



# *Desert Skies*

*Tucson Amateur Astronomy Association*

Volume XLVI, Number 4

April, 2000



IN MEMORIAM

Pierre Schwaar

1946 - 2000

## Calendar of Events

**BEGINNERS LECTURE:** Friday, April 7, 6:30 pm at the Steward Observatory Auditorium - Room N210. This month's topic is *To Touch the Stars* by Elizabeth Alvarez (IDA).

**GENERAL MEETING:** Friday, April 7, 7:30 pm at the Steward Observatory Auditorium - Room N210. Topic is *Stellar Occultation Studies of the Outer Solar System* by William B. Hubbard (LPL).

**BOARD OF DIRECTORS MEETING:** Thursday, April 13, 7:00 pm at Steward Observatory Conference Room N305.

### STAR PARTIES & EVENTS:

- Apr. 6 - UofA Astronomy Students Star Party
- Apr. 8 - Telescopes For Telethon 2000 Star Party
- Apr. 11 - Copper Creek Elementary School Star Party
- Apr. 12 - Mission View Elementary School Star Party
- Apr. 13 - ASARCO Mineral Discovery Museum Star Party (Paid)
- Apr. 14 - Catalina High School Star Party
- Apr. 26 - Agua Caliente Elementary School Star Party
- Apr. 27 - Amphi Middle School Star Party
- Apr. 29 - Joint TAAA/TIMPA Flying Event/Barbecue/Star Party
- May 1 - Donaldson E.S. 5<sup>th</sup> Grade Camp Star Party
- May 3 - Desert View High School Star Party

**Newsletter Schedule:** Deadline for articles: Monday, Apr. 17. Printing: Tuesday, Apr. 25. Folding Party: Wednesday, Apr. 26. Mailing: Thursday, Apr. 27. The newsletter is scheduled to be in the mail at least one week prior to the following month's General Meeting.

**Cover:** Pierre Schwaar, past member and officer of the TAAA and innovative telescope maker passed away after a brief illness on March 6<sup>th</sup>. Photo taken by Terri Lappin in 1982.

**TAAA Web Page:** <http://www.tucsonastronomy.org>

**TAAA Phone Number:** (520) 882-1950

| Office/Position            | Name                | Phone    | E-mail Address               |
|----------------------------|---------------------|----------|------------------------------|
| President                  | John Kalas          | 620-6502 | jckalas@aol.com              |
| Vice-President             | Andrew Cooper       | 795-3585 | acooper@pobox.com            |
| Secretary                  | Ingrid Saber        | 797-3834 |                              |
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| Member-at-Large            | Bill Lofquist       | 297-6653 | wlofquist@aol.com            |
| Chief Observer             | Wayne Johnson       |          |                              |
| AL Correspondent (ALCor)   | Laurel Dunlap       | 544-7780 | laurel117@earthlink.net      |
| Astrophotography SIG       | Open                |          |                              |
| Computers in Astronomy SIG | Roger Tanner        | 574-3876 | rtanner@seds.lpl.arizona.edu |
| Newsletter Editor          | George Barber       | 822-2392 | barbergi@flash.net           |
| Star Party Coordinators    | Maggie & Jeff Buzek | 760-4578 | jeffbuzek@aol.com            |

### TAAA Mission Statement:

We are a resource for anyone interested in astronomy. It is our mission to nurture a person's natural curiosity about the night sky. By giving people a knowledge and understanding of astronomy, we enhance their enjoyment of the solar system and beyond. Through our public activities and school evening observing sessions, we bring astronomy to persons of all ages. Our regular meetings and observing sessions offer members a forum to meet others with similar interests and experiences and to learn from one another.

### Annual Membership in the TAAA:

|   |                            |
|---|----------------------------|
| Regular membership  | \$ 23                      |
| Senior membership (over 60)   | \$ 21                      |
| Student membership  | \$ 15                      |
| Add for Family membership   | \$ 5                       |
| Add for Astronomical League (optional)                                | \$ 3                       |
| Add for contribution to Southern Arizona Section of I.D.A. (optional) | \$ 3 (recommended minimum) |
| Add for Sky & Telescope Magazine Subscription                         | \$ 29.95                   |
| Add for Astronomy Magazine Subscription                               | \$ 29                      |

Rates for membership are given above. Family Membership includes two adults plus minor children. Members may subscribe to Sky & Telescope or Astronomy magazine (or both) at the time of membership renewal, saving substantially over the regular subscription rates. To assure we understand what you are paying for, please identify which class of membership and what options you want. Send one check made payable to TAAA to cover membership dues, magazine subscription(s) and any contributions to:

Tucson Amateur Astronomy Association  
P.O. BOX 41254  
Tucson, AZ 85717

### Four 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. Find your membership class and its rate. Add the Family Membership rate to this, if applicable.
3. If you desire membership in the Astronomical League or magazine subscription(s) or wish to make a donation, add the appropriate amounts to your membership rate. If a magazine subscription renewal is desired, include the magazine renewal notice, if possible. Be sure to identify which options you are paying for.
4. Write one check, payable to TAAA, and send it to the address given above.

- Call the Treasurer if you have any problems.
- Send address changes to the above address.

### Desert Skies Publishing Guidelines:

All articles, announcements, news, etc. must be submitted by the newsletter deadline noted 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 in Word compatible files via e-mail or on a floppy disk. 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  
c/o John Kalas  
3470 W. Red Bird Court  
Tucson, AZ 85745

or e-mail: [jckalas@aol.com](mailto:jckalas@aol.com)

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Arizona 85717

### President's Message

March was another very busy school/organization star party period. April has filled up nicely as well. We could still use a few more scopes for the UofA Astronomy Students star party on Thursday, 4/6, at the Saguaro National Park West. This activity was not published in the March newsletter because the details had not been worked out by press time. It was announced at the March monthly meeting, but the sign-up was a little weak. If you would be interested in helping out, please call me at 620-6502.

This month's highlight will be the Telescopes For Telethon 2000 event on Saturday, 4/8, at Sabino Canyon. The activity this year will be much different from last year's. A committee, headed by the TAAA's Laurel Dunlap, has been planning the event for many months. There will be plentiful advertising; television (KGUN 9 News & Arizona Illustrated), radio, fliers, mailings, and maybe even a newspaper ad. Volunteers have been responding to Laurel's request for support. Last year, there were about thirty telescopes at Old Tucson. So far, we have seventeen volunteers. We could use more help. And the help does not have to be telescopes. We will need many people to assist with

collecting the contributions for the MDA, crowd control, parking control, giving telescope operators a break, etc. Won't you help? Contact me at 620-6502 if you would like to volunteer.

Another fun event this month will be the joint TAAA/TIMPA activity on Saturday, 4/29, at the TIMPA site. Afternoon activities will include radio-controlled airplane flying and solar viewing. A pot-luck barbecue will be held before dark. Dark sky observing and night flying will top off a great day. If you haven't attended one of these events, you've missed an enjoyable outing. Don't miss this one!

With club elections only about a month away, the Nominating Committee is still searching for a replacement for Ingrid Saber as Secretary. If anyone is interested in supporting the club in an officer capacity for any position, please contact a member of the Nominating Committee; Andrew Cooper (795-3585), Mike Turner (743-3437), or Ingrid Saber (797-3834).

John Kalas

### Meeting Information

#### Beginners Lecture

"To Touch the Stars"  
by Elizabeth Alvarez

The International Dark-Sky Association will coordinate a program of hands-on activities and inquiry-based learning techniques for formal (K-14) and informal (family-oriented) education. Lessons should promote the value of our dark skies and show how quality lighting would serve our nighttime needs while preserving a beautiful resource. Participants should feel empowered to make a positive difference in their community. Star parties are ideal forums to introduce these concepts and activities. The current status of this program and some of these activities will be presented, and then the speaker wants your input to the project. What needs does the amateur astronomer have pertaining to light pollution education and what suggestions do you have for the IDA?

Elizabeth M. Alvarez del Castillo will present this lecture. She serves as the Associate Director of IDA and has a formal background in physics and international relations. Before joining IDA, she spent 15 years doing research and project coordination in planetary science, focusing on asteroids, comets, and NASA's Galileo Project. She also served as the education and public outreach coordinator for the Galileo imaging camera team, as the press officer for

the U.S. Gemini Project, and as an outreach coordinator for the National Optical Astronomy Observatory.

#### Main Lecture

"Stellar Occultation Studies of the Outer Solar System"  
by William B. Hubbard  
Lunar and Planetary Laboratory  
University of Arizona

Roughly every year, an interesting object in the outer solar system occults a star bright enough to give useful data on the object's size, shape, and atmospheric structure. Bill Hubbard, Professor of Planetary Sciences at the UofA Lunar and Planetary Lab, heads a group that has been making such observations for about 25 years and has accumulated data on almost all objects at Jupiter and beyond with detectable atmospheres. The data give precision information in an atmospheric pressure range that is mostly inaccessible to spacecraft and he has uncovered a few problems with spacecraft data sets. The biggest surprise found in the occultation data sets is how nonspherical many high planetary atmospheres are. Dr. Hubbard will describe some recent data and analyses from a Triton occultation in 1997 and Jupiter and Saturn occultations in 1999. Dr. Hubbard has been at the UofA since 1972 and Principal Investigator for NASA Planetary Astronomy Program since 1974. He is considered a specialist in stellar occultations by planets, so this should be a fascinating lecture.

### Club News

#### Election of Officers

In preparation for the election of officers at the May 5<sup>th</sup> monthly meeting, the following slate of candidates are presented:

- |                  |               |
|------------------|---------------|
| • President      | John Kalas    |
| • Vice President | Andrew Cooper |

- |                   |                 |
|-------------------|-----------------|
| • Secretary       | Open            |
| • Treasurer       | Teresa Lappin   |
| • Member-at-Large | Bill Lofquist   |
|                   | Robert Callanan |
|                   | Steve Peterson  |

Additional nominations will be solicited from the floor at the May meeting.

### Club News (cont.)

#### TELESCOPES FOR TELETHON 2000

Saturday, April 8, 2000 6pm-10pm

Sabino Canyon Recreation Area Parking Lot

Contact: T4T@jarnac.org

Well Folks, it's here! Come join a pleasant evening under the stars in support of MDA research, programs, and children's camps. [Suggested donation \$5 per individual and \$10 per family] Here's a great opportunity to introduce friends and family to the wonders of the night sky. We will have a 24% illuminated moon, with Saturn, Mars, and Jupiter very close together in the western twilight. Overflow parking has been provided by the Catalina Foothills School District at Esperero Canyon Middle School and Canyon View Elementary School, both located just several feet north of the main parking entrance to the Canyon on the west side of Sabino Canyon Rd. Volunteers can begin to arrive and set up by ~5:30 pm. T4T committee members will be there to assist with directions. Remember that the park will still have patrons departing after 5pm or even later. This is to our advantage. Set-up will be in the parking lot - West side, the circle drive area near the entrance off of Sabino Canyon Rd., and in the tramway. Volunteers will be allowed to continue to observe after the T4T event is concluded until ~11:30pm. As with events at Kitt Peak, alcoholic beverages, and glass bottles, are NOT permitted on the grounds. We will have to bag out our own trash and be respectful of the existing vegetation/habitat of the park.

Sabino Canyon Recreation Area is located on the Coronado National Forest, Santa Catalina Ranger District at Sabino Canyon Rd. and Sunrise Drive, in the Foothills of the Catalina Mountains. Because we have secured a National Park for this event there are some standard NFS rules that must be followed by volunteers and patrons alike. At the 4/7/00 TAAA/TAL club meeting there will be a copy of expectations attached to the sign up sheet on the back table.

The Tucson Planning Committee / T4T 2000 will have member representation from the following groups:

- Tucson Amateur Astronomy Association
- Tucson society of the Astronomical League
- Flandrau Science Center and Planetarium
- Columbia University's Biosphere 2 Center
- and Tucson's largest Astronomy retail stores  
SKY WORKS, STARIZONA, and STELLAR VISION

Our very own David and Wendee Levy will be hosts throughout the evening. They look forward to seeing all of you there to support MDA's research needs and programs, as well as MDA's children's camps, here in Arizona.

David Levy will be taping a "Telescopes For Telethon 2000 Arizona Illustrated" for PBS in the near future that will air Wednesday, 4/5, prior to the event for advance advertising. I have written a PSA in conjunction with the editorial assistance of David and Wendee and John Kalas that will be released to the media before you read this newsletter. In addition, KGUN 9 and Colleen Bagnall have agreed to do pre-event taping at a Tangua Verde Elementary School Star Party on 4/7/00 hosted by David and Wendee. Arizona Senior World interviewed Committee members and will

feature a story with photos for publication on April 1, 2000. Fliers promoting the event have been distributed throughout the community by members of the Tucson Citywide Planning Committee. We're getting the word out, ...and so should you!

On behalf of Telescopes For Telethon 2000 I would like to commend the effort of the committee and especially extend thanks to the support I received from David and Wendee Levy, and John and Liz Kalas over the past 5 months. Several other club members lent an ear, a shoulder, and a hand, to help with this effort. You know who you are and know you're appreciated! Many, Many, Many, heartfelt thanks, and I hope to see everyone there.

Laurel Dunlap

Telescopes For Telethon 2000 Committee Chair

#### In Memoriam

Pierre Schwaar

Amateur astronomers and telescope makers lost a friend this past month. Pierre Schwaar passed away on March 6th in Phoenix after a brief illness. A memorial service was held in Phoenix on March 11 where about 50 people gathered, several from the TAAA, to remember Pierre. Pierre lived in Tucson for about 10 years and was very active in the TAAA, serving as Vice President in 1983. In 1982 he was awarded the TAAA Bart and Priscilla Bok Award for his contributions to telescope making. Pierre was an avid observer and accomplished astrophotographer. Pierre had a passion for solar eclipses and always had his photo album handy to show off his photos. Many issues of the Desert Skies from the 1980's contain his "Image Fragments" articles - stories and reports of his observing outings. Pierre was probably best known for his innovative telescope designs. He developed the Bigfoot telescope mount while here in Tucson and, for a while, worked out of a shop next to The Image Point selling his product. About 1985, Pierre moved to Phoenix where he continued making his mounts and telescopes. Pierre will be missed at many star parties, especially the Riverside Telescope Makers Conference where he often participated as a judge on the awards committee. A few days after his death, the Arizona Republic published an interesting article about Pierre's life. A copy of this article will be at the April meeting for anyone wanting to read it.

A floral arrangement was sent to the memorial service on behalf of Pierre's friends in the TAAA. To contribute towards the cost of the flowers, please see John Kalas.

#### TAAA Annual Picnic

Saturday, June 24, 2000

Mark your calendars! Ed and Pat Vega have again graciously invited the TAAA to have the annual picnic at the Vega-Bray Observatory in Benson. If you have not attended this event in the past, you won't want to miss this one! It is a fantastic, fun outing. There will be a pot-luck barbecue in the afternoon and tours of the fabulous Skywatcher's Inn. Telescope viewing will take place in the evening. Dr. Vega opens his observatory facilities to the attendees for some terrific celestial views. It is a great family outing.



## Club News (cont.)

### Member News

We welcome the most recent members who have joined the TAAA: Sherman and Sandra Keene, Fred C. Larson, Kristen Ward and her family, and Jim Weber. Glad to have you join! If you haven't already, be sure to pick up a new member's pack at a meeting. Hope you'll make it to a star party or a meeting so we can all get to know you.

### Computers and Electronics in Astronomy Subgroup Meeting Notice.

I have set up a meeting to visit Roy Tucker's home observatory. Roy has been hunting for near earth asteroids for 3 years and he has found 3 of them. Roy had designed and built his own CCD camera utilizing a back-illuminated CCD. He made his discoveries with a 14" Celestron telescope. He is now building a new telescope to hunt for asteroids using three 14" Newtonians on a single mount. Each fitted with a back-illuminated CCD camera of his design. He has invited us out to see his setup on April 15th at 7:00 PM.

Roy lives at 5500 Nebraska, which is southwest of Tucson. Go west on Ajo Way, until you are about ¾ mile past Kinney Road, then turn south onto Sunset Blvd. Go south for about a mile, then turn east. He is just down the road a short way. His phone is 578-8564 in case you need further instructions. You can see some of his work on his webpage at <http://www.azstarnet.com/~gpobs/gpobs.htm>

So get your taxes done early and join us there,  
Roger Tanner

### Help Wanted

Astrophotography SIG Coordinator

Ray Wallace has advised the club that he will no longer be able to coordinate the Astrophotography Special Interest Group (SIG). Astrophotography is one of the most popular activities of amateur astronomers. Once you've seen an impressive object in a telescope, capturing the view on film or disk is a natural desire. The TAAA is fortunate to have many accomplished astrophotographers as members. Would one of you be willing to share that expertise with members who are yearning to try their hand at this fascinating activity? If so, please contact John Kalas at 620-6502.

### Another Great Donation!

MIRA image processing program donated to TAAA

For the past couple of years, the TAAA has been fortunate to have been allowed the use of the image processing program MIRA AP at our meetings for displaying CCD images. At the request of James McGaha, Mike Newberry of Axiom Research and the developer of MIRA, agreed to allow the use of the program at our TAAA meetings. A couple of months ago, I was discussing the use of MIRA at TAAA meetings with Mike and he agreed to donate the copy of the program to the TAAA. His only stipulation was to keep the program updated to the current version, MIRA AP 6.03. Club members can use MIRA to display CCD images at our meetings. MIRA displays images in FITS, TIFF, JPEG & BMP formats. Bring your images on an IBM compatible 1.44MB

floppy or a 100MB Zip disk. Call John Kalas before the meeting to schedule a time to show your images. We would like to thank Mike Newberry for his generous donation.

Gary Rosenbaum

### May's Big Event

Desert Museum Public Star Party

TAAA Member, John Polacheck, has been working for some time now with the folks at the Desert Museum to co-host a large public star party. That event will take place on Saturday, May 6<sup>th</sup>. The details of the activity are still being established. What we do know is that the TAAA telescope volunteers will set up their equipment in the front two rows of the main parking lot and the circular drive close to the museum entrance courtyard. The event coincides nicely with the interesting conjunction of the planets Saturn, Jupiter, and Mars. We will also have a 3-day old Moon to observe. This is shaping up to be a fun event, so mark your calendars! More details will follow in the May newsletter.

### Grand Canyon Star Party

3-10 June, 2000

You can always tell how many folks are going to come to your star party by how fast the free campsites are taken. A couple years ago, back when we only had a dozen sites or less to be given away, I remember going into June with not all of them spoken for. Well, for Grand Canyon 2000 the 16 campsites lasted all of 24 hours, gone by 10am on March 2nd! In fact we have a few people on a waiting list. Some will share and I'll petition our staff at the park for a couple more this year. Somehow we'll all fit in. For those that reserved one, make sure you let me know if your plans change about attending - would hate to have one go unused as popular as they are.

We've also been getting a lot of press. There are at least 3 magazines with stories coming to publication this spring, so word is getting out. The three are the inflight magazines of Southwest Airlines and Alaska Air as well as Sunset Magazine.

As always, if you have never been up to join us, this, our 10th anniversary year, is a perfect time to pull the trigger. It is a wonderful respite from the heat of the lower desert, a chance to enjoy those cool if not downright cold nights at 7,000 feet elevation, some great appreciative crowds of observers and, of course, some great skies too. The first weekend is dark of the moon, so think about joining us for a 3 day weekend, if you can. Campsites can be reserved for \$12/night and they make for a great family getaway. Check the website for how to reserve your own campsites or motel rooms; <<http://www.tucsonastronomy.org>>. Hope to see you there.

Dean Ketelsen 293-2855

### Wanna Go Observing?

OK all you cheeseheads. Here's your chance to show your fellow Wisconsonites the beauty of our Tucson skies. We have received a request for taking a couple from Madison, Wisconsin out to TIMPA for a brief night of observing between April 23 - 26. If you would like to help with this outing, call John Kalas at 620-6502.

## Club News (cont.)

### Feb./March Star Parties Report

by Ed Finney

#### Our Mother of Sorrows Elementary School - Feb. 11

What a star party this was! Seven scopes were present with one being the Goliath 3/4 meter (28") scope of Dennis Young. Everyone was more than willing to climb 6 ft. high to view the sky through this large scope for a school star party. Over 150 parents and kids had a super time.

#### C.E. Rose Elementary School - Feb. 22

What can you say about a turnout? These parents and kids take a school star party seriously. They were turned loose in waves. Each scope would be 15 - 20 deep. By the time you thought a break was coming, it would start again. Somewhere close to 200-250 parents and kids were in attendance. All of the members present said it was one fantastic night.

#### Erickson Elementary School - Mar. 8

With weather a factor all week, it was almost cancelled. But Wednesday's sky broke in the morning and everything was on. Terri Lappin and Steve Koerber of Skyworks coordinated the show with seven scopes present. Everyone was kept very busy answering questions and showing the sky. The kids were very courteous with "pleases" and many a "thank you". After 2 hours of viewing with about 200 people, we were ready to pack up and go home to hot chocolate.

#### Rincon Country West RV Resort - Mar. 9

Bill Lofquist and Judy Fried of the RV park put this party together. It was supposed to be 3 scopes, but as the date

came near, the party grew larger than expected (175+). More scopes were needed and the members responded with six telescopes. The group was between 30 and 70 years of age. There were many questions like; "Did we own the scopes?" and "Were we professional astronomers?" Everyone took some time looking through each scope. Most scopes had 10 to 15 people waiting in line all evening with lots of repeats. This adult group was very interested in what TAAA does and, hopefully, we will see some of them at a future meeting. It was a grand party! (Editors Note: The club will receive a donation of \$1.00 per attendee.)

### From the Mailbag

Some good stuff this month...

- Riverside Telescope Making Conference Registration Packets - Memorial Day weekend in San Bernadino Mountains with about 2000 other amateur astronomers and telescope makers. Camping, meal plans, dorms, snack bar, swap meet, lectures, observing...What fun it can be!
- Kalmbach Publishing has a book sale on discontinued titles, 50% off.
- Double Star Observer Newsletter, only \$12/year.
- SkyTent - A portable "observatory"
- A couple of trips/cruise announcements

All this will be posted near the back table. Riverside registration material will be available on first come-first serve basis. Kalmbach orders should be given to Terri who will place a single order for the books.

## Items of Interest

### Websites: Trips on the Internet Super-Skyway

by Rik Hill

It is said that amateur telescope making is a dying art. Well, this may or may not be true but I do see a lot of innovations to existing telescope being done by amateurs all over the country. And why not? Never has there been more available parts for such inventions and innovations. Many of these suppliers are now accessible on the web.

For the old-timers among us, and I have to count myself among them, C&H Sales has been a familiar supplier of motors, optics, electronic parts, and miscellany for decades. Now they are on-line! You can find them at:

<http://aaaim.com/CandH/index.htm>

This site contains more items than can be found in their quarterly catalogs. They even have an email list to announce short supply items that never appear in print.

One of my favorite sources is Surplus Shed. This is much like C&H sales but they have more optical items. They are ONLY an on-line business at:

<http://www.surplusshed.com/>

This site tends to be a bit slow from, I expect, usage. So be patient, it's worth it!

In recent weeks I have talked to a number of amateur astronomers and telescope makers who were unaware of AstroMart. It seems fantastic to me that this is possible so

let me tell you all. AstroMart is an on-line list and auction for used and new astronomical equipment. I have purchased and sold numerous things through this service and in only one case, where I ordered something from Canada, was I ever dissatisfied with the interaction (in that one case I was dealing with an unscrupulous seller.) For more information on AstroMart go to:

<http://www.astromart.com/>

On this first page you will find a lot of other links to useful allied sites but, for their equipment sales, go to "Classified".

For the hardcore telescope builders/modifiers there are a few websites that should be regular destinations. The Amateur Telescope Maker's Journal (ATMJ) has a website at:

<http://www.atmjjournal.com/>

This is the publication of the ATM Association in response to the loss of the Kalmbach magazine ATM. It is a site where you can sample the current issue of the ATMJ, get some basics in making your own quality telescope from scratch, and find links to other ATM sites.

Another good site is maintained by the Tallahassee Astronomical Soc. at:

<http://www.polaris.net/~tas/atm/atm.html>

Here are references and resources for not only building a telescope from scratch, but also for the improvement and repair of existing telescopes. It will take you a while to get through all that is offered here but, if you're a real glutton

## Items of Interest (cont.)

### Websites: Trips on the Internet Super-Skyway (cont.)

for punishment and a die-hard glass pusher, then you may want to consider visiting the ATM Archives at:

[www.system.missouri.edu/ics/staff/andy/ATM/](http://www.system.missouri.edu/ics/staff/andy/ATM/)

Almost any topic you can imagine in telescope making can be found here. It is a searchable archive that covers all aspects of ATMing. These archives are from the ATM list run by Mel Bartels. If you don't mind a lot of e-mail you may even want to consider joining the list. You will definitely find answers there for any telescope/ATM question you might have. The problem is that you may get too many answers! However, it's fun and often invigorating and inspirational.

### International Dark-Sky Association

Annual Meeting

April 27-30, 2000

(EDITOR'S NOTE: This article is a condensed summary of an e-mail message received 3/15/00 from Sam Herchak.)

The annual meeting of the International Dark-Sky Assn (IDA) is scheduled for April 27-30 in Tucson. Highlights include a barbecue and star party at Vega-Bray Observatory in Benson (Apr 27), a tour of the Kitt Peak observatories (Apr 30), and talks by noted astronomers/observers/authors David Levy, Chris Lingnibuhl and Stephen O'Meara. The banquet talk on Saturday evening is by Lief Robinson, editor of Sky & Telescope magazine. These are just the highlights! Many other talks/workshops are scheduled on the important issue of quality outdoor lighting and restoring our dark skies. See the IDA website for details. IDA needs your support!

International Dark-Sky Assn (IDA)

3225 N. 1st Ave

Tucson, AZ 85719-2103

[www.darksky.org](http://www.darksky.org)

### Project ASTRO - Recruiting Astronomers and Teachers

The NOAO Educational Outreach Office is now accepting applications from TEACHERS in grades 4-9 and ASTRONOMERS (professional, amateur, and students) who wish to take part in Project ASTRO's fifth year in Tucson.

Project ASTRO forms partnerships between teachers and astronomers who attend a two-day training workshop where hands-on activities for teaching astronomy in the classroom are presented. Astronomers promise to come into the teacher's classroom at least four times during the school year and star parties are often planned for students and their families. Project ASTRO is in its fourth year in the Tucson area and over 150 teachers and astronomers have participated in the program so far, including six teachers from IOBSD and BIA Tohono O'odham schools.

Project ASTRO is heading in new directions. The fall workshop will include two authors from California who have written a book called "Moon Journals: Art, Writing, and Inquiry through Focused Nature Study". NOAO staff are working with them to develop a teacher workshop integrating Project ASTRO science and math activities with an observational study of the lunar cycle.

Applications will be accepted through August 30 and new partners will be notified by Sept. 15. Consider applying as an astronomer partner (a degree in astronomy is NOT required), and pass this information on to local teachers. Get involved in a worthwhile program to improve science education in Tucson schools!

Partnerships will take place next academic year (2000/2001) and the training workshop is scheduled for October 13 & 14, 2000.

Ginny Beal, NOAO Outreach Coordinator  
phone: 520-318-8535, email: [gbeal@noao.edu](mailto:gbeal@noao.edu)

## Star Parties & Events

### UofA Astronomy Students

April 6 (Thursday)

[West]

No. of Scopes: 15

This event was not finalized at the time of printing of the March newsletter. It was announced at the March meeting and about eight volunteers signed up for it. We need more help! This activity will probably be as large as the previous star party held for these students back on 11/12/99 when about 200 people showed up. At that time the TAAA set up 17 scopes and it was still busy. Please consider helping. The activity will be held at the Red Hill Visitor's Center in the Saguaro National Park West. Set-up will be at 6:00 to 7:00 pm and observing will last until about 10:00 pm.

### Copper Creek Elementary School

April 11 (Tuesday)

[North]

No. of Scopes: 10-15

This large (200-300 people expected!) activity is in support of Project Astro. Take La Canada Drive north past Lambert Ln. and Naranja Rd.. Turn right on Silverleaf and follow it around until it dead-ends at the playground. Turn right down

a driveway and then turn left into a gate that leads to the basketball courts. Set-up begins at 6:30 pm. Observing starts at 7:00 pm, and ends at 9:00 pm. A Star Party leader is needed for this event. A sign up sheet will be available at the April meeting.

### Mission View Elementary School

April 12 (Wednesday)

[South]

No. of Scopes: 8-10

The school is located at 2700 S. 8<sup>th</sup> Avenue. From 22<sup>nd</sup> and South 6<sup>th</sup> Avenue, proceed south on 6<sup>th</sup> Avenue to 37<sup>th</sup> St. (just over 1 mile). Turn right (west) on 37<sup>th</sup> St. and proceed approx. 1½ blocks. The school is on the right side of the road. There will be a set of double gates near the west end of the school. Look for a grassy area to the west of the school. This is the set-up area. Set-up will be at 6:30. Observing will run from 7:00 pm to about 9:00 pm. Refreshments will be provided to all TAAA volunteers. A Star Party leader is needed for this event. A sign up sheet will be available at the April meeting.



### Star Parties & Events (cont.)

#### **ASARCO Mineral Discovery Museum [South]** April 13 (Thursday) No. of scopes: 5

For a donation, the TAAA has been invited to supply an observing session at the museum for about 44 RV'ers. Set-up will be from 6:00 to 7:00 pm with observing from 7:00 to 9:30 pm. Take I-19 south to Pima Mine Rd, exit 80. At the end of the exit ramp, turn right. Take an immediate left through a gate and over some railroad tracks. The museum entrance will be a few hundred feet ahead on the right. Set-up will either be in the northwest corner of the parking lot or just west of the parking lot near a picnic area. Rob Vugteveen, Museum Director, will guide you to the correct spot. A Star Party leader is needed for this event. A sign up sheet will be available at the April meeting.

#### **Catalina High School [Central]** April 14 (Friday) No. of Scopes: 6-7

The school is located on the northwest corner of Pima Street and Dodge Blvd. As this went to print, the exact location for set-up has not been provided. Bill Lofquist is coordinating this star party, so please contact him for further details (297-6653). Set-up begins at 6:30 pm. Observing starts at 7:00 pm and ends approximately at 9:00 pm. A sign up sheet will be available at the April meeting.

#### **Agua Caliente Elementary School [Northeast]** April 26 (Wednesday) No. of Scopes: 7-10

Join the approximately 200 expected students and parents of the school for PIZZA and stargazing. Pizza will be served to all telescope volunteers starting at 6:00 pm. Take Tanque Verde Rd. east to Catalina Hwy. Turn left on Catalina Hwy and proceed approx 1.5 miles and turn right on Prince Rd. Pass Houghton Rd, Wendell Rd and Melpomene Rd. Prince Rd. will end and take a left on Homestead Rd. The school's athletic field will be on the left. Enter the gate on Homestead and drive to the north side of the field. Set-up begins at 7:00 pm. Observing starts at 7:30 pm, and ends approximately at 9:00 pm. A Star Party leader is needed for this event. A sign up sheet will be available at the April meeting.

#### **Amphi Middle School [North-Central]** April 27 (Thursday) No. of Scopes: 4-5

The school is located at 315 E. Prince Rd. (between Stone Ave and 1<sup>st</sup> Ave.) Take Stone Ave. north from Prince Rd. to Pastime St. and turn right. Turn right into a parking lot at the rear of the school and park near the gate to the track. The set-up area will be behind the school on a running track. Set-up begins at 7:00 pm. Observing starts at 7:30 pm. and ends at 9:00 pm. A Star Party leader is needed for this event. A sign up sheet will be available at the April meeting.

#### **Joint TAAA/TIMPA Flying Event/Barbecue/Star Party** April 29 (Saturday)

Mark your calendars!!! This is going to be a fun activity. We've done these events for the past two years and they've been a blast! The club has arranged for a joint activity between the TAAA and the TIMPA organization. The event is designed to be entertaining and beneficial to both organizations. The TIMPA group has offered to give TAAA members hands-on instruction for flying radio-controlled

model airplanes. The flying activity, along with solar viewing, will take place between 4:00 and 6:00 pm in the afternoon. At 6:00 pm, the grills will be started and there will be a barbecue/pot luck dinner. Attendees are requested to bring their own main dish (i.e. meats, buns, condiments, etc.), drink, plates, utensils and also a side dish to share with other attendees. The side dish may be a vegetable, salad (garden, fruit, pasta, etc.), bread/buns, desert or snacks. After the dinner at about 7:30 pm, TAAA members will open up their telescopes for an evening of viewing for both organizations. The TIMPA group will also demonstrate some night flying between 8:00 and 9:00 pm. Be there or be square! Directions to the TIMPA site are on the outside flap of this newsletter.

#### **Donaldson E. S. 5th Grade Camp [Oracle Area]** May 1 (Monday) No. of Scopes: 5-6

This event is located at the Triangle Y Ranch Camp near Pepper Sauce Canyon outside of Oracle. Head north for 25 miles on Oracle Rd (HWY 89), continuing through the towns of Catalina and Oracle Junction. At Oracle Junction, bear to the right onto HWY 77 and travel 11 miles to the town of Oracle. Look for a sign that says "Business District" and turn right. You'll be on American Way Blvd. Continue on this road 2.5 miles then veer right at the sign to Mt. Lemmon (Old Mt. Lemmon Road). Continue on this road for 4 miles until you arrive at a fork in the road. The road now turns into dirt. Take the right fork and continue along the Old Mt. Lemmon road for 1.6 miles. Turn right at the sign "YMCA Triangle Y Ranch Camp". Travel on that road for ¼ mile, go through the front gate of the camp and follow the signs. Set-up should be no later than 7:00 pm with observing starting at 7:30pm; however, it's very important to arrive at the camp well before it gets dark. Observing will run from 7:30 pm to about 9:30 pm. Any TAAA volunteers who sign up for this Star Party are welcome to join in on dinner. A Star Party leader is needed for this event. A sign up sheet will be available at the April meeting.

#### **Desert View High School [South-Central]** May 3 (Wednesday) No. of Scopes: 3

Once again, Jim Treat, an astronomy instructor at the school, wants his students to do some New Moon observing. The school is located at 4101 E. Valencia Rd (on the north side of Valencia, east of Alvernon and west of I-10). Set-up will be at 7:00 pm in the faculty parking lot's SE corner. Observing will run from 7:30 pm to about 9:30 pm. A Star Party leader is needed for this event. A sign up sheet will be available at the April meeting.

## TAAA ANNUAL PICNIC

### Saturday, June 24, 2000

### Vega-Bray Observatory

### Mark Your Calendars!



### Dark Skies for April 2000

**DARK SKIES** (no twilight, no moonlight) for Tucson in 24-hour MST: 18=6pm, 20=8pm, 22=10pm, 0=12am  
**RISE, SET, VISIBILITY** for sun and bright planets: rise for morning object, set for evening object

|             |              |             |               |             |               |
|-------------|--------------|-------------|---------------|-------------|---------------|
| Fr/Sa 31/ 1 | 20:07 - 4:37 | Mo/Tu 10/11 | 1:22 - 4:35   | Fr/Sa 21/22 | 20:25 - 21:56 |
| Sa/Su 1/ 2  | 20:08 - 4:48 | Tu/We 11/12 | 2:15 - 4:33   | Sa/Su 22/23 | 20:26 - 22:50 |
| Su/Mo 2/ 3  | 20:08 - 4:46 | We/Th 12/13 | 3:03 - 4:32   | Su/Mo 23/24 | 20:27 - 23:41 |
| Mo/Tu 3/ 4  | 20:09 - 4:45 | Th/Fr 13/14 | 3:46 - 4:30   | Mo/Tu 24/25 | 20:28 - 0:29  |
| Tu/We 4/ 5  | 20:10 - 4:43 | Fr/Sa 14/15 | 4:24 - 4:29   | Tu/We 25/26 | 20:29 - 1:13  |
| We/Th 5/ 6  | 20:11 - 4:42 | Sa/Su 15/16 | - - -         | We/Th 26/27 | 20:30 - 1:55  |
| Th/Fr 6/ 7  | 21:06 - 4:40 | Su/Mo 16/17 | - - -         | Th/Fr 27/28 | 20:31 - 2:33  |
| Fr/Sa 7/ 8  | 22:13 - 4:39 | Mo/Tu 17/18 | FULL MOON     | Fr/Sa 28/29 | 20:32 - 3:10  |
| Sa/Su 8/ 9  | 23:19 - 4:38 | Tu/We 18/19 | - - -         | Sa/Su 29/30 | 20:33 - 3:45  |
| Su/Mo 9/10  | 0:22 - 4:36  | We/Th 19/20 | - - -         | Su/Mo 30/ 1 | 20:34 - 4:08  |
|             |              | Th/Fr 20/21 | 20:25 - 21:01 |             |               |

| Weekend | Sun   | Sun  | Mercury | Venus   | Mars    | Jupiter | Saturn  |                    |
|---------|-------|------|---------|---------|---------|---------|---------|--------------------|
| Sa/Su   | Set   | Rise | Rise Vi | Rise Vi | Set Vi  | Set Vi  | Set Vi  | Vi=Visibility      |
| 1/ 2    | 18:42 | 6:08 | 5:04 5  | 5:26 4  | 20:38 3 | 20:47 0 | 21:14 1 | -3 brilliant       |
| 8/ 9    | 18:47 | 6:00 | 5:03 6  | 5:22 4  | 20:35 4 | 20:27 1 | 20:51 2 | 0 conspicuous      |
| 15/16   | 18:52 | 5:51 | 5:04 7  | 5:18 5  | 20:32 4 | 20:07 2 | 20:27 3 | 3 moderate         |
| 22/23   | 18:57 | 5:43 | 5:07 8  | 5:13 6  | 20:28 5 | 19:47 5 | 20:04 5 | 6 naked eye limit  |
| 29/30   | 19:02 | 5:36 | 5:14 -  | 5:10 7  | 20:25 6 | 19:28 9 | 19:41 9 | 9 binoculars limit |

By Erich Karkoschka

### TIMPA Site News

#### Next TIMPA Site Committee Meetings

Note: All meetings are held at 7:00 pm in the Steward Observatory Conference Room N305

- Site Prep Sub-Committee Meeting - Tuesday, April 18<sup>th</sup>
- Long Range Planning Sub-Committee Meeting - To Be Announced
- General TIMPA Site Committee Meeting - Thursday, April 27<sup>th</sup>

#### What is TIMPA, Anyway?

We forget that not all TAAA members know about the TIMPA project. For our new members, this explanation will appear in all future newsletters.

TIMPA stands for; Tucson International Modelplex Park Association. It is a parcel of land (approx. 160 acres) located about seven miles west of the Saguaro National Park West. The property is leased from the City of Tucson by the TIMPA organization and is to be used as a specialty park. The TIMPA organization flies radio-controlled model airplanes at the site. The Southern Arizona Rocketry Association (SARA) also uses the site to launch model rockets.

About three years ago, TAAA member, John Polacheck, heard about the site and inquired if the TIMPA organization would be interested in acquiring another partner, the TAAA. The TIMPA group was very interested because the relationship

would be non-competing. TIMPA and SARA use the site during the day and the TAAA would utilize the facility at night. The TAAA used the site, by permission, for about a year for scheduled star parties, such as Beginners Star Parties. On July 14<sup>th</sup>, the TAAA and the TIMPA organization signed a letter of agreement allowing the TAAA unlimited use of the site for scheduled star parties as well as member use at other times. Ultimately, the TAAA intends to develop an observing area on the site that will include an observatory for the club's 16" reflector telescope. Many club and joint benefit projects will be undertaken in the next several months to improve the facilities at the site:

1. Run electricity and telephone line to our observing area and on to TIMPA's ramada. Also, run a water line to our site. (Completed - 10/9/99)
2. Construct a secure storage cage in the TIMPA Barn. (Completed - 12/11/99)
3. Move the TAAA property from the mini-storage unit to the new security cage in the TIMPA Barn. (Completed 12/12/99)
4. Construct permanent bathroom facilities. (Tentative schedule 2<sup>nd</sup> quarter 2000)
5. Construct observatory to house club's 16" telescope. (Tentative schedule 2<sup>nd</sup> quarter 2000)
6. Upgrade club's 16" telescope. (Tentative schedule 2<sup>nd</sup> quarter 2000)
7. Construct additional site improvements. (Schedule to be determined)

Watch the newsletter for announcements about TIMPA activities and how you can help.

## Constellation Report by Chris Lancaster

## Coma Berenices

## Berenice's Hair

Stargazers are presented with the best collection of galaxies the sky has to offer in the springtime skies. Here we find the Virgo cluster of galaxies, and most, as the name suggests, are located in the constellation Virgo. However, a large number are within the dim constellation of Coma Berenices.

The name of this constellation comes from Berenice II, who was the queen of Ptolemy III, ruler of Egypt circa 240 BC. When Ptolemy III left to fight an especially dangerous battle, Berenice II pledged to sacrifice her long, golden hair, of which she was very proud, if her husband returned victorious. When he did, she placed the hair in a temple honoring the goddess Aphrodite. To their dismay, the hair disappeared from the temple a short time later, so the court astronomer, Conon, comforted the royal couple by saying that the goddess was so enamored by the gift that she placed the queen's hair in the heavens so that everyone could admire it. You can find Berenice's hair by looking between the nearby constellations of Leo bordering to the west and Bootes to the east.

To the naked eye, the most distinguishing feature of the constellation is the large open cluster Melotte (or Mel) 111, which appears as a hazy spot sprinkled with a small handful of brighter, naked eye stars near the northwest section of Coma Berenices. This is one of the nearest star clusters to Earth at 260 light years, and for that reason is spread out across a large chunk of the sky. Binoculars are best for viewing this cluster which measures  $5^\circ$  across. The most prominent shape of the cluster reminds me of a vintage propeller-driven fighter plane with its wings folded up as when stored on an aircraft carrier.

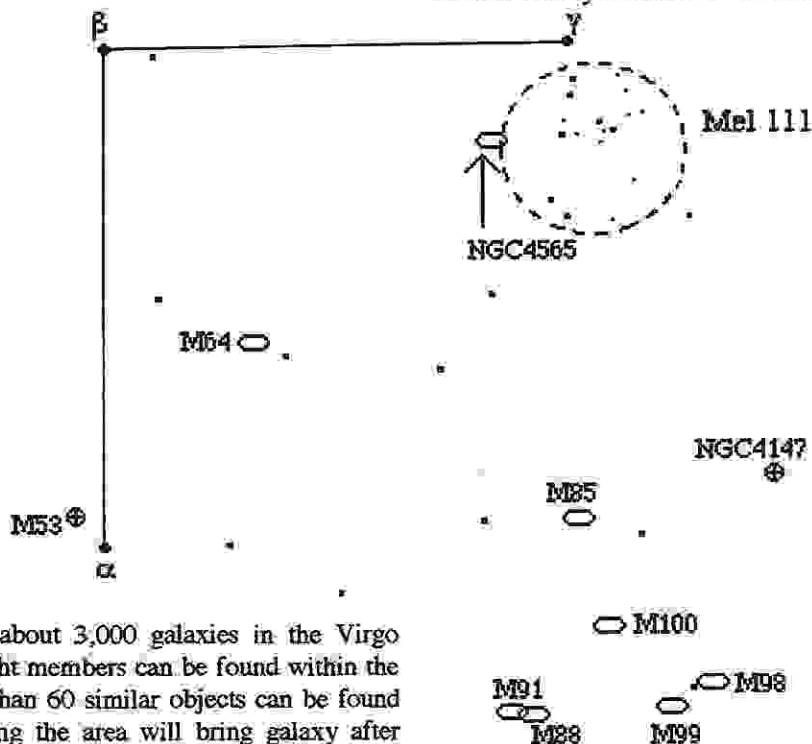
galaxy into view. M64 deserves special mention since its bright 8.0 magnitude glow is easy to find slightly less than one degree to the northeast of 35 Comae Berenices (RA 12h 56.7' Dec +21 $^\circ$  41'). This galaxy is nicknamed the "Black Eye Galaxy" because of a huge dark mass of dust wrapping around the bright nucleus. At a dark, clear site you should see close to half of the inner disk darkened by the dust cloud in contrast to the outer glow of the galaxy's oval.

NGC4565 is a favorite to those familiar with it. It is turned edge-on to our line of sight, and measures  $15'$  in its longest dimension and only  $1'$  in width. It appears much like a knife blade against the darkness of space, and running along its length is an easily noticeable dust lane which bisects the egg-shaped nucleus. Find NGC4565  $7'$  in RA east of 17 Comae Berenices, the closest 5th magnitude star of Mel 111, or RA 12h 36.3m Dec +26 $^\circ$  00'.

We can summarize other Messier galaxies as follows:

|      |           |        |              |                      |
|------|-----------|--------|--------------|----------------------|
| M85  | Mag. 10.5 | Spiral | RA 12h 25.4' | Dec +18 $^\circ$ 11' |
| M88  | Mag. 10.9 | Spiral | RA 12h 32.0' | Dec +14 $^\circ$ 25' |
| M91  | Mag. 11.1 | Spiral | RA 12h 35.5' | Dec +14 $^\circ$ 30' |
| M98  | Mag. 11.4 | Spiral | RA 12h 13.8' | Dec +14 $^\circ$ 54' |
| M99  | Mag. 10.5 | Spiral | RA 12h 18.8' | Dec +14 $^\circ$ 25' |
| M100 | Mag. 10.8 | Spiral | RA 12h 22.9' | Dec +15 $^\circ$ 49' |

Closer to our home galaxy are two bright globular clusters, M53 and NGC4147. M53, magnitude 8 and  $16'$  in diameter, has a broad nucleus saturated with stars  $1^\circ$  northeast of Alpha ( $\alpha$ ) Comae Berenice. NGC4147 is one-third the size of M53 and has few, if any, resolvable stars, but its obvious nucleus is easy to find  $6.5^\circ$  northeast of Beta ( $\beta$ ) Leonis.



Overall, there are about 3,000 galaxies in the Virgo cluster. While over 200 bright members can be found within the boundaries of Virgo, more than 60 similar objects can be found in Coma Berenices. Scanning the area will bring galaxy after

### TAAA Board of Directors Meeting - March 9, 2000

**EDITOR'S NOTE:** The following information are summaries of the topics discussed at the board meeting. Complete minutes of this meeting are available for review at the next monthly meeting from Ingrid Saber, TAAA Secretary.

Location: Steward Observatory Conference Room N305, University of Arizona

Call to Order: 7:22 pm

Board Members Present: John Kalas, Andrew Cooper, Ingrid Saber, Terri Lappin, Robert Callanan

Board Members Absent: Daniel Manrique, Bill Lofquist (excused)

1. **Treasurer's Report** - Terri Lappin distributed copies of the monthly financial statements to the board members. Terri mentioned that a relatively high bank balance was being maintained because the expenditure for the bathrooms at TIMPA will be required in the near future. Terri advised the board that she had purchased the upgrade for Quickbooks but had not yet had a chance to install the upgrade.
2. **Nominating Committee** - Andrew Cooper advised the board that to-date no one has offered to accept the position of Secretary. He said that several members are considering the Member-at-Large position.
3. **Monthly Meeting Schedule Change** - John Kalas reported that the meeting schedule changes previously announced in the March newsletter did not take place, as planned, at the March meeting due to time constraints. The meeting schedule will essentially revert back to the previous schedule with minor adjustments.
4. **TAAA Website E-Mail Listing** - Andrew Cooper has contacted the SEDS group to investigate protection for the listing of TAAA member e-mail addresses on the website.
5. **TAAA E-Mail Exploder** - Andrew Cooper reported that he will inquire with the SEDS group about establishing an e-mail list server for TAAA members.
6. **Telescopes For Telethon 2000** - John Kalas mentioned that the insurance issue had been resolved with the MDA covering the required insurance policies for both Sabino Canyon Park and the adjacent schools for overflow parking. The T4T committee recommended a donation of \$5.00 per person or \$10.00 per family. A combination of TAAA and MDA personnel will collect the donations. It was planned to have raffle prizes at the event. (Editor's Note: Due to federal regulations, there will not be a raffle drawing for prizes.)
7. **TIMPA Site Review** - John Kalas reported that the next step in the observatory acquisition project is for him to write a letter to Kitt Peak to negotiate the cost of transporting the dome and support building out of their storage area and up to the parking lot. The current quotation for this transportation is vague and excessive. The next TIMPA Long Range Planning Sub-Committee meeting will be either 3/28 or 3/29. Terri will check with the sub-committee members to see which date fits best. The next TIMPA Site Preparation Sub-Committee meeting will be either 4/17 or 4/18. John Kalas will check with sub-committee members for the best date. John Polachek had requested that the next general TIMPA Site Committee meeting be 4/20. (Editor's Note: The final dates for these meetings are: 3/28 for L.R. Planning, 4/18 for Site Prep, and 4/27 for the general meeting.)
8. **S.A.R.S.E.F. Participation** - Ingrid Saber mentioned that the TAAA judges for this science fair would be John Polachek, Ingrid Saber, and Ken Morse.
9. **Electronic Newsletter** - Due to time constraints, John Kalas just briefly announced his desire for the board to consider a policy for distribution of the newsletter electronically to some members of the club. This item will be discussed at the April board meeting, 4/13.
10. **TAAA Annual Picnic** - John Kalas reviewed several proposed dates for the annual picnic at Vega-Bray Observatory. June 24<sup>th</sup> was selected by the board. John will convey this info to Dr. Ed Vega.
11. **Biosphere II** - Robert Callanan reviewed discussions that he had with people at the Biosphere regarding the TAAA supporting them with their astronomy programs. John Kalas reported the latest contact information with the Biosphere relating to the 3/11 event with David Levy as a speaker. John was asked to call an individual at the Biosphere and he did. As of the board meeting date, no response had been received.
12. **TAAA 14" Telescope** - The board discussed the situation regarding developing the 14" scope at Robert Callanan's residence. There is no good way to support the massive scope without constructing a pier base. It was decided that the club should not dilute its efforts developing this instrument at this time and that the scope should be moved back into storage. The date of 3/18 was selected to transfer the scope back into storage. John Kalas and Andrew Cooper will coordinate the effort.
13. **Fundraising** - Robert Callanan recommended that long-range fundraising plans be established for the TIMPA Site. He suggested contacting various suppliers of material or services and offering star parties in exchange for free or discounted items. Robert also suggested that the club get more aggressive in pursuing paid star parties at the resorts around Tucson. John Kalas said that he had solicited for a publicity person some time ago to handle this sort of thing, but no one stepped forward.

Meeting Adjourned: 9:17 pm

### Desert Skies Classified

- FOR SALE:** Tele Vue wide field 1 1/4" eyepieces, each in excellent condition; 24mm \$110. \$100., 15mm \$90. \$80. Celestron Light Pollution Rejection filter for 1 1/4" eyepiece \$20. Contact Duane Niehaus at 290-1722. (4/00)
- FOR SALE:** Hard case for 10" SCT (broken fastener), \$10. Contact Hazel Lawler at Arizona City (520) 466- 9845 or e-mail at lawler@cybertrails.com (4/00)
- FOR SALE:** Meade 16" Dobsonian tube and base (no optics) \$50.00, 1 1/4" Meade focuser \$40.00, 4" diagonal mirror \$40.00, 6x30 Meade finder scope with bracket \$35.00. Buy one item or whole package. Negotiable. Call Jim Brix (520) 281-8759 evenings.(5/00)
- FOR SALE:** Celestron 90mm Spotting Scope, includes: tripod, two 1 1/4" eyepieces (12mm & 32mm), glare filter, reflex finder, and hard case. Very good condition. \$200. cash. Call Eric at 323-8435. (6/00)
- FOR SALE:** Meade 12" LX 200 SCT Telescope includes super wedge, tripod, custom storage box on wheels, Telrad, 2" Astro-Physic barlow, Pentax 40 mm lens. Excellent condition, used about 12 times. Asking \$5,000. Call Doug at 520-762-5135 or email at: clemans@flash.net. (7/00)
- FOR SALE:** Meade wedge with latitude adjuster bolted to heavy 8" diameter pipe pier (5 1/2 ft. long). \$100. Call Gordon Gower @ 792-9690. (7/00)
- SERVICE:** Custom machine shop work - design and manufacture of telescopes and mountings. Fabrication of small parts or repair of existing hardware. For consultation and price quotes, call Duane Niehaus at 290-1722.

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 John Kalas at 620-6502 or e-mail at jckalas@aol.com.