

# *Desert Skies*

September, 1993

*The Newsletter of the Tucson Amateur Astronomy Association (TAAA)*



**DON'T FORGET THE "GAB FEST" AT THE KETELSEN'S 28 AUGUST!**

**GENERAL MEETING - Friday, September 3rd, 7:30 pm** at the NEW Steward Observatory Auditorium. David H. Levy - "Comet Shoemaker-Levy 1993e."

**6:45 pm - pre-meeting "Beginners lecture"** by Teresa Lappin will be "Saturn, the Ringed Planet" All are welcome! ("old" Steward obs. room 204). See enclosed map for directions!

**EXECUTIVE MEETING - Thursday, September 9th, 7:30 pm** at Flandrau Science Center's Conference Room

**30" TELESCOPE DESIGN, LAND & FUNDRAISING MEETING - Wednesday, September 15, 7:30 pm** Niehaus residence - call for directions

**STAR PARTIES -** September 11 - Empire Ranch (see enclosed map)  
September 18 - Club Picnic at Vega Bray Observatory!

**October Newsletter Deadline - 15 September**

**COVER:** Ghostly images of meteor watchers and star trails appear over the Vega-Bray Observatory, where about 40 observers gathered to watch the Perseid meteor shower. Between some clouds which dissipated early and reappeared about 1am, they were witness to a very good display. In a dress rehearsal for this month's TAAA picnic, Eduardo Vega provided lots of sodas, munchies and tremendous views through his collection of telescopes. **BACK COVER:** In photos by Bob Goff, two Persieds appear very near the radiant point, and a brilliant non-Perseid appears in Cygnus.

**TAAA EXECUTIVE**

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**MEMBERSHIP IN THE TAAA**

Individual	\$20.00/year
Family	\$25.00/year
Senior Citizen (over 60)	\$18.00/year

Sky & Telescope subscription (optional) \$20.00 (as of July, 1992)

Rates for membership in the TAAA are given above. Members may subscribe to Sky & Telescope at the time membership renewal, saving more than 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, PO Box 41254, Tucson, AZ 85717. It is best to pay your dues 2-3 months before your membership actually expires.

**Desert Skies Publishing Guidelines**

- \* All articles, announcements, news, etc. must be submitted by the newsletter deadline listed above. Materials received after that date will appear in the next issue.
- \* All submissions are retained by the editor unless prior arrangements are made.
- \* Partial page article submissions should be submitted on Wordperfect compatible files on a floppy. Full page articles, artwork, and photos should be camera ready.
- \* We will not publish slanderous or libelous material!

Send articles, announcements, etc. to:  
TAAA - Desert Skies  
PO Box 41254  
Tucson, AZ 85717

Send ADDRESS CHANGES to:  
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**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 \$20 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.

## **September's Featured Speaker: David H. Levy "Comet Shoemaker-Levy 1993e"**

Though David spoke to us only a few months ago, he wanted a repeat performance to bring us up to date on one of his latest and oddest discoveries - comet Shoemaker-Levy 1993e. Discovered just this last March, its first claim of distinction was that it appeared to have broken up into at least a dozen pieces. Fortunately, it was even bright enough to be seen in large amateur telescopes. Preliminary orbital analysis indicated that it had encountered Jupiter nearly a year earlier at a distance close enough to fracture the nucleus. Its latest claim to fame is that further orbital analysis shows that it will most likely collide with Jupiter this coming July.

David will fill us in on the oddities of 1993e in detail and tell us about its ultimate fate and the visibility of the collision and its aftereffects from earth.

## **Beginner's Lecture "Saturn The Ringed Planet"**

Saturn is to blame for hooking many people onto astronomy. Saturn gets at least as many 'oohs and aahs' as does the moon at public star parties. The ring system is a special treat to many first time observers who assume that the rings are far too faint or small to see from the earth. As a result, the planet itself is often overlooked, its features being very subtle. At this month's Beginner's Lecture I will discuss Saturn and its ring system with an emphasis on past observations and what to look for during its current apparition.

The Beginner's Lecture starts at 6:45pm, 45 minutes before the start of the regular meeting. See you at 6:45pm on September 3rd in room 204.

## **The Second Half**

During the second half of the September 3rd meeting, Gil Esquerdo will be demonstrating the newest version of Dance of the Planets. Gil demonstrated an older version of this program several months ago and there was quite an interest in it. So, stick around after the refreshments to find out more about this newest version.

I want to start announcing the second half presentations in the newsletter. If you have a short presentation for the October meeting please let me know at the this month's meeting, or call me by September 12th if

you want an announcement in the newsletter.

We have access to some of the most sophisticated audio-visual lecture equipment I have ever seen! This equipment is available to you if you wish to use it. In addition to slide projectors, we have access to a VHS VCR and a laser disc. Software demonstrations can be performed using the IBM computer which is tied into the projection tvs so everyone can see the screen. Let's get more out of the equipment that Steward Observatory has so kindly allowed us to use.

Teresa 579-0185

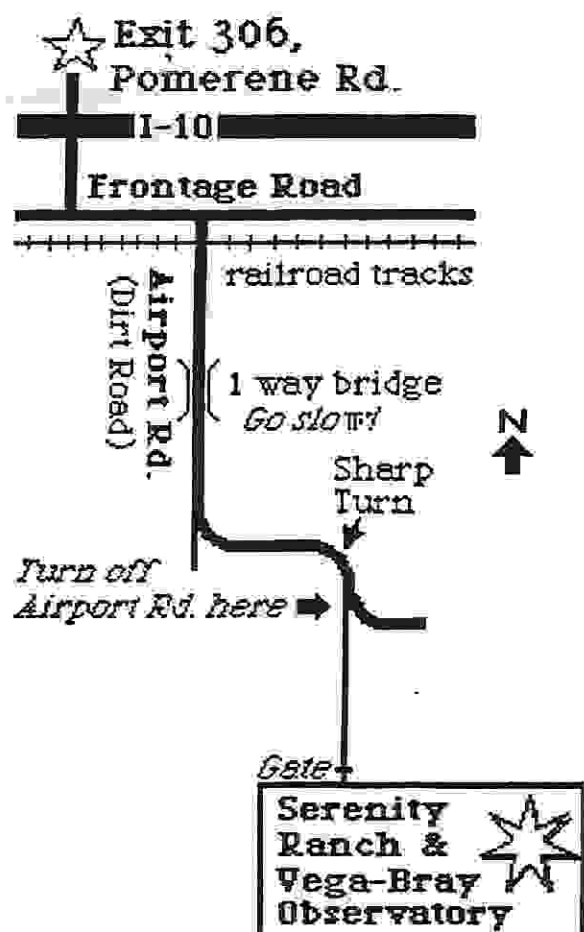


# TAAA Spring Picnic

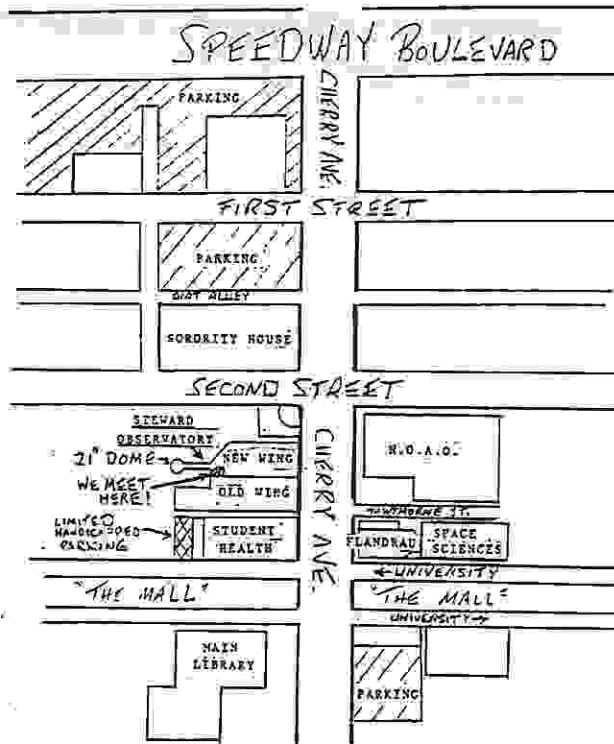
September 18 has been rescheduled for the annual picnic. Dr. Eduardo Vega has again generously offered his observatory as the location, starting at about 3pm. For those of you who have never been there, it is part observatory, part museum, and part learning center. It is an incredible collection of all things astronomical, and then some. The picnic is the highlight of the year for many of us. All are encouraged to come.

A map is included below. The observatory is located just past Benson, allow an hour drive from Tucson. Located on 40+ acres, there is a small lake for fishing (catch and release), canoeing, or stone-skipping, and plenty of room for general exploring, badminton, horseshoes, rock hounding, or getting a glimpse of the sun through members' telescopes (in other words, bring the kids!). We will have the newly refigured and aluminized 16" operational.

Please bring something to grill and a dish to share. A grill and some sodas will be provided, bring your favorite soda if you have a preference. We also are interested in having a twilight talk during dusk - bring some slides or make some suggestions at the next meeting. **Plan to come early and stay late!** For questions please call Eduardo Vega (747-9323) or Dean Ketelsen (293-2855).



## TAAA Meeting Location



## TAAA News Notes

### Potential Observatory Sites Identified

On Saturday, 21 August, Rick Blakely and Dean Ketelsen met with realtors in Sonoita and were shown two sites for possible observatory development.

The first and probably most desirable is located 9 miles south of Sonoita in Sunset Knolls development. There are two adjoining 5 acre lots available, the asking price for each is \$15,000. The property is bordered on the east and south by ranch land, north and west by the development, however, the contour of the land shield any potential lights from housing over the majority of the property. The land is virtually flat with slopes to the east and south and the horizons are excellent in all directions. No power is currently available within 1/2 mile, but will probably be brought closer by any construction.

The second site adjoins the southeast corner of Empire Ranch and is located about 9 miles east of

Sonoita about 1/4 mile off highway 82. The land is flat with the Whetstone Mountains about a mile or two to the east. Two 10 acre plots are available for about \$24,000 each. The major reservations about this land is that route 82 is line of site, though headlights are not pointed towards the site, though the N-S road to Elgin would direct headlights towards us.

I am quite optimistic about the first site and would suggest that anyone interested in visiting them come to the next scheduled Empire Ranch star parties and meet at the Sonoita Steakhouse on the southeast corner of the route 83 and 82 intersection at 6pm for a visit and observing from the potential site. Or contact me to see if the executive plan any special trips to the site. -Dean 293-2855

### Planetarium Update

We have received word that the Flandrau Science center has revised the development plan for its basement. They will be having a major geology exhibit in the section that had been slated for our use for a mirror making class. However, they have committed to supporting us in that endeavor, so a spot will eventually be found.

We will need to again move the equipment and

supplies that are stored in the planetarium's basement to a new location. At that time, I would like to also do a detailed inventory for Ellen Fultz, since it may be the only time to do so before tax time. Probably over the first weekend in September, it would be nice to have a few volunteers to move and inventory our collection. Call Dean or come to the September meeting to volunteer your services.

### Automatic Donation now in effect

The first payments to TAAA's automatic donation program were made in August. The success of the program depends on our membership contributing a few dollars on a regular basis. You would approve the automatic withdrawal from you account and once a month the amount you chose would get transferred into the TAAA land and telescope fund. If only half of the membership donated only \$5 per month, our fund would

raise \$5,400 in a year's time.

Currently we have 7 members donating a total sum of \$105 per month. Much thanks to Steve Alden, Brad Becker, Ed Blair, Bob Goff, Dean Ketelsen, Herb Roth and Eduardo Vega for getting the program started! For those of you wishing to help, pick up a donation form at the September meeting, or call Brad Becker at 881-7999.

### Newsletter Changes

Thanks to the efforts of Teresa Lappin, you will notice that this newsletter was delivered without stamps. For over a year or two, we have qualified for bulk mail, finally the relevant paperwork is now in and eventually it will cost us as little as \$.08 to mail these. Until our non-profit status is approved, however, it will cost us \$.14 apiece. There is a price to be paid, however, in that the newsletters must be sorted by ZIP code,

putting a greater load on those doing newsletter folding and labeling. Also, for greater savings, we hope to eventually use ZIP+4 and barcoding.

An added benefit other than saving hundreds of dollars a year in postage is that the above rates are for 3 ounces, meaning that we could more than triple the current newsletter's size. So think about submitting more reports and photographs for newsletter use.

## The Secondary Obstruction-Atmosphere Resolution Threshold by Rick Blakley

During my presentation near the end of the August 6 meeting, my assertion that the resolution of large reflectors is limited by the atmosphere rather than the obstruction of their secondaries was questioned, but the justification of such an assertion is easily made. For example, presume two large aperture, *ideal* telescopes are situated under a sky offering no less than 1/2 arc second resolution. One telescope has a secondary of a diameter that restricts it to a minimum resolution of 1/4 arc second, and the other instrument is limited at 1/8 arc second by its secondary. Both instruments will resolve no better than the 1/2 arc second that the sky offers, regardless of the obstructions of their secondaries. Of course, if both instruments' apertures were small enough that their secondaries worsened their resolving power to values greater than the sky's minimum, they both would perform at their worsened values, and would be said to be limited by their secondaries' obstructions. These examples imply that a threshold value exists between the extremes given here where the resolution limit of the atmosphere is match by the resolution allowed by the instrument's secondary obstruction.

We can pursue this more systematically using the contrast transfer curve, but we must become familiar with some concepts first. Let us presume that we are observing special targets with alternating dark and light parallel bars. The local brightness of a bar is a function of the sine of the bar's position so that bars fade in and out as one proceeds down the target perpendicular to the bars. The "spatial frequency" of the bars is merely the counted number of bar (or line) pairs per millimeter. We must also define "contrast", and we will call it the difference in intensities of adjacent light and dark bars divided by the sum of the same intensities. Assuming the brightest equals 100 and the darkest equals zero, we get  $100-0$  divided by  $100+0$  gives 1 for the contrast. An optical system will diminish contrast as the light from a target travels through the system, so we can not expect to get a 1 at our focus (the lighter part gets darker and the darker parts gets lighter). In fact, if we divide the contrast value we get at the focus by our starting value for the target, we get "contrast transfer". While scattered reflections, diffraction from mirror or lens edges and secondary obstructions, aberrations, and other things enter to reduce contrast transfer, we will consider contrast transfer only from the effect of the secondary obstruction in this article.

Our procedure entails measuring or calculating the contrast transfer for a given obscured aperture for various targets having differing spatial frequencies, and plotting the results. Fortunately, Rutten and van Venrooij have done this for us for an aperture with a 40% obscuration on page 215 of their book *Telescope Optics* (Willmann-Bell, 1988), and we will use their graph, printed below by permission. The contrast transfer is noted in percent on the left vertical axis of the graph, and the spatial frequencies of the targets observed are located on the bottom horizontal axis, noted as "resolution" in line pairs per millimeter. Note the ski-slope curve no. 1 for the unobstructed aperture and the humpy curve no. 2 for the system with a 40% obstruction beginning with 100% contrast transfer at the extreme left.

That spatial frequency is equated with resolution is significant; an optical system will resolve the various spatial frequencies up to a maximum (which is 180 line pairs/mm for this case) found by calculating  $lp/mm = 1/[w(F/no.)]$ , where  $w$  is the wavelength of light used in the observation and  $F/no.$  is the aperture ratio. Neither aperture nor focal length appear alone in the calculation. We can use the graph for any system with the  $F/no.$  considered here, which the authors indicate is  $F/10$  (actually one can calculate  $lp/mm = 1/[w(F/no.)]$  for another  $F/no.$  and rescale the horizontal "resolution" axis). If the resolution axis is to be read in arc seconds, we use the equation  $r = 206265/[f(lp/mm)]$ , where  $f$  is the focal length of our telescope (in millimeters) and  $lp/mm$  is the line pairs per millimeter on the resolution axis.

Let us now look at the graph, but let us consider a contrast transfer of 10%, a value appropriate for planetary viewing. This corresponds to line no. 4 for the 40% obstructed aperture on the graph. We need also consider the contrast response of the eye on the graph for bright, low contrast objects like planets, line no. 5. Notice lines 4 and 5 cross at about 62 lp/mm at point H. Let us assume that we are observing with an

F/10, 6650mm focal-length system. We find that 62 lp/mm corresponds to 1/2 arc second.

Now, we know that we cannot resolve any better than what the atmosphere will allow us unless we use special techniques such as speckle imaging (which in any case is only good on stars) or active optics, which we are not equipped to use as amateurs. For our 6650mm focal-length system, a resolution of 1/2 arc second equates to the 62 lp/mm, as we have already calculated. This suggests that 665mm is the ideal 1/2 arc-second threshold aperture for 40% obstructed systems used visually. If we rescale the horizontal resolution axis for an F/8 system, and do the same calculation for 1/2 arc-second resolution, we find that we would get the same 665mm aperture. This occurs because the resolution axis is scaled using the F/no. in the relation  $1/[w(F/no.)]$  and we divide through by the focal length to get the resolution axis to read in arc seconds.

Let us presume that our instrument is F/10 but has an aperture of only 508mm. Transposing the equation  $r=206265/[f(lp/mm)]$  to  $lp/mm=206265/[f(r)]$  we get that 1/2 arc second is equivalent to 81 lp/mm. This value is well to the right of the intersection of lines 4 and 5 at H on the graph. The secondary, therefore, limits this instrument at a resolution more coarse than that allowed by the atmosphere's 1/2 arc second for a 10% contrast transfer value. The actual resolution allowed by the secondary at 10% contrast transfer is 0.65 arc seconds.

Let us again make a presumption, but this time the instrument has an aperture of 762mm at F/10. We calculate that a 1/2 arc-second sky allows 54 lp/mm in the focal plane of the telescope. This value is to the left of the intersection of lines 4 and 5 at H on the graph. The minimum resolution of the instrument due to the 40% obstruction of the

secondary is the 62 lp/mm at H which equals 0.44 arc seconds. Clearly, the sky limits this instrument at 10% contrast transfer.

The same technique can be used for evaluating the performance for various instruments relative to other eye-instrument intersecting lines on the graph (at 4 & 6 or 2 & 6, for example). Other values for resolution allowed relative to the sky can be accounted for as well for other secondary-obstruction percentages if one is willing to plot the various eye-lines from the graph used in this article on the graph of figure 18.7 on page 213 of *Telescope Optics*. But one should take care not to interpret the results too literally. Other factors that are not considered here play a roll, and so one should allow a hefty fudge factor before building. One may choose to allow a 35% obstruction for a 665mm aperture system rather than the 40% we presumed here, perhaps.

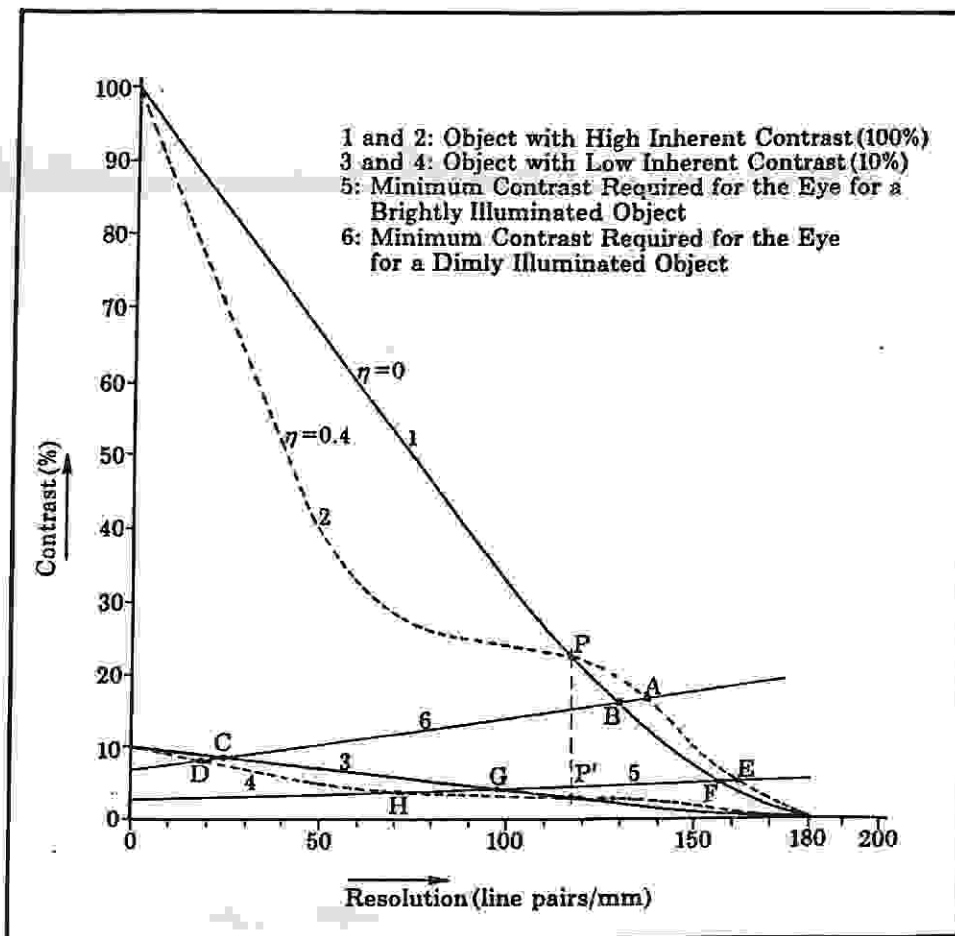


Figure from *Telescope Optics: Evaluation & Design* by Harrie Rutten & Martin van Venrooij, copyright 1988 by Willmann-Bell, Inc. Reproduced by written permission.



## OBSERVER'S REPORT

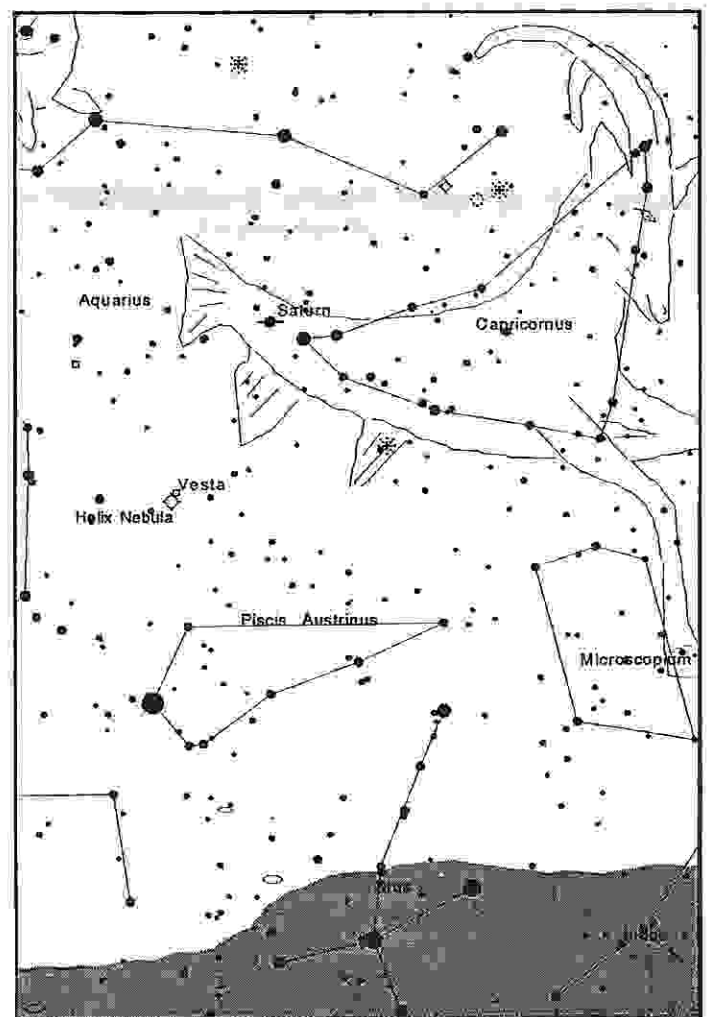
August brought seasonal clouds and rain to southern Arizona, but the usual monsoon pattern dried up enough during mid month, allowing for limited stargazing and meteor watching. While the weather cooperated (at least for a few hours) on the night of August 11th, the debris trail left by Comet Swift-Tuttle did not. As a result the much hoped for Perseid meteor "storm" never materialized. The Perseid meteor shower was richer than usual worldwide, but here in Arizona it seemed like just an average year. Europe apparently had the best view. By dawn in France hourly rates may have surpassed 300. In addition, many observers around the globe reported a much higher percentage of bright meteors (at least +1 magnitude) than average. This fact is no consolation to the fifty or so skywatchers gathered at the Vega-Bray Observatory or to those club members who chose the Empire Ranch as their site for this event. All of us saw a fairly average Perseid meteor shower. Yes, there were some nice, bright meteors streaking through 30-60 degrees of sky, but most observers I've talked to weren't awed by the show. The most optimistic report I've heard in the southwest was from comet hunter Harold Brewington who reported an hourly rate of 100 to *Sky and Telescope*. I was too busy tending three cameras to make an accurate count like Harold, but if you did please let me know.

While it's always cliché to say "wait till next year", there are some astronomers (Matthew Sykes at UA among them) who say it's quite possible a Perseid storm will occur August 11, 1994. The key word here is *possible*. On the other hand some astronomers believe we will never get a spectacular Perseid shower. Let's hope they're wrong. At least the moon won't present too much of a problem next year (A five-day old waxing crescent will set at 9:53). I personally feel we will have a good idea how rich the shower will be the night before. The poor showing Dean Ketelsen and I witnessed at Kitt Peak August 10 gave me little optimism for the following night's viewing, and this feeling unfortunately was fulfilled by the average shower we witnessed August 11. Hopefully next year will be different.

Although much larger than meteoroids, asteroids are far less spectacular in our skies (that is as long as they don't hit the earth!). This month the brightest asteroid, Vesta, appears close to the Helix Nebula, NGC 7293. The closest planetary nebula to earth, the Helix is so large I can see all of it well only with low power oculars yielding 60 power or less in my 10" Dobsonian. From Australia (in dark skies) the Helix is used to judge sky transparency as it culminates directly overhead, and

so is a naked eye object. Although it's integrated or total magnitude is 6.5 it's low surface brightness makes it appear much fainter. This combination of large size and low surface brightness makes the Helix a good target for binoculars in a dark sky. In my 14x70 and 10x70 binoculars the Helix is easy to pick out, appearing as a circular hazy spot one half the size of the full moon. The fact that Vesta (at magnitude 6) will appear  $1/2^\circ$  to the northwest on the 12th will make it even easier to spot the Helix. While looking at both these objects, consider the size distances involved: The Helix lies 450 light years away (only 2,700 trillion miles) while Vesta averages 121 million miles. While the chart below will be helpful, more complete ones are in this month's *Sky and Telescope*, pages 66-67 (only ignore the mistake on page 66-the chart is for September, not August). Good viewing!

Mike Terenzoni



**Looking Southeast From Tucson  
9 p.m. September 12**



## Vesta Reaches Opposition

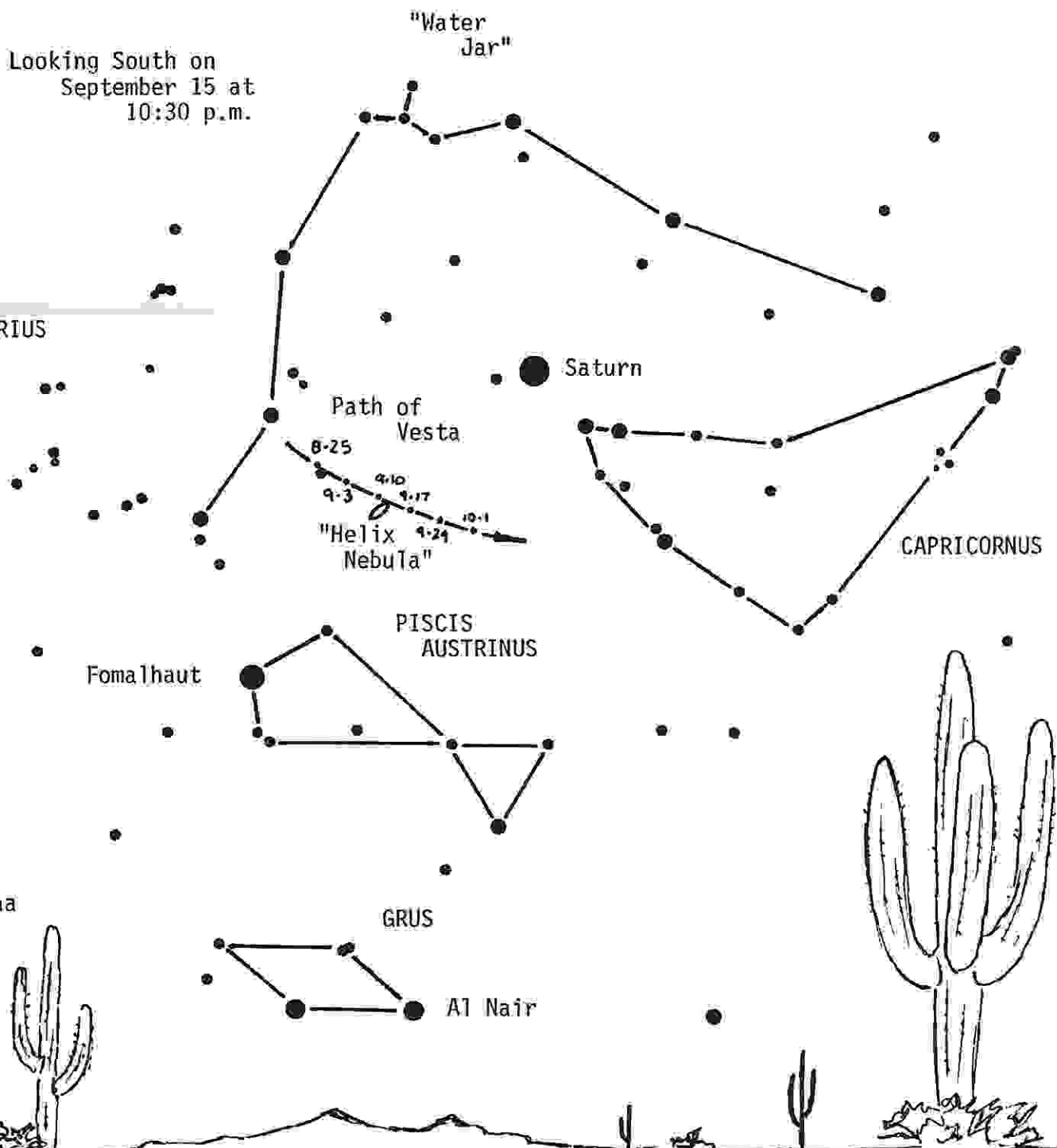
On the night of August 27th, Vesta will reach opposition shining at magnitude 5.9 in the constellation of Aquarius. Vesta will be an easy binocular object this month lying 15 degrees southeast of Saturn. Unlike planets which show disc's in amateur telescopes, asteroids appear star-like and featureless, but none the less are interesting to track against the stellar background.

Vesta belongs to a group of celestial bodies called Minor planets or Planetoids, none are known to be larger than 500 miles in diameter. Vesta was the fourth asteroid discovered, being found in 1807.

Vesta has a diameter of about 240 miles, and appears to be rather spherical in shape. Vesta at opposition is the brightest of the asteroids visible usually shining at about 6th magnitude. Vesta as well as most of the asteroids orbits between Mars and Jupiter at about 300 million miles from the Sun.

So this month we have a fine opportunity to observe one of the Solar System's minor planets.

Jeff Brydges



## Desert Skies Classified

**For Sale:** 6 inch F/10 refractor, Dobbins lens, 2 inch focuser, tube assembly only, \$750.00. Astronomy magazine 1973-1992; only 14 issues missing, \$100.00 obo. Call Mike, evenings at 297-2781.(11-93)

### **HOUSE FOR SALE! PERFECT FOR LUNAR AND PLANETARY OBSERVERS!**

Three bedroom home in convenient location only 15 minutes from the UA in quiet neighborhood (close to good schools too!). ~1000 sq. ft., slump block construction with covered porch, separate workshop and lots of storage. **Roll-off roof observatory can accommodate a 16" Newtonian with room for equipment! ASLO can be included is a solar observatory!** Large walled-in yard has beautiful shade trees and 600 sq. ft. of ORGANIC, low water-use garden beds, covered garden center and three composting bins. Ceiling fans, mini-blinds & curtains, stove & fridge all stay. Asking price is \$59,500. **OPEN HOUSE SAT.-SUN, 9-6 at 4632 E. 14th St.** Call Rik or Dolores Hill at 325-9820.(11-93)

**For Sale:** 3" Unitron Refractor, excellent optics, altazimuth tripod mount with slow motion controls, star diagonal and eyepieces - \$500. Call Jeff Brydges 888-0591.(12-93)

**Services Offered:** I have a multimeter (volt/ohm/amp meter) and a dual trace oscilloscope and will assist and advise you in debugging your electrical systems at no charge. Ray Wallace - 294-1197.(12-93)

Your ad will run for 4 months unless specified. Month and year of last appearance is last item of ad. For additions or changes to this list call Dean, 293-2855.

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### **TAAA Exec Meeting - 12 August 1993**

The meeting was called to order at 7:35. Present were Dean Ketelsen, Teresa Lappin, Gary Rosenbaum, Rick Blakely, Rob Nieberg, Jim Wilmot, Derald Nye, Tim Hunter, Sharon and Duane Niehaus, John Zajac, Susanna Caldwell, and Mike Terenzoni.

**1. Land Search:** Dean will arrange a group of members to see some land for sale in the Sonoita Area. The current best site borders the south side of Empire Ranch. Forty acres are available for \$3,500 per acre, but subdivision is possible. The agent will have other sites we can visit also. August 21 was the proposed trip date.

**2. Educational Program:** Terri gave a presentation regarding her and Sharon's trip to San Diego and the Universe '93 teacher's workshop. She and Sharon have been working on a plan to do after school and summer programs with kids to serve both as an educational outreach and source of income. Teresa submitted a preliminary budget for such a program. Detailed organizational plans were tabled for the next 30" meeting.

**3. Bulk Mail:** Teresa has been busy trying to get the TAAA using bulk mailings which will save over a factor of two for current newsletter mailings. Application will be made hopefully in time for the next newsletter.

**4. Fundraising:** There has been no update on the automatic donation program as Brad Becker has been

on vacation. We are attempting to contact Pat Daniels about simplifying his winning t-shirt design. There was some debate regarding the use of funds obtained from the Vann 20" telescope. Some wanted to purchase eyepieces and accessories for the 16" and 30" telescopes, some wanted to get raffle prizes which could be used to increase our revenue. Debate will continue at the 30" meeting.

**5. Treasurer's Report:** Duane reported a savings account balance of \$14,026, and a total of \$18,740.

**6. Sabino Canyon Observatory?:** Teresa and Gary met with the Forest Service representatives of Sabino Canyon and submitted the idea of permanently locating the 16" telescope at that site. They will present the idea at their next organizational meeting. They were concerned about the possibilities of vandalism and how such a observatory would fit in with the desert and other existing structures. Such a location would serve as an outreach location as well as a close in site for members to observe.

**7. Upcoming Events:** Women's fitness camp at Oracle is on 27 August. Tentative dates for the Chiricahua Campout is 9 October and the All-Arizona Star Party is 15/16 October.

There was no other business, meeting adjourned at 10:20.

## An Editorial

A few years ago the second half of the meeting was much more interesting. Short presentations about recent observations or projects were made by many members. Some were well prepared, others were spur of the minute type things; most were not technical talks. I think our members have become somewhat intimidated by the advanced level of recent speakers, both during the main lecture and the second half. Lets try to get back to the basics! I suspect that about 50% of our members are beginners and want to hear something they understand, not a bunch of professional/technical jargon! The only way this will happen is if the general membership communicates this to the executive board. Your Member's at Large (Bob Goff and Dave Harvey) are there for this very reason, but any executive member will listen to your comments.

Beautiful slides of any and all kinds of astronomical objects were often shown in the second half. Some were great, others not so great. not everybody is successful the first time...come on astro-

photographers... show us your photos! Only have prints?...No problem, the visualizer can project prints onto the screen. No need for the audience to squint at your photos.

How about your own astronomical projects...have you fashioned a handy little gizmo that holds your flashlight over your observing table? How about the performance of the new eyepiece you just bought? Let's hear about it!

If you feel that your presentation will take more than 15 minutes, then consider giving it at one of our member's nights. These nights were started because many people had longer presentations to make.

As a member of the executive board, I am concerned about what members think about our association, especially first time impressions. Our membership turn-over is far too high and something needs to be done to keep members coming back.

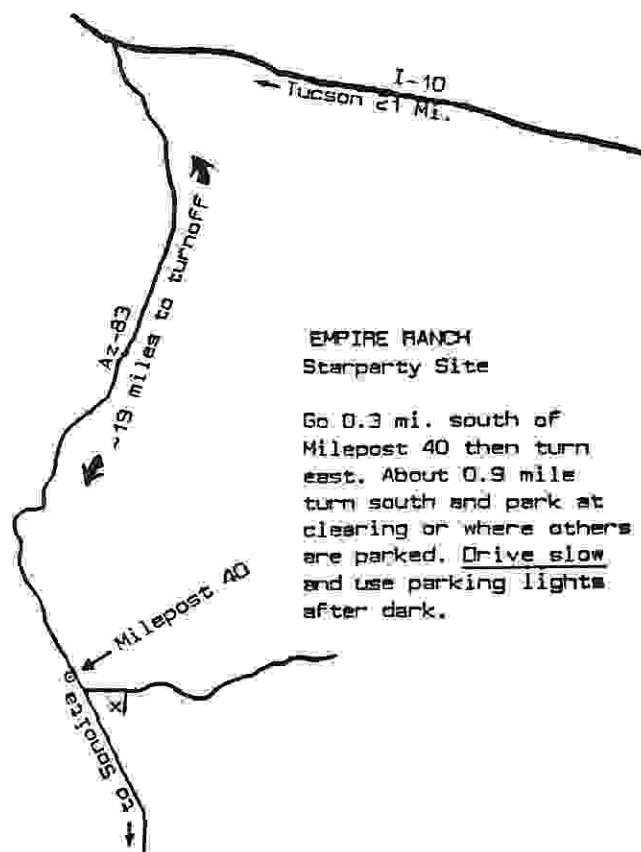
Teresa 579-0185

### DARK SKIES for Tucson (in MST)

1993 SEPTEMBER no twilight  
no moonlight

We/Th	1/ 2	-	-	-
Th/Fr	2/ 3	-	-	-
Fr/Sa	3/ 4	-	-	-
Sa/Su	4/ 5	8:08pm	-	8:27pm
Su/Mo	5/ 6	8:06pm	-	9:03pm
Mo/Tu	6/ 7	8:05pm	-	9:42pm
Tu/We	7/ 8	8:03pm	-	10:25pm
We/Th	8/ 9	8:02pm	-	11:14pm
Th/Fr	9/10	8:01pm	-	12:09am
Fr/Sa	10/11	7:59pm	-	1:08am
Sa/Su	11/12	7:58pm	-	2:12am
Su/Mo	12/13	7:56pm	-	3:18am
Mo/Tu	13/14	7:55pm	-	4:27am
Tu/We	14/15	7:53pm	-	4:45am
We/Th	15/16	7:52pm	-	4:46am
Th/Fr	16/17	7:50pm	-	4:47am
Fr/Sa	17/18	7:49pm	-	4:47am
Sa/Su	18/19	8:10pm	-	4:48am
Su/Mo	19/20	8:58pm	-	4:49am
Mo/Tu	20/21	9:51pm	-	4:50am
Tu/We	21/22	10:47pm	-	4:50am
We/Th	22/23	11:45pm	-	4:51am
Th/Fr	23/24	12:43am	-	4:52am
Fr/Sa	24/25	1:41am	-	4:52am
Sa/Su	25/26	2:37am	-	4:53am
Su/Mo	26/27	3:32am	-	4:54am
Mo/Tu	27/28	4:26am	-	4:55am
Tu/We	28/29	-	-	-
We/Th	29/30	-	-	-
Th/Fr	30/ 1	-	-	-

Erich Karkoschka





***Tucson Amateur Astronomy Association***  
***P. O. Box 41254***  
***Tucson, AZ 85717***

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