Desert Skies

December, 1994

The Newsletter of the Tucson Amateur Astronomy Association (TAAA)

GENERAL MEETING - Friday, December 2nd, 7:30 pm at the Steward Observatory Auditorium -room N210. December's speaker is James McGaha **"The Search for the Nebulae."**

Pre-meeting "Beginners lecture" at 6:30 by Teresa Lappin - **"Larger Telescopes/Larger Universe."** All are welcome! This lecture is in Steward obs. lecture hall N210. (Note earlier starting time). See enclosed map for directions!

EXECUTIVE MEETING - Thursday, December 8th, 7:30 pm at Flandrau Science Center's Conference Room

STAR PARTIES: 26 November/3 December - Empire Ranch dark-sky star party.
6 December - Star party at Carson Middle school.
8 December - Star party at Vail Middle School.
8 December - Star party at Agua Caliente Elementary School.
10 December - Saturn party on the U of A Mall in front of Flandrau.
26 December/31 December - Empire Ranch dark-sky star party.

Next Newsletter Deadline - December 21st.

Cover: This image of the total solar eclipse of 3 November, 1994 was recorded by Eduardo Vega from LaLava Botosi, Bolivia (a lot of the details in the original slide are lost in the translation to newlsetter). Back Cover: Proving that the world really is a small place, the Vegas and the Nyes accidently run across each other at an archeological museum in LaPaz, Bolivia two days before the eclipse. Both photos by Ed Vega.

TAAA EXECUTIVE

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Past President	Tim Hunter	299-2972
Newsletter	Dean Ketelsen	293-2855
Starparty Chair	Karen Allen	749-5744

MEMBERSHIP IN THE TAAA

Individual	$25.00/year	(increased
Family	$30.00/year	rates as of
Senior Citizen (over 60)	$23.00/year	July 1st '94)

Sky & Telescope subscription (optional) $20.00. 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:
TAAA
Attention: "address change"
P.O.Box 41254
Tucson, AZ 85717

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.

December's Speaker - James McGaha
"The Search for the Nebulae"

TAAA member James McGaha, of the Grasslands Observatory, will present a lecture on the discovery of nebulae. The first nebula (from Latin "Cloud") discovered with a telescope was in 1610 by Nicholas Pieresc. He found M42, which was only the 10th nebula known (9 objects had been seen by naked eye). It would be 55 years, in 1665, before another object would be found. In the next 120 years only 128 more objects would be discovered. Then William Herschel would find nearly 500 entirely new objects in just one year. James's lecture will cover this history.

James got his first telescope at age 12 - 35 years ago, and has been an amateur ever since. In 1991, he retired from the U.S. Air Force after 20 years of service. James has been fostering science awareness through his public speaking to a variety of amateur and professional audiences around the world. His current interest include asteroid occultations, supernova searches, and CCD imaging. James holds a Master of Science in Astronomy from the University of Arizona and is a Fellow of the Royal Astronomical Society. He is currently on the Faculty at Pima Community College.

Beginner's Lecture
Larger Telescopes/Larger Universe

This month we will explore the disease known as aperture fever and what happens when professional astronomers "need" bigger and bigger telescopes. This will be a historical account of the role that large reflecting telescopes have played in mankind's leap from a small universe to a very large one.

The Beginner's Lecture starts at 6:30pm, one hour before the start of the regular meeting, in Steward Observatory's Lecture Hall.

Young Astronomers Club
December 2, 1994, 7:30 - 8:30
Steward Observatory, room 208

A big thanks to Sharon and Karen for their help with our first meeting November 4, 1994! Quite a few people expressed interest prior to the meeting and we had a good turnout. We briefly discussed Cassiopeia in the north and Saturn in the south as current night sky objects to locate. We then assembled hand-made compasses to illustrate how to find magnetic north.

This month we will look at refractor telescopes. I would like all children who made their own telescopes as part of Sharon & Duane's astronomy class or Karen Allen's science club to bring their telescopes. I am in need of a small refractor with an alt/az mount. We have one with an equatorial mount. We will also discuss the current night sky. The children will have some time to describe observations they made since the last meeting. We will be asking children or their parents to fill out a form providing their mailing address so that they can receive a monthly YAC newsletter. If you can provide the aforementioned telescope, please e-mail to 74750.247@compuserve.com or call me at 579-1382.

Membership List Updates

We plan to publish the TAAA membership list as part of the January newsletter. We also know from experience that many of the phone numbers are unlisted or no longer valid. It is difficult to contact you without a phone number. Please take a minute and call Gary Rosenbaum at 579-0185 if you have moved or changed numbers in recent years and make sure the information we have is correct.

School Star Parties in Jeopardy

We had 5 school star parties last month, and fortunately, 3 of them were clouded out. Fortunately, because effectively no one volunteered to bring their scopes out to the schools. At the two that did take place, we had two members at each event. This is a sad showing for a group that only a few years ago would easily have 6-8 scopes show up at each event. Yes, they are during the week, and yes, with the early setting sun they start early, but by the same token, they end very early as well, getting you back home with minimal schedule disruption.

We have a few more scheduled this month, and yes, there are two scheduled for the same night again - the result of several people scheduling these events simultaneously. Multiple events will stop with the new star party chair (see next story). Please try to make one or two if you can. Another failure to round up volunteers is a positive mandate that we should not be offering this service to local schools.

New School Star Party Chair

Karen Allen has volunteered to take over as the school star party chairperson. She will coordinate the needs, locations and times of the events with the teachers, arrange maps for the newsletter editor, maintain signup lists for the events, and may call cloudouts in advance of the star party if the forecast is poor. She should be contacted when arranging any star party. If you would like to be on her volunteer list, call her as well. Karen's phone number is 749-5744.

Newsletter Editor Needed

Dean is giving up the newsletter editorship at the end of the year, so the January issue is his last output in that regard. It is recommended that the editor have access to a computer with a laser printer. The editor coordinates input for the newsletter from the Executive and other member's submissions, sees to its xeroxing, folding, labeling and bulk mailing. The monthly effort of late has been about 15 hours per month. If you are interested in helping out, contact Dean or Teresa. You might want to take part in January's production to see what it is like!

No Pinacate Event this Year

With only 4 members expressing interest, as well as the rainout of the scouting trip over Veteran's holiday weekend, we will not be scheduling any special events over New Year's weekend. If you have any ideas for special event star parties like that, however, let Dean know and we will try in the future.

Christmas Party Host Needed

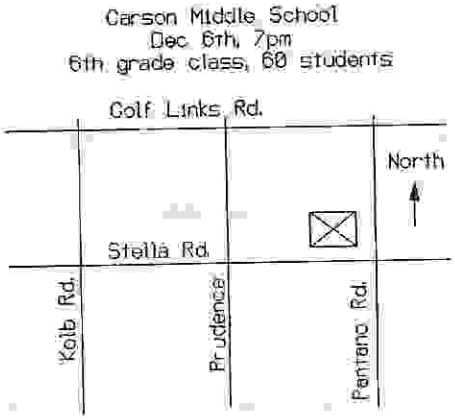
If you would like to host a December Gabfest/Christmas get-together, let Dean or Teresa know as soon as possible. We can make some quick arrangements and announce such an event at the December 2nd meeting. Such an event is usually a potluck affair and thus is not usually too labor intensive for the hosts. Try it, you will like it!!

Public Star Parties for December

Sign up for any of these events at the December meeting or call Karen Allen at 749-5744.

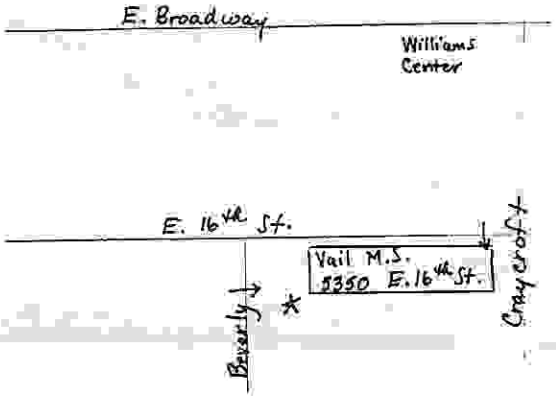
Carson Middle School
Tuesday, 6 December, 1994
Pantano/Golf Links
7pm - 8pm

Carson is at 7777 East Stella, where they expect up to 60 students and their parents. Setup will most likely be on the recreation field on the east side of the school.



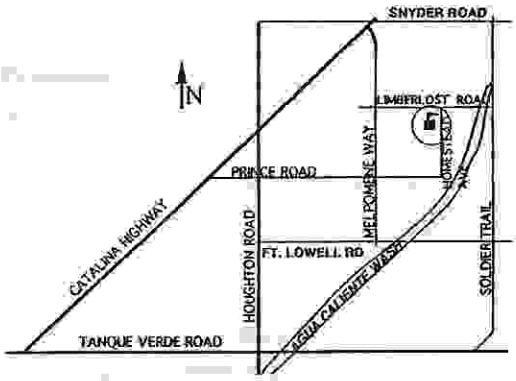
Vail Middle School
Thursday, 8 December
Craycroft/22nd
7pm - 8pm

Vail Middle school is at 5350 East 16th Street, where they expect up to 120 students and their parents. Setup is on the southwest side of the school, with access off 16th st. or Beverly as indicated. Note the Agua Caliente event following is tonight as well.



Agua Caliente Elementary
Thursday, 8 December, 1994
Snyder/Catalina Highway
6pm - 9pm

Agua Caliente is at 11420 E. Limberlost Rd, where they expect up to 200 children and parents. Setup will be on the playing field on the east side of the school, which is accessed from a gate on Homestead Avenue.



Saturn Party at U of A Mall
Saturday, 10 December
6pm - 8pm

The Executive debated holding a public star party on campus or Sabino Canyon and U of A won out. The Planetarium will help publicize this event, so large crowds may result. Saturn is in prime position for observing right now, and along with the moon, some of the brighter Messier objects can be shown as we are negotiating for having the lights turned off. Parking along the Mall will be allowed by permit (see planetarium staff upon arrival), and you can set up either in front of the planetarium or on the mall itself, if the soccer and frisbee players will let you. Come on out and help get the public excited.

From: Wayne Itokazu <witokazu@bishop.bishop.hawaii.org>
Subject: 3 Nov Solar Eclipse Follow-up Report for TAAA members
Hi there to all TAAA members!

It's good to be back home again!!! Here's a post-eclipse follow-up report that can be printed in the December's issue of DESERT SKIES.

Our group from TravelBug International went to Foz do Iguacu, Brazil to view the solar eclipse. Iguacu, which is a Guarani word for "Big Water", is a large, meandering river system that separates Brazil, Argentina, and Paraguay. The Falls, unlike the Niagara Falls here in the United States, consists of 275 waterfalls stretched over 2 1/2 miles with an average height of 230 feet. Since the weather was clear with no major storm fronts anywhere, I, along with Bryan Brewer and several veteran eclipse chasers, decided we should chance on crossing the border to the centerline.

Puerto Esperanza, which means "Port of Hope", is a small village located some 35 miles due south from Iguacu Falls in Argentina. We chose an abondoned airfield site since it was the only piece of real estate that was flat to polar align the scope and to view the receding moon shadow. Since we were about one mile south of centerline, we experienced totality with a duration of 3m 50s - about 33 seconds shy of the maximum that occured over the south Atlantic.

When the eclipse started 9:35am local time (3:35am MST), the weather was clear. But as the eclipse progressed until 2nd contact, the clouds become more numerous and bothersome. When 2nd contact occured at 10:47am, Baily's beads were nonexistent, however, the "diamond ring" was the most intense sight I have ever witnessed. Then came totality. Everyone at our site, 68 from our group plus 225+ from Mexico and alot of locals, yahooed at the eclipsed sun. I have to say that this is the darkest eclipse I experienced because I lost 15 precious seconds looking for my flashlight!!! Observing this eclipse was very exciting.

The planet Venus, which passed inferior conjunction some 13 hours prior, was a blazing beacon shining at -4 magnitude some 5 degrees west from the eclipsed sun. Jupiter was also easily seen some 11 degrees southeast of the sun. I really didn't pay much attention looking for bright stars since the clouds were patchy and thick in some areas. But in one instance, we lost about 45 consecutive seconds of totality due to clouds. Unlike the Big Island eclipse of '91, these clouds were the puffy cumulous type that was brisk in their motion with no high cirrus clouds. This was a great opportunity to look at the circular sunset around us. Then as quickly as it started, it was over!!! This time the diamond ring was much more spectacular than the first one, lasting up to 8 seconds. The corona was witnessed up to 1 minute after totality. With the cloud cover, the receding moon shadow was seen going southeast at nearly 1800 mph. No shadow bands were seen, although a few experienced observers in our group did see some.

Although my excursion was a short one (only three days), I didn't have the opportunity to do some serious astrophotography of the southern sky delights. I have to say seeing Sagittarius upside-down took me ten minutes to figure out what I was looking at. Likewise, the LMC, SMC, and 47 Tucanae was a beautiful sight.

If anyone is planning to witness a solar eclipse in this decade, there are four more. The longest duration eclipse will occur 26 Feb 1998 which will last 4m 08s near the Galapagos Isles. See ya there, maybe in Maracaibo, Venezuela or on a cruise ship in the Carribean Sea!!! Till then, clear skies to all of you and see you the next time I'm back in Tucson (Lord knows when that will be). -Wayne S. Itokazu

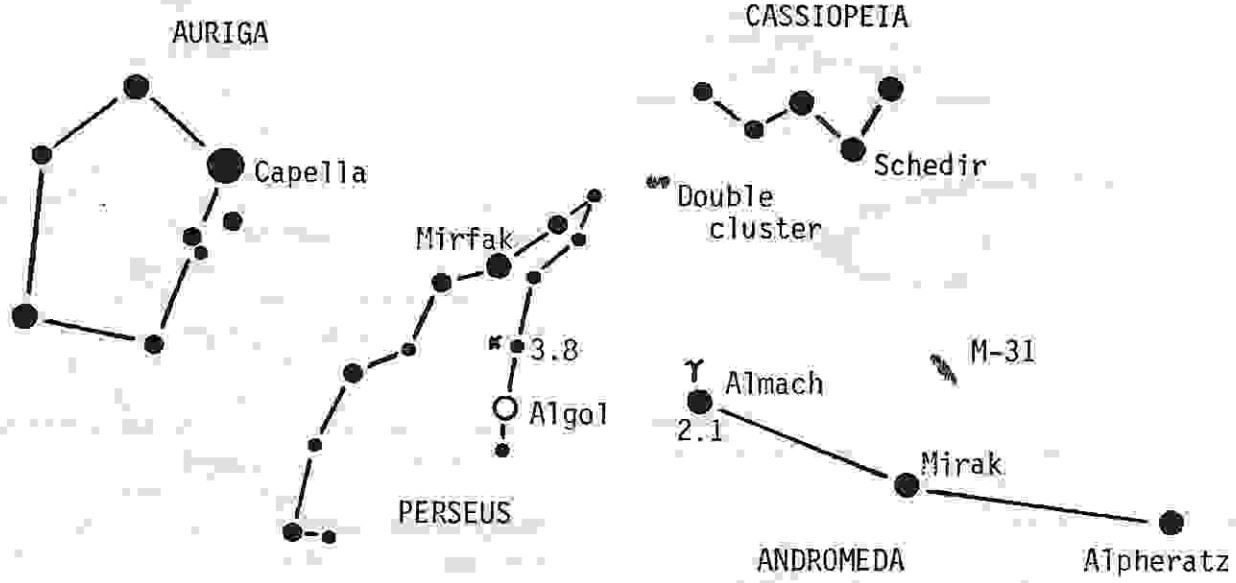
THE DEMON STAR

Following close on the heels of Andromeda is Perseus the Hero of ancient Greek Mythology and rescuer of the Princess. Perseus contains one of the most famous variable stars in the sky. This is a star called Algol or "The Demon Star". Even to ancient astronomers Algol was of interest. They noticed something different about this star - that it occasionally winked. Algol usually shines steadily at magnitude 2.1 but every 2 days 20 hours 48 minutes and 55.1 seconds it fades to magnitude 3.4, this eclipse lasts for a period of 10 hours. The reason for the light variations wasn't explained until John Goodricke an English astronomer in 1782 hypothesized that an unseen companion was passing in front of the much brighter star.

Algol is an eclipsing binary star with two stars involved in the eclipsing activity. The eclipsing occurs when the cooler orange star passes in front of the hotter blue white star. The primary is a main sequence star with a spectrum of B8, it has a diameter about 3 times the Sun's and a mass of 4 Sun's, its also hot with a temperature of 12000°K. The secondary is a sub-giant star with a spectrum of K0, it has a diameter of about 3½ Sun's, and a mass equal to the Sun, its temperature is a rather cool 4900°K. The separation between the two stars is about 6½ million miles or roughly 1/6th the distance of Mercury from the Sun. There also is occurring some mass transfer from the secondary to the primary with the primary being surrounded in a gaseous disk. The shapes of these stars is interesting the primary is almost nearly spherical while the secondary is teardrop ellipsoidal in shape. The distance to the Algol system is about 90 light years, and it has a luminosity of 95 Suns.

Observing Algol is very easy just step out your back door and look up at Perseus high overhead and compare its brightness to Gamma Andromedae (mag. 2.1) and Kappa Persei (mag. 3.8). Times when Algol reaches minimum light are published in "Sky & Telescope" magazine monthly and if you look 5 hours before or after these times you will catch Algol either fading or brightening. So this month why not watch this demon star that winks in the night.

JEFF BRYDGES



OBSERVER'S REPORT

November brought a series of Pacific storms to the Grand Canyon State. To us in the Tucson area, this translated into one weekend of observing, the weekend of the club meeting, November 4-5. A few lucky TAAA members showed up at Kitt Peak that Saturday with hopes of peering through Steward Observatory's 90" telescope. Steward was celebrating the 25th anniversary of what is now the third largest telescope on "the mountain", and was kind enough to invite a small number of TAAA members up for the event. Although the seeing wasn't very good, and Saturn could not be viewed due to its low declination (too low for visual use using the observing platform), observers who patiently waited in line were rewarded with spectacular views of objects such as the dwarf galaxy M110, the globular M15, and planetary nebulas M27 and NGC 7662. The latter three were the most interesting of all the objects viewed that evening, though M110 looked not too much different from views I've had in large amateur 'scopes. The eyepiece used was a ultra low power (at least for the 90"!) 4" diameter Erfle yielding about 300 power with the f/9 secondary in place. In addition, the 20" Steward reflector was also open, and good detail could be seen on Saturn during fleeting moments of decent seeing. Apparently the 20" will be relocated in Safford sometime next year, Now, if we could only put the club 30" where the 20" now stands...

December finds Venus dominating the dawn sky in the southeast. Venus reaches greatest brightness on December 9th and is 25 degrees in altitude 1 hour before sunrise on this date. By Christmas morning, Venus is 28 degrees in altitude 1 hour before sunrise (6:25 a.m.). Venus, Jupiter and the Moon gather in the morning sky December 28-29 to make a pretty sight for early risers: Look 45–90 minutes before sunrise.

Mars also becomes prominent in our December sky. Rising mid-month at 10:30 p.m., the red planet displays a disk of 9.7 arc seconds and is magnitude 0.1. By month's end, Mars increases to 11.2 arc seconds in size at magnitude –0.2. With the kind of seeing we can get here in Arizona, it's quite possible to see good detail, especially if you drive to a higher elevation site.

Early risers will get 90 minutes of dark time to see the peak of the Geminid Meteor shower on December 14. The waxing gibbous moon sets at 4:15 a.m. on this date, leaving the predicted peak visible without interfering moonlight. Meteor watchers, warmly dressed and with ample supplies of hot chocolate, should seek out a dark sky several miles away from city lights and look overhead from 4-6 a.m. The shower is also active on the mornings of December 13 and 15th, and worth observing if you can roust yourself from a warm bed.

Finally, Periodic Comet Borrelly continues to be visible in the morning sky. This month the comet, at 8th magnitude, will move from Lynx into Ursa Major. Although the comet is visible 20 degrees above the northeastern horizon by 10 p.m. much of the month, it's better to wait until midnight, when the comet rises to an altitude of 40 degrees. Fortunately for observers, Comet Borrelly fades very slowly after perihelion, according to John Bortle in December's *Sky and Telescope* (p. 76), and so should be visible this month in small telescopes in a dark sky. Perihelion was reached on November 1st when the comet was 1.37 a.u.'s (or 127 million miles) from the sun. Closest approach to Earth is on Dec. 4th with the comet 0.62 a.u.'s (58 million miles) from us. If you're going to observe this comet, look for a small, sharp tail which has been seen in previous oppositions. Here are the latest positions for Periodic Comet Borrelly:

Dec. 1____8 h 56.2 min +36.37°
Dec. 11____9 h 18.3 min +44.45°
Dec. 21____9 h 36.6 min +52.16°
Dec. 31____9 h 48.7 min +58.40°

Until next year, seasons greetings!

Michael Terenzoni

WHAT'S NEW AT

FLANDRAU
SCIENCE CENTER

Flandrau's computer exhibits, introduced in January, have been complimented and expanded by a fast new Macintosh Performa series computer. Although this computer is on loan from Simutek, Inc., the others you'll see next to it were bought from revenue generated by our new laser shows. These user-friendly Macintosh computers are a big hit with patrons, especially kids. On the computers are two simulation and several educational programs. The simulation programs include an aircraft flight simulator and a planetary gravitation simulator that allows a user to create moons and planets. By manipulating the orbits of the moons, the user can witness the effect those orbits have on the planet. Also included on our new machines are two educational exploration programs for children and a fantastic planetarium/stargazing program. On most color machines is Apple Computer's "Mouse Practice" program which gives verbal instructions, making it both fun, easy to learn and entertaining. As an added bonus, when the user clicks on any of the program icons the computer actually talks, announcing the name of the program the pointer is on. In addition the much improved version of the "Meteor" program created here at Flandrau can be used during evening or morning hours on our older computers. This program allows the user to generate a meteor and then watch it crash, skip or burn up in earth's atmosphere. Variables in this program include the meteor's density, speed and angle of impact. Why not come out to Flandrau and have a science experience with impact?

Michael Terenzoni
Outreach Coordinator
Flandrau Science Center
Phone: 621-4515;
Voice mail at 621-2001–mailbox #111-1123

IN DEFENSE OF POWER
By G. Dean Williams

When I first got into observational astronomy, I was fortunate to have access to plenty of good advice from more advanced amateurs, and from many excellent publications. One piece of advice which was drilled into me from the start was to stick with low powers on a telescope. This is a pretty good rule of thumb - especially for a beginner, and I'm certain that heeding this advice kept me from a lot of frustration in my early days. The only problem with following the low-power rule is that it led to a brain-washing of sorts. Like many observers, I associated high powers with dark, shaky, terribly fuzzy images which are impossible to track. A quick glimpse at a deep sky object at 222X from time to time would convince me that sure enough, my short focal length oculars were good for nothing but a little planetary or double star work. Only slowly have I found my attitude in this area changing. Now I can stand proudly in defense of the use of high power - even for deep sky observing. A number of factors contribute to my appreciation for power, and I will try to present them here for others' consideration.

The key to successful use of higher powers lies in your own observing skill. An observer accustomed to only quick glimpses of objects will never find good detail at high power (and not much at low power either). However, amateurs with more polished habits ought to be acquainted with some important disciplines of observing which help to bring out extra detail at any power, but more so at high powers. Skilled use of dark adaptation, averted vision, tube movement, use of filters, knowledge of seeing conditions, proper polar alignment, and above all, patient, lengthy observation of every object all lead to better success. It is quite true that a 200X image will never be as sharp and bright as the same object at 80X, but with a skilled eye, you'll be able to find exciting detail hiding in the more difficult 200X image which simply is not to be had at 80X. Higher power yields better contrast and a darker background sky, so you'll be able to see those dark lanes and spiral arms which were washed out in the smaller low-power image with less contrast. Also, the larger image will allow such detail as bright knots, which may look like faint stars at low power, to be more easily identified.

The study of telescopic images is a black art, with emphasis on all kinds of things we never worry about. Optimum exit pupil sizes, actual and apparent fields of view, image surface brightnesses and many other esoterica all influence what you'll get from a given eyepiece in your telescope under different conditions. Since few of us can (or wants to) work out these specifics for an observation, I will offer a good solution. Instead of advocating the use of higher powers most of the time, what I really recommend is the use of a range of powers for every observation. Yes - I believe that you will find lots of juicy extra detail at high powers, but even more useful is the contrasting blend of information you can obtain by comparing a set of observations for an object made at a variety of powers. Low power images offer the best impression of the overall field, and larger-scale structures, while higher magnifications can bring out finer details on a smaller scale.

You probably use a variety of powers already, but perhaps like me, you've been taught to shy away from using that 9mm Orthoscopic for deep sky objects. Give it a try under good seeing on, say, M82, and see if the image doesn't raise your eyebrows. If you carefully read the late Walter Scott Houston's notes in Sky & Telescope, or if you study the excellent deep sky notes in the Webb Society Handbooks, you're bound to find that the most detail is always extracted from comparative observations at a variety of powers - right up to the very highest useful power for that object. After a point, you reach powers that obviously do more harm than good. You should however, change powers up to that point in order to explore all the possibilities for a given object.

Since you will be making multiple observations of the same object, note-keeping will be a big help with sorting out the various details. Keeping notes is another habit of the more successful observer, and is a good subject for another article someday.

I bought a handy accessory for my 8" Celestron some years ago which has helped my observing significantly. It is a rotary ocular holder, or "turret" which takes the place of a star diagonal. I load it with 4 eyepieces - usually a 28mm wide-field design for 71X, a 20mm Erfle for 100X, a 12.4mm Erfle for 161X, and a 9mm Orthoscopic which gives 222X. The LPR filter which I sometimes employ fits between the main tube and the turret, rather than in a single ocular. This way, I can filter all the eyepieces at once, without having to change filters in the dark. Even swapping eyepieces for changing powers is a hassle - especially on a cold night. Before I got the turret, I would often skip the power-changing process because it was such a bother, but now I never fail to record my observations on all four powers. (Somebody should invent a multiple ocular holder for Newtonians, so that the majority of observers can benefit from the turret.)

The old advice is still priceless - stick with low powers most of the time. Especially for the beginner, this is a must, but for those of us looking for more detail and more substantial satisfaction from observing, a cautious venture into a more close-up universe can be just the thing.

The preceeding was from the Electronic Journal of the Astronomical Society of the Atlantic (EJASA). For free inclusion on their e-mail distribution, send a note to that effect to **ist@america.net** -ed.

TAAA Executive Meeting Minutes were not available at press time.

Serious Observers Sought

Bob Ross from Colorado is going to be in the area December 1st, 2nd and 3rd with his 36" scope and is looking for some company. Call Dean to find out where he is camped out and you can join him!

Desert Skies Classified

For Sale: CD-ROM disks of astronomical images and CD-ROM player. ARN (Astronomical Research Network), IRAS, Deep Space, Neptune and moons for $40 each or best offer. External CD-ROM drive, like new in box $150 or best offer. Perry Berlind, 795-4575. (02-95)

For Sale: 7X32 riflescope for telescope finder - long eye relief $10. Gilbert Freidman 571-1662.(03-95)

For Sale: Issues of Astronomy and Sky & Telescope magazines. Will only be sold as groups. Prices are suggested, and negotiable. **Astronomy** 8/85-7/86, 8/86-7/87, 8/87-7/88, in the nice Astronomy binders, $5 per set, fragments from 9/88-1/89, free. **Sky & Telescope** 2/88-1/89, 2/89-1/90, 2/90-1/91, in standard magazine holders, $1 per set, 1/87-1/88 fragments free. Enrique, 792-9975, or e-mail echavez@as.arizona.edu. (03-95)

Free: Boxes, Boxes, Boxes! After moving all my worldly posessions to Tucson, I am left with an abundance of sturdy boxes of all sizes. Call me if you need any - Roger Tanner 574-3876.

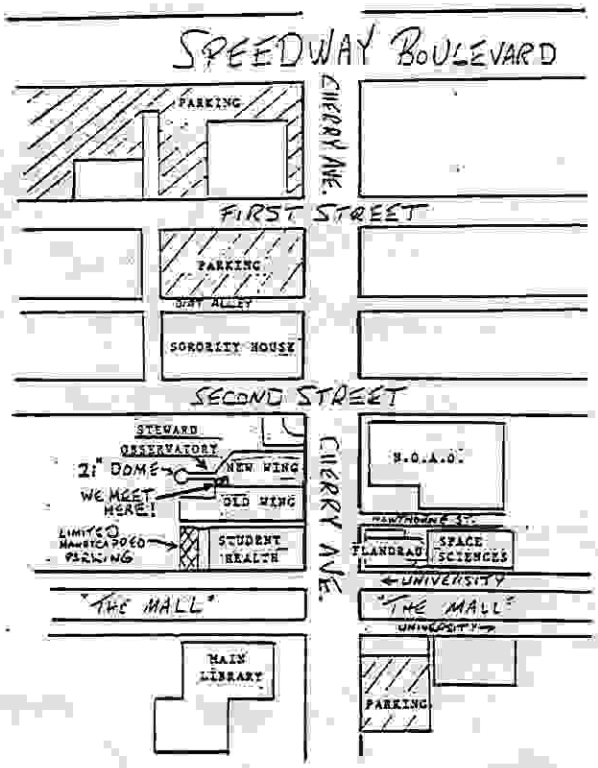
Your ad will run for 4 months unless specified. Month and year of last appearance is last item of ad. For additions or changes to this list call Dean, 293-2855.

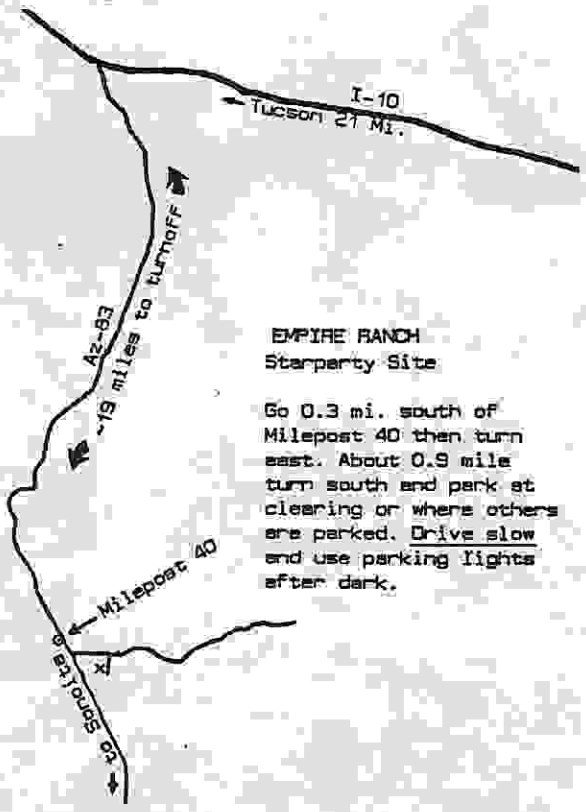
DARK SKIES for Tucson (in MST)

1994	DECEMBER	no twilight no moonlight	
Th/Fr	1/ 2	6:46pm -	5:41am
Fr/Sa	2/ 3	6:46pm -	5:42am
Sa/Su	3/ 4	6:46pm -	5:43am
Su/Mo	4/ 5	7:32pm -	5:43am
Mo/Tu	5/ 6	8:38pm -	5:44am
Tu/We	6/ 7	9:42pm -	5:45am
We/Th	7/ 8	10:43pm -	5:45am
Th/Fr	8/ 9	11:42pm -	5:46am
Fr/Sa	9/10	12:39am -	5:47am
Sa/Su	10/11	1:34am -	5:47am
Su/Mo	11/12	2:28am -	5:48am
Mo/Tu	12/13	3:22am -	5:49am
Tu/We	13/14	4:15am -	5:49am
We/Th	14/15	5:08am -	5:50am
Th/Fr	15/16	-	-
Fr/Sa	16/17	-	-
Sa/Su	17/18	-	-
Su/Mo	18/19	-	-
Mo/Tu	19/20	6:50pm -	7:10pm
Tu/We	20/21	6:51pm -	8:06pm
We/Th	21/22	6:51pm -	9:02pm
Th/Fr	22/23	6:52pm -	10:00pm
Fr/Sa	23/24	6:52pm -	10:59pm
Sa/Su	24/25	6:53pm -	11:59pm
Su/Mo	25/26	6:53pm -	1:00am
Mo/Tu	26/27	6:54pm -	2:05am
Tu/We	27/28	6:54pm -	3:11am
We/Th	28/29	6:55pm -	4:18am
Th/Fr	29/30	6:56pm -	5:24am
Fr/Sa	30/31	6:56pm -	5:57am
Sa/Su	31/ 1	6:57pm -	5:58am

Erich Karkoschka

TAAA Meeting Location





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