East Valley Astronomy Club

September Newsletter 1995

EVAC MEETING HIGHLIGHTS

The August Club Meeting began promptly at 7:30 PM as Don Wrigley asked new members and guests to introduce themselves. It was a full house with 55 people present which included at least one new member and two guests.

Camelback Inn Star Party

Don posted a sign-up sheet and gave details of this star party planned for Friday, Sep. 8th. It will be held from 6:00 PM to 12:00 AM on the roof of the Sunshine Ballroom—no big Dobsonians please! Only three telescopes are required but extra help answering questions, giving people breaks, etc. would be appreciated. Contact Don if you can help (982-2428).

Club Elections

It's almost been a year since the last elections. Nominations take place in October for publication before the actual elections in November. Any member in good standing is eligible. Although officers can serve two consecutive terms, Don and the Board of Directors would like the positions filled by different people next year. If you are interested in serving, please have a friend nominate you! The Officer positions are:

President
Vice-President
Secretary
Treasurer
Properties Director

In addition, the Club needs at least two at-large Directors. Most of our committees are run by these people so a larger number would be even better. If you want to learn more about the duties of each position, call the current Officer listed on the back of the newsletter.

Featured Presentation—Show and Tell

Frank Honer gave a detailed account with about 20 slides of a recent trip to the observatory on Mauna Kea (home of the twin Keck telescopes) in Hawaii. Although the visitors center is modest, Frank found the peak itself very accessible and the people quite friendly. The roads aren't well marked but they're in great shape (unless the weather is severe). If you go, plan to visit on the weekend closest to the New Moon—Frank reports the local astronomy club then sets up at the visitors center. Bring lots of warm clothes though—it gets cold all year!

Comet Hale-Bopp

Tom Polakis then gave the latest on what may become a spectacular comet, perhaps as bright as Jupiter! This included transparencies that detailed the actual orbit of Hale-Bopp. In addition, Bernie Sanden, who was at Vekol Road observing with Tom Bopp when the comet was sighted, gave a firsthand account of the discovery. Look for more details elsewhere in the newsletter.

Multi-media Presentation

Bill Dellinges stole the show with his "sound on slides" story of an observing session that took place 15 years ago at Fremont Peak in northern California. That's when Bill was part of the San Jose Astronomical Association (and looked a little younger!). Most notable were an observing companion named John Dobson and Bill's special breakdown of his telescope the next day.

UPCOMING CLUB EVENTS

Camelback VIP Star Party, Sep. 8, 6:00 PM
Camelback Inn, Phoenix

EVAC Club Meeting, Sep. 13, 7:30 PM
SCC, Physical Sci. Bldg, Room PS 172

Local Star Party, Sep. 16, Sunset 6:32 PM
Florence Junction Site

Deep Sky Star Party, Sep. 23, Sunset 6:21 PM
Vekol Road Site

Astronomical Artwork

Last up was Ken Spruell who displayed artwork by a good friend named Jenns Robertson. This artist started out painting fish but his work in the Air Force and a good break put him rapidly into celestial renditions. Ken showed several originals and numerous slides of Jenns' work. Everyone was impressed with them.

The treats afterwards provided by Sheri Cahn's Bakery were devoured in record time. Fortunately, the chips from Robert Kerwin and sodas from Don Wrigley lasted until everyone was ready to go home.

GUEST SPEAKER

This month's speaker is Dan Heim, physics instructor at Brophy Prep and director of the Phoenix Astronomical Society (PAS). The talk will be on atmospheric phenomena.

SIDEWALK ASTRONOMY STAR PARTY

After contacting the San Francisco Sidewalk Astronomers, Frank Kraljic learned the perfect gift for John Dobson's 80th birtday would be to throw a public star party in the tradition of the Sidewalk Astronomers and dedicated to John. This means setting up telescopes in a **very** public place like a shopping mall, library, or the Arizona Center for instance. Frank will organize this for the Saturday of September 30th if he can get support. The biggest hurdle is to select a site and get permission to throw the star party—please contact Frank ASAP if you have any ideas at 991-5105. Hopefully, he'll have good news on this at the Club meeting.

MEMBERSHIP LIST

Expect an updated EVAC membership list in the next newsletter. Check your address label and give any changes to Bill Smith (including phone numbers). **Important: If you do not want your name or number published, you must tell Bill!** If you use email and want that address included, fire off a note to him. You'll find his addresses on the back cover.

NOVA CAS 1995

from *Sky&Telescope* OnLine via Compuserve

A nova was discovered on August 24th by Japanese observer Minoru Yamamoto. It's in the constellation Cassiopeia, at RA 1h 5.1m; Dec +54° 2'. Nova Cas 1995 was magnitude 9.2 on discovery and it's brightened to 9.0 since then. Prediscovery images show that it was no brighter than magnitude 12.5 on Aug. 1.

A NIGHT OF DISCOVERY

by Bernie Sanden

The last two July dark-of-the-moons have been unexpectedly favorable for observers in Arizona. July 1994 brought us a beautifully clear New Moon weekend. Etched clearly in my memory are the Veil, North American, and Pelican Nebulae overhead at Dugas meadows with a OIII-filtered view through Gus Van Noy's Genesis refractor. This year, the monsoon didn't amount to much the entire month of July. Emerging from work Saturday July 22nd, it appeared we had a chance for a good observing night ahead.

Tom Polakis was out of town so I called Kevin Gill to see about his observing plans. I hoped he was considering the north high country, as the visions of last year were prompting me. But instead he said Vekol Valley was the place be so I whipped out a computerized observing list of objects to view that night. Among them were some globulars in the southern part of Sagittarius.

Arriving just after sunset, I found Kevin had already set up his 20˝ Obsession. Jim Stevens was ready and waiting with his 17.5˝ Newtonian Dob, and their friends Tom Bopp and Dick Jacobson were there as well. Tom currently does not own a telescope, but had spent a number of years involved in a club in Ohio that had a member owned scope which he apparently made good use of. Also, Bob Erdmann (who helped get me started with my first home-built scope) and George DeLange had come to partake of the sky and share a few stories. Bob brought his 16˝ Dobsonian "Cyclops II" (the now infamous Sentinel dust-devil magnet). Bill Calvert showed up with his 10˝ Newtonian as dusk was ending.

My observing efficiency sometimes suffers when Kevin is around. Between stories of the Winter Star Party "asphal-ite" meteorite (ask him) and Marfa-light hysteria (ask me), I hadn't gotten very far on my list by 11 PM. We did manage a couple of nice views through his 20˝ though. A nebula-filtered view of the Crescent Nebula in Cygnus (NGC 6888) was nothing short of astounding. The object is not a mere crescent but displays a complete ring, somewhat similar to the Helix Nebula if inclined about 30 degrees from edge on (and moved a few hundred light-years further away). The "crescent" results from a large portion of the arc being much brighter than the rest. We spent nearly a half-hour on that object alone.

Tom Bopp was observing the globular M70 in Jim's scope when I heard Tom ask if there was another globular near M70 (their conversation caught my attention since I planned to observe in that region shortly). Moments before, Jim had gone over to the atlas to determine the location of the next object to view while Tom (according to his own account) continued to

observe M70 and noticed a fuzzy object drifting plainly into the field of view. Jim replied to Tom that he didn't believe there were any other globulars close to M70, so they consulted the atlases. I wasn't paying much attention for the next few minutes until Tom got out a cellular phone and was attempting to contact Lowell Observatory's Brian Skiff. It was then I realized they felt this might be an undiscovered comet. I walked over to the assembling group and mentioned that Brian might still be in France. Kevin and I suggested contacting Brian Marsden instead. But my gut cautioned me, having been through this before. On separate occasions in the past I have mistaken Jupiter and Sirius as supernovae. I suspected a supernova in M49 not long ago. I viewed the object in Kevin's and Jim's scopes. It looked like a comet. Wispy with a condensed star-like nucleus under moderate power. But it was bright; probably greater than 11th magnitude. Comet d'Arrest was far to the east. Could it be Clark, or maybe a more recent comet we had not gotten word of? The night before had also been clear in Arizona; certainly if it were this bright last night and near the meridian at prime observing time someone would have reported it.

Kevin made a note of the coordinates off his telescope as I continued to view the object. I decided someone better draw the thing with relation to the background star field, maybe if only to convince myself of movement. I grabbed a scrap of paper and carefully drew the field stars and an "X" for the original position of the unidentified object. I didn't note the time but I believe it was probably around 11:45 PM. So guarded was my thinking that I refused to entertain Jim Stevens' contention thirty minutes later that he had detected movement. Kevin gave the coordinates to Tom who left the site just before 12:30 AM to send the appropriate telegram. I thought to myself it would be hard to pack up and leave a night of observing as good as this on the slim chance the object was undiscovered. Perhaps I would have felt differently had I seen it first.

I returned to my scope for routine observing and as the night progressed, wondered whether Tom Bopp had succeeded in sending the telegram. Meanwhile, we witnessed an awesome meteor to the W-NW about 50 degrees up. It was bright with perhaps a 20 degree trail and did something I'd never seen before. Just when it seemed it would break up like most bolides do, it gave one final, bright flash and dissipated. It reminded me of fireworks—the kind that are so bright they hurt your eyes—followed by a loud, delayed bang. In any event, if there was no comet discovery that night, then this was the celestial highlight I'd remember.

On nights just before new, I like to capture a view of the rising Moon through my telescope or binoculars before I quit for the night. The silhouette of cacti, mountains, or whatever foreground topography happens to be positioned between myself and the Moon often stamps one final serene image into my mental hard drive as I climb into the back of my station wagon and pass out. The Moon rose at 2:30 AM, but it took another 10 minutes to clear the distant hills. During that time (and almost forgetting to), I took one last look at the fuzzy mystery object in Sagittarius. It was then that it hit home...there was no doubt it had moved! My mind was now fully convinced and it "looked" more like a comet to me. I still couldn't fathom that it hadn't been discovered earlier, or that it might be a faint catalogued comet undergoing some kind of brightening, but it was certainly a comet in any case. I drew the object's new position relative to the field stars and announced to Kevin and Jim my latest findings. Jim said in effect "I told you so." I went back and studied it for a few more minutes, then wheeled the scope around to observe the rising Moon over the hills (a non-event this night due to nearby creosote bushes obscuring the view). The "one last serene image" stamped into my memory this night would be the comet in its new position. Yes, there was something deep-down suggesting that I might possibly know a secret only a handful of people on the planet knew about yet.

On Sunday afternoon I received a call from Kevin. "We got it" he stated with some enthusiasm. "It's called Hale-Bopp and Alan Hale in Cloudcroft, New Mexico saw it as well last night. The only thing left to determine is whether it's a previously discovered periodic. In case it's new, we'll be considered part of the discovery team so you need to write your version of the event and e-mail it to me." I was very happy, especially for Tom Bopp who I figured had to be thrilled. But caution kept my enthusiasm in check as I awaited further word. The next week was extremely busy at work and I still had not heard when I left for a family vacation the week after. When I returned to Phoenix I got word it was new and that it might be spectacular! I almost immediately started thinking of Kohoutek and Austin, but like everyone else that has been waiting so long for a good one, still hope for the best.

Am I envious that my name is not on it? Not at all! I never expected to make a mark discovering comets. I merely walked over and observed something Thomas Bopp had called to our attention. At the time I didn't know I was one of the fortunate few to see a new comet; maybe the fifth person on this planet to see it in 3,000 years. We gaze up at the wonders and see them come and go. Are we not wonders of creation ourselves? For that I am thankful. The lesson for me is simple—keep looking up and things will be revealed to you! Congratulations Tom Bopp and Alan Hale for doing just that.

Sky&Telescope has quoted several experts who feel Hale-Bopp could be the biggest comet since 1811, possibly reaching -2 magnitude in 1997 and displaying a huge tail as well! Keep your fingers crossed.

PLOTTING COMET HALE-BOPP ON YOUR PC

by Tom Polakis

One of the reasons to own a personal computer as an amateur astronomer is that it gives the user the ability to simulate astronomical events with a desktop planetarium program. With the impending arrival of what may be a great comet, now is the time to try out the comet tracking options on your computer.

The computer will need to know the comet's "Orbital Elements," a set of six numbers that describe the position of the comet in space at any time. These elements are a kind of "curve fit" that have been generated after acquiring enough measured positions to obtain a good arc. The International Astronomical Union (IAU) is in charge of calculating and publishing these elements on IAU Circular Cards (which are now published electronically as well). IAUC #6198, published on August 2, 1995, contains the orbital elements for Comet 1995 O1 (Hale-Bopp) that will remain sufficiently accurate for amateur use for years to come. Your planetarium program may not use this nomenclature; explanations follow.

Perihelion Date = 1997 April 1.392
q = 0.9167
E = 0.996348
SOMEGA = 130.4405
LOMEGA = 282.4733
I = 88.8797

Perihelion Date—This should be self-explanatory. In Voyager II, it is simply referred to as "Date."

q—This is the perihelion distance, in Astronomical Units (AU). Note that this comet only comes slightly closer to the Sun than the Earth does.

E—This term describes the eccentricity of the orbit, or how "oval" it is. Comet Hale-Bopp has a parabolic orbit. Its eccentricity is nearly 1.0.

SOMEGA—The longitude of perihelion is a bit harder to visualize. It is the ecliptic longitude of the perihelion point, in degrees. In the last three elements, the ecliptic is used as a datum plane.

LOMEGA—The longitude of the ascending node describes the ecliptic longitude, in degrees, of the point at which the comet crosses the ecliptic on it's way "up" through the plane.

I—This is simply the inclination to the ecliptic plane, also in degrees. Comet Hale-Bopp's orbit is nearly perpendicular, quite unlike any of the nine planets.

If your program asks for "Mean Anomoly," just set this term to 0.0, as it has this value at the perihelion date. Be sure that you are working in Epoch 2000.0 coordinates. Also, you should include all of those decimal places for accuracy. After entering the elements, it is wise to make a couple positional checks (I never seem to get all those numbers right on the first try). Here are positions for two dates, at 0h UT. If your computer plots these positions correctly, you're on your way!

9/1/95	18h 21.55m	-30° 41.7′
4/1/97	01h 44.85m	+44° 43.0′

KITT PEAK TOUR '95

by Sam Herchak

In spite of the map I published with the wrong corner as the meeting point, Tom Polakis had all the members in place and on time (even Don). Everyone but the bus driver that is! Through no fault of Tom, the bus was over an hour late. This required major modifications to the agenda and Tom did a great job of turning a disastrous start into a perfect tour. You'll read at the end how he also turned it into a good deal as well.

After picking up Dean Ketelsen at the University of Arizona, we began the trek up to Kitt Peak. Dean was formerly a technician at the Peak and is still intimately familiar with the facilities. We began the tour at the 36″ (0.9m) Spacewatch telescope built in 1920 and first located at the U of A campus. Its massive steel tube, Newtonian focus and classic setting circles showed its age but the research being done is very up-to-date. This telescope is dedicated to finding close encounters with asteroids and has been very successful in this endeavor. Last year, it found a house-size boulder that came within 80,000 miles of Earth (the Moon is 3 times farther). It routinely picks up more distant asteroids and comets as well. TIDBIT: The Spacewatch telescope does not track during CCD exposures. A computer processes the star trails and creates a normal image where stars are points and moving objects appear as streaks.

Next up was the huge structure that houses the 4m Mayall telescope. This scope is built high atop a concrete pedestal and has a moving mass of over 200 tons! It looks like a "smaller" Hale telescope (at Mt. Palomar) except the declination bearings are mounted on the huge "horseshoe" that makes up the north equatorial bearing. TIDBIT: The mirror has a turned-edge and is masked down to 3.8m.

Before heading down the hill, the tour took in the McMath Solar telescope. The new 3.5m WIYN telescope was not available but Dean told us all about it. TIDBIT: Although almost as big as the Mayall telescope, the WIYN's moving mass is only 20 tons.

By late afternoon we headed back to the U of A and Dean's current work place, the Steward Observatory Mirror Lab. For most of us, this was the best part of the tour! The Lab is capable of spin-casting single,

lightweight, 8.4m mirrors! By spinning the blank during casting, a rough parabolic curve is molded into the blank. We were able to make hands-on inspections of the two 6.5m mirrors currently being worked. One was vertical in the "wash rack" where its massive size was most apparent. Aluminum silicate molds that create the hollow honeycomb structure inside the blanks are trapped during the casting process. They are removed by a high pressure water wash. The other blank was in the polishing phase. A computer controls the polishing tool which is a 2" thick aluminum plate with actuators on the backside. This plate is deformed to the proper curve as it passes over various regions of the mirror by the computer and the actuators. TIDBIT: These mirrors are fast—f/1.25! The sagitta (depth of the parabolic curve) is over 12 inches! Final polishing and figuring are still done with rouge. One of these 6.5m mirrors will replace the six 2.1m mirrors that make up the Multiple Mirror Telescope (MMT) on Mt. Hopkins (south of Tucson). A future Spacewatch telescope will use one of the old 2.1m mirrors.

The tour was a complete success! Many thanks to Dean Ketelsen who spent his entire day off with us, and Tom Polakis who put in countless hours organizing the trip, even after it was over. Tom documented a complaint about the late bus and negotiated a 50% discount on our next tour! Those members who took this Kitt Peak Tour will have first shot at the next tour (possibly Lowell Observatory) at a discount. Watch for details.

COMET BRADFIELD

from *Sky&Telescope* OnLine via Compuserve

Although the newest comet (designated 1995 Q1), is gradually climbing in declination, William Bradfield's 17th comet discovery remains only visible in the evening skies of the Southern Hemisphere. From midnorthern latitudes, the 5.5 magnitude comet rises with the Sun in the morning.

Comet Bradfield's orbit indicates that the comet will reach perihelion on August 31st and continue to move closer to the Sun in angular elongation through September 10th, making it temporarily unobservable from either the Southern or Northern Hemisphere. Then it should slowly emerge into the morning sky for observers in midnorthern latitudes. It won't become visible in truly dark skies (that is, just before dawn) until early October as it moves from Leo toward Ursa Major. By then it will probably have faded to about 8th magnitude, but it could still be an interesting sight in binoculars or a small telescope if it still has its tail.

THE UNKNOWN PLANETARIUM

by Bill Dellinges

You may have read recently of plans to build a planetarium in downtown Phoenix, but did you know there's an existing one on the campus of Arizona State? It's not highly advertised, difficult to locate, but it's there! The facility is a small 50 seat affair on the third floor of the Bateman Physical Science Building, room B-350. This is the building on the south side of University Avenue where the conspicuous crosswalk bridge arches overhead. Good luck trying to find room B-350. It would be easier finding your way into Los Alamos in 1945. Best to ask for help along the way as we did. There's supposed to be free parking on the northeast corner of University and College streets, but the attendant knew nothing of this but we parked on College with no problem. I think the deal is the lot is available after 7:00 PM for free parking (we were there before 7:00). Shows for the public are offered on Tuesday and Wednesday at 7:00 PM. Admission is $2.00. After the show, stargazing sessions are held on the roof utilizing two 8" Schmidt-Cassegrains and a 6" Newtonian telescope. An adjacent building has an observatory with a Celestron 14 that will soon be replaced with a custom made 16" computerized scope costing $27,000. Lecturer Dan Matlaga reminded me of Star Hustler Jack Horkheimer in his presentation and also ran the rooftop session. All in all, it was a pretty good show. Certainly worth $2.00! Call 965-4704 for more information.

CANADIAN FIREBALL

forwarded by Frank Honer from the Internet

A bright fireball was widely viewed throughout southern Ontario and northern US at 00:38 EDT on Friday morning August 25th. It was seen by hundreds or thousands of people. The many fireball reports make it very clear that it ended up south of Ontario, either over Lake Ontario or Lake Erie probably. The path was predominantly north to south, with some slight west to east component. The fire in the mobile home (just outside Windsor, Ontario) started at about the time of the fireball, and someone claimed that it was related. Not only has there never been a well substantiated case of a meteorite igniting a building (they cool pretty rapidly because it is only the outer crust a few mm thick which gets heated), but this is confirmed now that we have more reports of the fireball orientation. There are unsubstantiated reports that the rumours started by firemen joking that it was probably the meteor that started the fire. The fireball was caught by a MuchMusic CITY TV crew from Toronto. R.L. Hawkes (rhawkes@mta.ca).

VERY AMATEUR RADIO ASTRONOMY

by Mike Sargeant

"Hey neighbor, your antenna blew down!" Ralph next door had caught me as I pulled into the drive. "Thanks Ralph, but actually I built it that way." My yagi antenna next to his back patio was tilted straight up. "You pulling in satellite signals with that thing?" Do I just say yes and hope he doesn't pursue it or do I opt for the truth? "Nope, signals from space," I confessed. Damn, he's getting that look again—I remembered how I explained the electric car I built in the front drive. "Radio astronomy, Ralph." He looked relieved and started for his garage. "Signals from objects in space, like astronomy except with radio signals." "Oh, okay." The garage door closed. He already thinks I'm a fruitcake; no harm done.

I'd cleared out the shed by the fence in December '94 and moved in a radio receiver and computer, and stuck an FM antenna on a 2x4 nearby. I'd been reading how most of the stuff we look at in space was sending signals on many frequencies that my C8 wasn't getting. Since I was interested in electronics and computers and astronomy, it seemed a neat way to put it all together. I had this vision of myself in a dark room before a screen with squiggles all over it, nodding knowingly as I communed with Cassiopeia-A or Virgo-A. But then I've had clouded vision before.

The wife needed a slow-rotating platform for her Christmas skating pond display. I suggested an old AM/FM/phono stereo receiver combo with 16 rpm capability. She found one at a thrift shop and after I removed and wired the turntable for the display, I got the good part, a genuine surplus high power space signal receiver, $9.95 plus tax.

"Can you get Mars on that thing?" Not knowing if she was serious or not, I played it straight. "Mars does not broadcast on the frequencies I'm designing for." She went back to her Christmas display. I'd been running out to the shed every few minutes, taking readings from a voltmeter connected to one channel of the stereo tuned to 110 MHz. The other channel was gushing classic static on an old Pioneer rear deck car speaker. I wanted to know if I was communing with the spheres or someone's Bronco before I connected with the computer. By the end of the day I had plotted a curve that looked like a Bronco. Convincing myself that I was looking at the sweep of the galactic plane across my high-tech antenna ($28.24 with lead-in at Radio Shack), I made the big decision—let the computer in the shed take the readings.

Microsoft QuickBasic has a neat way of letting the universe commune with the computer, through the joystick port. Sooo... a quick light bulb across one receiver output channel (the Pioneer still croons "Moonlight Over Monoceros" on the other) and a cad sulfide cell in place of one joystick potentiometer and... direct deposit of signal strength values onto floppy. Actually, to get this working took two weeks; to get it working right, two months.

I don't spend much time at the monitor. Random static plots are about as uninspiring as the underside of clouds. I asked the computer if it wouldn't mind making sense out of all of this by taking several hundred reading every 179 seconds, plotting a point on screen and doing this 484 times to come within 1/4 second of 1 sidereal day (while saving the average reading, the local time and the sidereal time to file, then doing it over and over until I told it to stop). It said it would be happy to comply if I told it how, which took me a week or so to do incorrectly. I really could use a computer that does what I mean, not what I say. The end result was that by May I was up to my asteroids in data as the computer hadn't heard from me and was determined to see how quickly it could present me with a "Disk Full" message.

The purpose of all this sidereal time stuff is to distinguish between extraterrestrial and terrestrial signal sources. By rotating the antenna through the source signals on my "Earth Driven 2x4 Mount" and accounting for the rotation of the Earth around the Sun, if similar signal changes come up at the same sidereal time over many days, it's ET calling.

Continuous changes called "frequencies" are observed by radio and visual astronomers. The eye is a receiver of a certain narrow band of frequencies having a wavelength of 0.00004 cm to 0.00008 cm (375,000 - 750,000 GHz). A cosmic radio source generally emits power simultaneously on all frequencies within a very broad band. To avoid manmade signals we tune to quiet spots in the Earth originating frequencies. Because old AM/FM stereo receivers are cheap, powerful, and tune to a quiet spot, they make good first choices.

In radio astronomy, we measure the magnetic wave energy (energy per second) received by the antenna and relate that to the intensity of the wave (the power passing through one square meter of an imaginary surface lying perpendicular to the direction the wave is traveling). The intensity is proportional to the frequency bandwidth, the range of frequencies or wavelengths emitted by the source (or accepted by the telescope), whichever is smaller. Thus the power accepted by an antenna is given by $P = S \times A \times B$ where S is the flux density of the wave in watts per square meter, A is the effective collecting area of the antenna in square meters, and B is the bandwidth of the receiver in Hz. My system detects random audio range variations (static) in any of several 110 MHz carrier waves it happens to be receiving at the moment but that is not the object of the project. Rather, the system is measuring the average signal strength (noise level of

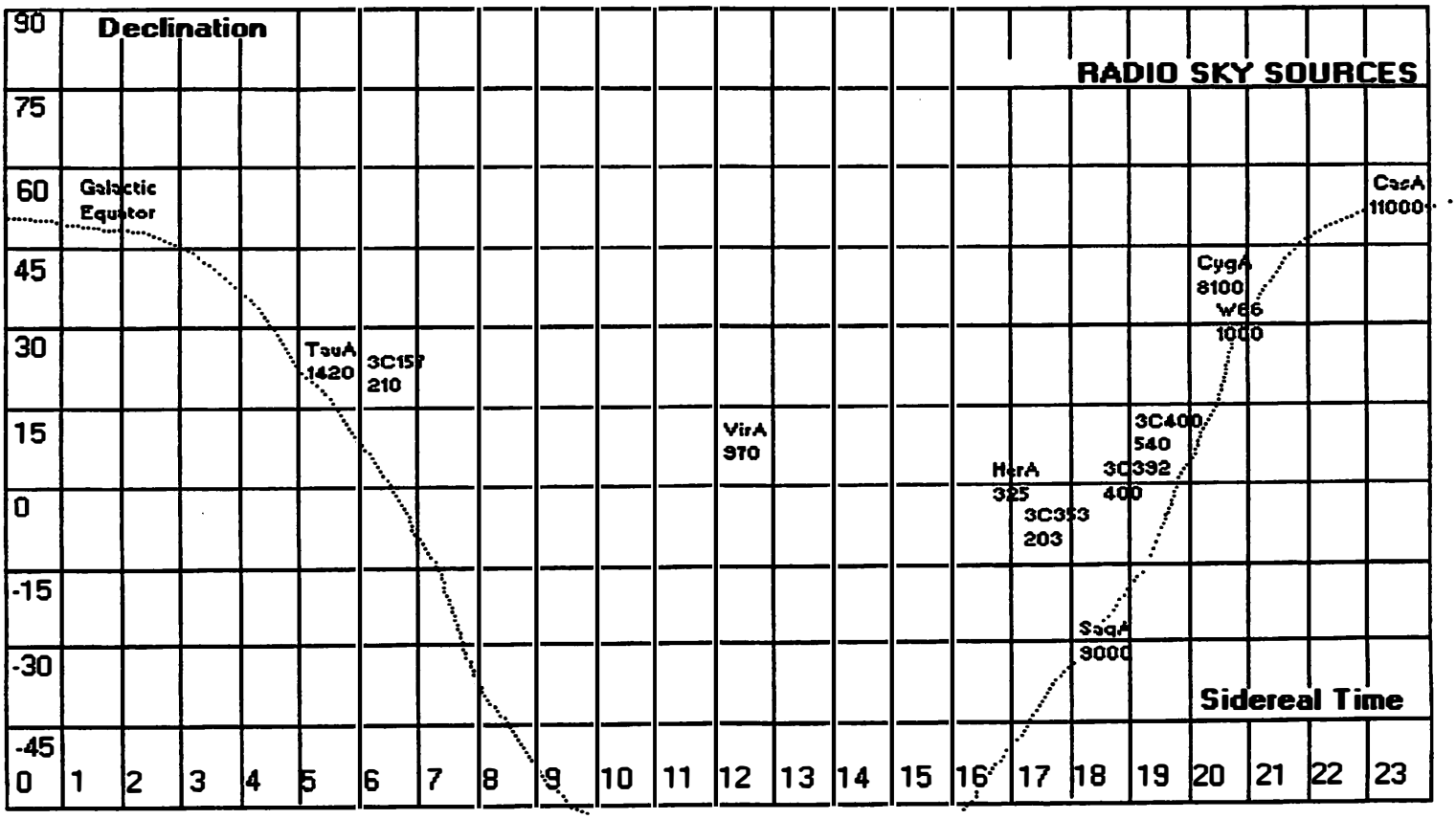
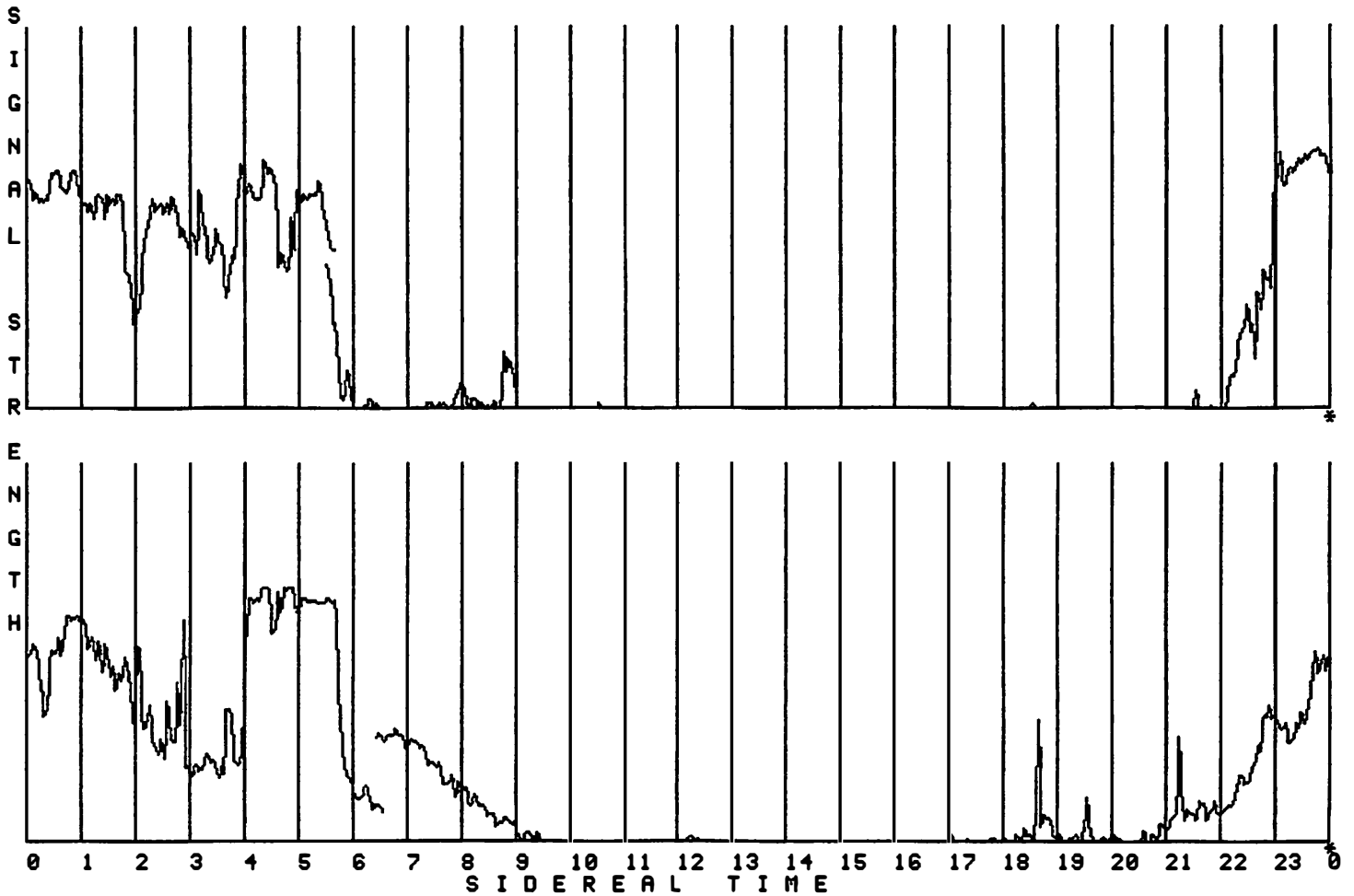


CHART COMPARISON : * = solar noon
Chart number: 5085J110 Declination: 35
Chart number: 5086J110 Declination: 35

GE
GE

GE/W66/CygA
GE/W66/CygA



the static) of the 110 MHz carriers it receiving to indicate point sources. It does not matter that the receiver is capable of FM detection; it would serve its purpose as well if the circuitry was capable of AM detection.

The radio astronomy frequency spectrum extends from 18 MHz to 30 GHz. Below 18 MHz there is little thermal radiation to detect while the Earth's atmosphere is opaque to frequencies above 30 GHz. This spectrum is used for many commercial purposes except the bands from 73 to 74.6 MHz and 136 to 137 MHz which are reserved for radio astronomy use. TV channels 4 and 5 work each side of the 73 to 74.6 MHz band so professional astronomers stay in the middle of this band (73.8 MHz) using a bandwidth of 250 kHz. They also go out of town a lot to get away from earth-based radio interference. The AM/FM receiver cannot tune to the 136 to 137 MHz band reserved for radio astronomy use. However it can tune to the region above 108 MHz, the end of the FM broadcast band and the beginning of the aviation band, which is fairly quiet. Around 109 MHz to 110 MHz, ET signals can be monitored relatively free of manmade interference.

Even a low sensitivity system such as mine can detect several 110 MHz sources. The most prevalent source is the Milky Way galaxy. As the antenna is pointed at the galactic equator by the Earth's rotation, signal strength increases from the combined output of millions of small sources and remains fairly stable for many hours. Closely aligned with the plane are individual and detectable sources known as Taurus-A, Sagittarius-A, Cygnus-A and W66 to name the most powerful. The spikes from these sources can be detected over the general galactic clutter. Outside the plane is Virgo-A at about 12 hours right ascension and +15 degrees declination. This is an individual source whose characteristics are relatively free of galactic source interference. Antenna resolution is between 7 and 15 degrees (30 to 60 minutes recording time) so point sources tend to be detected for an extended period and variations during that time are recorded.

At other frequencies there are very interesting events to be monitored. The Sun can be observed at 18 MHz (16.7meters for ham radio operators) and 80 MHz (3.75m). Solar flares are most intense in the 137 MHz (2.2m) region. Jupiter can be observed at 18 - 30 MHz. The Crab Nebula can be observed at 30 MHz. Pulsars radiate in the 100 to 1000 MHz band. Such observations are complicated by the need for receivers designed for such frequencies and large antennas on tracking mounts to observe variations over extended periods of several hours.

In our Club library, I've deposited further technical information and photos of my original radio telescope setup for your use. Please feel free to contact me at (602) 839-3209 in Tempe if you have further questions.

EVAC BOD MEETING MINUTES
August 9, 1995

The Board meeting was held at the Scottsdale Community College and began at 6:50 PM. Four Club Officers and four additional Board members were present. The following items were discussed:

MINUTES FROM LAST MEETING:
- Minutes from the April 8, 1995 were read.

TREASURER'S REPORT:
- Sheri Cahn announced the Club currently has 106 members, 35 who are new this year. The Club began this year with a positive balance which has grown through dues and donations. An additional donation of $450.00 is anticipated from the Camelback Inn Star Party.

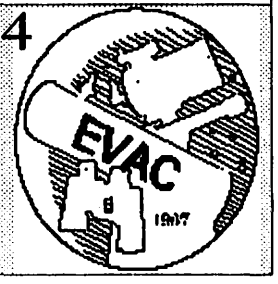
OLD BUSINESS:
- Club Incorporation—Information from Bob Kelley is that the Club is incorporated at this point and documents to that effect will be forthcoming.
- All AZ Star Party Site—A new site is still being sought. One possible solution is land owned by an Arizona City farmer who volunteered it's use. A trip to evaluate this site was agreed necessary in the next few weeks.
- Upcoming Kitt Peak Tour—It was agreed Tom Polakis would disperse the extra funds collected for the tour to Kitt Peak National Observatory, Dean Ketelsen, and the bus driver in appreciation of their services.
- Camelback Inn Star Party—details for the September 9th event were given by Don Wrigley. It requires at least three telescopes for a period between 7-12:00 PM.

NEW BUSINESS:
- Membership List—An updated membership list will be published in October after members have an opportunity to change any information or ask to have it withheld.
- Elections—Interest and ideas about the upcoming Club elections were exchanged. Although several officers were willing to continue for another year, it is hopeful that enough interest exists among Club members that each officer position will be filled by a different person.
- Adopt-A-Highway—Sam Herchak will pursue the Club adopting a stretch of road near the Florence Junction Site for cleanup. In return, the State would erect their Adopt-A-Highway sign with the Club's name on it. Details at the next Club meeting.

CLOSE: Meeting adjourned at 7:20 PM. The August Club meeting followed at 7:30.

East Valley Astronomy Club

October1995

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1 ◐ *Moonset next day *ALL MONTH NOTES *5:03 AM Titan reappears	2 *Moonset 12:10 AM	3 *Moonset 1:13 AM	4 *Moonset 2:17 AM *6:00 PM Mercury at Infer. Conjunction	5	6 *7:30 PM SAC Mtg	7 *3:10 AM Occ
8 ○	9 *1:29 AM Titan's shadow Sunset 6:00 PM	10 Sunrise 6:26 AM	11 7:30 PM EVAC Mtg	12 *2:31 AM Occ *9:38 PM Feronia Occ	13 *Moonrise 9:34 PM	14 *Moonrise 10:23 PM *4:26 AM Occ
15 *Moonrise 11:14 PM	16 ◑ *Moonrise next day *5:38 AM Io Occ	17 *Moonrise 12:09 AM *4:17 AM Titan reappears	18 *Moonrise 1:03 AM	19 *Moonrise 1:59 AM	20 *Moonrise 2:56 AM *4:57 AM Occ *7:00 AM Mercury at Elong	21 All AZ S Party *Moonrise 3:55 AM
22 *5:00 AM Orionid Meteors	23 ● Sunset 5:43 PM	24 Sunrise 6:37AM	25 *12:40 AM Titan's shadow *1:26 AM Rhea reappears *6:05 PM Moon Conjunction	26	27 *Moonset 8:58 PM	28 Local S Party *Moonset 10:00 PM *8:04 & 8:09 PM Occ
29 *Moonset 11:04 PM *Daylight Save Time ends	30 ◐ *Moonset next day	31 *Moonset 12:10 AM	1	2	3	4 

All Times are LOCAL - add 7 hrs for Universal Time

Flip over for event details

Date	Start	Title	Description
10/1/95	12:00 AM	ALL MONTH NOTES	CALENDAR NOTES: For Lunar Occultation details (Occ), see the "1995 Occultation Predictions for Phoenix" in the Feb EVAC Newsletter. PLANETS: MERCURY reaches Inferior Conjunction with the Sun and Greatest Western Elongation all in one month! Look for it low in the East before sunrise. Last half of month will be best chance to spot this elusive planet. VENUS barely makes it into the evening sky. Look low in the West right after sunset. MARS is not far away from Venus, setting within 2 hours of sunset. JUPITER sinks lower in the SW in the evening sky. Sets around 8:30 PM. SATURN is well placed all night but rings are still "thin." Numerous events of Saturn's satellites. See ASTRONOMY (ASTRO) or SKY&TELESCOPE (S&T) magazines for details. URANUS and NEPTUNE in evening sky, setting about 11:30 PM. PLUTO still in evening sky but sinking lower in SW. Sets by 8:30 PM. Although a challenge, it is possible to spot all the planets during one night this month. Late in the month is better–maybe at the All Arizona Star Party? OBJECTS OF INTEREST:Comets Hale-Bopp (S&T) and d'Arrest (ASTRO), Asteroid Hebe (ASTRO), and Zodical Light/Gegenschein in AM hours. ASTRONOMICAL TWILIGHT TIMES: 2nd 7:32 PM and 4:57 AM 23rd 7:06 PM and 5:12 AM LUNAR LIBRATIONS: Excellent southern libration during first week and month's end. Excellent northern libration near mid month. Maximum eastern exposure on the 21st. Penumbral lunar eclipse on the 8th takes place after sunrise and is a non-event.
10/1/95	5:03 AM	5:03 AM Titan reappears	The Solar System's second largest satellite, Titan reappears from Saturn's shadow. See magazines for details and other events.
10/6/95	7:30 PM	7:30 PM SAC Mtg	Saguaro Astronomy Club meeting, Grand Canyon University, Fleming Bldg, Rm 105. Camelback and 33rd Ave.
10/12/95	9:38 PM	9:38 PM Feronia Occ	Asteroid 72 Feronia occults star SAO 128175. See Oct S&T.
10/16/95	5:38 AM	5:38 AM Io Occ	Asteroid 85 Io occults star PPM 119705. See Oct S&T.
10/20/95	7:00 AM	7:00 AM Mercury at Elong	Mercury at greatest western elongation. Visible low in East before sunrise last two weeks of month.
10/22/95	5:00 AM	5:00 AM Orionid Meteors	Orionid Meteors peak this AM. Radiant above horizon after midnight. ZHR 20.
10/25/95	6:05 PM	6:05 PM Moon Conjunction	Conjunction of cresent Moon, Venus, and Mars low in West after sunset.

DEEP SPACE CCD ATLAS

by Don Wrigley

They say a picture is worth a thousand words, but how much are 2,400 pictures worth? Exactly $29.50 plus $5.50 shipping according to John C. Vickers, creator and publisher of the *Deep Space CCD Atlas: North*. Actually, the claim is that the atlas shows over 2,400 clearly identified deep sky objects. While some of the images contain multiple objects, many of the better known objects are shown several times at different levels of exposure, so it is difficult to say exactly how many images are actually present without counting them. But suffice it to say that there are enough to keep most of us quite busy, especially when you add in the 1,600 images contained in the second volume, the *CCD Atlas: South*, bringing the total to over 4,000 objects!

If you're not sure you want to spend $27.00 for the southern edition, you could probably get by fine with just the northern edition. It covers objects down to -30 degrees declination and includes almost anything you can observe from our latitude. The southern edition covers up to +30 declination, so there is considerable overlap with just over 200 objects making appearances in both editions. These multiple appearances are nicely cross referenced in both indexes and at the bottom of the pages where the duplicated images appear in the southern edition. Whether you chose to purchase one or both editions, I think you'll be pleased with the response time; I received my atlases only 12 days after mailing my check!

Nearly all the images were created using rather modest apertures (14" reflectors) so that the result is not "Palomar" quality in terms of detail, but is probably closer to what we are used to seeing through the eyepiece. Perhaps the real beauty in these images is they do so closely resemble the visual impressions of the larger amateur telescopes so widely in use today. Since the vast majority of the images are of galaxies, these atlases should prove invaulable in locating supernovae and identifying complex fields of galaxies.

Objects are identified by M number, NGC, UGC, IC, Mel, Pal, PK, and a few designations I've never heard of! All are neatly indexed and cross referenced, both in the rear index and at the top of each page. A box under each image contains the designation of the main object, the identity of any other objects shown, the constellation it is located in , the type object, the coordinates of the main object, its magnitude, its dimensions, and the image scale. All this and pictures too!

The images themselves appear as negative images; that is black stars on a white (or grey) background. This arrangement is better for detecting subtle detail and is easier to view under a red light. Also, those who are inclined to make pencil drawings will find it easy to compare their drawings with the CCD images.

The images are not without flaws. Brighter stars tend to show horizontal bars extending from both sides, a CCD imaging side effect that is easy to ignore and which helps prevent the larger star images from being confused with bright galaxy cores. There are also a number of halos present, both large and small, which are the result of dust particles on the CCD equipment. The smaller ones resemble planetary nebulae at first, but are easy to recognize after viewing enough of them. The more confusing ones are labeled on the page as artifacts.

Though I have not yet had the opportunity to use it out in the field, I am convinced that the *Deep Space CCD Atlas* is well on it's way to becoming the most useful deep sky publication for amateurs since Burnham's guide. Browse through one at our next meeting and I think you'll agree.

For more info or to order, contact:

John C. Vickers
P.O. Box 1292
Duxbury, MA 02331
(617) 934-6909

LOCAL HOMEPAGE

For the Internet browsers, dial up the following homepage created by Tom Polakis. Someone write a review on it for the newsletter—I promise Tom won't see it!

http://www.indirect.com/www/polakis/skyphoto.html

FOR SALE

8" f/4.5 Coulter Odyssey with Telrad finder, extra 18mm orthoscopic eyepiece: $195.00. Canon AE1 with 28mm f/1.8 and 80-210 zoom. Autowinder, flash, metal case and instruction book: $275.00. Contact John Vames at 946-3658.

New Scikanon 60mm refractor: $75.00. Contact Harry Felker at 345-1983 (work) or 968-2167 (home).

EAST VALLEY ASTRONOMY CLUB
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EAST VALLEY ASTRONOMY CLUB

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MEMBERSHIP&SUBSCRIPTIONS: $20.00 annually. Reduced rates available to members for *Sky&Telescope* and *Astronomy*. Contact Sheri Cahn, 4220 W. Northern #116, Phoenix, AZ 85051, (602)-246-4633.

CLUB MEETINGS; Second Wednesday of every month at the Scottsdale Community College, 7:30 PM. Normally Room PS 170 or 172 in the Physical Sciences Building.

NEWSLETTER: Published and mailed out the week before the monthly Club meeting. Send your thoughts and stories for publication to: Sam Herchak, 145 S. Norfolk Cir, Mesa, AZ 85206-1123, (602)-924-5981. Email to: 76627.3322@compuserve.com. Faxes welcome with prior notice.

CHANGE OF ADDRESS: Notify Bill Smith, 1663 S. Sycamore, Mesa, AZ 85202, (602)-831-1520. Email to: bsmithaz@aol.com.

EVAC LIBRARY: The library contains a good assortment of books, downloaded imagery, and helpful guides and is usually brought to the Club meetings. Contact Steve O'Dwyer for complete details, (602)-926-2028.

BOOK DISCOUNTS: Great savings for members through Kalmbach and Sky Publishing Companies. Contact Sam Herchak, 145 S. Norfolk Cir, Mesa, AZ 85206-1123, (602)-924-5981.

EVAC PARTY LINE: Let other members know in advance if you plan to attend a scheduled EVAC observing session. Contact Robert Kerwin, (602)-837-3971. Email to: p24493@gegpo7.geg.mot.com.