

SJAA EPHEMERIS

VOLUME 3 NUMBER 7 OFFICIAL PUBLICATION OF THE SAN JOSE ASTRONOMICAL ASSOCIATION

JULY, 1992

SJAA OBSERVATORY STRUCTURE DESIGN TEAM REPORT

by Jerry Dunmire

A team has been formed to consider structures for the SJAA observatory at the proposed Grant Ranch site. The members are Andy Guidas, Mike Ficco, Marty Hutchison and myself.

We have met twice. During our initial meeting, we discussed the priorities for the observatory. Our second meeting was at the proposed Grant Ranch site to review the physical layout of the site.

Various features are being considered, including those on the list printed in the April Ephemeris. Trade-offs are being made between the features by applying the following priorities and assumptions:

- The facilities primary purpose is public service.
- Groups of 20 to 40 will attend the public observing sessions. Though the observatory itself need only have room for 3 to 4 people at a time. There must be provisions for flow of foot traffic with staging areas to deal with large groups.
- Handicap access must be provided.
- The telescope will be a Schmidt-Cass of 10 or 11".
- The structure should be designed to allow for simple expansion or duplication to support a second telescope.
- The structure should fit the "Park" environment.
- The structure should be designed and built for low maintenance.
- Keep it simple.

The design team will continue to consult with and solicit advice and suggestions from all interested parties. Please feel free to call me at (408) 248-1451. **The Design team will be at the July General Meeting. Please come.**

July 4: 1st Qtr Moon - no activity. Clean your optics.

July 10: Star Party at Houge Park

July 11: 8:00 p.m. General meeting at Milpitas Library. Board of Directors meet at 6:30 p.m. preceding the program. Our design team with Eathan Clifton will present an observatory proposal for review.

July 13 to 18: Cosmocon 92 at San Jose State University. Contact AANC or (415) 225-1279

July 18: 8:00 p.m. Beginning Astronomy Class at the Milpitas Library.

July 25: Star Party at Henery Coe - Also one at Grant Ranch- your choice - SJAA will be at Henery Coe.

August 1: SJAA Picnic, General Meeting and Star Party at Fremont Peak State Park 4:00-4:30 P.M. followed with the general meeting and a star party. The 30 inch Challenger will also be open. This picnic will be held along with the FPOA picnic at the Peak.

Please Note: There will **not** be a General Meeting held at the Milpitas Library in August.

August 7: Star Party at Houge Park.

August 15: 8:00 p.m. Beginning Astronomy Class at the Milpitas Library.

August 22: Star Party at Grant Ranch w/Halls Valley Group.

August 29: Star party at Glacier Point, Yosemite. Contact Jim Van Nuland for more information and reservation. These summer skies are wonderful at over 7,000 feet. We have a group camping site at Bridal Veil.

Also a no host Star Party at Fremont Peak.

Beginning Astronomy Class

Sat. May 16, 1992

Reported by Paul Barton

Jack Peterson began his talk promptly at 8:00 p.m. to six beginning astronomers, three intermediate and one late comer (so, no credit given). The discussion began with polar precession, then polar alignment, why polar align, Sky Gazers Almanac, rise and set times of planets for the year, sidereal time, equation of time, analemma, and the constellations of Bootes, Corona Borealis and Hercules. There seemed to be quite a discussion over leveling the telescope base for polar alignment. Jack is correct in that the telescope base does not have to be leveled if the polar shaft is parallel to the earth's axis (that is polar aligned). The main advantage of leveling the telescope mount (base) is that you can make the use of the latitude setting of the previous alignment. You must account for errors of azimuth in the current setup, however. There was one important question asked: How or why would polar alignment be important when using binoculars? How easily some of us forget that not all of us have astronomical telescopes!

Regarding Sidereal Time: To simplify things, sidereal time is the star time of the meridian (the north to south meridian overhead). So objects exactly on the meridian will have a right ascension value equal to the sidereal time for that instant. the difference between sidereal time and any object's right ascension (RA), plus or minus, is the local hour angle (LHA), a necessary value for simple RA setting circles.

When the sun is photographed, or measured in RA and Dec, at the same time each day during a whole year, it's

Continued on page 3

Backroad Observatories

Bill Dellinges

On a recent trip to Arizona, I ran across a couple of interesting characters who operate small observatories in the Phoenix area. Years ago I had met an astronomy teacher at the ASP Flagstaff meeting who told me about his facility in Globe, Arizona, about 80 miles east of Phoenix. I vaguely remembered something about him and his students doing photometry work with a C-14.

Being in the area, I decided to check out Globe and look the fellow up. I had forgotten his name since the 1985 meeting but asked at our motel if they knew of someone who had an observatory in town. Without missing a beat the lady replied, "Oh, you mean Ken Zeigler, the astronomy teacher at the high school." I recognized his name immediately. I looked him up during his lunch break and we had a nice chat for about an hour. Strangely, we had not seen each other since 1985, he said he was just thinking of me two days earlier. Seems he was talking to his wife about a guy (me) who had a photo of Clyde Tombaugh and James Christy (the discoverers of Pluto and Charon) and how he sure would like a copy of that shot. Then I walk into his classroom!

Ken has two observatories in his backyard. A 3 meter Observa-Dome houses a C-14. Next to that he has a huge roll-off roof structure about 14 by 30 feet. Each half of the roll-off rough weighs 750 pounds! Even at that, these two halves were torn off the building in a wind storm once and a crane had to be called out to replace them. Ken designed and built the structure himself, taking 4 years because of financial restraints. On each end of the observatory there is a small room, a visiting astronomer's "dorm", and a control room where his computer equipment is set up and where he can operate another C-14 while peering through a large window. He showed me several of the hundreds of CCD images he has on file taken through this equipment. The C-14 is mounted on a tall cement pier with a Byers mount. Another similar pier supports a 12 inch reflector.

Ken uses the facility to run his

students through photometric work with the scopes. He also retreats to the computer room to write science fiction stories (he regrets that so far, he has not been published). I found him to be a fascinating, goofy person - totally enthralled with astronomy. Incidentally, Ken shared a dark secret with me. Check an Arizona map and find Globe. About 35 miles northeast on highway 77 you'll find a turn-out leading to a microwave relay station. He states it's the darkest site he has ever seen, stars right down to the horizon. I've sent Mr. Zeigler his photo of Tombaugh and Christy.

Having several days of vacation left over, I decided to cruise over to Ajo, Arizona (90 miles southwest of Phoenix). I'd wondered for some time what Ajo would be like and how dark its skies might be. The city is far from anywhere and virtually surrounded by a wildlife refuge, Air Force test range, Indian reservation, and Organ Pipe Cactus National Monument. It's a small, charming, desert retirement town, where we found a wonderful Bed and Breakfast establishment called the Guest House Inn. We decided to stay 3 nights and relax from our 2 week trek.

I asked our host if she knew anything about "Window Pane Observatory", a private facility I'd seen advertised in Sky and Telescope magazine some time ago. Evidently, one can rent time on telescopes there. The name refers to the optical window on the slit of the 12 meter Ash dome allowing viewing inside the heated dome during cold weather. While no one in town seemed to know anything about the place, our delightfully helpful host, Norma Walker, said she thought there was an observatory just a few hundred yards away near the copper quarry! I managed to track down the observatory's owner, Bill Jorgavich, with Norma's help.

Bill charges \$50 a night for up to two persons to use the scopes with his assistance and \$75 for up to four persons to use the equipment without his services. There is a 17-1/2 inch Coulter Dobsonian in the dome and a Ultima-8 in an adjacent roll-off roof structure. He has plans to add several more instruments to the facility. (I thought it a bit odd to find the dobsonian in such a sophisti-

cated dome).

Bill has a degree in astronomy (he studied under Clyde Tombaugh) but gave up professional work for personal reasons. Perhaps a contributing factor was the story he shared with me about the observatory director who once stole credit of his lone comet discovery saying, "Young Man, you'll find another one."

Mr. Jorgavich is self employed with many "irons in the fire" as jobs are few in Ajo. He recently moved to Ajo from Santa Fe where he felt it was too cold to operate his observatory, and where things were getting to "up scale", and to crowded. A moving outfit wanted \$10,000 to move the dome to Ajo, so Bill disassembled it and moved it himself. As motors opened and rotated the dome, I wondered how on earth one person could do that and still end up with a functional observatory. But after talking to this guy, I wasn't so surprised. Bill is a take charge kind of guy who gave me the impression of being undaunted by any challenge. He claims to be working on getting all the street lights in Ajo changed over to low pressure sodium to reduce light pollution in town. He'd also like to get the Group 70 1.8 meter LAT scope down there but admitted that wasn't likely as locals in California probably want to keep it closer to home.

I tried a \$50 one night shot, but got clouded out (first clouds I'd seen in two weeks - figures, doesn't it?). The next night brought an early monsoon down-pour, so I never did get to use the facility. I was not charged because of the inclement weather. Bill did take me out to one of his dark sky sites later that first night where we glimpsed views of deep sky objects through breaks in the clouds with his 10X70 FMT-SX Fujinon (they are dynamite!). The night sky was probably the darkest I'd seen on this swing through Arizona, though Ajo does generate some annoying light pollution. Perhaps Window Paine Observatory's Bill Jorgavich can focus his considerable talents on that problem.

So there you are, my story of a couple astrophiles I stumbled upon exploring the backroads of Arizona. I look forward to sharing my next astronomical experience with you. [If interested contact me for addresses]

RTMC 1992 by Bob Madden

The 24th Riverside Telescope Makers conference is history. Next years, the 25th, will be better than before. Cliff Holmes and Ashley Mc Dermot retired from RTMC Inc. and during this past week passed the baton to Steve Edberg and crew. A very emotional tribute was given to Cliff by his colleges, wife, and his friends. Cliff was given a standing ovation. To those who don't know, Cliff was the initiator, worrier, planner and motivator of RTMC. It was his life. We owe him a great debt of gratitude for what he has given to all of us. I didn't know him personally, but I have watched him in action for several years. He is an amazing person.

This year the conference seemed to run very smooth. Bob Brauer, who has Stellafane to compare with, and I arrived for breakfast Friday morning in Big Bear city at 6 a.m. The gate opened promptly at 9 a.m. as advertised. We were the first into the big bunk house. There was no paper work to check or fill out if you were pre-registered. The feeding frenzy started at some vendors booth before the 1 o'clock opening. Bob and I stood in line, seventh position, for two hours at Meade's booth. The first guys grabbed complete boxes of eyepieces and left nothing for the following buyers. I'm thinking of writing to Meade, telling my feelings, and suggesting they limit purchases to five pieces maximum of each item, then selling the remaining quantities on Saturday. I have been in this feeding frenzy before and it is pandemonium and unfair. These guys who grab full boxes of stuff, turn around and sell it for a profit on Saturday's swap. There were good buys of eyepieces at Meade's spot with several other Vendors having decent stuff.

Meade had their new telescopes on display, but you couldn't look through them as they were prototypes (yeuk - yeuk). The rumor is that Meade is not getting delivery and the drive has some sort of bug in it. Now, the delivery is to begin in early '93. That is the story.

Celestron was there, but didn't have reject stuff as they have had in past years. Scott Losmonday was with them

showing his mounts. Losmonday mounts will be sold by Celestron. The price will be competitive. It will be Celestron's policy to only have quality systems on display that can be ordered for later delivery.

Parks Optics was not there. However, Epoch, Valley Optics, Wholesale Optics of Penn, and many others were there. William Kelley was there with his telescope which was described in *Sky and Telescope*. Peter Cerevolo, Terry Dickenson, Doug George, Richard Berry, Chris Shur, David Levey, and of course Steve Edberg were there. Kevin Medlock, Peter Cerevolo, Paul Jones, and Terry Dickenson held an hour long Optics workshop which was interesting. Chris Shur's talk on Pan 2415 and auto guider was superb! Chris showed some great celestial photographs. The presentations were well given.

On Saturday night the door prizes were handed out. Someone again won the grand prize of an 8" SC on an LX200 mount donated by Meade. I won \$100 donated by Epoch Instruments, which made it easier explaining to my wife why I purchased so much.

There were many hand made telescopes the owners had every right to be proud of. Again there was a wooden-ten inch-telescope that was a beautiful piece of furniture. Kevin's computer controlled CCD telescope wowed the crowd. This place had a pair of 20" binoculars which had outstanding performance. Even Fujinon showed up with a pair of 25X150 binoculars. Group 70 had a booth run by Bob Ashford and Dave Enos. Dave sold his 10" Meade as soon as he unpacked it. Good for Dave. Now I'll try selling mine.

Absent was Jack Zeiders who was hampered with Pneumonia, Dave Ambrose, and Steve Greenberg. I don't know why Dave wasn't there. If you looked close you would find Jim Van Nuland, Del Johnson and Jim Rodgers. There were others from our group there also. Friday afternoon it rained for about 45 minutes and every night there was some clouds hampering viewing. It still was some party and a must attend event.

**Please Take Note:
IT IS MEMBERSHIP RENEWAL TIME**

Beginning Astronomy Class continued from page 1

path will describe a figure eight. This path is called the Analemma. Webster's definition is "A figure - eight - shaped graduated scale which shows the declination of the sun and equation of time for each day of the year". An Analemma is often found on a spot on a globe where there is no land mass, usually in the Pacific ocean. The equation of time is related to minutes gained or lost due to the earth's change of speed in it's yearly orbit. For a graphic example look at Dennis Di Cicco's photograph in *Sky and Telescope*, page 536, June 1979.

Those who were there are:

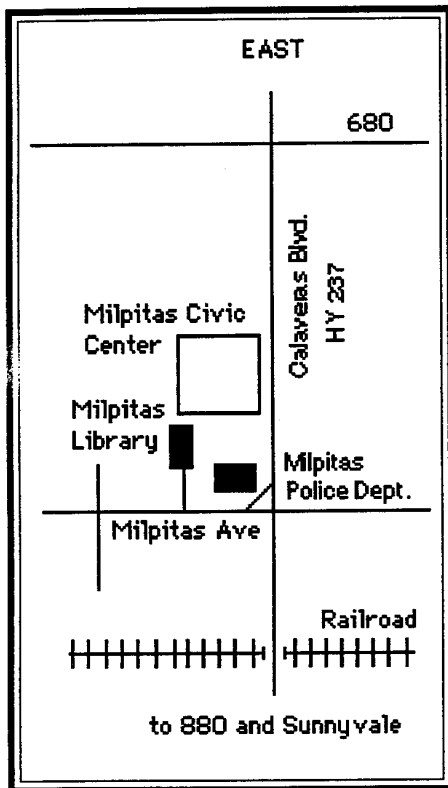
Alice Finley
Dan Finley
Terry Kahl
Dick Hultquist
Jim Van Nuland
A. J. Hultquist
Paul Barton
Richard Paw

[I get a kick out of these meetings. It is important our association perform these services for the public and to those who are beginning and want to learn about our universe. . . ed]

ANNUAL DUES

Please take note that we have been notifying you that the Membership dues will be going up \$2 a year beginning the first of July. There is also an increase in the membership subscription rate to *Sky and Telescope*. The subscription rate will also increase \$2. The new Subscription rate will be \$20 instead of the regular rate of \$27. That is a \$7 discount to Association Members. The subscription and membership renewal will still be handled through Jack Peterson, our Treasurer. Therefore the last page of this issue is reflecting both of these increases on the membership application form.

Sky and Telescope is also making other changes in ordering material from them. Instead of ordering through our Treasurer to obtain a 10% discount, you may order directly, give the club's name and ask for the discount. This may be done through their toll free number 1-800-253-0245. Also call this number for a current catalog.



General Meeting
and Beginning Astronomy
Site

Directions to our Favorite Places by your Editor

To the left is a map showing directions to the Milpitas Library location for our Board of Directors, General Meeting and Beginning Astronomy Classes. To alleviate discussion, let me state here and now that the Milpitas Police Station shown is the *old* location. The public and members are welcome to these meetings. There are interesting talks given by professional and amateur astronomers along with lively discussions. Here is a chance to ask someone about your equipment or theory to work out a solution. Come early or stay late to ask. I solved an RA drive problem by asking one of the members at a meeting.

The map below shows directions to our public star party site at Hough Park. Star Parties begin at sundown and continue until around 11:00 P.M. As you know the public is invited and so is the membership. Come display your favorite telescope, help another who is less proficient, and get some one else interested in astronomy and the night sky.

On the reverse side of this page, page 5, is a map showing directions to

Fremont Peak State Park. This is the site of some of our star parties and this years summer picnic. From my door to the park it is 57 miles, but I live just off Blossom Hill Ave. Generally it takes about an hour and fifteen minutes. I hope this helps more members to attend these outings.

More Astro Ads

Celestron C8 - Black tube assembly w/ mounting bracket for a Super Polaris, star bright coating, 2 yrs old, 1.25" and 2" backs, 6X30 finder, 26 mm plossl. \$550.
1 Televue 7mm Nagler eyepiece - \$140.
Celestron 7X50 WA Pro Series binoculars, wide strap and case - \$110. Call Rich Neuschafer

(W) (408) 285-6818

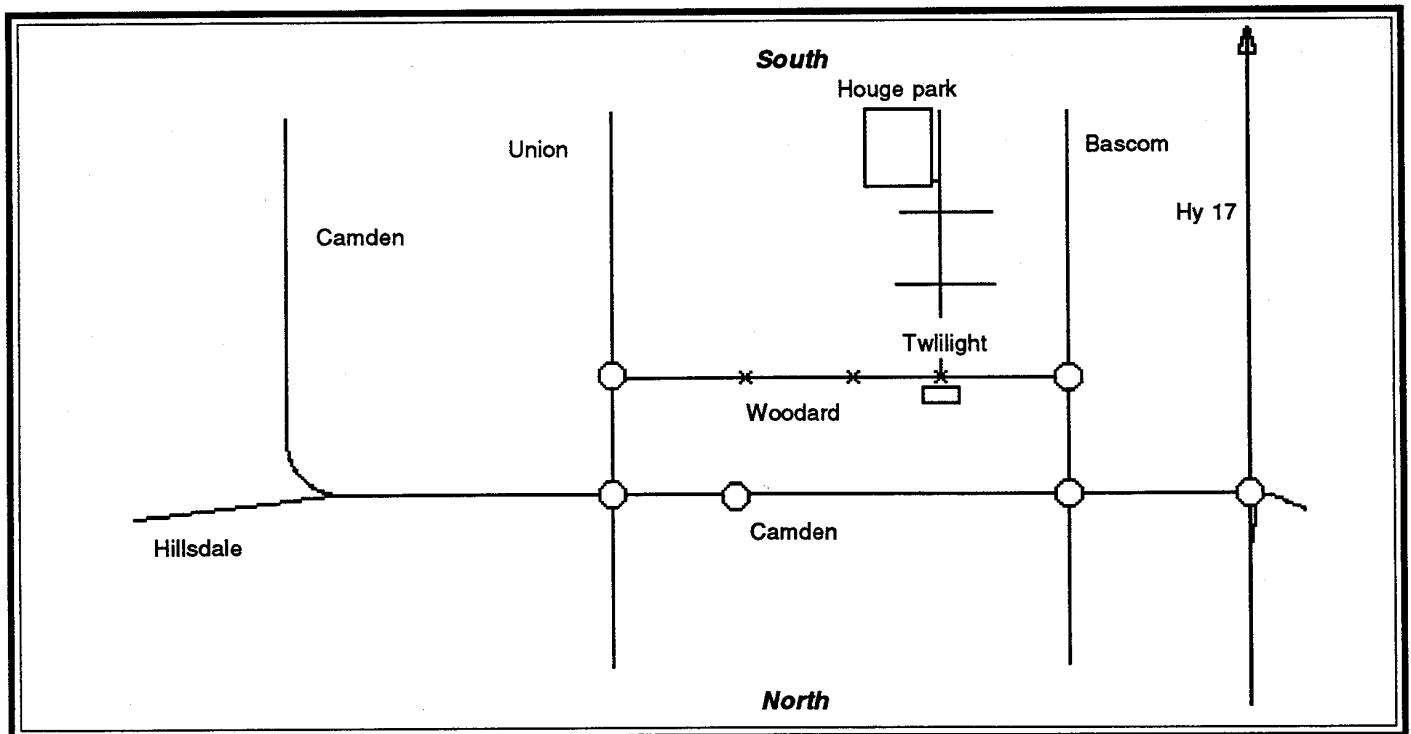
(H) (408) 446-0975

6/92

Celestron 11X80 - Binoculars, excellent condition, case has a few scuffs - \$200. Call Bill Dellings (510) 792-9206


6/92

**PLEASE REMEMBER
IT IS
MEMBERSHIP RENEWAL
TIME**



Hough Park Public Star Party

(408) 623-4255



DATA TO TOP OF PEAK.
GREAT MOUNTAIN OF SUNSET / WALK UP.

to camp sites (lower)

PARK HERE

*IF YOU WAIT 10-15 min after you turn off all lights you can see well enough without lights to walk up to the observatory.

OVERFLOW AREA
(ASTRONOMY SITE)

44

WOMAN/OK
GAY/JOAN
BAPTISTA.

THIS INTERSECTION HAS
A FLASHING YELLOW
LIGHT TURN RIGHT

WISCONSIN
COUNTY

ROAD

101 50405 101

RIGHT EXIT
TO SAN JUAN
BAUTISTA / Hollister

••••• = TRADITIONAL CAMP AREA
(TENTS, COOKING TABLES)
OBSERVATORY WILL OPEN
~ 1 HOUR AFTER SUNSET (7:30 PM)
AND BE OPEN TILL MIDNIGHT OR SO

DRESS WARM & HAVE A WARM HAT.

A RED FLASHLIGHT IS HELD FULL
(THERE ARE PEOPLE DOING ASTROPHOTOGRAPHY
BEHIND THE RANGERS HOUSE. WHITE LIGHTS
RUIN PHOTOS. Please be careful)

- Questions Call Jack Feidors (408) 281-0220 (leave message)

CELESTIAL CALENDAR July 1992

by Richard Stanton

Lunar Phases	Date	Rise	Tran	Set
FQ 17:43hr	06-07	1310	1842	0015
FM 12:06hr	14-07	2007	0106	0604
LQ 05:12hr	22-07	0008	0659	1355
NM 12:35hr	29-07	0611	1259	1951

Nearer Planets

Mercury	07-07	0750	1444	2141
0.68 AU	17-07	0749	1427	2109
Mag -1.9	27-07	0716	1347	2022

Venus	07-07	0603	1324	2048
1.70 AU	17-07	0619	1333	2051
Mag -3.9	27-07	0640	1343	2050

Mars	07-07	0211	0859	1552
1.56 AU	17-07	0152	0847	1547
Mag +0.8	27-07	0133	0834	1541

Jupiter	07-07	1010	1630	2309
6.07 AU	17-07	0939	1605	2234
Mag -1.8	27-07	0910	1533	2200

Saturn	07-07	2159	0305	0811
8.96 AU	17-07	2118	0224	0729
Mag +0.3	27-07	2036	0141	0644

SOL Star Type	G2V	Mag	- 26.72
0700+2239	07-07	0544	1258 2017
0738+2119	17-07	0543	1257 2010
0621+1924	27-07	0542	1256 2002

Astronomical Twilight

JD 2,448,811.5	07-07	0344 - 2215
,821.5	17-07	0352 - 2204
,831.5	27-07	0402 - 2152

Siderial Time

Transit Right	07-07	0000	PST=1714
Ascension at	17-07	0000	PST=1834
Local Midnight	27-07	0000	PST=1913

Darkest	Saturday Night	Jul 27
Sunset		2004
Twilight End		2155
Moon Rise		0210

**TIMES AND DATES ARE
PACIFIC DAYLIGHT**

PLEASE TAKE NOTE !!

**You will not be able to enter
Grant Ranch after 10:00 pm.
The gates will be closed and
a roll over will damage tires**

Public Star Parties

by Paul Barton

Of course all star parties are public, but some are more public than others, are staged specifically for the public at schools, parks, street corners, parking lots, etc. Those who haven't tried it are missing a pleasurable treat. The public is always appreciative and well behaved, tho sometimes a bit over enthusiastic.

Often youngsters are encouraged to operate the telescope themselves — place the telescope on an object and focus it — to their great delight. Their sharp eyes can normally see stars older eyes can only see in their memory. One 10 year old pointed out Ursa Minor and Polaris and correctly called it the Little Dipper, when Polaris could barely be seen by adults! Another youngster decided to be an Astronomer instead of a nurse.

The Hosts often supply treats such as coffee, cider, hot dogs, etcetera.

It is often hard to get time to polar align, with lines of impatient youngsters "helping" you. So who polar aligns Dobsons? (John Dobson is at least a saint in some books).

Thursday, June 4, at Fischer Middle School off Roberts Road in Los Gatos we had a nice evening, small moon, clear, windy, but only a few customers. Even though fliers went out there wasn't enough publicity and encouragement from the staff.

Friday, June 5, at Houge Park was a disaster with high cold winds.

Saturday, June 6, at Fremont Peak was another disaster, but this time it was high dew - almost raining.

BUT! Monday, June 8, at Dilworth School in Cupertino made up for the previous disappointments. It was clear, dry, warm and calm with free cider drinks and lots of enthusiastic customers. In attendance at this party were Paul Mancuso, Paul Summers, Paul Barton, Jim Van Nuland, Del Johnson, Jack Peterson and, of course, Lady (Yogi) Barton, who can smell a picnic basket a half mile away. Apologies if some folks were missed; we were all too busy to do much visiting.

A beautiful Thank You Card was presented by the Teachers and Chil-

dren, computer generated and hand engraved. Thank you cards are usually received at a later date. One was even re-routed to Tom Ahl!

Hey, come join the fun! [You can do this by giving your name and telephone number to Jim Van Nuland and Jack Peterson, who coordinate the parties with the schools]

Appologies

by Jack Zeiders

I want to take this opportunity to appologise to those who were at the Milpitas Library for our June General meeting. We had pumped the incorrect data into our digital setting circles. It seems there was a lack of coordination between the party who obtains the key to open the meeting room and a back-up person. It was simply a matter of not communicating who should pick up the key from the librarian. Our fault! Plans have been taken to never let this happen again. We were fortunate to contact Dr. Romani at his office just before he was to leave for our meeting and advise him of our delima. Dr. Romani will be re-scheduled at a later time. I know we were all anticipating his talk. My appologies again. Jack

Help Wanted

Public Relation/Publicity

SJAA needs a member to keep amateur astronomy in the public eye, including activities of our fellow clubs. We have contacts with various TV channels (2,4,5,11,36), the San Jose Mercury-News, officials of various city/county/state agencies, and a special relationship with Ch 54. The contacts are neither consistent nor from a single SJAA source.

We need to publicize our school star parties, Houge Park, the Beginning Astronomy class and current activies at Grant Ranch, Henry Coe, and Fremont Peak. We want the public to be aware of other astronomy clubs in the region and to furnish points of contact for them along with a basic description of their activities.

Call Del Johnson (408) 448-0239 or any officer/member of the board.

ASTRO ADS

ASTRO ADS are free to all noncommercial advertisers wishing to sell astronomically related products or services. Please send your ad directly to the Editor:

Bob Madden

1616 Inglis Lane

San Jose, Ca. 95118

NO LATER THAN THE 12TH OF EACH MONTH! Your Astro Ad will run approximately 3-months.

Celestron C8 Schmidt - Cassigrain.

Drive system with Joy stick with declination and right ascension. Has starbright coating, 28 mm ER eyepiece. Also optional field tripod with wedge and 8X50 finder scope. The optical system is perfect! For \$1,000. Call Syd Goldstein (408)-923-6706 (H) 5/92

2 Coulter Mirrors 10" f/5.6 - Matched focal lengths, new in the box. \$300 for both. Ed Allen (408)-438-1014 3/92

Lumicon 1-1/4 Newtonian Easy-Guider \$100. Celestron Cometron 60 mm RFT w/tabletop tripod, diagonal, 1-1/4 focuser w/extension tubes, 6X finder, 25 mm Kellner (12X), case, plus camera adapter: use for first scope, telephoto, or big finder, \$100. Celestron 1-1/4" Barlow, \$20. Meade 1-1/4" prime +e.p. projection camera adapter \$18. Orion prime focus camera adapter and eyepiece projection tube for S-C's, \$14 each. Tony Americh (408) 985-6978. 4/92

Meade S/C w/motor drive, Plossl, documentation, case - \$500. Wm Leslie Howard (408) 353-8344 6/92

C-8, S/C w/Byers mount on Meade tripod. Includes drive corrector, Lumicon off-axis guider, illuminated guiding eyepiece, celestron focal reducer, 26 mm Plossl, dew shield, Cannon T-ring and other photo adapters. Excellent condition. \$1000. Day (408) 553-3314

Night (415) 967-4974 ask for Tom.

6/92

Celestron 6-inch F/5 Newtonian tube assembly, 6X30 finder, No eyepieces, Mint cond. \$195 Joel Goodman (415) 292-4381 6/92

Celestron Super C-8 w/Byers drive, 8X50 finder, wedge and tripod. excellent optics. \$795 Joel Goodman (415) 292-4381 6/92

Celestron 750mm S/C F/6 tube assembly

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COMET COMMENTS

Don Machholtz

Two comets remain visible in our circumpolar sky this summer. Comet Tanaka-Machholtz has already displayed a couple outbursts. Meanwhile, Comet Shoemaker-Levy is brightening steadily as it approaches its July 24 perihelion.

Comet Spacewatch (1992h) : D. Rabinowitz of the Lunar and Planetary Lab at Kitt Peak discovered this comet

with a CCD attached to a 1-meter telescope. Discovered at magnitude 19, the comet will brighten only slightly as it approaches its September 1993 perihelion of 3.2 AU.

Comet Bradfield (1992i) : William Bradfield of Australia discovered this, his sixteenth comet, on May 3 at a magnitude 10, in the morning southern sky. The comet reached perihelion three weeks later at 0.59 AU. It then briefly appeared in the evening northern sky as it dimmed rapidly.

EPHEMERIS

DATE (UT) RA (2000) DEC ELONG SKY MAG

COMET SHOEMAKER-LEVY (1991a₁)

06-22	03h07.0m	+72°28'	55°	M	8.0
06-27	04h45.6m	+77°27'	55°	M	7.6
07-02	07h50.6m	+77°55'	55°	E	7.2
07-07	10h06.1m	+70°50'	55°	E	6.9
07-12	11h04.7m	+59°49'	54°	E	6.7
07-17	11h32.7m	+47°34'	52°	E	6.6
07-22	11h47.9m	+35°38'	51°	E	6.6
07-27	11h56.9m	+24°58'	49°	E	6.8
08-01	12h02.5m	+15°53'	47°	E	7.0
08-06	12h06.1m	+08°21'	45°	E	7.3

COMET TANAKA-MACHHOLZ (1992d)

06-22	06h32.0m	+61°06'	38°	E	9.6
06-27	06h56.1m	+59°18'	36°	E	9.8
07-02	07h16.5m	+57°28'	35°	E	10.0
07-07	07h33.9m	+55°38'	34°	E	10.2
07-12	07h49.0m	+53°51'	32°	E	10.4
07-17	08h02.2m	+52°08'	31°	E	10.6
07-22	08h14.0m	+50°28'	30°	E	10.7
07-27	08h24.4m	+48°55'	30°	M	10.9
08-01	08h33.8m	+47°23'	30°	M	11.1
08-06	08h42.4m	+45°57'	30°	M	11.2

Don Machholz (916) 346-8963

bly w/tripod mounting block, visual back and canera coupler. Joel Goodman (415) 292-4381 6/92

Celestron 14 Very good condition. Proven performance. Previously housed in a University's observatory. Complete with tube, 2 inch diagonal, counterweight

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