Desert Skies

Tucson Amateur Astronomy Association

Volume XLII, Number 6 June, 1996

Calendar of Events

BEGINNERS LECTURE- Friday, June 7, 6:30 pm at the Steward Observatory Auditorium - room N210. Topic is Special Relativity by Daniel McIntosh. All are welcome!

GENERAL MEETING - Friday, June 7, 7:30 pm at the Steward Observatory Auditorium -room N210. Topic is Member's Night.

YOUNG ASTRONOMERS CLUB -No club meetings planned for the Summer.

BOARD OF DIRECTOR'S MEETING - Thursday June 13, 7:00 pm at the Flandrau Science Center.

STAR PARTIES & EVENTS:
June 4: Tohono Chul
June 8: Empire Ranch Dark Sky Observing
June 8-15: Grand Canyon Star Party
June 15: Whipple Observatory Open House
June 19: Planetary society Star Party
June 22: Met Tucson Con & Visitor Bureau

Newsletter Schedule: Deadline for articles: Monday, June 17. Printing: Monday,June 24. Folding Party: Tuesday, June 23 at the Mirror Lab at 5 pm.. The newsletter is scheduled to be in the mail at least one week prior to the following month's General Meeting.

Cover: Eduardo Vega and Max Brey, with the 20-inch Maksutov telescope they designed, at the Vega-Brey observatory. The observatory hosted the annual TAAA Picnic on May 11, 1996. Members toured Ed's new bed & breakfast addition to the observatory, ate mass quantities of food, enjoyed good company and a nearly perfect night for observing. Many thanks to the Vegas for their hospitality!

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

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Membership in the TAAA

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

Sky & Telescope subscription (optional) $27.00. 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

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 $27 to your membership rate.
   b) Include Sky & Telescope's renewal notice, if possible.
3. Write one check, payable to TAAA.
4. Send it to: TAAA
   P.O. Box 41254
   Tucson, AZ 85717

Call the Treasurer if you have any problems.

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:

THIS ADDRESS IS ONLY FOR NEWSLETTER SUBMISSIONS!

TAAA - Desert Skies
PO Box 91316
Tucson, AZ 85752-1316

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

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President's Message

Thank you for electing me president for a second year. Most of the current board will also be returning. I welcome our two newest members to the board, Steve Kristmann and John Polacheck. I look forward to working with them and the rest of the board in the coming year. We are losing two productive board members. Bob Goff has served as a Member-at-Large since being elected into the position in May 1990. John Zajac, while serving as Member-at-Large for only one year, has been very instrumental in our constitution reform and our land search for the past several years. I thank both Bob and John for their helpful input over the years and I hope they will continue to be active in the TAAA.

Our Annual Potluck and Picnic was attended by several TAAA members. I want to thank Ed and Pat Vega for having us at the Vega-Bray Observatory and Skywatcher's Inn. A lot of food was available and lots of fun was had. Ed and Pat provided all the drinks and had lots of hamburgers and hot dogs for those who were hungry. The weather was pleasant being a little cooler than Tucson's 104 for the day. The sky stayed clear and the observing was good, especially the view of M51 through the 20" Maksutov. It was an unexpected pleasure to meet Tom Bopp, of Comet Hale-Bopp fame, who was invited by TAAA member Randy Quiroz.

I look forward to this month's meeting. It is member's night. It is always interesting to see the projects other members are involved in. If you didn't get a chance to show off your comet picture yet, here's your chance! I promise this meeting will be shorter than the last member's night which went until 11:30 or so.

This month there are a few star parties that need your support. The first one will be held at Tohono Chul Park. This has become an annual event at which Dean presents a lecture before the star party. This is a public star party, so we don't know how many people to expect, but the lecture is usually standing room only. If you can help out, contact Dean and let him know. There is a second public star party at Whipple Observatory and a sign up sheet will be at the June meeting. There are two other star parties this month which will benefit our Land and Telescope Fund. These are for the Planetary Society and the Metropolitan Tucson Convention and Visitor's Bureau. See announcements in the newsletter for both these events. We also have the Grand Canyon Star Party which should be a lot of fun! Wish I was going to that one. Then, finally, there is the Empire Ranch star party on the 8th. If you're wondering why all these star parties...well, usually we have a monsoon season which starts in July and puts an end to observing for a month or two. So, take this opportunity to get some observing in before the rains come...that is, if they come!

Clear Skies,
Terri *

Meeting News

Beginner's Lecture:

In 1905, Albert Einstein boldly postulated that the speed light travels is the SAME for ALL unaccelerated observers and is the posted speed limit of the universe. These statements are the foundation for the Theory of Special Relativity which predicts a variety of strange phenomena. To say "moving clocks run slow" or "moving lengths shrink" sounds like something out of your favorite Star Trek episode, but it's all true and more! Daniel McIntosh, a graduate student at the U of A, will discuss the basic concepts and consequences of Special Relativity, and will then review some of its most famous and important experimental validations (proofs!). *

Member's Night at June Meeting

Member's Night is a chance for member's to show us what they have been up to. Member's Nights have always proven to be the more interesting meetings because we never fully know what to expect. So far we have Dave Harvey, Jeff Brydges, John Polacheck and Ray Wallace lined up for 15 minute presentations. There are still about five slots open, so here's your chance to say a few words about your current project. Please contact either Terri or Larry to be added to the list.

You can use any of the AV equipment in the room for your presentation. The visualizer, using a CCD, images paper onto the screen. It is the easiest way to show photos if you do not use slide film. We also have a PC at our disposal if you wish to show off a program. Please make arrangements for using the PC a few days before the meeting as there are rules about using them. There is a VHS VCR which plays 2 hr/SP tapes. Please have the tape queued to the correct position before the meeting. There is also a slide projector available. Dave Harvey has always kindly run the AV equipment for us, so if there is a question about their use he can help. Other frequent presenters can also help with questions. *

Sky & Telescope Price Increase

The subscription price for Sky and Telescope is being increased to $27.00. Anyone who gets their renewal in to the treasurer not later than the next general meeting can still renew under the old price ($24.00). *

Club News

Omnibus Appropriations Bill

The Omnibus Appropriations Bill, containing the Mt. Graham rider offered by Congressman James Kolbe, was passed on Thursday, April 25, 1996 with a vote of 399-24 by the House and with a vote of 88-11 by the Senate. President Clinton signed it into law the following day. The Large Binocular Telescope project will now be taking the necessary formal legal steps to get the injunction lifted and proceed with further construction activities. Many thanks to all of our friends from TAAA who provided important political support in the form of letters, faxes, emails and telephone calls to help push this legislation through Congress. Due to the efficiency of the fire fighting crews and their efforts to save the existing telescopes from the recent fire, the trees immediately around the mostly cleared LBT site did not burn. Thus, we still have about 0.3 acres of trees to clear later this summer.

John Hill
LBT Director *

Special Interest Groups

Computers In Astronomy Subgroup

BY ROGER TANNER

Veikko Kanto and the Cookbook CCD camera at my house.

The 14th meeting of the subgroup was held at my backyard observatory on the SE side of town. Veikko gave a presentation on the
design and concepts in the Cookbook CCD camera to a group of about 8 members.

Veikko started by describing how he got involved with the CCD camera. He started by trying to design an autoguider for astrophotography. He started by using a type of ram chip with a window which would give digital images, one bit deep. then he read Christian Buil's book on CCD cameras and designed one with John Munger. This led to a camera based on the Texas Instruments TC-211, which is the chip used in the SBIG ST-4 and the LYNX PC CCD cameras. This camera was designed to have the minimum amount of circuitry and relied heavily on the computer to generate the timing signals and to process and display the final image. The camera used the parallel printer port to generate the clock signals to run the camera, and used the printer status lines to read the digitized image back into the computer. The camera was described in one of the last issues of Telescope Maker magazine. The camera was slightly modified and upgraded to also use a TC-245 chip and the user interface software was written by Richard Berry. The construction book, software and circuit boards are being sold by Willmann-Bell. The remainder or the parts are being sold by a variety of vendors, with most of the parts being available through University Optics.

Veikko described the operation of the camera and how a CCD imager works. He handed out a short paper that described the operation of CCD's. He described how a photon from a stellar object will pass into the silicon of the CCD and liberate a electron. After several photons strike a particular pixel on the chip, a clump of electrons or a charge is built up. The CCD then moves this charge bucket brigade style to one corner of the chip where it is amplified and a voltage proportional to the charge is developed at the output of the CCD. Veikko showed a neat basic program he wrote that graphically demonstrated the process of transferring the charge in a CCD pixel from one pixel to another as the voltage on the electrodes was raised and lowered. The output voltage is amplified by external circuitry and the voltage is measured with a analog to digital converter. The output of the converter is a digital word (12 bits or about 2 bytes) that represents the voltage and therefore the number of photons that struck that pixel. The bytes are sent back to the computer back the parallel port. All of this activity is controlled by the clock signals generated by the computer. The camera software was one of the more difficult parts of the design, as Veikko had to send fast clock signals out the parallel port with the 8088 and 286 PC's that were common in 1992. He gave out some copies of code snippets that demonstrated some of the code optimization that was needed to generate the signals to read out the CCD array. The assembly code program to generate the clocks was combined with a Quick Basic program that handles the user interface and viewing and storing the images.

Then he got out a TC-211 version of the Cookbook camera and hooked it up to my computer. He started the software and took images of people in the subgroup using a small lens on the front of the camera. He showed how he used a small six pack cooler that was filled with ice to cool the water that cooled the camera. He then demonstrated a Windows 95 imaging program that he wrote in Visual Basic. This was a handy program that can call up images and do basic image processing and display of Cookbook camera images. He described how he overcame one of the problems of displaying images in Visual Basic, as you cannot write an image from memory to the screen at any reasonable speed. He solved this problem by saving the image to disc in a common format like .BMP (windows bit mapped format) . Then he used a fast Visual Basic command to load a disc image to the screen. This would normally be slow except most Windows systems run a ram disk cache and the write and subsequent read all happen in a fraction of a second from the ram disc cache.

The meeting broke up into discussions between several members and Veikko. Some of the people viewed the Moon at 400 power through the 17" (with a neutral density filter to dim the image). Deep sky objects were not to good with the nearly full Moon in the sky although it was a fairly steady night. Then the meeting adjourned to the house and Terry Lappin served the cake she made. You could tell is was delicious by how rapidly it was vacuumed up by the crowd. The meeting concluded with some excellent slides of comet Hyakutake taken by James McGaha.

Tour of the Steward Observatory CCD lab with Mike Lesser.

The 15th meeting of the subgroup was held at the Steward Observatory CCD lab where the CCD's undergo extensive preparation for use in cameras and spectrographs used on the professional telescopes. About 10 members attended this meeting.

Mike started out the tour describing the various types of CCD's that they have worked with. Several types of older CCD arrays were displayed in a case in the hall of the lab. The earliest ones were 300 x 500 pixels and were modified video camera chips. The later ones were expressly made for scientific imaging. The largest array he was holding in his hand encased in a box, it was 7000 x 9000 12 micron pixels! The "chip" was 84 x 104 mm or about 3 x 4 inches! This is the largest single array in the world (at the moment). The other way to get larger chips is to mount individual chips close together and fill in the gaps with offset images. There was an 8000 x 8000 pixel chip in the display case that was made of 8 individual 1000 x 2000 chips. There was no circuitry on three sides of the individual chips and they were trimmed right up to the active areas giving an image with only a few pixel gaps. Since most telescopes can deliver good images over a much larger areas than current chips, there is a strong desire to make bigger chips to make better use of time on the scopes. The Kitt Peak 4 meter can cover about 16 " square, still much larger than available chips. The drawback to such large chips, besides the cost, is they take a long time to read out. The lowest noise readout rate is about 50,000 pixels per second, so for a chip with 64 million pixels this would take 21 minutes. The largest chips usually have multiple output ports but still take several minutes to read out.

From there we went into the testing room where a new CCD camera was being tested. The cameras are cooled by liquid nitrogen held in a vacuum insulated dewar. The output of the chip is fed to several boxes of amplifying electronics. The clocks to control the chip take another box of electronics, with the control circuitry for temperature and power supplies taking another sizable box. The size of the camera dewar was about the size of a C-8 telescope. The camera was in an optical bench that could send light of any wavelength and intensity into the camera to test the wavelength response and the readout noise level. The readout noise in a state of the art camera is usually expressed in terms of the number of electrons it is equivalent to, the best cameras being about 5 electrons with 6-7 being typical. With a quantum efficiency of 100 % a camera would generate one electron for every photon. This puts the read noise into perspective, that is about 5 photons of noise. This is a small value but, for very dim objects, that may be all that a large telescope can collect in a long exposure.

One of the processing steps is treat the surface of the chips with an ion implant that drives the charge away from the surface. Since the surface of a silicon chip has more defects in the crystal structure they create more thermal noise. By driving the charge away from the surface they lower the noise by several magnitudes. That combined with the liquid nitrogen cooling (-170 deg. C), gives such a low thermal noise that professionals don't often take dark frames any more, there just isn't any measurable thermal noise! Typical amateur cameras are cooled to -20 to -40 deg. C and have thermal noise rates of 1 to 100 electrons per minute of exposure.

The other measure of a CCD camera is the quantum efficiency which is the percentage of photons that strike a pixel that generate an electron. Typical amateur CCD cameras have quantum efficiencies closer to 40-60 % in the red dropping to 10% in the blue (or worse). In a typical amateur CCD camera the pixels are below the electrodes that control the charge in the pixels. The light must pass through the electrodes to get to the silicon to liberate an electron. This is called a front illuminated chip. By comparison film has a quantum efficiency of about 5%. The professional cameras have a quantum efficiency of above 95% from the near infrared to the near ultraviolet. The difference comes from back illuminating the chip and applying high efficiency wide band antireflection coatings. For the professional cameras, the chip is flipped over and epoxied face down to a set of conductive bumps on a silicon carrier. Then the body of the chip is etched away until a thin layer of silicon is left, just the part with the active circuitry. In this way the light doesn't have to pass through the electrodes, it enters right into the silicon. Mike showed us the room where they etch the chips and polish the top flat to within 5 microns. That extreme flatness is necessary for some of the very fast optical systems where the depth of filed is only a few microns. We also viewed the two vacuum coating systems that are used to apply the coatings.

The meeting ended up with a tour of the bonding and mounting lab where the chips are bonded and the chip carrier housings are wired to the chips. The other thing is they are building a cold testing rig to test chips while they are still in the wafer. Right now they test them in the wafer but they are at room temperature and some that test ok at room temperature are not good at liquid nitrogen temperatures. The cold testing rig will help sort out the bad chips before they spend the many man hours to prepare the chips for use.

The next meeting is in the process of being set up. It is a behind the scenes tour of the Flandrau Planetarium, where we will get a look at what it takes to give a typical planetarium show. The exact date and time is still being defined, so stay tuned. The Flandrau Planetarium is right across the street from Stewart Observatory. If you have any questions call me at home, 574-3876 or at work, 621-1218, or email at rtanner@gas.uug.arizona.edu. *

Dark Skies for June

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	- - -	Mo/Tu	10/11	21:11 - 2:22	Fr/Sa	21/22	23:13 - 3:37
Sa/Su	1/ 2	Full Moon	Tu/We	11/12	21:11 - 3:01	Sa/Su	22/23	23:46 - 3:38
			We/Th	12/13	21:12 - 3:37			
Su/Mo	2/ 3	- - -	Th/Fr	13/14	21:12 - 3:36	Su/Mo	23/24	0:20 - 3:38
Mo/Tu	3/ 4	21:06 - 21:26	Fr/Sa	14/15	21:12 - 3:36	Mo/Tu	24/25	0:55 - 3:38
Tu/We	4/ 5	21:07 - 22:19	Sa/Su	15/16	21:13 - 3:37	Tu/We	25/26	1:33 - 3:39
We/Th	5/ 6	21:08 - 23:06				We/Th	26/27	2:16 - 3:39
Th/Fr	6/ 7	21:08 - 23:49	Su/Mo	16/17	21:13 - 3:37	Th/Fr	27/28	3:03 - 3:40
Fr/Sa	7/ 8	21:09 - 0:29	Mo/Tu	17/18	21:14 - 3:37	Fr/Sa	28/29	- - -
Sa/Su	8/ 9	21:09 - 1:07	Tu/We	18/19	21:26 - 3:37	Sa/Su	29/30	- - -
			We/Th	19/20	22:04 - 3:37			
Su/Mo	9/10	21:10 - 1:44	Th/Fr	20/21	22:39 - 3:37	Su/Mo	30/ 1	Full Moon

Weekend Sa/Su	Sun Set	Sun Rise	Mercury Rise	Vi	Venus Set	Vi	Mars Rise	Vi	Jupiter Rise	Vi	Saturn Rise	Vi	Vi=Visibility
1/ 2	19:24	5:16	4:16	7	20:27	2	4:08	7	21:47	-2	1:59	1	-3 brilliant
8/ 9	19:28	5:15	4:03	5	Rise	-	3:57	6	21:17	-2	1:32	1	0 conspicuous
15/16	19:30	5:15	3:58	5	4:46	7	3:47	5	20:46	-2	1:06	1	3 moderate
22/23	19:32	5:17	4:05	5	4:10	1	3:37	5	20:16	-2	0:40	1	6 naked eye limit
29/30	19:33	5:19	4:25	6	3:40	-1	3:28	4	19:45	-2	0:13	1	9 binoculars limit

By Erich Karkoschka

Star Parties & Events

Tohono Chul Star Party
June 4

Dean Ketelsen is again rehearsing his Grand Canyon Star Party twilight talk for what is getting to be an annual lecture and star party at Tohono Chul. The lecture is at about 6:30 - set up before then if you want to attend the talk, otherwise, observing begins about 7:30. Call Dean for questions, 293-2855. *

Grand Canyon Star Party News
June 8 - 15

If you are attending this year's event, you should already have received your star party package from me including fee waivers and information regarding star party rules. If you have not heard from me, it means I don't know that you are coming! Please let me know if you plan to attend - it WILL be a great time.

Believe it or not, I still have 2 spots for free campsites on the second weekend, the 14th and 15th of June. While I am getting about one note per day from a new person who will attend, somehow these two spots go begging. Let me know if you want one. Rooms, of course, are not available unless you try to pick up a no-show when the motels release them at 4pm.

Don't forget the North Rim version, meeting for the first time this year. If any of you are attending the south rim with me and have a CB radio - bring it as Deloy, running the North Rim event, will have one and we can talk across the canyon.

For those of you who like to people watch, of course, the regular human zoo attracted to the Canyon can't be beat. If you want to see famous people, David Levy may make an appearance in mid-week, and John Dobson should be attending and helping out with the fabrication of a 10" scope for the local school at Grand Canyon.

There are some changes in Park rules and traffic, so make certain you tell me your attendance plans and get on the mailing list for the star party. This will be our 4th year of no clouds (knock on wood), the observing will be great, and we have a bunch of new friends coming, so come join us! Dean - 293-2855. *

Whipple Observatory Open House and Star Party
June 15

Smithsonian Institution's Fred Lawrence Whipple Observatory Offices near Amado, Arizona

The Whipple Observatory will present an Open House and Star Party on Saturday, June 15. The Observatory Visitors Center will open at noon. Observing will begin at 8 p.m. courtesy of telescopes provided by the Tucson Amateur Astronomy Association. Observatory staff and TAAA members will be on hand to answer questions.

On view: Venus, and later, Jupiter, Neptune and Uranus; double stars, star clusters, galaxies, a comet, and perhaps meteors.

Dress for cool evening temperatures. Small flashlights and binoculars are useful to bring.

After 6:30 p.m., please cooperate with staff directing parking when you arrive. The parking spaces nearest the building are reserved for TAAA members and their

telescopes. Visitors should park along the driveway or in the parking area outside the gate or along the road as directed.

For more information call 670-5707. In case of threatening weather, call 670-5707 after 3 p.m. on the 15th for information about star party cancellation. *

Planetary Society Star Party June 19

The TAAA has been asked to provide a couple telescopes for a meeting of the Planetary Society. Sixty people are expected to attend the dinner and star party. The event will be held near the Tortolito mountains, northwest of Tucson. A sign up sheet will be at the meeting. Since the site is not well marked, the meeting organizer has arranged to have an employee meet us at the southwest corner of Tangerine and 1st Street at 6:15pm. Our members will be escorted to the site. It is a couple miles from Tangerine and 1st and includes a half mile dirt road to reach. Dinner begins around 7pm. The star party will end by 9pm. This is a fund-raiser for the TAAA with the money received going to the Telescope and Land Fund. *

Metropolitan Tucson Convention and Visitor's Bureau Star Party June 22

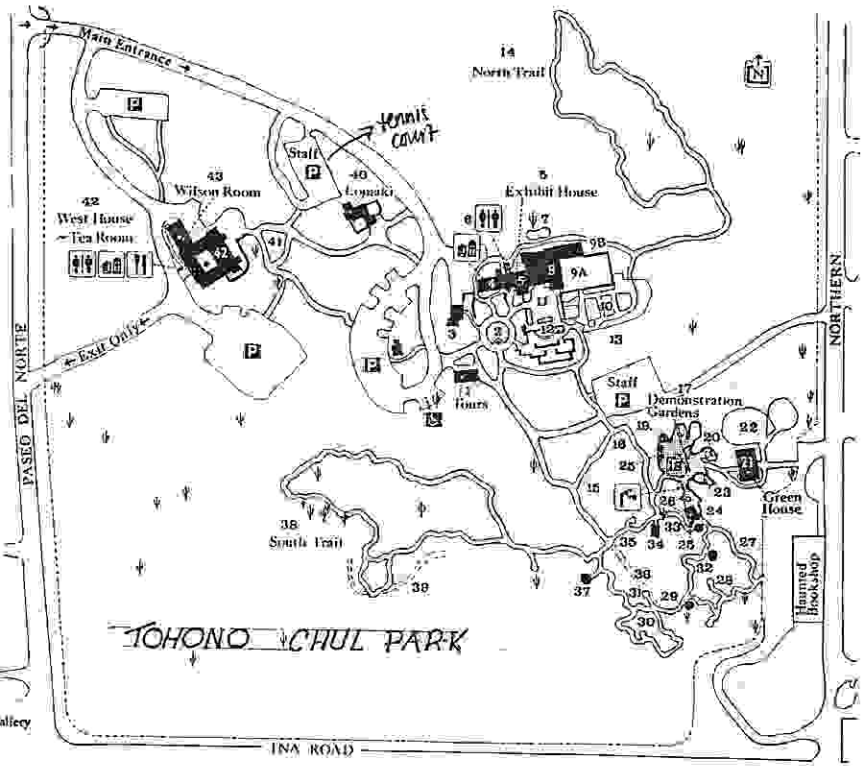
This star party will be held at the Tucson National Golf Resort which is located between La Cholla and Thornydale on Magee/Cortaro Farms Road. This is the annual meeting of the Metropolitan Tucson Convention and Visitor's Bureau and about 350 people are expected to attend. This is a formal event, so you are asked to dress appropriately (no T-shirts or jeans). We will be served a very nice dinner and have been asked to spread ourselves out among the tables so that there is one of us at each table. The "stars" are the theme of the dinner and we are tour guides for the evening. If for some reason you do not want dinner, please let Karen Allen know.

To cover a group this large, we need a few more telescopes than the 12 that have signed up so far. Telescopes must be set up by 6:30pm as this is part of our agreed arrangements with the visitors bureau. Since we will be setting up before sunset, those with solar filters can offer solar viewing to the guests. The star party will run from about 8pm to 9pm. The observing site, which overlooks the golf course, should be pretty good with a clear view of the southern horizon.

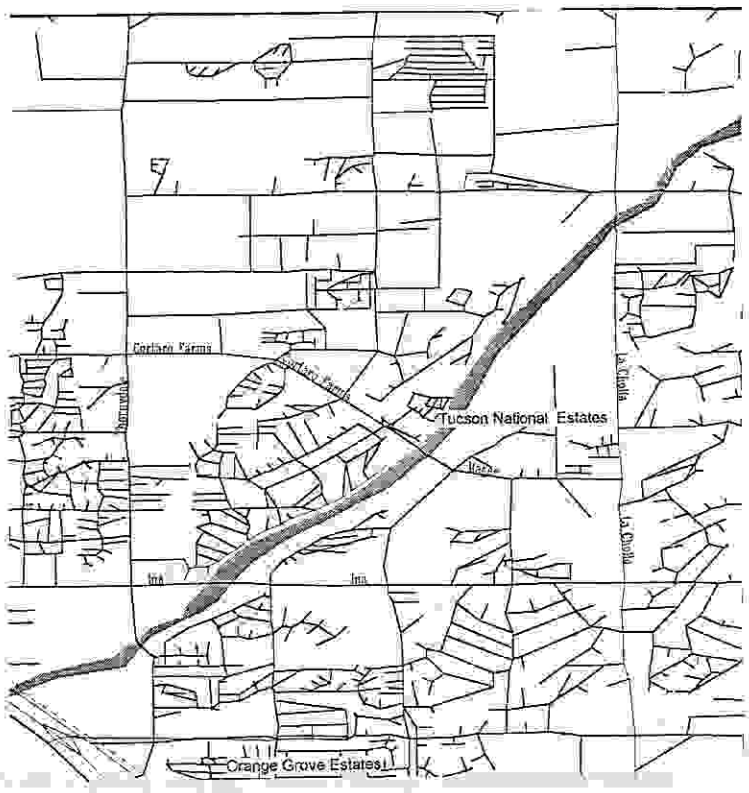
This is a fund-raiser for the TAAA in two ways. First, we will receive $500 which will go into our Telescope and Land Fund. Second, this is a meeting of local business people and we will be promoting our organization to both those interested in astronomy and to those coordinating conventions and looking for a unique experience for their customers.

Thanks to those already signed up: Paul Brown, Jeff Brydges, Terry Gilmartin, John Kalas, Dean Ketelsen, Kris Koenig, Terri Lappin, Duane Niehaus, Glenn Nishimoto, Craig Oliver, Randy Quiroz, Salvador Sandoval, Jim Wilmot. If are listed here and will be unable to attend this event, please let Karen Allen know. *

Maps



MTCVB Star Party

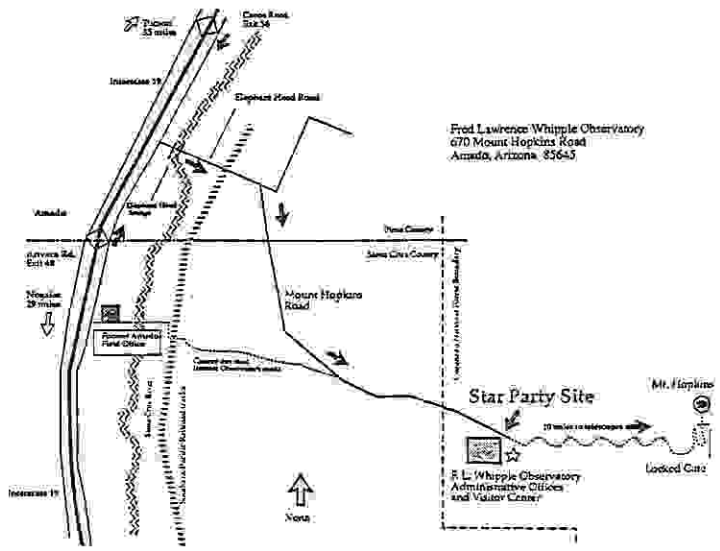


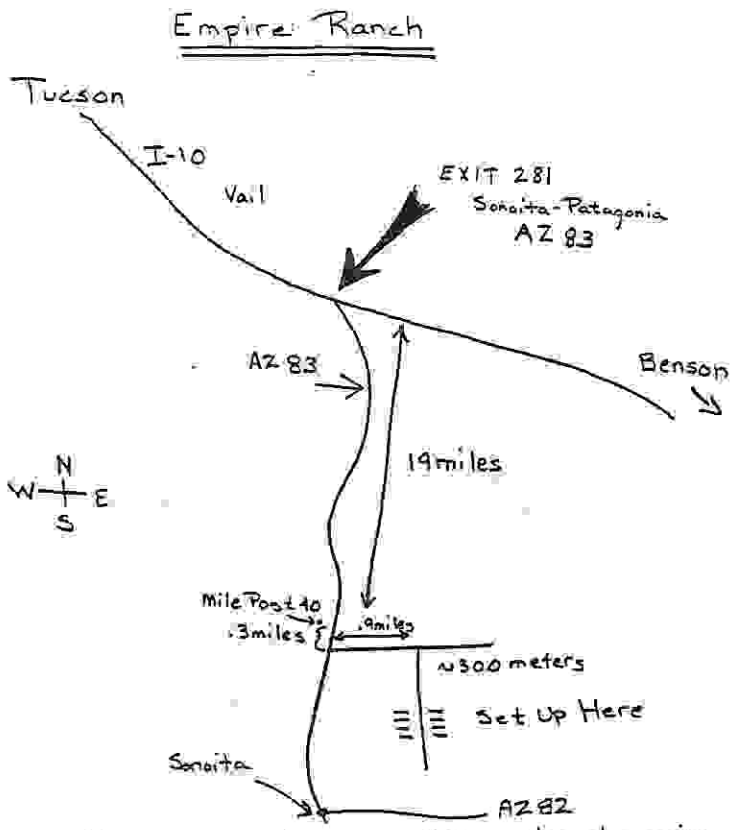
How To Find The Observatory Offices

The new administrative complex for the Fred Lawrence Whipple Observatory is 43 road miles south of Tucson and 38 road miles north of Nogales, Arizona.

From Tucson, drive south on Interstate 19 to exit 56 (Canoa). At the bottom of the exit ramp, turn left and drive under the freeway to the frontage road on the east side. Turn right and drive south three miles to Elephant Head Road. Turn left and drive east, crossing the Santa Cruz River on Elephant Head Bridge. One mile east of the river, turn right on Mount Hopkins Road. Drive southeast about seven miles to the Observatory Office (end of pavement)

From Nogales, drive north on Interstate 19 to exit 48 (Amado/Arivaca Junction). At the end of the exit ramp, turn right and then left onto the frontage road. Drive north for about two miles to Elephant Head Road. Turn right and drive east, crossing the Santa Cruz River on Elephant Head Bridge. One mile east of the river, turn right on Mount Hopkins Road. Drive southeast about seven miles to the Observatory Office (end of pavement).





Member's Forum

Is There a Case for the Amateur Cosmologist, Part II

BY JULIAN GRAJEWSKI

I remember attending a lecture by Fred Hoyle at McGill University in Montreal in 1976 and being surprised at seeing a multi-tiered auditorium packed with 2,000 or more rapt listeners. At that time black holes were an intriguing possibility, but 20 years later they have become a hoary idea made more tiresome by the insistence with which they are conjured to explain every anomaly. Twenty years of saying so has not made them so, and no black holes have been discovered. (I am skeptical of the claims for one in the galaxy M-87). It is not that meteroids do not smash into solar system bodies, galaxies never collide, or black holes cannot exist. Rather, such phenomena do not dominate the universe.

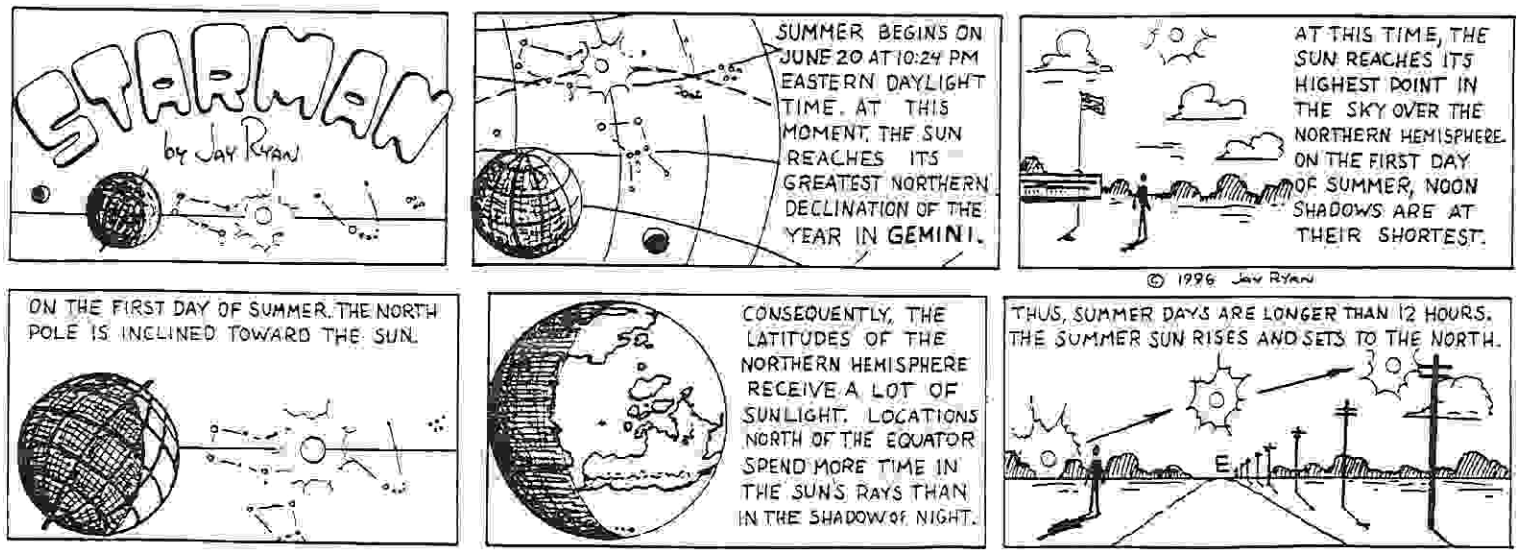
The notion of black holes, predicted by Einstein in relativity theory, a geometric theory, successor to Kepler's geometric approach, has been adopted by quantum cosmologists ("Quark! quark! quacks the quantum duck"), successors to Newton's mechanistic approach, giving an opening to irrational, ever more bizarre and mystical hypotheses (witness the May Astronomy cover story on "Multiverses") - the flip side of an empiricism carried to the extreme that it meets the other side of the coin in a revived eastern mysticism. But a philosopher worth his salt should note the lack of correspondence and even mutual exclusivity between general relativity and quantum mechanics.

Red shifts are assumed to be evidence for the expansion of the universe and the Big Bang. Except in a few significant cases, the data seems to support the belief that increasing velocities of galaxies, which shift their spectrum towards the red, indicate their greater distance. But we do have some non-conforming astronomers such as Halton Arp who stubbornly point out that objects such as NGC 4319 and the quasar Markarian 205 have divergent recessional velocities while seemingly connected by a bridge of matter. The Hubble telescope, with its superior resolution, could settle this question, but its time allocation committee has so far rejected proposals to study the objects. And what about the bewildering phenomenon of quantized red shifts?

Mr. Arp and before him, the Armenian astronomer Victor Ambartsumian (who was the first to discover stellar associations and posited a non-condensation hypothesis of stellar formation) has argued since 1958 that the nuclei of galaxies eject matter, what astronomers observe as quasars, out of which new galaxies are formed, part of his thesis that celestial bodies are formed by ejection and explosion, rather than through the gravitational condensation of diffuse matter, or the present favorite, collisions. If this is so, then we are faced with a spectacular, hitherto unknown physical process which has been hidden from us by pedestrian gravity explanations, and the non-recessional red shifts may be an indication of a more interesting and vital phenomenon than distance and universal expansion.

The comical search of extra-terrestrials intelligence, trumpeted by Carl Sagan to the point that millions of dollars have already been invested in radio telescope listening posts, could have been obviated by a little non-formalistic conceptualization grounded in basic knowledge of social processes: Understanding that the human species, sentient beings, have been developing in terms of population growth and energy and material consumption at an exponential rate since the invention of farming, our signals which have been propagating into intersetllar space for less than a hundred years, will not be received by an alien species because the rate of technological innovation is such that human beings will marshall their resources to develop superluminary travel and reach a putative alien intelligence ahead of their own signals, unless the aliens happen to be near by. Sentience being an universal, the process would be replicated among extra-terrestrial cultures, and Dr. Sagan's listening "saucer" in Argentina would much more likely one day have an alien spaceship-flying saucer parked next to it long before the radio dish would ever pick up its transmissions! Then intrepid astronomers could simply step out and shake hands with its crew without all that tedious mucking about in time and space! *

Starman



OMEGA CENTAURI

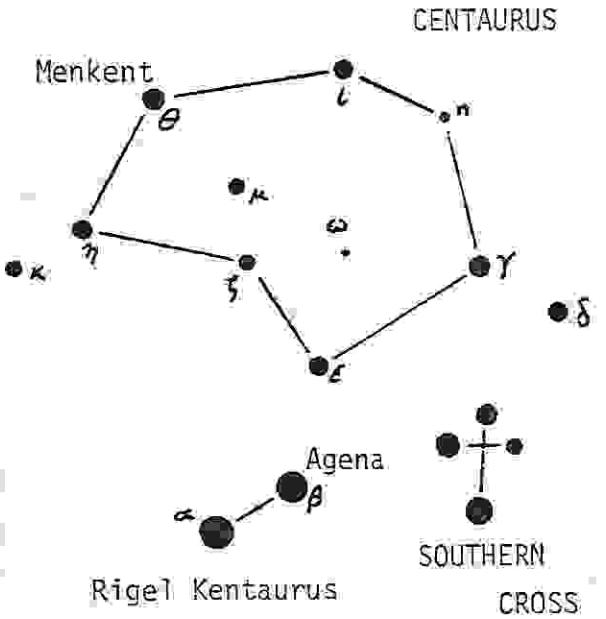
When I hear the name Omega Centauri I imagine myself lying on some tropical beach in the South Pacific with the Southern Cross passing high overhead and the Milky Way spanning toward the horizon.

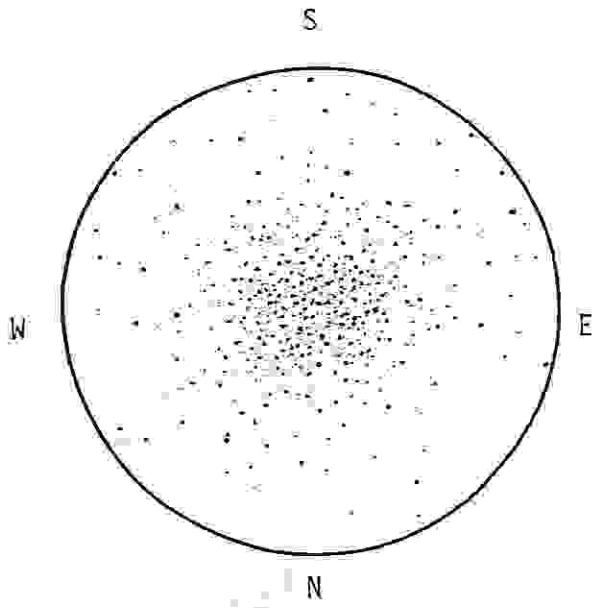
When ancient stargazers were cataloging the heavens they thought Omega Centauri was a faint star and assigned it the Greek alphabet letter Omega (ω). In fact Omega Centauri is not a star, but the brightest member of a group of objects that astronomers call "globular star clusters". Globular star clusters are huge spherical collections of stars possibly containing up to one million stars in the largest ones, such is the case with Omega Centauri. Omega Centauri's non-stellar identity was first noticed by Edmond Halley of comet fame in 1677, when he turned his telescope on it from the volcanic island of St Helena in the South Atlantic. To him it appeared as a fuzzy tailless comet-like object. Similarly today that's the best you can do with binoculars and small refractors. Omega Centauri lies outside the plane of our galaxy at a distance of about 16,000 light years. Omega Centauri's diameter extends to about 600 light years across if we consider all of its outlying stars. The dense central part we see with our amateur telescopes is about 100 light years across which corresponds to about half the size of the full moon. Omega Centauri has the luminosity and mass of one million suns. You can generally see Omega Centauri as a faint 4th magnitude star with your unaided eyes.

Now to find Omega Centauri first locate Spica (α Virginis) the bright 1st magnitude blue-white star high in the southern sky this month, then drop 36° straight south. It should appear in binoculars and finder telescopes as a little fuzzy ball of light in central Centaurus. Omega Centauri only rises 11° above the southern Arizona horizon. With my 3" refractor Omega Centauri is so big and bright that at 50x to 70x I can see some of its many individual stars spread across a circular haze - A grand View! In a 20" telescope Omega Centauri shines in all its glory with thousands of stellar points filling the entire telescopic field of view, and many of these have a golden yellow hue.

So this month take your telescope out to some dark location with an open view of the southern horizon and focus in on this fabulous stellar collection of giant suns.

By Jeff Brydges





A view of Omega Centauri with a 20" f/5 Dobsonian

TAAA Executive Committee Meeting - June 9, 1996

Attending: Dave Harvey, Teressa Lapin, John Kalas, Gary Rosenbaum, Dean Ketelsen, John Zajac

Other Topics:

Dean reminded the Board that newsletter folding will now be held at the Mirror lab - 5:00 pm.

Results of the recent election of Board of Directors and ratification of the new club constitution were as follows:

Total Votes Cast: 68

Teressa Lapin	President (63)
Larry Wilson	Vice President (63)
Gary Rosenbaum	Treasurer (64)
Dave Harvey	Secretary (67)
John Kalas	Member at Large (67)
Steve Kristman	Member at Large (65)
John Polacheck	Member at Large (63)

Note: Dean Ketelsen, Chuck Goldman, and Ed Blair withdrew from Member At Large candidacy after learning of that there were already a sufficient number of nominees.

Constitution: Ratified (62:6)

Events/Meetings: The following Star parties are scheduled for June:

June 4th	Tohono Chul Park
June 8-15	Grand Canyon Star Party
June 15	Smithsonian
June 19	Planetary Society (compensated - 60 people attending)
June 22	MTCVB (compensated - 350 people)

The following Meetings are scheduled for June:

June 7th General Meeting - Speaker: Members Night

June 7th Beginners Lecture - Speaker: Daniel McIntosh - "Relativity and the Speed of Light"

Treasurer's Report:

Total Current Cash Assets:	36,915.87
Total Fixed Assets:	$34,234.00
Total Assets:	$71,149.87

ALPO Meeting: TAAA will host an ALPO poster session on October 20.

Association Handbook: With the ratification of the new constitution an Association Handbook will be generated describing the duties and obligations of club Officers and members. The work is in progress.

Old Business:

Chief Observer: Selection of Chief Observer to be Gil Esquerdo who will most likely head up a pool of observers to carry out the duties of this position. Appointments to be forthcoming.

Photo Fund-raiser: John Kalas reported that total income to date was $1015.00 with $65.00 profit.

Motions: John Zajac moved that a written Annual Treasurer's Report should be submitted by the acting Treasurer to the Board of Directors at each September Board of Directors meeting. Motion carried unanimously.

John Zajac moved that meetings of the TAAA General Membership will be held the first Friday of every month at the Steward Observatory Lecture Hall Room N210 at 7:30 pm. Motion was carried: 3 for, 2 abstentions.

John Zajac moved that the ballots for general elections be held in club files for a period of one year for safe keeping. Motion was not carried 2 for, 1 against, 2 abstentions.

Dave Harvey moved to adjourn at 8:50 pm. Carried unanimously.

Desert Skies Classified

FOR SALE: Meade MTS-SN6 6" Schmidt-Newtonian reflector, 8X50 finder, aluminum stand, electric drive w/CCD capability. Portable and in mint condition - paid over $900 new, hoping to get $375. Moving to England and must sell! Barry O'Connor (520) 636-1397 (Chino, AZ). (07-96)

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

FOR SALE: Pump-up camping trailer $500. Call John Mulder at 745-2406. (09-96)

FOR SALE: Celestron SPC102 refractor. 102mm; F/9.8 with Super Polaris mount (with clock drive and Polaris alignment scope). Excellent condition, used very little. $1150. or best offer. Call Frank Cathell at (520) 825-5540 or e-mail fcathell@aol.com. (09-96)

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.