

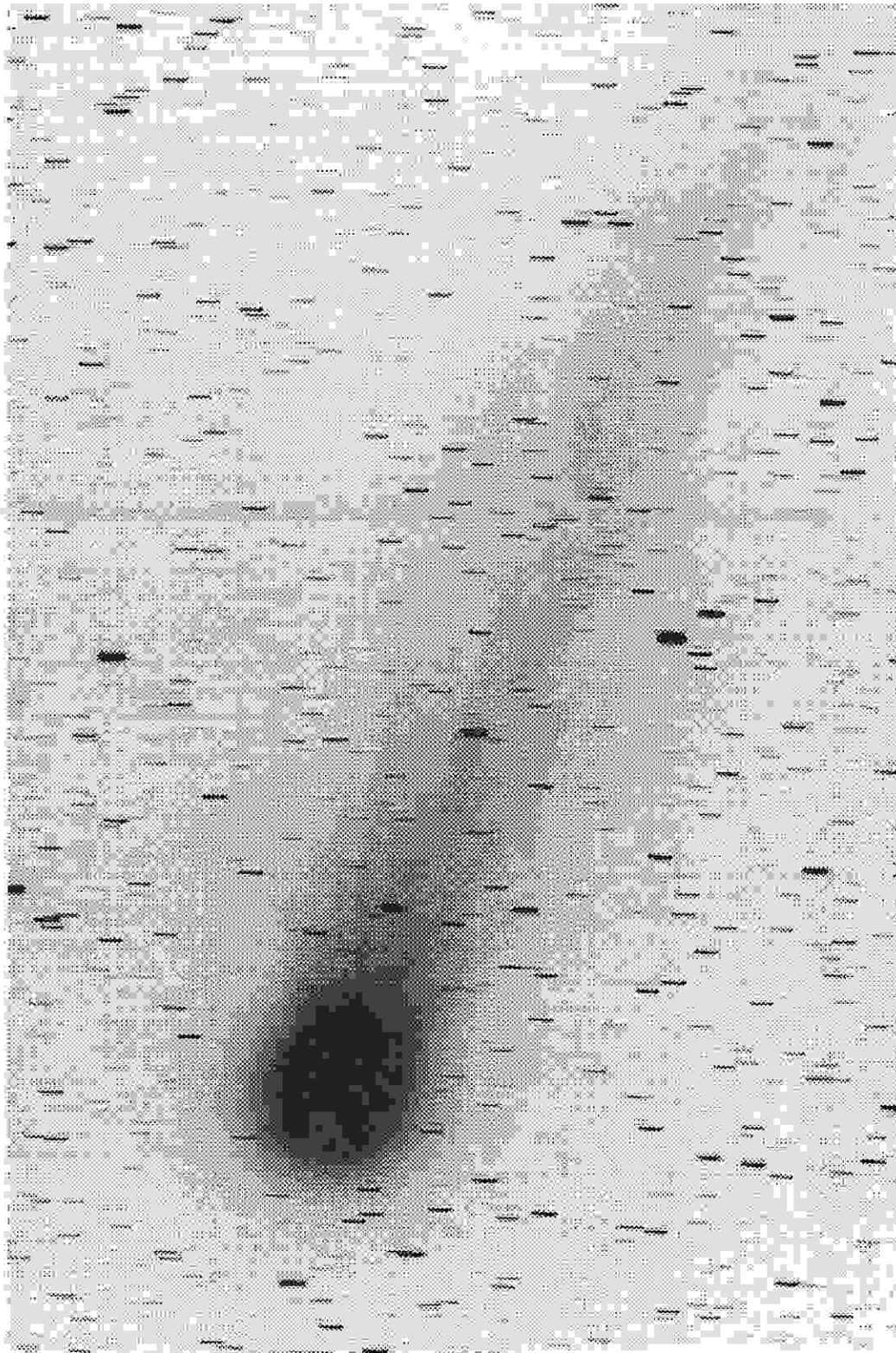


Desert Skies

Tucson Amateur Astronomy Association

Volume XLII, Number 5

May, 1996



Calendar of Events

BEGINNERS LECTURE- Friday, May 3, 6:30 pm at the Steward Observatory Auditorium - room N210. Topic is Planning a Solar Eclipse Trip by Wolf Forrest. All are welcome!

GENERAL MEETING - Friday, May 3, 7:30 pm at the Steward Observatory Auditorium -room N210. Topic is Adaptive Optics by Michael Lloyd-Hart.

YOUNG ASTRONOMERS CLUB - Friday, May 3, 7:30 pm at Steward Observatory room 202. Aimed at school-age kids and is concurrent with the general meeting.

EXECUTIVE COMMITTEE MEETING - Thursday, May 9, 7:00 pm at Flandrau Planetarium Conference Room.

STAR PARTIES & EVENTS:

May 8: Triangle Y Ranch
May 11: TAAA Picnic at Vega-Bray
May 18: Empire Ranch Dark Sky Observing
May 21: Quail Run Elementary
May 23: Smithsonian at Vega-Bray

June 4: Tohono Chul Park
June 8-15: Grand Canyon Star Party
June 19: Planetary Society
June 22: MTCVB

Newsletter Schedule: Deadline for articles: Monday, May 20. Printing: Monday, May 27. Folding Party: Tuesday, May 26. The newsletter is scheduled to be in the mail at least one week prior to the following month's General Meeting.

Cover: Streamer activity in the tail of comet Hyakutake was near a peak when this photo was taken on March 22, 1996 at 7:47 UT. Photo by Dean Ketelsen with Pentax 300mm f/4 on Ektachrome 1600. Scanned by Photographic Works Imaging Lab.

TAAA Home Page: <http://www.primenet.com/~lwilson/taaa/taaa.html>

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Member-at-Large	Bob Goff	790-1452	goffaxe@azstarnet.com
Member-at-Large	John Zajac	299-3203	
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Star Parties	Karen Allen	749-5744	

Membership in the TAAA

Individual \$25.00/year
Family \$30.00/year
Senior Citizen (over 60) \$23.00/year

Sky & Telescope subscription (optional) \$24.00. 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

Send Address Changes to:

TAAA
Attention: "ADDRESS CHANGE"
P.O. Box 41254
Tucson, AZ 85717

Call the Treasurer if you have any problems.

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 91316
Tucson, AZ 85752-1316

OR email: ninalehman@aol.com or nlwagner@aol.com

Desert Skies is published monthly by the Tucson Amateur Astronomy Association, PO Box 41254, Tucson, Arizona 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. If you want Sky & Telescope:
 - a) add \$24 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

President's Message

I hope everyone had a chance to see Comet Hyakutake when it had a good tail. I saw it from Empire Ranch on March 23rd. At the time it was estimated to have a 30 degree tail and I have heard reports of a 50 degree tail! It was a spectacular sight! I thank all the photographers who showed photos at the April meeting. Good work guys! Remember, June will be Member's Night, so it's another opportunity to show some nice comet pictures.

The annual TAAA Spring Picnic and Potluck will be held on May 11th. You and yours are invited to join us for a good time, good eating, and hopefully good observing. Ed and Pat Vega have kindly allowed us to use their observatory in Benson for this annual event for the last 5 years. There is an announcement and map in this newsletter. See you there!

This time of the year people start making plans for the summer conventions and conferences. The Riverside Telescope Makers Conference occurs over the Memorial Day weekend each year. The Grand Canyon Star Party, organized by Dean Ketelsen each year, will be held the week of June 8-15. The Astronomical League convention will be held in Rockford, Illinois this year. The Association of Lunar and Planetary Observer's will join the AL. This joint meeting is called Astrocon '96 and will be held July 25-27. There are many other star parties and conventions held over the summer. The May 1996 issue of Astronomy magazine has list of all of them with contact addresses for more information. If you attend one or more of these meetings, bring back

some photos or other goodies and tell us about the experience during the second half of a meeting.

This month we will be electing new officers to the TAAA Board of Directors. These positions are for one year terms, starting June 1st. Please attend the May meeting to cast your vote. Also at the May meeting we will take a vote to ratify a new constitution. This new constitution has been included in this issue of Desert Skies for you to review. Much thanks to John Zajac for making sure this constitution is in line with Arizona state statutes for non-profit organizations. I encourage you to accept this constitution.

There was some discussion at the April meeting suggesting that spending limits be included in the constitution. It should be brought to your attention that we have never before had spending limits and at times this has been a source of discontent among a few members. As was stated at the April meeting, it is felt that mentioning spending limits in the constitution will not serve it's intended purpose, but will instead limit us in managing the association business. However, spending limits will be set in the Association Handbook. The Association Handbook will set the rules by which the Board of Directors operates, but hopefully allow enough flexibility so our organization will be effective. If you have any concerns or suggestions regarding the operation of the TAAA, please give me a call and we can talk. Wishing you clear skies... Terri *

Meeting News

Beginner's Lecture: Planning a Solar Eclipse Trip

This month's Beginner's Lecture will be presented by Wolf Forrest. Wolf will be discussing some practical aspects of planning for a solar eclipse trip. Wolf went to India for the eclipse on October 24 of last year. He plans to see the March 9, 1997, eclipse which passes through Mongolia and Siberia. If you are planning an eclipse trip sometime, you may be interested in what Wolf has to say. *

May's Speaker: Michael Lloyd-Hart

ADAPT OR DIE! ADAPTIVE OPTICS - THE EVOLUTION OF A REVOLUTION

Michael Lloyd-Hart used to be an amateur astronomer with binoculars and a 4" Newtonian. Now he observes with the MMT! He knew he wanted to be an astronomer, but coming from England he had little hope of doing it there! When he met his future wife, a Tucson native and amateur astronomer, things changed for the better. In 1987 he received a Bachelors degree in Physics with honors from Oxford University. He received his Ph.D. in astronomy from the University of Arizona in 1991. Michael will present

his lecture "Adapt or die! Adaptive optics - the evolution of a revolution" at the May 3rd meeting.

Michael is an Assistant Astronomer at Steward Observatory and an Associate Research Scientist at the Optical Sciences Center. He works with the current MMT adaptive optics instrument and is involved in the creation of a new adaptive secondary mirror for the 6.5m conversion. The adaptive optics instrument at the MMT is a "really really neat gadget", according to Michael. Michael enjoys building gadgets, so this project suits him well. Some of his hobbies are making models of old planes and artistic woodwork. For more information about the adaptive optics program at Steward Observatory, point your Web Browser at:

<http://athene.as.arizona.edu:8000/caao/> *

Member's Night at June Meeting

Did you get some great comet photos? Have you finally finished that project you've been working on? We're interested in your story! June 7th will be our next Member's Night, so start getting ready to make a presentation. There will be a sign up sheet at the May meeting, so be sure to get on it. In an effort to end the meeting on time, we will only accept 8 presenters. *

Club News

Proposed Changes to TAAA Constitution

Enclosed in this issue is the entire proposed constitution which the Board of Directors would like you to ratify at the May meeting. This version doesn't contain any of the text stricken from the current constitution, so it should be easier to read. It is basically identical to the document which appeared with last month's Desert Skies but we have made sure to "dot the i's and cross the t's." The Board of Directors made some additional minor changes to Article IV regarding amendments to the constitution making it clear they can not be made by initiative. This was a little unclear in the version distributed last month. Because we must notify all the Members ahead of the vote, we can discuss the merits but will not be able to make changes at the meeting. Please read through this document and be ready to cast your vote at the May meeting. If you think there are serious problems with it, vote no and let the board know your objections so we can address them. *

Note from a Past President

TAAA Members,

I have to say it was a trip back in time to visit the TAAA's web site and see photos of the 16" telescope. A few members I noticed on your roster will remember the early days of its construction.

Tom Caudell, myself (Dennis Nendza) Kitt Schweitzer and the late Al Anslow (sp?) spent many a night sawing, boring, turning, threading and grinding metal at a machine shop in the physics building to give the scope its early start. The mirror (from the Tumamok Van Biesbrock telescope) spent a few years in my garage patiently waiting for its home. It looks as if succeeding TAAA members have done the project proud.

If I'm not mistaken I noticed a few knurled nuts in the photos that are used to clamp the rings together. I still remember learning to use the knurling tool and many other tools on the lathe under the tutelage of Mr. Anslow, who was certainly a master machinist.

And now for a short story from the past concerning the construction. The large brake-drum shaped object on the upper end of the polar axis almost figured in a news-making event one evening. From the photo, that part looks like the original we had installed. One of us (I won't say who) was boring out the center of that old aircraft wheel drum, and doing a rather fine job of generating a smooth clean finish when all of a sudden the stringy material that had been bored out flashed into a bright (I mean BRIGHT) fire. Someone shouted to get water and one of us recognized it was magnesium and water wasn't the answer. We danced around the thick smoke and finally loosened the piece and knocked it to the floor, dislodging the strands of material trapped in the bore hole. Our immediate concern was getting the flaring magnesium off the milling table so we wouldn't destroy an expensive piece of machinery. Our secondary concern became the linoleum floor which soon had little holes burned in it. By carefully dispersing and stepping on the burning strands we extinguished the mess. The whole episode probably lasted under 30 seconds, but our pulse didn't slacken for much longer. The room now lay heavy with the thick chalky white smoke and not wanting to answer embarrassing questions about the mishap we quickly cleaned up our projects and left for the night. The next few hours at "The Bum Steer" helped take the nervous edge off our

shaking hands. For months afterward as we worked in the shop the evidence of the now-settled white smoke lay on top of everything, a reminder of what could have been.

Club members may get a few laughs from our foibles, and certainly the parties to the event now laugh about it as well.

Best wishes in using the 16" and in observations of our new visitor scheduled to put on quite a show.

Dennis Nendza

One-time TAAA president (circa 1979)

Santa Monica, CA

dnendza@laintet.com

*

Larry Wilson - Web Wizard!

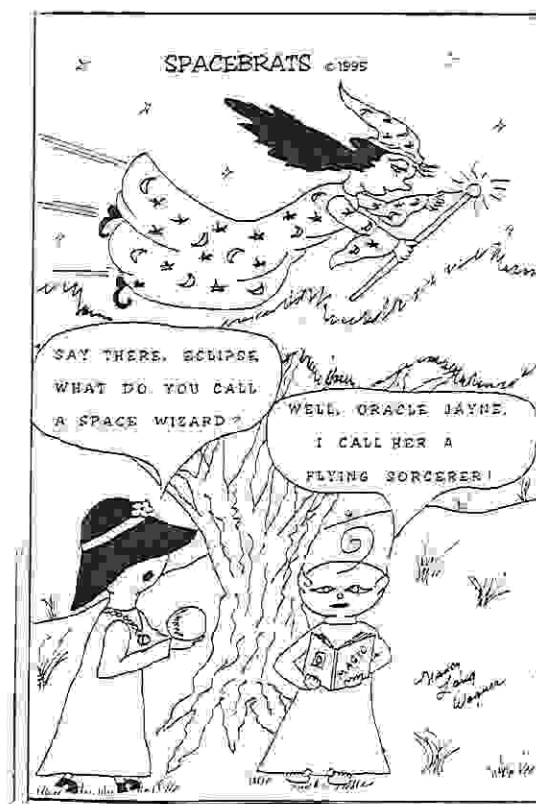
Several months ago the TAAA Web site managed by Vice President Larry Wilson, was given high honors by Magellan Associates in the form of a 4 star rating! This reflects highly on Larry's mastery of the esoterica associated with HTML and his abilities as a true Web Wizard! Kudos to Larry Wilson - Web Master extraordinaire! *

Foot Notes

Your editors URGENTLY NEED photos and drawings to use for the Desert Skies cover! All you talented friends out there - please mail us copies of your endeavors that we can use. Don't forget to place a label with your name and address on the back. This is your newsletter, let's see your inputs on our cover. Photos or drawings of comets, stars, planets, heavenly bodies, and earthly bodies (photos taken at members' activities) are needed. We promise to return them to you after we use them.

Nina and Nancy

*



Special Interest Groups

Computers and Electronics in Astronomy Subgroup

BY ROGER TANNER

Computer Controlled Telescope System and the Axiom Viper CCD Camera at Ed Vega's Observatory

The 13th meeting of the subgroup was held at Ed Vega's Observatory just east of Benson. The 6 members attending were treated to Ed and his wife's wonderful hospitality, and the roomy observatory which houses a 20" Maksutov telescope. The meeting started with a tour of the new addition which contains a very well decorated 2 bedroom bed and breakfast including one bedroom with a domed ceiling for planetarium projection. Another addition is a science demonstration and meeting room. There Ed showed one of the science demonstrations, a TV camera equipped microscope which displayed a beautiful image of an 35 million year old insect trapped in amber on a large screen TV (but not old enough to make dinosaurs!).

The meeting started with the startup of the computer controlled telescope system which is the Telescope Control System (TCS) sold by Dave Harvey. The system uses a dedicated PC to control the telescope and microstepped stepper motors to move the telescope. The system starts with the scope in a known position, tube vertical on the east side, with the declination axis horizontal. With the time from the computer clock and the observatory location set in the computer program the system can calculate the local sidereal time and the position of the scope. When the program moves the scope it counts the steps given to the stepper motors and calculates the position of the scope and the corresponding right ascension and declination. Ed slewed the scope over to an open cluster, which wasn't quite centered. The cluster was centered and the control system recalibrated on that object. The subsequent objects were centered in the field until the scope was flipped over to access the other half of the sky. The scope need a tune up of calibration after this move. The control system is still being tuned up to account for all of the particularities of Ed's system. Ed mentioned that some of the position error was due to a small amount of polar misalignment in the mount.

The discussions turned to the ability of the computer control system to compensate for any polar misalignment in the mount. The consensus was the system could account for this effect in the pointing of the scope and finding objects, but could not eliminate the effect of polar misalignment on images taken with the scope. Although the scope is usually guided on a star near the object being imaged, the field will rotate around the guide star slightly. For a small amount of polar misalignment and short CCD exposures this is negligible, but for long film exposures, it can be noticeable. Ed's custom built mount can be adjusted for altitude with the mounting bolts but doesn't have an easy way of adjusting the azimuth. We discussed slotting the mounting screws to allow the whole mount to be rotated. This would work but still leaves the considerable problem of raising the more than half ton scope and mount assembly up to allow the mounting holes to be enlarged. The polar misalignment can be compensated for in TCS by entering the offset if it's known or by entering a the position error at several points in the sky. The second method can also account for many other problems in a telescope, such non-perpendicularity of the

optical, declination and right ascension axes and flexure of the telescope assembly.

Ed related that the system also has a small amount of backlash in the drive gears which also contributes to the position error. Ed is looking for a system to apply a torsional preload to each axes to hold the telescope against one side to the gear teeth. Dave Harvey's fork mount telescope uses bungee cords to perform this function. A more substantial and complex system would be needed for Ed's larger German equatorially mounted scope.

The second part of the meeting centered around Ed's Axiom CCD camera. The camera has the larger Kodak KF-1600 chip with 1500×1024 - 9 micron pixels. This 9×14 millimeter chip combined with the 190" focal length gives a field of view of 6.4×9.6 arc minutes. Ed usually uses the camera with the pixels binned 2×2 for an image size of 750×512 pixels. The other thing about the camera is Ed has the high speed readout option. Typical CCD cameras readout the chip at 50,000 pixels per second, which would give about a 7 second read time for even the 2×2 binned images. Ed's camera has a faster but lower resolution converter which gives an image in less than a second. This is impressive seeing a high resolution image appear on the screen in such a short period of time and very useful for adjusting focus.

Another aspect of the Kodak chips are their low thermal noise compared to the typical astronomical CCD. A dark frame image was taken for 60 seconds as the camera was cooling down. At slightly below room temperature, $+14$ degrees C, the thermal filled the well to 102-180 counts, with the noise of 32 counts, most CCD would be saturated with thermal noise at that exposure and temperature. At 0 degrees C, the noise was down to 12 counts, at the setpoint of -15 degrees C, the noise was only 4.5 counts (and some of this was read noise). This means the noise contributed by a dark frame for a typical 1 minute exposure is only 4 to 5 counts out of a range of 4000. Typical CCD chips would need cooling to -30 to -40 degrees C to match this noise level. The noise drops by about $1/2$ for each 5 degrees C, which is more rapid than the typical CCD chip which are usually closer to 7 to 10 degrees. This allows the camera to have a less powerful and complex cooling system and yet achieve low thermal noise.

James McGaha ran the camera control program on a second computer, taking several images and showing the typical processing. The camera control software is integrated into the image processing software MIRA also sold by Axiom. This makes it easy to take an image and process an image at the same time without having to switch back and forth between several pieces of software. The software has extensive image processing and analysis functions, too many to list. The routine dark subtraction, stretching and display of the images were easily done and the resulting images showed the objects in nice detail. Ed showed us his images of the HorseHead Nebula taken with the 20" and with a small refractor. While the 20" image had the small scale detail, the HorseHead nearly filled up the screen. The short focal length refractor gave up the resolution but showed the HorseHead nebula and a good portion of the bright nebula backlighting it.

Contact Roger Tanner at 574-3876 or email:

rtanner@gas.uug.arizona.edu.

*

Dark Skies for May

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.

Tu/We 30/ 1	- - -	Sa/Su 11/12	20:45 - 2:27	Tu/We 21/22	22:48 - 3:46
We/Th 1/ 2	- - -	Su/Mo 12/13	20:46 - 3:05	We/Th 22/23	23:27 - 3:45
Th/Fr 2/ 3	Full Moon	Mo/Tu 13/14	20:47 - 3:42	Th/Fr 23/24	0:04 - 3:45
Fr/Sa 3/ 4	- - -	Tu/We 14/15	20:48 - 3:52	Fr/Sa 24/25	0:38 - 3:44
Sa/Su 4/ 5	20:38 - 20:41	We/Th 15/16	20:49 - 3:51	Sa/Su 25/26	1:12 - 3:43
Su/Mo 5/ 6	20:39 - 21:43	Th/Fr 16/17	20:50 - 3:50	Su/Mo 26/27	1:46 - 3:42
Mo/Tu 6/ 7	20:40 - 22:41	Fr/Sa 17/18	20:51 - 3:49	Mo/Tu 27/28	2:22 - 3:42
Tu/We 7/ 8	20:41 - 23:35	Sa/Su 18/19	20:52 - 3:49	Tu/We 28/29	2:59 - 3:41
We/Th 8/ 9	20:42 - 0:23	Su/Mo 19/20	21:20 - 3:48	We/Th 29/30	3:40 - 3:41
Th/Fr 9/10	20:43 - 1:08	Mo/Tu 20/21	22:06 - 3:47	Th/Fr 30/31	- - -
Fr/Sa 10/11	20:44 - 1:49			Fr/Sa 31/ 1	- - -
Weekend	Sun	Sun	Venus	Jupiter	Saturn
Sa/Su	Set	Rise	Set Vi	Rise Vi	Rise Vi
					Uranus
					Vesta (4)
					Set Vi Vi=Visibility
4/ 5	19:05	5:32	22:24 -4	23:41 -2	3:42 3
11/12	19:10	5:26	22:08 -4	23:14 -2	0:46 6
18/19	19:15	5:22	21:44 -3	22:45 -2	0:18 6
25/26	19:20	5:18	21:10 -2	22:16 -2	23:50 6
1/ 2	19:24	5:16	20:27 2	21:47 -2	23:23 6
					4:50 6
					4:17 6
					-3 brilliant
					0 conspicuous
					3 moderate
					6 naked eye limit
					9 binoculars limit

By Erich Karkoschka

Star Parties & Events

Donaldson Elementary at Triangle Y Ranch May 8

About seventy-five 5th graders from Donaldson Elementary will be spending some time at the Triangle Y Ranch. This site is located north of Tucson, near the town of Oracle. We need about 5 telescopes for this group. To help our members out, they have offered to prepare us dinner, but you must let them know you will be there. Set up time is about 7pm. A sign up sheet will be at the meeting. *

TAAA Spring Picnic May 11

3:30PM TIL ??? AT VEGA-BRAY OBSERVATORY

As usual, Ed Vega is opening up his observatory in Benson for our annual spring picnic. It is a wonderful place, not only for astronomical observing, but for other activities as well. There is a stocked lake for catch-and-release fishing or canoeing. There is a badminton court and a horseshoe pit. There is plenty of room to spread out and socialize in the twilight, as well as space to set up your scope if you want to share the view with others.

If you haven't been out to the observatory in a while, there have been some massive changes. Besides the roll-off roof observatory with 5 major telescopes in it, and the dome with a 20" Maksutov and CCD camera, they have built on housing for a bed and breakfast! They now have a small planetarium for star shows on cloudy nights or for video projection, a very nicely appointed bedroom facilities, a new kitchen area and a classroom in support of the teaching activities they conduct there. In addition to all the landscaping, you may not recognise the place! Plan to bring

the kids to check out all the new science exhibits as well as take part in the above activities.

As host, Ed will supply a couple horse tanks of iced drinks - soft drinks and beer. You need bring your own only if you have specialized tastes. He will also supply a grill for cooking. The tradition has been to bring something to grill and a dish to share - an astronomical pot luck. For those who like to eat sitting at a table, bring along some chairs and portable tables for that purpose. Also, allow for cooler night time temperatures as it will likely be far cooler than the 100 degree temps seen in Tucson earlier in the day and you and the kids will need jackets.

This is the event of the year, so make your plans now. Take advantage of Ed and Pat Vega's hospitality and help make this year's event the best ever! *

Quail Run Elementary May 21

This star party is for about 30 kids and their families. We should have about 3 telescopes. This school is located north of Ina Road and just west of Thornydale at 4600 W. Cortaro Farms Rd. Set up time is around 7pm. A sign up sheet will be at the meeting. *

Smithsonian Astronomy Seminar Star Party at Vega-Bray Observatory May 23

The Smithsonian Associates "New Astronomies" seminar star party will be held at Vega-Bray Observatory the evening of THURSDAY, May 23. In the past, these star parties have been held on Fridays at Sabino Canyon or Gilbert Ray, so please note the change of day and location.

April 11, 1996

**PROPOSED
CONSTITUTION AND BYLAWS
OF THE
TUCSON AMATEUR ASTRONOMY ASSOCIATION**

ARTICLE I

Section 1.

Name: The name of this Association shall be the Tucson Amateur Astronomy Association, Inc. hereinafter referred to in these Bylaws as the Association. The Association is an Arizona recognized nonprofit corporation and also a 501(c)(3) organization as designated by the U.S. Internal Revenue Code.

Section 2.

Purpose: The Association shall be a nonprofit, educational, service, scientific, and technical organization devoted to the study of, and promotion of interest in, Astronomy and its related allied sciences.

ARTICLE II

Section 1.

General Membership: Anyone interested in Astronomy may become a member of the Association upon payment of dues and by complying with the other requirements for membership as specified in these Bylaws or as specified by the Board of Directors.

Section 2.

Dues: The dues for general membership shall be set by the Board of Directors and changed from time to time, as the need arises, by a 2/3 vote of the Board of Directors. A 2/3 vote of the members represented at a General Meeting is required to ratify any dues increases. Notice of a proposed dues increase ratification vote shall be published in the Association Newsletter at least thirty days prior to the vote, and announced during at least one meeting preceding the meeting of the vote.

Section 3.

Types of General Memberships:

Individual Memberships: Individual members shall enjoy the full privileges of the Association including the right to vote (one vote per member) at any General Meeting as specified under Article IV Section 6.

Family Memberships: Family memberships shall include two adults and their children under the age of 18, who shall enjoy the full privileges of the Association including the right to vote (two votes per family membership) at any General Meeting as specified under Article IV Section 6.

Honorary Memberships: Honorary members shall be selected by a 2/3 vote of the Board of Directors. Term of honorary membership shall be one year subject to renewal by the Board of Directors. Honorary members shall enjoy the full privileges of the Association including the right to vote at any General Meeting as specified under Article IV Section 6.

ARTICLE III

Section 1.

Board of Directors: The Board of Directors shall consist of a President, Vice President, Secretary, Treasurer, Member(s) at Large, and the immediate past President who may be an ex-officio member for one term after his term of office expires. There shall be one Member at Large for every complete unit of 100 Association members, and one for any remainder between 1 and 99. With the exception of the immediate past President, the General Membership of the Association shall elect the members of the Board of Directors. Elected and ex-officio Board members shall hold office for a term of one year beginning on June first. The

Board of Directors shall meet at least annually, and only the President or a majority of Board members may call a Board of Directors Meeting.

Section 2.

General Powers of the Board of Directors: The Board of Directors shall manage all affairs of the Association, and the Board shall set the time and place of the General Meetings of the Association. The Board shall have final authority over all Association finances and may establish a fund available to the President and Treasurer for discretionary expenses. The Board of Directors shall fulfill all legal requirements of the State of Arizona, in particular, all requirements currently set out in Title 10, Chapter 5 of the Arizona Revised Statutes governing nonprofit corporations. The Board of Directors shall have sole power to appoint the Statutory Agent of the Association.

Section 3.

Veto and Modifying Power of the Board of Directors: By a 2/3 vote, the Board of Directors may veto or modify any decision that any officer, appointee, or committee has made on behalf of the Association.

Section 4.

Powers and Duties of Officers:

President: The President is the Chief Executive Officer of the Association. The President presides over the General Meetings, calls the Board of Directors Meetings, and chairs the Board of Directors. The President shall have the power to form or abolish committees, create or abolish other positions, and make all appointments to these committees and positions as needed to carry on Association business. The President is responsible for overseeing the performance of his appointees. The President is also responsible for overseeing the compilation of the Association Handbook which describes all important Association operations. Furthermore, the President, at his discretion, may delegate some of his authority. In the absence of the Vice President, the President shall appoint another person to coordinate member presentations at the General Meetings. In the absence of the Secretary, the President shall appoint another person to take minutes of General or Board of Directors Meetings.

Vice President: The Vice President shall coordinate member presentations at General Meetings. In the event the President is unable to fulfill his duties, the Vice President shall assume the duties of the President.

Secretary: At the direction of the presiding officer, the Secretary shall correspond with other organizations and individuals. The Secretary shall keep and maintain the minutes of Board of Directors and General Meetings. In the event the Vice President is unable to fulfill his duties, the Secretary shall assume the duties of the Vice President.

Treasurer: The Treasurer shall receive all funds and maintain complete and current financial records for the Association. The Treasurer shall maintain complete and current records of all dues paying and honorary members and shall notify dues paying members at least thirty days prior to their membership expiration. The Treasurer shall give a written annual report and other reports of financial status, either orally or written, as required by the Board of Directors. The Treasurer shall maintain all legal documentation for the Association and file all appropriate Arizona and Federal documents. The Treasurer shall serve as the Statutory Agent for the Association unless the Board of Directors chooses to appoint another Statutory Agent. The Treasurer may appoint assistants who serve at his discretion.

Member(s) at Large: The Member(s) at Large shall serve the Association membership as an independent representative to the Board of Directors.

Section 5. General Elections: At the February General Meeting, the General Membership shall elect a Nominating Committee of three members. At the May General Meeting, the Nominating Committee shall propose candidates for election to the Board of Directors. The President of the Association shall not be a member of the Nominating Committee. Members of the Nominating Committee shall hold office from the date of their election until the May General Meeting.

The Board of Directors shall be elected annually at the May General Meeting. Nominees names shall be published in the Association Newsletter at least thirty days prior to the election meeting. Nominations for elective offices must be submitted prior to the publishing deadline to be officially included on the ballot; however, nominations for write-in candidates shall be accepted from the floor at the May General Meeting. Any member who has been a member for one year, and is a member in good standing, may be nominated for office. All members of the Board of Directors must be at least 18 years of age. No member shall simultaneously hold two or more positions on the Board of Directors. Newly elected members of the Board of Directors shall take office on the first day of June following their election at the May General Meeting. At the General Meeting in June, the newly elected Board Members shall be introduced to the General Membership.

Section 6. Vacancies on the Board of Directors: In the event an elective office is not filled or is vacated, the remaining Board of Directors shall appoint by majority vote a member in good standing to fill that office until the next June first. If by reason of death, resignation, or otherwise, the Association has no Directors in office, any member may call a special meeting of the General Membership for the purpose of electing the Board of Directors who shall then hold office until the next June first.

Section 7. Removal of Members and Officers:

A. Causes: Any member or officer may be dropped or expelled from the Association for any of the following reasons:

1. Willful misuse of Association property.
2. Willful disregard for his own safety or the safety of others while on Association sponsored activities.
3. Conduct detrimental to the Association and constituting misfeasance, malfeasance, or nonfeasance.

B. Removal of Members: By a vote of all the Board of Directors minus one, any member may be removed from general membership in the Association. Before the Board of Directors takes a final vote to remove a member, the Board shall send a written letter announcing the vote to the member in question at least ten days prior to the final vote.

C. Removal of Officers: By a 2/3 vote, the Board of Directors, following the guidelines set up in the Disciplinary Procedures chapter(s) of the latest edition of Robert's Rules of Order Newly Revised, may remove one of its members from office. Prior to the final vote for removal, the Board of Directors may by a 2/3 vote suspend the voting rights and powers of office of the member in question. This suspension period shall not last for more than thirty days and by the end of this period, the Board of Directors must by a 2/3 vote remove the member in question from the Board or the member in question shall be restored to full voting status and to his original office on the Board of Directors. Before the Board of Directors takes a final vote to remove the member in question from the Board, the remaining Board of Directors shall send a written letter announcing the vote to the member in question at least ten days prior to the final vote.

D. Removal of Appointees: By a 2/3 vote of the Board of Directors, any appointee or committee member may be removed from office. Appointees shall remain subject to dismissal at any time and for any reason by their respective committee chairperson or by the President.

- E. Appeals: If the Board of Directors votes to remove an officer or to expel a member, that person may appeal to the General Membership for reinstatement. A vote shall be taken at a General Meeting at least thirty days after an announcement in the Association Newsletter. Reinstatement shall require a 2/3 vote of the represented General Membership. In the interim, the vote of the Board of Directors shall remain in effect.

Section 8. Nonpayment of Dues: Any member shall be automatically dropped from the Association for dues thirty days or more in arrears.

ARTICLE IV

Section 1. General Meetings: The Tucson Amateur Astronomy Association, Inc. shall meet monthly as determined by the Board of Directors. General Meetings shall be announced in the Association Newsletter.

Section 2. Rules: The latest edition of Robert's Rules of Order Newly Revised shall be the governing parliamentary law at all meetings, except as provided in these Bylaws.

Section 3. Amendments: Amendments to this Constitution shall only be made upon a 2/3 vote of approval of the General Membership at any General Meeting provided the requirements of Article IV, Section 6A, are met and with prior approval of the Board of Directors. Notice of a proposed Constitutional Amendment vote shall be published in the Association Newsletter at least thirty days prior to the vote, and announced during at least one meeting preceding the meeting of the vote.

Section 4. Special Meetings: Special meetings may be called from time to time and announced in the Association Newsletter.

Section 5. Motions: Any member of the Association may bring items of business before the Board of Directors at any regularly scheduled General or Board of Directors Meeting.

Section 6. Voting:

A. General Meetings: The members present at a General Meeting shall constitute a quorum and shall be eligible to vote on any issue provided prior notice is given to all members via the Association Newsletter. Except when these Bylaws require a 2/3 vote, a majority vote of the members represented at the General Meeting shall carry all motions. Absentee votes are permitted and:

1. Shall be in written form and must be signed by the member,
2. Must be presented to the President prior to holding the vote in question,
3. Shall be independently counted by two members who are to be appointed by the President,
4. Need to be counted only when the number of absentee votes cast can have an effect on the outcome of the vote.

B. Board of Directors Meetings: A majority of the members of the Board of Directors who are not ex-officio members shall constitute a quorum of the Board of Directors. Proxy or absentee voting is not allowed.

C. Initiatives, Modifications, Vetoes, and Recalls by the General Membership: The General Membership may initiate a vote on any matter other than Constitutional Amendments, modify or veto a decision by the Board, or recall any officer by presenting the President with a petition signed by ten percent of those members with voting rights. The petition must clearly spell out the reason for requesting a vote of the General Membership at the top of the form where it can be read by members signing below. Upon verification of the petition signatures, a vote shall be held at the next General Meeting following an announcement in the Association Newsletter at least thirty days prior to the vote. The vote of the General Membership shall supersede any decision of the Board of Directors.

The Associates will arrive at Vega-Bray about 7 p.m. TAAA members who plan to come and would like a box dinner must tell Dan Brocius (670-5706) or Terri Lappin by Tuesday, May 21. All TAAA members are welcome to attend, but if you want dinner provided, you must respond by the end of May 21. *This event is a fund-raiser for the club, since the Smithsonian will make a contribution to the TAAA.*

Approximately 20-30 Smithsonian Associates will be present. The star party has always been a high point of the program since most of them come from light-polluted parts of the country. Sunset is 7:18 p.m. The Moon is up, 35% phase, and sets at 11:26 p.m. *

Tohono Chul Park June 4

Dean is rehearsing his annual Grand Canyon lecture for Friends of Tohono Chul. Setup is any time after 6:00 pm. Lecture begins at 6:30, observing around 7:30. Look for map in the June newsletter. *

Grand Canyon Star Party News 8th - 15th June

Well, the time is approaching - only 6 weeks til this year's event. If you have not made your plans yet time is growing short. I have heard reports that rooms are not available for this time period, so camping is just about the only way of guaranteeing a place to sleep. It is possible to pick up a motel room by showing up at 4pm when they release the

no-shows that the travel agencies overbook, but there are no guarantees. I still have a couple of the complimentary campsites left, especially on the first weekend. They are now open to all comers, so let me know if you want one once you establish when you can attend.

One note of interest - some of you may not be aware that TAAA member Deloy Pierce of Farmington, UT is organizing the North Rim version of the event, as it is a shorter drive for him. This will be the first time star party for the North Rim, so if you want to go to a little quieter, less frantic location, contact Deloy at: P.O. Box 674, Farmington, UT 84025 (801) 451-8215. Deloy is a big proponent of public astronomy, so it should be a great time up there as well.

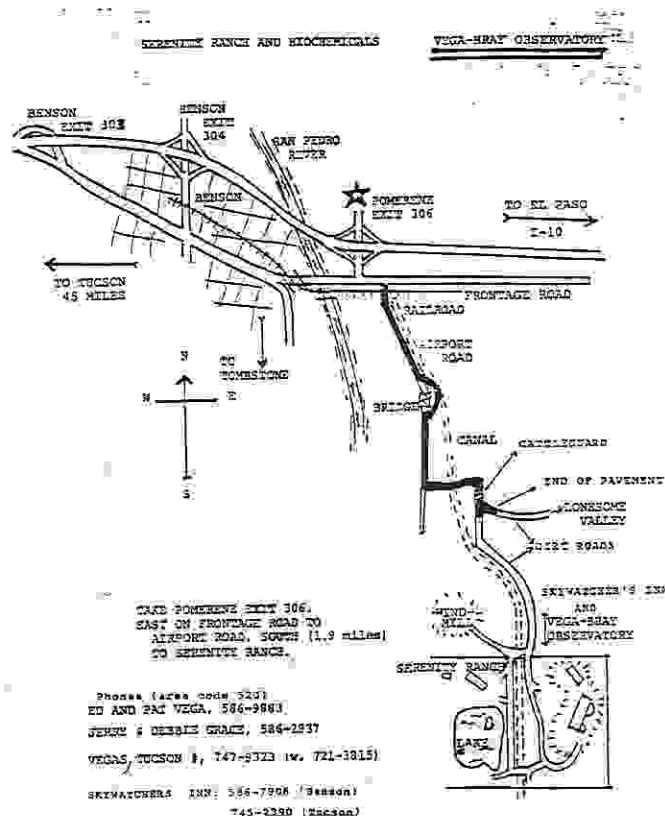
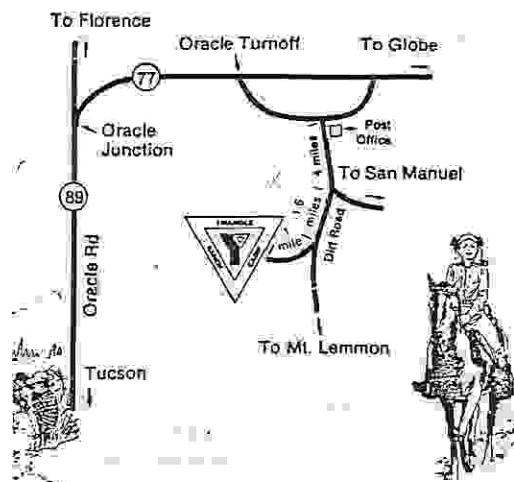
There is some interest in nailing down dates for certain events. To that effect, I'll declare that the official star party bar-b-ques will be on Sunday the 9th, and Saturday the 15th, most likely at the Aspen Loop campsites that we occupy. We are also planning a day trip to Meteor Crater and Lowell Observatory on Wednesday the 12th. The other days we will be doing the standard daytime rim activities. Don't forget that we are hoping to complete construction of a 10" telescope for the local school there and we need some optical helpers to run the daytime display. Take part in this worthwhile activity and help us out!

I am getting daily requests for information via e- and regular mail, and the notice has not even run in Sky and Telescope yet! From the response, this may very well be the best attended event yet. I hope to see you all there! For questions or information, call Dean at 293-2855, or e-mail at ketelsen@as.arizona.edu. *

Maps

Triangle Y Ranch

Map to Camp



Notes From Other Clubs

Eye piece to Eye piece

By BARRY HIRRELL

San Francisco Sidewalk Astronomers

It was the little comet that could, inspiring even the most jaded urban stargazers to scan the heavens; searching for it's frosty glow. Three cheers to you Hyakutake, icy denizen of the outer solar system.

The trick it would seem, would be to somehow convince the lady who was about to leave the perfect parking spot that she should wait for me to bring my car over before she took off. I'd just carried 3 telescopes 100 yards all by myself, and was up for another challenge. Cautiously I approached the car. Suddenly a little girl pokes her head out of one of the windows, "Hi, Barry!" Turns out it's Crystelle, a student in one of my Project Astro classes. The parking spot was mine, needless to say.

As the crowd of onlookers gazed off at the comet, hovering over the apartment house across the street, it became obvious we had caught the attentions of partygoers on the top floor. Shortly, a delegation of inebriated diplomats wearing bed sheet togas and sofa pillow coneheads was dispatched to greet us. "Earthlings, we beg you. Please do not look at our comet. It bears the souls of our ancestors!" they beckoned to us. Although we offered them a glimpse of "home" it became clear they preferred mentally marinating themselves instead. A local drunk, a "regular" proudly showed off a stolen Danish canned ham to me. "It's a Hamlet," he proclaimed. I told him there were more things in that can than were dreamt of in his philosophies. A good time was had by all, Horatio.

An enthusiastic by far more sober crowd awaited us March 23rd at St. Anselm's School. Afterward, a few of us migrated to Olema, near Point Reyes, for a dark sky look at the comet. From our new vantage point, we measured its visible tail at 32 degrees. By the time we headed home, that was also the ambient air temperature! But our striking view of the comet was worth it. Stretching across the zenith, it appeared as if the heavens had ripped open and stardust was pouring out!

Till we meet again fellow watchers of the sky -- "To Infinity...and beyond."

This article received in the mail from San Francisco for insertion into our newsletter. Edited. *

1996 All Arizona Messier Marathon

By AJ CRAYON

Saguaro Astronomy Club

This years Marathon was held on March 16th at a new location south of an older observing site south of Arizona City. This is a very dark and secluded location about 20 miles past Arizona City.

Before getting there we took a poll amongst ourselves to determine how many scopes would be there when we arrived and how many would be there by sunset. Steve got the number right for our arrival at 12 and I was closest for sunset at 58.

After passing through Arizona City and getting towards the site we came upon SAC signs pointing the way. They were placed there by Adam Sunshine. Pulling into the site we saw flashing red lights marking the way from the road well into the observing field. This would be a great help for those departing before morning twilight!

In the middle of the observing field was the much expected port-a-john. This was initially requested by ladies; but was also well used by men. Mainly because the observing site was so large the port-a-john was closer than any tree or bush! It to was marked by flashing red lights. After darkness the lights proved to be too much of a distraction to observers. So they were placed inside. You could still see the flashing through the side vents near the roof.

But, before it got dark I had a chance to chat with Ray Farnsworth. He is the owner of the land we were using for the site. He is a very pleasant person to talk with. Some of the rain damage to the road was cleaned up by him. We owe him a thanks, a big thanks!!! Not just for the site, but also for maintaining the road.

I also had a chance to see old friends and make new ones. Space doesn't permit mentioning all. But I had chance to speak with Glen Nishimoto who let me use his camera - loaded with film - and Hazel Lawler; both belong to TAAA. I can't forget new friends Tom McGowan, all the way from Massachusetts, and Tom Bopp of Hale-Bopp fame! Also well represented was EVAC with Tony Ortege, Don Wrigley and the Albers! Thanks to these and all who attended. You made the event a success!

By sunset there was much expectation about the marathon and Comet Hyakutake. A good thing the marathon wasn't a week later as this comet turned out to be a spectacular treat! By this time the number of scopes had grown to 65.

As darkness descended the marathon, general observing and astrophotography began! By 11 pm I had completed the Realm of the Galaxies and decided to take a well deserved break.

After midnight I noticed some clouds covering a large area to the north and east. Well away from that part of the sky I needed to observe.

Fortunately the clouds weren't a problem for me. As morning approached the clouds became a dreadful problem for others because they covered parts of Pegasus and Aquarius. They caused a number of observers to miss objects in these constellations.

Finally it came to the final object, M30! In the minutes before morning twilight I was able to locate the two bright stars to the west of the globular in my 8X50 finder. They were just above a mountain top to the southeast. When I thought M30 was just above the horizon I walked over to David's telescope to have a look. I didn't see it in his telescope either. I scurried back to my telescope, hoping.

A few moments later I heard Dave call for me to come confirm his observation of M30. While I head the call, it was ignored for two reasons; 1) the 200 feet distance between us was too far to get there in time to see it before disappearing and 2) I was hoping to see it in my scope.

As time passed and daylight began descending upon the observing field, 41 Capricorni appeared in the finder for a few fleeting moments. But, alas, M30 never showed up in my scope.

When it was all over, David came by to deliver his check off list and to discuss his fleeting view of M30. While viewing it he jiggled the telescope; the fuzzy blob moved accordingly. After discussing whether his glimpse was enough to qualify for being observed or not he decided it was. A total of 30 observing reports were turned in.

Edited

*

THE SOUTHERN CLAW

Blue-white Spica rises high in the southern sky on these May evenings and rising above the southeast horizon later is Antares. In between these two bright luminaries is the dimmer constellation of Libra. Its two brightest stars are Beta (β) Librae "Zubeneschamali" magnitude 2.6 and Alpha (α) Librae "Zubenelgenubi" magnitude 2.8. Zubenelgenubi pronounced (zoo-ben-ell-jen-NEW-bee) is a wide binocular and small telescope double. In fact some keen eyed observers can notice that α Librae is elongated with their unaided eyes! Can you?

α^2 Librae is the primary and its a subgiant or giant with a spectrum of A3. It has a luminosity of 20 suns and its diameter is about twice the Sun's. α^1 Librae the companion is a subgiant having about the same diameter as our Sun, but it shines twice as brightly. α Librae lies $231''$ from the primary at a P.A. of 314° or northwest as seen in binoculars. The two stars seem to be an actual binary system. They share the same proper motion through space and may take 100,000 years to rotate around their center of mass.

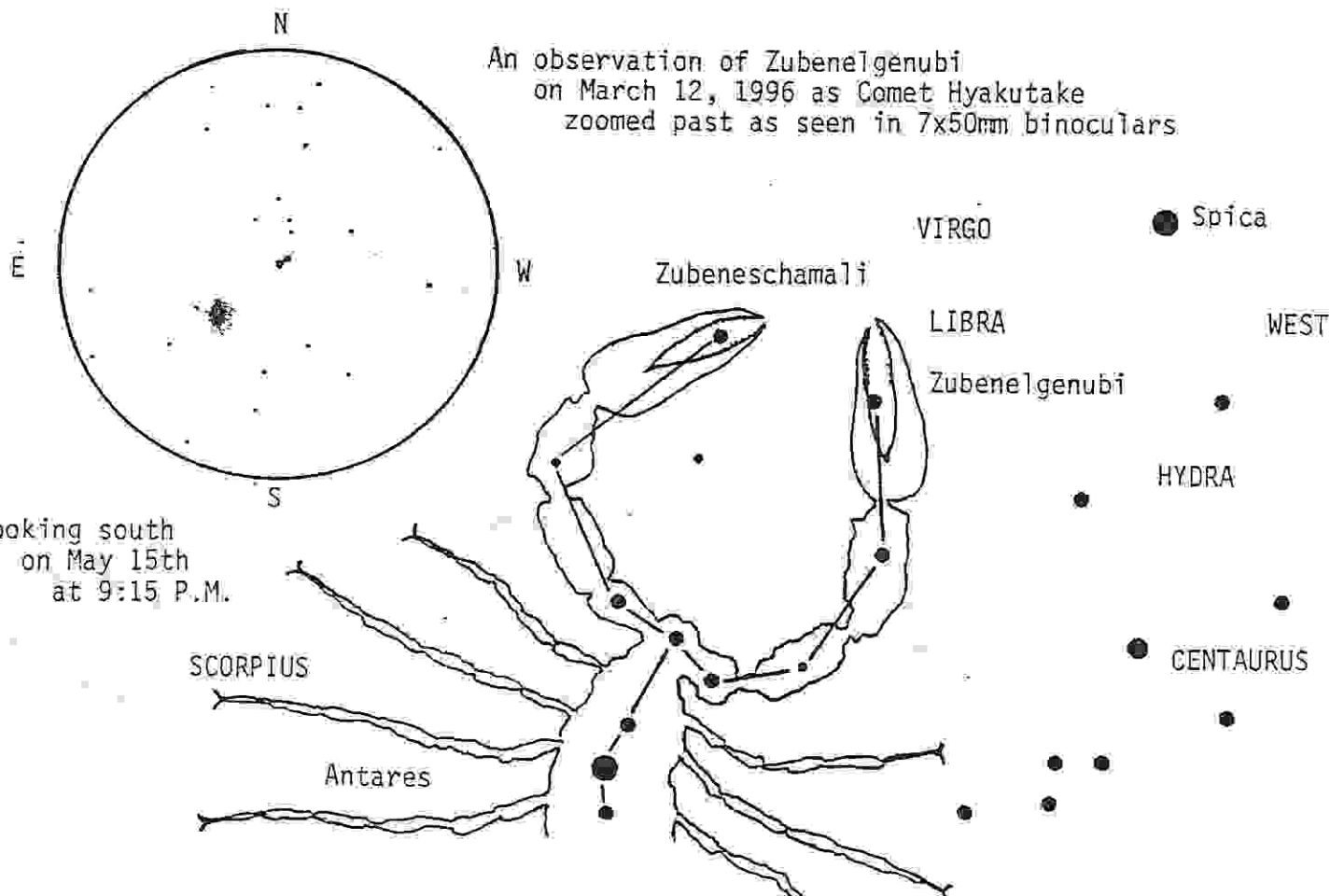
At α Librae's distance of 57 light years the separation of $231''$ is equal to about 3900 A.U.'s. The pair has remained fixed since it was first measured in 1823. Most observers report the colors as yellowish for the primary and pale blue for the companion probably a contrast effect because the companion has a spectrum of F5 and should have about the same color as the primary. What kind of color combination do you see with binoculars and or a small telescope? If you are using a telescope to view this pair use your lowest power to get the widest field of view.

To find α Librae start at Spica and move southeast toward Antares at the halfway point you should come across it. Its the southernmost of the two 3rd magnitude stars and its fairly bright to spot even from the city of Tucson.

These warming May evenings will allow you to observe longer into the night. So this month why not try observing α Librae first with a pair of binoculars and then try your telescope.

BY JEFF BRYDGES

An observation of Zubenelgenubi on March 12, 1996 as Comet Hyakutake zoomed past as seen in 7x50mm binoculars



Member's Forum

Is There a Case for the Amateur Cosmologist, Part I

By JULIAN GRAJEWSKI

I am a member of the TAAU and have been subscribing to *Sky & Telescope* since the early 80's. Several times a year I read in its pages enthusiastic claims for the definitive proof of the "Big Bang" theory as well as plugs for black holes, the ever more massive missing mass, an unerring confidence in the correlation between red shifts and universal expansion, gravity as a "be-all", "end-all" explanation for solar system, stellar, galactic, and cosmological processes, and the endorsement of millions of dollars for S.E.T.I. Programs. Some issues back I was disturbed to see the two leading U.S. astronomy magazines carry identical cover stories on the impact hypothesis of dinosaur extinction, "hot potato" whizzing through the earth's atmosphere and all.

In August 1991, a brief article of mine was published in the TAAU newsletter titled "Did Astronomy Kill the Dinosaurs?" ridiculing "the empiricist bias, epistemological poverty and stochastic naivete" of this supposition, pointing out that this was a conceptually thin hypothesis that postpones further investigation. The reality is that dinosaurs were probably done in by internal biospheric processes such as the evolution and angiosperms over gymnosperms, a change that made the giant reptiles thermodynamically obsolete. *Deus ex machina* notions smacking of Velikovsky's cataclysms hijack science, as phrenology did for much of the nineteenth century.

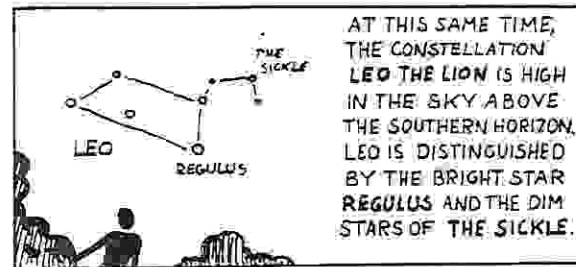
David Levy, famed comet hunter and TAAU member singled out this article at the monthly meeting while introducing Timothy Ferris (an erudite proponent of the Big Bang). During the break in that meeting I discovered that my article had voiced the skepticism of other association members who found themselves annoyed by the aconceptual barrage of suppositions to which they are regularly subjected. They helped me compile the above list, one member adding the possibility that globular clusters may not be globular after all, star chains perhaps indicating a more coherent structure such as a pinwheel.

Most amateurs are not professional astronomers, so we feel diffident in challenging the professionals. While writing this I worry that I am committing a howler and making a fool of myself. But we are educated, thinking persons, many of us have degreed backgrounds and wide and deep reading habits which at least allow us to become skeptical, even if we cannot offer coherent, mathematical, alternative hypotheses. In my case I have a background in literature, politics and philosophy, and an education stressing the dialectics of Plato, Kepler, Leibniz, Kant, Hegel and Marx over the prevailing aristotelian nominalism expressed popularly as an intellectually corroding pragmatism and scientifically as a devilitating empiricism.

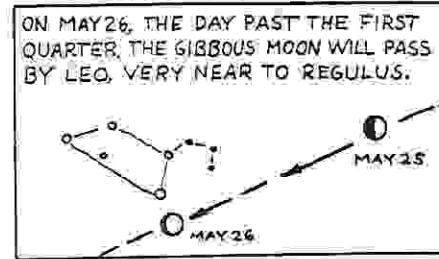
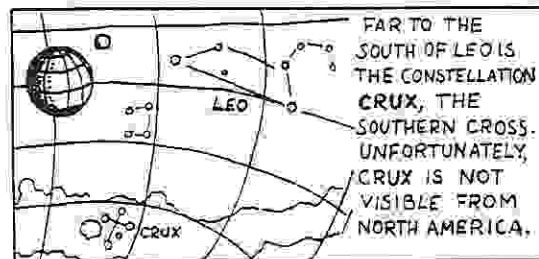
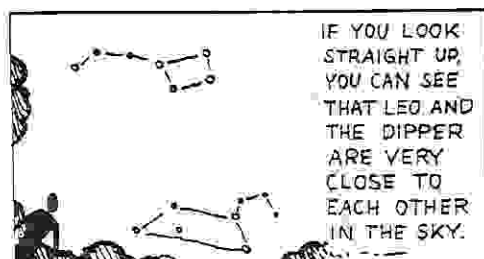
So how would "dialectical humanism" apply to a tentative amateur cosmology? Let me begin with the beginning: the Big Bang theory of universal creating is philosophically absurd on its face, a point made (and since apparently ignored) in an editorial in the August 10, 1989 issue of *Nature*. If the Big Bang created the universe, what created the bang itself? If God created the universe, who or what created God? Bod? Nod? Sod? Odd? Rod? An infinite regression is set up indicating that a paradox has arisen, a paradox which should not be glossed over, but resolved. Instead of solving the paradox, the Big Bang theory puts its antecedent arbitrarily beyond discussion, an attitude more mystical than scientific.

A dialectical hypothesis, one which considers the Big Bang not a quasi religious primal event (as a reactionary Belgian priest who first propounded the theory would have it) but a singularity interacting with a field, is a more fertile approach, one which could explain the formation of "lumpiness" leading to later galaxy formation. Plasma cosmology, and the related study of magnetic fields as organizing processes, dispenses with positing ever greater percentages of missing mass and suggests that a famous background radiation could have been an early period of stellar formation. "The Big Bang is Bunk," quoth Grote Reber. *

Starman



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TAAA Executive Committee Meeting - April 11, 1996

Meeting called to order at 7:12 p.m. by Teresa Lappin. In attendance were Dave Harvey, Larry Wilson, John Zajac, Dean Ketelsen, Teresa Lappin, Paul Lorenz, Terry Gilmartin, Kristmann.

AGENDA:

1) *Other Topics*: Paul Lorenz - Discussion of meeting length concerns. Terry Gilmartin - Discussion of spending restrictions on club officers.

2) *Meetings and Events*: Star Parties -
 May 8 Triangle Y/ Donaldson Elementary, grade 5
 May 21 Quail Elementary
 June 8-15 Grand Canyon Star Party
 June 19 Planetary Society
 June 22 MTCVB

Meetings - May General Meeting - Michael Lloyd-Hart, Adaptive Optics

Beginner's Lecture - Daniel McIntosh/ Relativity
 June General Meeting - Members' Night
 July General Meeting - TBA
 Potluck - May 11 - Vega-Bray Observatory

3) *Treasurers report/Insurance*: Lappin reported the club now has the following assets and liabilities.

Cash Assets:	\$37,734.95
Fixed Assets:	\$34,234.00
Total:	\$71,968.95

Insurance: Motion by Lappin to pay current outstanding liability insurance bill. Second by Harvey - carried unanimously.

Motion by Zajac to investigate theft and embezzlement insurance, second by Lappin, unanimously carried.

4) *Constitution*: Discussion of final changes to constitution. Motion by Zajac to approve constitution as modified. Second by Harvey. Carried unanimously.

Motion by Zajac to publish modified constitution in the May Newsletter for ratification by General Membership. Second by Lappin. Carried unanimously.

5) *Election and Constitution*: Discussion of Election and Constitution May Meeting.

6) *Old Business*: Tabled.

Motion by Harvey to adjourn. Second by Lappin. Unanimously carried.
 9:15pm - adjourned.

Desert Skies Classified

FOR SALE: 16" portable Ritchey-Cretien, F6, full thickness Norm Cole primary (1962), 6" secondary by Jor Appels of Tuc. Op. Res. Corp. (1985); 4" finder, tube assembly (90 lbs.) and Bigfoot mount (75 lbs.) by Pierre Schwaar. Total wt. w/counterweights and finder about 245 lbs. Good performer, fair price, \$6,000. Call Dick Crump at 750-9287 Tuesday or Wednesday evenings. (05-96)

FOR SALE: Brass Telescope Cheschire 5" (f5 with 3" guide scopewith 2 7" Byers drives on both axes. Brass Pier and legs, 2" and 1.25 star diagonal. Dual axes drive control and Baush and Lomb drive corrector. Kroy 80K editor (labeler) with 14 font disks. \$100 with tapes, sold for \$3000 in early 80's, makes nice permanent labels. HP 7550A graphics plotter/8pin \$300 for cad drawings on big paper. Canon NP-7550 Copier/50 copies per minute with 20 page collator/\$500. Contact Steve Petersen at 446-2731/pager or 326-5303/home. (07-96)

FOR SALE: 6" mirror made by Edmund Scientific, 30" focal length, & the diagonal that goes with it. It is glued to an 8" wooden disc, from which I tried to make a telescope, but my attempt was not very satisfying. Mirror and diagonal both for \$65. Call "Frosty" Gray at 296-9264 (07-96)

FOR SALE: Spitz Jr. Planetarium - \$40. Astroscope Planetarium - \$20. A 6" mirror f/3 no coating \$125. (for cassegrain) Call Gilbert 571-1662. (07-96)

FOR SALE: Well maintained Celestron C8 with wedge, tripod, five eyepieces (5, 9, 18, 25, and 40mm), 6x30 finder scope, solar filter, drive corrector, Barlow lens, plus additional accessories. \$499. Call Chris Lancaster at 750-9463 or stargzr626@aol.com. (07-96)

FOR SALE: 6" F.8 Newtonian telescope, (Meade, circa 1980) clock drive, setting circles, rotating tube, finder, 2 eyepieces. \$525. Call Dan Higgins COLLECT at (520) 824-3270 or see at May 11, TAAA Picnic. (08-96)

FOR SALE: Cannoni TX, 50 mm lens and 350 mm lens F 4.5 for \$220. Call Massoud Mortazavi at 326-0057 and leave message. (08-96)

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 Nancy or Nina at 579-1382 or email to ninalehman@aol.com or nlwagner@aol.com.