.M. at Flandrau Planetarium.

SPECIAL TALK - THURSDAY, APRIL 26, 7:30 P.M. at Optical Sciences Center
main lecture hall. Featured will be "Comet Hunting with
Rodney Austin and David Levy".

STAR PARTIES - FRIDAY, APRIL 6 Pima County Fair - TAAA Exhibit & Star Party
SATURDAY, APRIL 7 Pima County Fair - TAAA Exhibit & Star Party
SUNDAY, APRIL 8 Pima County Fair - TAAA Exhibit & Star Party
FRIDAY, APRIL 13 Pima County Fair - TAAA Exhibit & Star Party
SATURDAY, APRIL 14 Pima County Fair - TAAA Exhibit & Star Party
SUNDAY, APRIL 15 Pima County Fair - TAAA Exhibit & Star Party

SATURDAY, APRIL 21 Star Party at Buenos Aires Wildlife Refuge

SATURDAY, APRIL 28 Public Star Party at Sabino Canyon for Science
& Technology Week and Astronomy Day.

SATURDAY, MAY 18 Star Party at Sabino Canyon for Smithsonian
Institution.

SATURDAY, MAY 25 Star Party at Sabino Canyon for Smithsonian
Institution.

TAAA EXECUTIVE

President	Tim Hunter	299-2972	Member-at-Large	Dean Ketelsen	293-2855
Vice-President	Dan Knauss	881-2639	Chief Observer	Terri Lappin	790-5053
Executive Sec.	Dick West	1-762-5831	Past President	Duane Niehaus	299-7328
Recording Sec.	Sharon Niehaus	299-7328	Desert Skies ed.	Dolores Hill	325-9820
Treasurer	Terri Lappin	790-5053	Asst. ed.	Rik Hill	

MEMBERSHIP IN THE TAAA

Individual Membership	\$20.00
Family Membership	\$25.00
Senior Citizen (over 60)	\$18.00
Sky & Telescope subscription (optional)	\$16.00

Rates for membership in the TAAA are given above. Members can subscribe to Sky & Telescope at the time of membership renewal, saving over 25% off the cost of a regular subscription. The subscription term must match your membership period. Send one check, made payable to Tucson Amateur Astronomy Association, to cover both membership and subscription to: TAAA, P.O. Box 41254, Tucson, AZ 85717. It is best to pay your dues 2-3 months before your membership actually expires.

4 EASY STEPS TO MEMBERSHIP RENEWAL

1. Pay your dues 2-3 months early. Your month of membership expiration is listed on your newsletter mailing label.
2. a) Decide if you want Sky & Telescope, then add \$16 to your membership rate.
b) Include Sky & Telescope's renewal notice, if possible.
3. Write one check, payable to TAAA.
4. Send it to TAAA, P.O. Box 41254, Tucson, AZ 85717.

Call the Treasurer if you have any problems.

SECOND RAFFLE TO BENEFIT LAND FUND !!!

A raffle of donated items will be held at the April 6 meeting. Bring items to be raffled off to the meeting. Perhaps the central hole from the TAAA's 30" will be auctioned off! The last raffle was a great success ... See you there!!



A SPECIAL TALK ON COMET-HUNTING SPONSORED BY TAAA!

Famous comet hunters Rodney Austin and David Levy will present "Comet Hunting with Rodney Austin and David Levy" Thursday, April 26 at 7:30 P.M. at the main lecture hall of Optical Sciences Center (UA campus- across from Flandrau Planetarium). Come and learn some pointers on observing!

THANK YOU FOR THE SUPPORT!

Thank you to the following people who have supported the 30" Telescope & Land Fund Project for the last few years.

The Land Search	Tim Hunter, Dean Ketelsen, Jim Oliver, Ed Vega, Dick West, and John Zajac
The 30" Mirror	Bob Goff, Gary Hall, and Dean Ketelsen
The Telescope Design	Bob Goff, Dean Ketelsen, Teresa Lappin, Duane Niehaus, Gary Rosenbaum, and Larry Stepp
Project Fund Raising	Tim Hunter, Duane and Sharon Niehaus, Michael Sweetman, and everybody donating items for our auction or raffles and those purchasing tickets or bidding on items

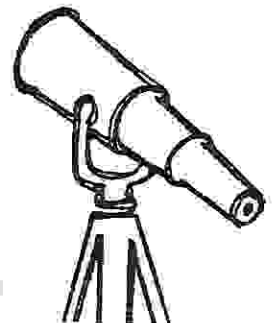
And of course all who have made monetary donations to the Fund. We now have over \$8100.00 in the Fund, about \$700 of it has been raised so far this year. Hope no one was forgotten.

Good work members!! Pat yourself on the back!!

FOR SALE:

17.5" Dobsonian telescope- Odyssey II with several improvements.
Sky & Telescope 1983-1989. Best offer. Call Erich Karkoschka 621-2819.

Heavy 8" diameter steel column on a triangular steel base with a rising heavy tube by rack & pinion. Min. height 5 ft. and max. height 7 ft. It was a NASA tooling stand.... would be good for a large refractor etc. \$500.
Will trade 3 1/2" Alvan Clark refractor on tripod mount for Mac II computer.
Call Mr. Sevilli at 327-0665 (450 S. Rosemont Ave., Tucson 85711)



OBSERVER'S REPORT

Star Parties:

April 6	Friday	Pima County Fair, 6:30pm, public
April 7	Saturday	Pima County Fair, 6:30pm, public
April 8	Sunday	Pima County Fair, 6:30pm, public
April 13	Friday	Pima County Fair, 6:30pm, public
April 14	Saturday	Pima County Fair, 6:30pm, public
April 15	Sunday	Pima County Fair, 6:30pm, public
April 21	Saturday	Buenos Aires Wildlife Refuge, sundown ~ 6:30
April 28	Saturday	Sabino Canyon, 6:30pm, public

You really are not expected to attend all these star parties!!

The regular star party will be held on April 21 at the Buenos Aires National Wildlife Refuge. A map is enclosed with the newsletter. The drive is about $1\frac{1}{2}$ to $1\frac{3}{4}$ hours for most people. This site is dark and we have been there only once before. Arrive by sundown so that you will not ruin everyone's night adaptation with your lights.

Elsewhere in this newsletter is a report from Dean about a piece of land that we have found which looks very promising for the 30" telescope. It is about 4 miles from the star party site (as the crow flies). If you are interested in seeing the site we may be able to plan a visit the afternoon before the star party, or the following morning if everyone stays overnight. (We have permission to stay overnight but camping is not allowed.) Details at the April 6th regular meeting.

Comet Austin is in the evening sky as of this writing and is running a couple magnitudes behind its prediction. The best time to observe it this month is from April 24 to May 6th, in the morning sky. Conjunction will be on April 13/14. Try to look for it even though the moon will interfere some. It hopefully will have a nice long tail. If you did not get a copy of Gary Rosenbaum's Comet Austin Ephemeris that was handed out a few meetings ago I have a few extras that I'd be glad to give away.

Jupiter is still missing one of its belts. It sets by midnight but next month Saturn will be just coming up around midnight--trade one giant planet for another.

Mercury is visible in the evening during the second week of April. It will be 20° from the sun and 19° above the horizon on April 13th (UT) when it reaches it's greatest eastern elongation (greatest distance from the sun).

Venus is in the morning sky, outshining all but the Sun and Moon.

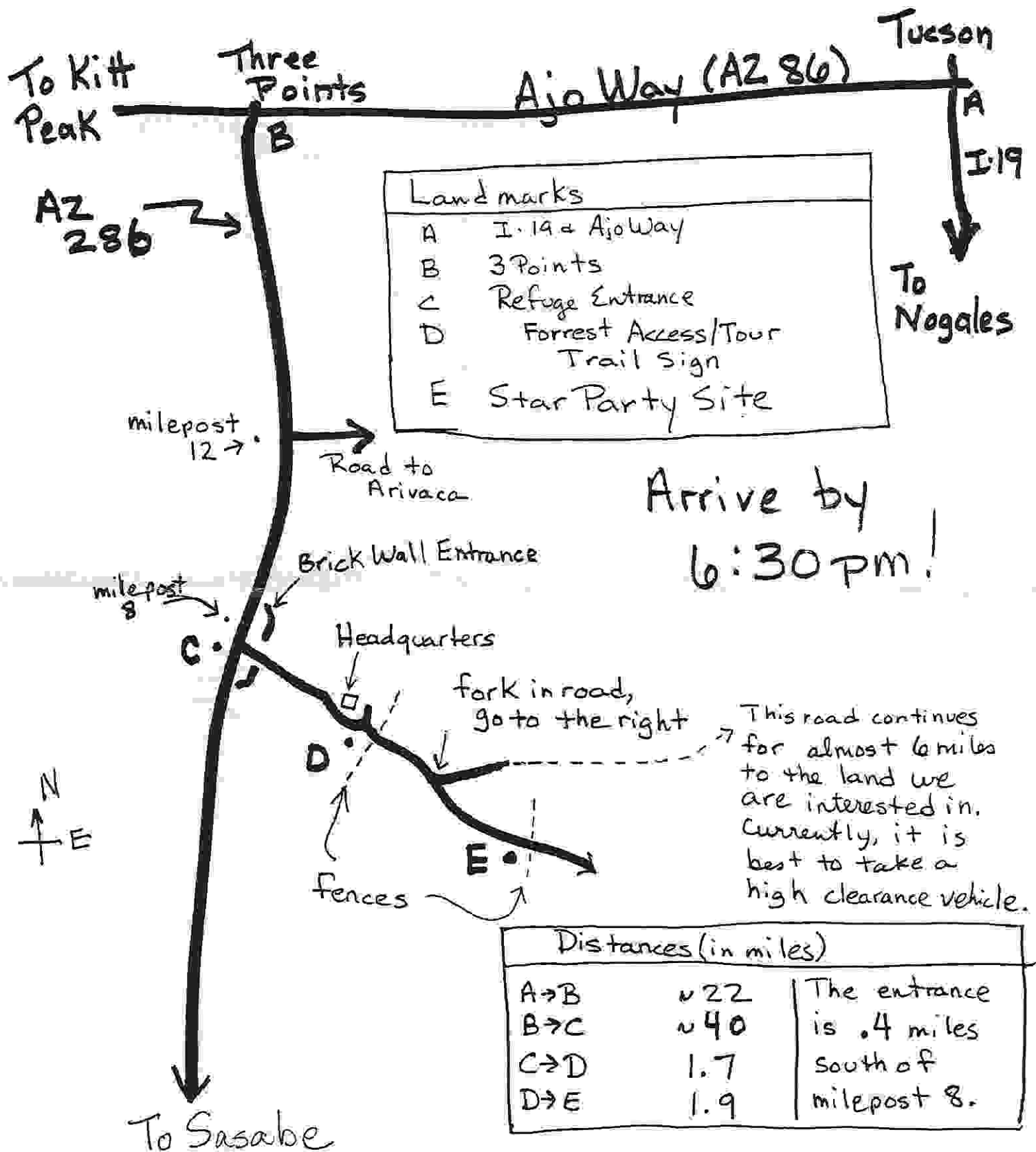
The Hubble Space Telescope is scheduled for launch sometime this month. Let's all pray that it really goes up and gets into operation without any problems and starts to return some of those stunning views of the cosmos that we're all anxiously awaiting.

Info elsewhere in newsletter for other star parties listed above.

Teresa Lappin, Chief Observer



Buenos Aires Wildlife Refuge





REMEMBER YOUR FIRST LUNAR VIEW?

If you're like many amateurs you became really hooked on astronomy after viewing the Moon or Saturn. My first image of Saturn through my 60mm refractor is the thing that got me! True, I've seen better images since, but that first image was incredible! While the Moon and planets are free for all to enjoy from their own backyards, it is really surprising that so few of the general public have seen the moon through a telescope. The United States has sent men to walk on the lunar landscape, but the average American citizen hasn't had a good look at it's surface! It is a very satisfying feeling to be able to show someone the Moon for the first time through your telescope. I estimated that about 1000 people saw the moon during last year's fair and a good percentage of these saw it for the first time. Your chance to show someone the Moon for the first time is here!

The Pima County Fair will be held April 6th to the 15th at the fairgrounds on south Houghton Road. I committed the TAAA to provide telescopes on Friday, Saturday, and Sunday evenings. Telescopes are still needed for April 6th, 8th, 13th, 14th, and 15th. Volunteers can drive onto the fairgrounds through the exhibitors entrance but I need to give your name to the guard or you will not be allowed in. Also, admission to the fair is free for exhibitors but, again, I need to know in advance that you will be there. Power is available but it is a lot easier if you have a portable power supply. (You can not use your car battery to run your drive.)

If you would like to donate some time to the fair but don't want to bring your telescope, you could be available at our booth to answer questions about our group's activities or astronomy in general. If you feel you don't know much or simply don't want to talk to people, maybe you would like to drop by the booth just to make sure that our flyer is out and that none of our photographs have fallen off our display boards.

I think I was at the last year's fair all but one or two nights, partly because I enjoy promoting astronomy and partly because nobody signed up to provide telescopes. This year I will not be able to be there every night so I really need volunteers. If club support for this activity doesn't increase we will not attend next year's fair. If you have questions, call Teresa at 790-5053.



SCIENCE & TECHNOLOGY WEEK AND ASTRONOMY DAY



To celebrate Astronomy Day this year the TAAA will be participating in Science and Technology week in cooperation with the Flandrau Planetarium and the University of Arizona. We will have a display at the Planetarium on Astronomy Day, Saturday, April 28th from 10am to 3pm. Set up time is at 9am. The display will be in the Galaxy Room and we will need help moving tables down from the meeting room. Afterwards, we need to move the tables back upstairs.

Events like this give members a chance to socialize with each other and with other people with an interest in astronomy. If there is an interest we may send out for pizza or meet at a nearby restaurant for some lunch.

After the events at the planetarium, the festivities will move to Sabino Canyon where we have scheduled a public star party, weather permitting. Bring your telescope and be set up by 630 or 7pm. The moon should be conveniently placed for observing and Jupiter will also be an object to show people, the two of them in the same part of the sky. Last year we tried handing out business cards announcing our meetings to anyone who expressed an interest in astronomy and we will try that again. Teresa will also have a sign up sheet for anyone interested in learning when our next public star party will be.

Questions??? Call Teresa at 790-5053.

WANTED! A NEW TREASURER

I'm sure that everyone is aware that I do not wish to continue as Treasurer but nobody has expressed an interest in the position yet. Here is a list of the things that the new Treasurer would need to do and how much time is involved on a monthly basis.

Attend regular meetings (1st Friday of month)	3 hours
-take dues from members, answer questions mostly regarding membership	
Preparation for Executive meeting	$\frac{1}{2}$ hour
-have account balances ready, notify president of items needing to be discussed	
Attend Executive meeting	3 hours
-give Treasurer's Report	
Make Deposit, send money to Sky & Telescope	2 hours
-we currently use Valley Bank but this could be changed for your convenience	
Other	$\frac{1}{2}$ hour
-annual reports, special reports requested by executive, balance the books, pay bills, keep track of donations, make purchases, etc.	

A book keeping system has been set up but would not necessarily have to be used.

Most active members already attend the regular meeting so the additional time involved is about 6 hours per month. I have always felt that the real duty of the Treasurer is to watch how the club funds are spent, keeping in mind that the money comes from members and that it should be spent in a way to help members achieve what they as individual amateurs can not. There are some incidental expenses that are the result of running a club and most of these expenses have been left to the discretion of the Treasurer. As current Treasurer, I think we should try to set up a yearly budget and we need to develop a policy for spending funds in the Land & Telescope Fund. These are two items that the next Treasurer will have to tackle.

I am interested in assisting the next treasurer in any way that would be useful. If you have even had just a curiosity about holding a position on the executive board, by all means, let me or somebody know about it. Honestly, all you really need is to be able to add, subtract, use a little common sense and give a little time.

Teresa
790-5053

You Want A Dark Site For The Club?

How Bad Do You Want It?

The Club is nearing the time when some important decisions need to be made, and it is more important than ever to keep the flow of information and members' opinions current. The Executive Committee has known for some time that the perfect site for TAAA development does not exist - that compromises have to be made concerning cost, darkness of skies, and easy access. I'm sure that even within our membership, many different opinions exist on which of the three to choose between, if the opportunity arose. Well, the time is now and a decision has to be made.

Mostly through the efforts of John Zajac, a piece of land has been located between Arivaca and the eastern border of the Buenos Aires Preserve. The land belongs to the University of Arizona, and exists as 15 mining claims (20 acres each) where gold was mined 100 years ago. The land has been idle for decades, and is pretty much intact except for access roads. There are a very few nearly horizontal mine shafts and a few exploratory digs mostly away from the area where we are looking. The land is on the western edge of the San Luis mountains. The land is not flat, but something like 40% developable, mostly near the access road going through the property - which ends at the mining site, so it has no traffic. There are hills in the area restricting horizons to the north and east about 6-8 degrees. The south and west is very good. Interestingly, there is a very nice hill about 150 feet above the flatter areas that a road passes near. The hill and the ridge leading to it is broad enough and flat enough at the peak to locate some telescopes and parking. The horizons from the hill are unlimited, except for a couple degrees to the east. Baboquivari dominates the view to the west and north - Kitt Peak is also visible. The indications are, that the University is willing, even anxious, to sell us the land at the appraised value of \$625 per acre. That is the lowest price we have ever seen for sale. In addition, they are willing to carry us for 5 years with a 25% down payment, which would allow some money in our account with which to start construction.

The skies are as dark as I've seen in Southern Arizona. The only direct lights from the hill was a ranch 15 miles to the northwest and about a dozen lights from Sasabe - 15 miles to the southwest. Tucson is noticeable to the northeast - but its light has to cross 4 mountain ranges in the line of sight, and does not contribute to zenith sky glow. Somewhat less significant, is Nogales, to the southeast. Phoenix is also visible in back of Kitt Peak as a weak glow. On 18 March, Teresa, John Z. and I observed for an hour or two and saw Comet Austin, the Zodiacal Light and some of the best views ever of Jupiter through my 12.5". Seeing was very good, though not perfect, but the sky was very dark.

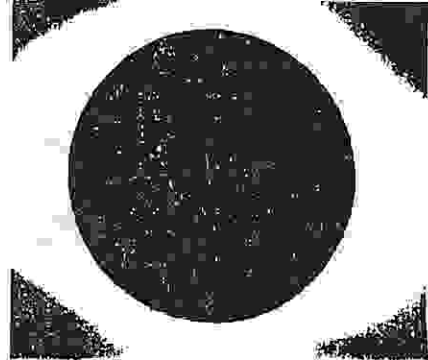
Now the bad news. The drive there is 75 miles from the University area, the last 6.75 on a dirt road that was last improved about 6 or 7 years ago. The road is certainly passable to your average family car, but one needs to drive slowly and improvements would be required. Whether those would come in the form of hiring a grader, or a volunteer road crew once or twice a year to remove rocks and fill holes remains to be seen.

The length of the drive is such that one would not go out just for a couple hours of observing. It is a serious drive - 3 hours round trip, and I would ask people at starparties, at this site, to consider camping overnight to avoid the drive when tired in the middle of the night. But it is a site that is uncompromising in its sky darkness, and bounded by the Preserve to the west and national forest to the southeast, lights are absolutely not a consideration. I like the opportunity to develop the hilltop to locate the Club's 30" and (hopefully) the University's astrographic camera, as well as pads for scopes for those arriving early. Up on the hill, the lights from late arrivals are less of a problem, and in fact, it would be easy to gate off the upper zone for latecomers. The 16" and lower flat areas would be available for those arriving after or during twilight. There is other impetus for early arrivals - the surrounding hills provide excellent hiking and views, there are some unique plant life I've not seen elsewhere in the wild, there are many signs and stories of wildlife in the area for you nature watchers, and I would like to see a program of cookouts before monthly starparties to encourage early turnout.

So decision time is here. With all the sites the Club has looked at, people always grumble about something. But to this point, we were generally compromising on light pollution and cost. In this case, there are no lights, city glow is minimized, and the cost is the lowest we've seen. People will complain about the 6 miles of bad road, but that is the one consideration they can do something about. Rather than complain, would they volunteer to walk part of it with a shovel to improve it? One cannot do much about light pollution, or how much the owner wants for the land, but we do have some control over road conditions, and I don't think grumbles about a rough road are valid for turning down a prime, dark site. I will have some slides of the area at the next general meeting, and I hope there will be some discussion of the potential of this site the second half of the meeting. For those of you with opinions relevant to the above discussions, or if you would like to visit the site over the weekend before the next meeting - assuming this reaches you in time, call me or leave a message at 293-2855. Become involved!

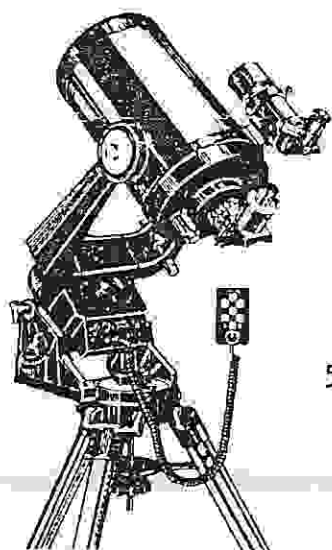
- Dean Ketelsen

NuArt
Astrophotography

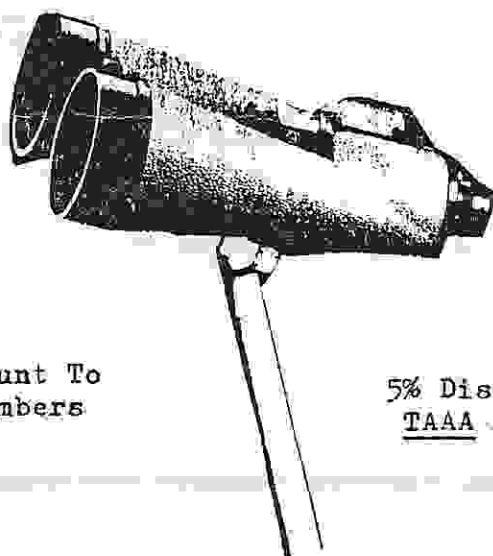


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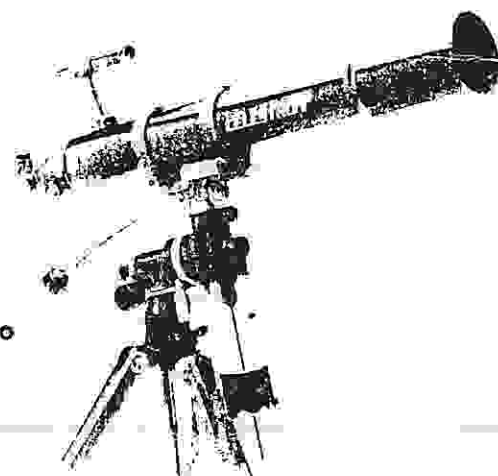
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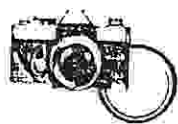
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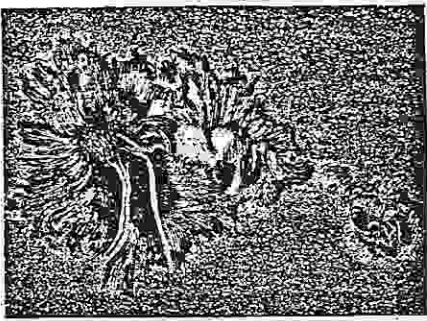
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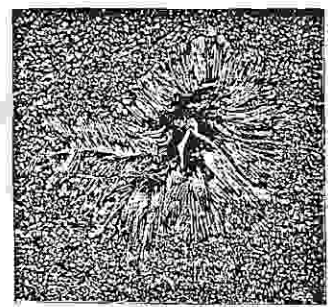
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SPRING SUNSHINE

by
Richard Hill



Spring is here without doubt. We have probably had our last frost and will be settling down to a year that will, in my humble prediction, be cooler than 1989 (which is not saying much) and wetter. Some hint of spring has been in the night air for a month now. The seeing, both day and night, has been improved from the hideous boil of winter. My tomatoes are off to a fine start, corn is 4 inches high, beans are sprouting fine leaves and I am ready to settle down to some quality observing.

The solar cycle has definitely peaked out. It looks as though November or December of last year will be the maximum of the present cycle, Cycle 22, with a smoothed peak daily sunspot count (R) around 200. This will make the maximum of this cycle the second highest in 300 years of recorded solar observing. In some respects this cycle was the highest or most active, but it is hard to correlate many of our contemporary observations with past records (e.g. rocket borne observations, x-ray observations, etc.). Since the peak, activity has dropped precipitously. Many days still have R's above 100, and a few above 200. Yet, numbers do not tell the whole story. Since December, sunspots and spot groups have become smaller in area and less developed or evolved. As the less developed groups might indicate, there has been a dramatic drop in flare activity. Still, there is every opportunity to catch some surprise activity. Things will pick up (if history is any indicator) and there will be more fireworks in Cycle 22 before minimum.

How will you observe these events? You could convert your ordinary nighttime telescope by buying a solar filter. This will work so long as you only want to take a quick look at low power. My own favorite brand of filter for such observing is Solar Screen by Roger Tuthill. It is a Mylar type filter of the finest quality. I have had no trouble in regularly seeing granulation with a 6 inch aperture. Since Celestron quit making them, there are no manufacturers of good quality neutral density filters in the US. There are plenty of bad Mylar type filters being sold. I have never gotten a bad filter from Tut in the 17 years I have been dealing with him. I tell you this so you, like others, will not be "turned off" to solar observing by a inferior quality filter. I have gotten bad filters from sources other than Tut. His may cost a bit more but their worth it!

But, if you want a view of solar features like the old Langley drawings (at the top of this article) you will need to build a specialized instrument for solar observing. Notice I said "specialized" not complex or complicated! First you have to decide what kind of observing you want to do. Do you want to observe a wide variety of features, observe flares, study faculae, sunspot penumbrae, or what? Different instrument/filtration combinations are required for different types of observing. By the way, this is a good field for the astro-artist as drawings by Langley and others have shown. In the ALPO Solar Section we are in great need of good drawings of individual solar features and their changes.

The easiest solar telescope is simply a newtonian with the mirror coatings removed on both mirrors. So get that old, small telescope out of the closet where you put it when you got the big one, and strip off the coatings! A four inch aperture will be quite good enough to exploit all that daytime seeing has to offer. It takes three reflections off of uncoated glass to allow direct viewing, so a mild eyepiece filter will be needed. With telescopes that do not reduce solar brightness before the eyepiece this would be a very dangerous practise. But, here we have reduced the light substantially before it gets as far as the eyepiece. I would suggest making an eyepiece filter from welding glass of suitable density. This will require some experimentation so be careful! I have done this with good results, though some filters were of too poor quality. You may have to make several, but the glass is cheap. Use low expansion glass on the telescope as sunlight will be passing through the optics and some absorbed. The mirrors do get fairly warm. I used a 6 inch f/10 with such a filter and got spectacular views of sunspot detail to better than one arc second. I read of two amateurs in the 1960's that built such an instrument with three mirrors and got true neutral density reduction. They claimed to have seen sunspots as red, a deep red instead of black. Until I built one of these telescopes I always thought the Langley drawings fanciful and pretty but not very accurate. Now I



have seen it and they are accurate!

The uncoated newtonian design still has an obstruction. With as much light as the sun puts into our instruments, any obstruction scatters a lot of light. So it is especially advantageous to have an unobstructed instrument. Also, because we try to observe the sun in the morning, before solar heating boils the sky, there is appreciable smearing of the image due to atmospheric refraction (as much as 5 or 6 arc seconds). It makes no sense to add to this with a refractor. So we will now look at several designs of unobstructed reflectors with short enough focal lengths allowing observation of the whole solar disk. This leaves out the Schiefspiegler's and Yolo-type telescopes with their very long focal lengths.

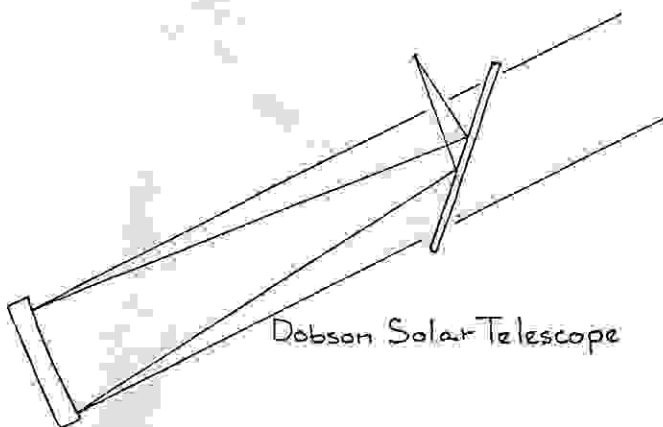
A number of years ago, nearly 20, John Dobson came up with a variation on his newtonian design adapting it to solar observing. In this case there is no secondary mirror. Instead, at the position of the secondary a full aperture aluminum coated window is placed at a 45 degree angle. It acts as both filter and secondary mirror. This has several advantages: 1) the system is unobstructed and 2) it is safe since if the filter breaks so does the secondary mirror. Dobson recommends the primary be coated like normal. In such a case the filter must do all the work of light reduction along with a mild eyepiece filter. If the primary were not coated, it may be possible to do away with the recommended eyepiece filter altogether. Of course this would preclude converting it to nighttime use. For further details see the May, 1972, SCIENTIFIC AMERICAN in the Amateur Scientist section.

I do not know what Dobson is now doing about windows for the filter but I have heard the glass is bought enmasse and better portions are selected by holding it in front of a telescope while observing a bright star. I doubt this is correct for only one piece in a thousand would be good enough at that extreme angle. I have used a similar method for selecting filter glass for small telescopes with about one in twenty being really good (in terms of surface area) and one in five passable. These were used perpendicular to the optical axis, like a normal filter, not at a 45 degree angle! Even optical windows that can be bought surplus could not be used like this to achieve high resolution. I have only seen low magnifications used on this design and I suspect that good quality windows are the problem.

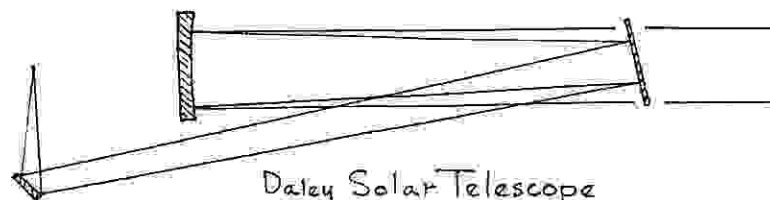
A solution is now at hand. In the December, 1989 SKY & TELESCOPE, page 593, was the ultimate, the Daley Solar Telescope. This instrument uses a plane parallel filter (reflective side inwards) through which the sunlight passes. It then goes less than $\frac{1}{2}$ the telescope focal length back to a primary mirror. This mirror should be fully coated with aluminum for faculae and flare observing and neutral density for general observing. The primary sends the light back to the filter where it is reflected off the coating of the filter (which is flat). The filter is mounted at a very slight angle (not like the 45° before). Because of this it sends the focussing beam off to one side to a tertiary mirror and then to the eyepiece. This system is capable of the maximum resolution for the aperture. The window, from which the filter is made, must be of the highest quality since it needs to be both parallel (to better than 3 thousandths of an inch) and flat or plane on both sides to better than $\frac{1}{4}$ wave. The instrument has all the advantages of the Dobson design plus it is a short instrument with a long (but not too long) focal length. I am making just such an instrument (with a few added features) out of the 6 inch mirror mentioned above.

There are some further rules that must be followed with all solar instruments. First everything sunlight might strike should be dead white. No other color stays as cool or prevents boiling. Even polished aluminum or stainless steel will not work as well, only white. Second, there should be a shield on the telescope so sunlight does not strike the tube. The telescope in the S&T article would probably work even better if the filter cell were white and the tube shaded.

So making a solar telescope need not be difficult. It requires no more optical ability than stripping the coatings off an old newtonian or those found in ATM Book I. In fact, the Daley design could probably be built out of plate glass! In any case, your views of solar features, even with a 4 inch aperture, will be as good as those of Langley who use larger equipment but less adapted for observing our spring sunshine.



Dobson Solar Telescope



Daley Solar Telescope