

SJAA EPHemeris

VOLUME 4 NUMBER 3 OFFICIAL PUBLICATION OF THE SAN JOSE ASTRONOMICAL ASSOCIATION March, 1993



The Eye Piece
by Bob Madden

First! We need nominations for our Dr. Gregory award, which is given each year to a deserving person who has contributed to our Association and to the betterment of amateur astronomy. Please see your President or any board member with your nomination. This is an urgent request as the selection must be made and engraving completed on the plaque.

Second! Ethan Cliffton, of Monoptec Corporation and also our Observatory Architectural Consultant, has sent us a request for sketches (drawings) of sections, parts, isometrics, etc. of 10" or a 12" compound telescope, and a CCD camera for adaption to his fixed shutter design. Please write him at:
870 Market Street, Suite 1266
San Francisco, CA 94102

MAC Software

Thanks to Bill O'Shaughnessy we now have a freeware copy of MacEphem. It was in response to my request for software at a recent general meeting. It works well, but has an IBM type shell. Rightfully so, as it was ported from a large machine to the Mac by William Downey. The results seem to agree well with other published ephemerides. If you wish a copy see Bill at any general meeting or contact me.

Mar 2: School Star party at Alviso School - located on North First St., Alviso. 7:00 - 8:30 pm. Call Jack Peterson for more information.

Mar 6: General Meeting, 8:00 pm. Board of Directors Meeting 6:15 pm. Seth Shostak, SETI, Speaking on the search for intelligent life (off earth).

Mar 13: Star Party at Coe Park. Sset 6:12 pm; 61% moon rises 0:43 am.

Mar 20: Star Party at Fremont Peak. Sset 6:18pm; moon absent. Also :Public star party at Grant Ranch.

Mar 26: Public star party at Hoge Park. Sset 6:25 pm; 13% moon sets at 10:01 pm.

Mar 27: Third session of Astronomy Class, 8 pm at the Milpitas Library.

April 3: General Meeting 8:00 pm. Board of Directors Meeting 6:15 pm. Rick McWilliams, of Tangent Ind., speaking on Digital Setting Circles and other items.

April 4: Day light savings starts.

April 10: Night off - too much Moon.

April 17: Fourth session of Astronomy Class, 8 pm at the Milpitas Library.

April 24: Astronomy Day. See Jim Van Nuland for Hoge Park set-up or Jack Petersen/Paul Mancuso for Milpitas Library set-up. Phone #'s on credit Marque.

April 30: Public star party at Hoge Park. Sset 6:25 pm; 13% moon sets at 10:01 pm.

May 1: SJAA Auction and Swap. Held at Hoge Park - Swap 1:00 pm to 5:00 pm. Auction 6:00 until we're done (10:00 pm?).

Decisions, Decisions

It looks as though the Texas Star Party will conflict with the Riverside Telescope Makers Conference. The TSP will be held May 17 - 23, 1993 at the Prude Ranch. The RTMC will be the following weekend, May 29 - 31. It will be tough to go to the TSP, a wedding in Houston and end with the RTMC. I do feel the RTMC is the best (including the wedding).

Telescope Making with John Dobson

This has to be a hot video tape! It isn't the least expensive piece of information at \$46.85 total, however, I feel it will be packed full of useful information. The price breakdown is:

Tape	\$39.95
S/H	\$03.50
Ca Tx	\$03.40
	\$46.85

Send your name, address and check made out to:

Dobson Astro Initiatives
P.O. Box 460915 San Francisco, CA
94146-0915

Universe '93

Will be sponsored by the ASP and Astronomy Magazine on July 10 and 11, 1993. Others in attendance will be:

Sally Ride
William Kaufman
Stephen Sanders
William Hartman
Harding E. Smith
Terence Dickenson
David Crawford
Sallie Baliunas
Richard Berry
Andrew Fraknoi
Jack Newton
Ed Krupp
Stephen Edberg
David Levy

Call 415-337-1100 for a registration

Continued on page 5

"FOSTER Teachers Prepare to Fly Aboard the KAO"

by Edna DeVore

The FOSTER Program—Flight Opportunities for Science Teacher Enrichment—is underway. The FOSTER Program is a new NASA educational outreach program for elementary and secondary teachers envisioned to enrich science education through airborne astronomy. Ten Bay-Area teachers are participating in the first year of the FOSTER Program. They are Jill Baumgartel (Woodside High School, Woodside); Bob Choate (Sheppard Middle School, San Jose); Jackie Ervin (J. F. Kennedy High School, Richmond); George O'Neal (Burnett Academy, San Jose); Mark Piccillo (Frick Junior High School, Oakland); Jeff Ring (San Jose High Academy, San Jose); Raymond Rogoway (Independence High School, San Jose); Chelda Ruff (Helms Intermediate School, San Pablo); and Mary Lou Zandona (McNair Intermediate School, East Palo Alto). In addition, the planetarium director at Independence High School, Gail Chaid, is participating in the project.

In October the teachers came to NASA Ames Research Center for two days of intensive workshops. Presentations on astronomy, astrophysics, aviation, and technology aboard the KAO filled the days. Andy Fraknoi, Astronomical Society of the Pacific, presented an "Introduction to the Universe"; Dan Lester, U. of Texas, Austin, a KAO Principal Investigator, shared his research program and the experiences of Texas teachers who flew aboard the KAO last summer; Geary Tiffany lead a tour of some of the research aircraft at ARC and gave a pilot's view of airborne research; Cheri Morrow, NASA Headquarters, Astrophysics, presented "Mission to the Universe"; David Morrison, Director of Space Sciences at ARC, welcomed the group and led a lively discussion of how NASA can best work with the schools in the FOSTER project; Dave Koch, Astrophysics, offered a view of observing from the ground up; and Garth Hull, Educational Programs, guided the group through the Teacher Resource Center. The teachers also had the opportunity to

sit in on the annual KAO users meeting.

A second two-day workshop was held in November. Hands-on science activities were presented by the teachers and the FOSTER staff. Astronomy activities for the classroom—star maps and locators, spectroscopes and telescopes—were constructed by the teachers and used in the planetarium and out-of-doors at Independence High School. A star-gazing party with the San Jose Astronomical Association capped the first day. The next day, Scott Sandford, Astrophysics Division, explained his spectroscopic work and took the teachers on a tour of his lab; Allan Meyer, Research Scientists for the KAO, showed the teachers how the KAO telescope tracking is planned; and Bob Morrison and Russ Padula demonstrated the construction of a flight plan. To get everyone ready, Carl Gillespie, Jr., Airborne Operations Manager, led a pre-flight information session.

The teachers are enthused and excited about the FOSTER Program and their upcoming flights. They will be participating in science missions aboard the KAO in January and February of 1993. Following the flights, the group will reconvene in March for work on the FOSTER curriculum. The FOSTER program is managed by Jeff Bennett and Cheri Morrow at NASA Headquarters, Astrophysics Division. At ARC, the Co-Managers are Dave Koch and Garth Hull with participation by Carl Gillespie, Jr. and assistance of Tom Gates, Aerospace Education Specialist. The project is being developed by Edna DeVore at the SETI Institute, who is the Project Teacher for the FOSTER Program. The pilot version of FOSTER will gradually expand to a national level in five years and fly 50 teachers per year.

Observational Astronomy Class

by Paul Barton

The first observational astronomy class was held at the Milpitas Library on 30 Jan 1993. It went off like precision, well oiled clock work. The leader, Jack Petersen, is on his third tour. Jack immediately indicated that this is to help amateur astronomers "Find" objects in the sky — observational or

positional astronomy. Making telescopes, orbital mechanics, technical topics, etc., is for another time.

Jack Zeiders' fine photos and computer generated star charts are a major tool in Jack Petersen's class.

A discussion of inferior planets, retrograde motions and Venus' phases led to the winter solstice (Dec 21), Analemmas (photographs) and other solar system orbital topics.

Then we got down to the business of Ursa Major, Minor, Polaris and other nearby constellations, Charles Messier's contribution to astronomy in (about) 1750 and the M objects were noted. The class closed after about 30 minutes of beautiful star slides. This night even the kibitzers had little to say.

Hey, I can't read some of those names on the sign-in sheet!! Are you bashful? The sign-in sheet is for inclusion in the Ephemeris monthly newsletter. I note that many or most of the class members are repeaters and at least somewhat experienced. Through programs like these everyone gains more insight to the wonders of celestial objects. Those in attendance were:

Paul Barton
Bill O'Shaughnessy
Terry Kahl
Benjamin Baez
David Simons
Delores Ryan
Lorraine Lo
Del Fausey
Chung-Lin Lee
Alex Calderon
Dan and Alice Finley
Bob Madden
Albert Chen
Paul Mancuso
Chuck Pooley
Jim Van Nuland
Rich Neuschaefer



DOUBLES

[From Compuserve]

This file contains predictions for a number of double stars appropriate for the testing of telescopes in the 3" to 30" range. This information is taken from the Handbook of the British Astronomical Association for the years 1986 through 1993.

Abbreviations: OE = Otto Struve Catalog
 B = Aitken Catalog
 Hu = Hussey Catalog
 I = Innes Catalog
 h = John Herschel Catalog

	RA	DEC	MAGS	PA	SEP(")	PA	SEP(")
85 Peg	0:02.2	+27:05	5.8 8.9	117.9			
	0.75	127.5	0.78 (1)				
OE4	0:16.7	+36:30	8.2 8.9	160.7			
	0.47	159.3	0.47				
B395	0:37.3	-24:46	6.3 6.4	119.1			
	0.60	123.6	0.48 (2)				
36 And	0:55.0	+23:38	6.0 6.4	299.6			
	0.81	301.8	0.83				
10 Ari	2:03.7	+25:56	5.9 7.3	339.9			
	1.02	340.8	1.04				
7 Tau	3:34.4	+24:28	6.6 6.7	2.4			
	0.72	2.0	0.72 (3)				
OE65	3:30.3	+25:35	5.8 6.2	215.7			
	0.22	218.5	0.17 (4)				
Hu445	5:01.7	+20:50	8.6 8.9	289.6			
	0.45	291.0	0.45				
14 Lyn	6:53.1	+59:27	5.6 6.8	263.6			
	0.45	264.6	0.45				
9Pup	7:51.8	-13:54	5.6 6.2	298.3			
	0.58	300.8	0.55 (5)				
Zeta Cnc AB							
	8:12.2	+17:39	5.6 6.0	146.2			
	0.63	135.4	0.65				
B208	8:39.1	-22:40	5.3 6.7	27.3			
	1.33	27.8	1.39				
OE235	11:32.3	+61:05	5.8 7.1	303.7			
	0.60	309.2	0.60				
I83	12:56.7	-47:41	7.4 7.6	225.4			
	0.82	225.7	0.83				
A1609 AB							
	13:25.8	+44:29	9.0 9.1	341.6			
	0.39	346.0	0.41				
Zeta Boo							
	14:41.1	+13:44	4.5 4.6	301.7			

0.92	301.4	0.91
17 Lib	14:46.2 -21:11	7.1 7.3 2.2
	0.19	23.9 0.17 (6)
h4707	14:52.2 -66:25	7.6 7.9 302.1
	0.76	300.2 0.78
Eta Crb	15:23.2 +30:17	5.6 5.9 35.1
	1.08	38.2 1.05

Gam Lup		
	15:35.1 -41:10	3.5 3.6 274.8
	0.68	274.6 0.68
Pi2 UMi	15:39.6 79:59	7.4 8.2 25.8
	0.74	25.7 0.74
Zet Sco AB		
	16:04.4 -11:22	4.9 4.9 60.8
	0.49	72.6 0.38
I253	19:19.0 -33:17	7.6 7.7 137.6
	0.36	137.3 0.30
Lam Cyg		
	20:47.4 +36:29	4.9 6.1 9.1
	0.88	8.6 0.88

4 Aqr	20:51.4 -5:38	6.4 7.2 17.3
	0.89	17.9 0.88

Eps Equ AB		
	20:59.1 +4:18	5.8 6.1 284.8
	0.96	284.7 0.95

Tau Cyg		
	21:14.8 +38:03	3.8 6.4 353.3
	0.68	345.5 0.71

A 632	22:52.0 +57:43	8.6 9.1 154.8
	0.61	153.2 0.59

B80	23:18.9 +5:24	8.5 9.1 2.9
	0.37	14.4 0.30

72 Peg	23:34.0 +31:20	5.7 5.8 91.5
	0.53	92.4 0.53

(1) 85 Peg passed periastron in 1989, when it was a test for a 12" scope. Now, it should be an easy object in a 6".

(2) B395 is closing very rapidly. As it does so, it is sweeping through the range of magnitudes suitable for testing small instruments:

Year	Test for
1991	6"
1992	7"
1993	8"
1994	10"

(3) 7 Tau is now an almost perfect test for a 6". It is slightly below Dawes' Limit (see discussion below).

(4) OE65 is closing fast, and if

you don't have at least a 24" you will miss your last chance to see this pair.

(5) 9 Pupis is past maximum separation, and is closing noticeably. Its interesting recent history is as follows:

PA	SEP
1986.0	272.4 0.19"
1987.0	282.6 0.39
1988.0	286.6 0.51
1989.0	289.3 0.57
1990.0	291.6 0.60
1991.0	293.8 0.61
1992.0	296.0 0.60
1993.0	298.3 0.58
1994.0	300.8 0.55

When this file was first published, five years ago, this star was a test for a 24". It widened until it was visible in a 6", and should now be a good exercise for an excellent 8".

(6) 17 Lib is closing rapidly. It was at its widest in 1989, now it is a test for a 24".

We say goodbye to an old friend. I314 has now passed through apastron, and is effectively out of reach to visual observers for the next thirty years. Since the first issue of this list, we have watched it change from a test for a 10" to a double which could only be split by a giant telescope. Unfortunately, such a telescope could not stand the power required because of its sensitivity to atmospheric turbulence. Here is what we have seen:

PA	SEP
1986.0	232.3 0.45"
1987.0	231.4 0.39
1988.0	230.1 0.33
1989.0	228.3 0.26
1990.0	224.7 0.17
1991.0	212.1 0.07
1992.0	67.9 0.06
1993.0	35.5 0.06
1994.0	313.6 0.04

Notice that between 1991.0 and 1994.0 the companion traversed almost 205 degrees of its orbit!

Continued on page 4

Doubles

Continued from page 3

Who said that the stars don't move? It is now a test for 100" telescopes.

RESOLVING POWER

The accepted empirical resolution limit of visual telescopes (Dawes' Limit) is as follows for visual instruments:

Closest Star	Aperture	Resolved
50mm	2.31"	
60mm	1.92	
80mm	1.44	
4"	1.14	
4.25	1.07	
5	0.91	
6	0.76	
8	0.57	
10	0.45	
12.5	0.36	
14	0.32	
16	0.29	
17	0.27	
20	0.23	
24	0.19	
29	0.16	

Star Parties - January '93

by Paul Barton

Saturday, the 23rd, weather was not good and very few people went out. The star parties were scheduled for Fremont Peak and Grant Ranch. It has been reported that Grant Ranch was locked-up and folks could not get in. [wrong weekend]

Monday, the 25th, looked a little better, but it was really hardly worth the trouble at Fremont Peak. It was clear below with lots of sky glow and quite a bit of wind. Hey, it never got below 50° F! There was an inversion — not uncommon at Fremont Peak.

So, we had a nice star party at John Muir school on Thursday, the 28th, attended by Paul Mancuso with a Quesstar showing off the moon, Jim Van Nueland and his 8" newtonian on Venus, Jack Petersen and the association's 11" Compustar Cassegrain showing Mars and Paul Barton with the JMI-18 on Orion. There was a large group of people and it was fun. The weather was fine with the moon about in the first quarter. Each of us was so busy we didn't know what the others were doing. [what fun it is with a large turn-out]

There was another fine star party at Hough Park on Friday, the 30th. The weather was OK with the moon about half. Seeing was fair and there were lots of people, including little ones who were bundled up until they were nearly a ball.

Mark Wagner took the sign sheet around early in the evening, but late arrivals may not have signed in.

Terry Kahl was seen handling that 6" Dobson like Paul Barton. Tiger Cubs (Scouts) #213 had several representatives. Mark Wagner and Daniel with the 12-1/2" Dobson that Buzz Glass used to squire around would find an object (like M-79) and then come to see if the JMI-18 was any better. It wasn't. The JMI-18 came to the front later in the evening finding Andromeda Galaxy, et al, next to the moon.

Rich Neuschafer and Jerry McGee have been shown how to turn off and on the parking lights. They will be used as back-ups.

Mark Wagner is "stuck" with that 12-1/2" monster, which he man-handles

expertly. No one else has the muscle or the van to wrestle it around. (No one has spoken for it either) There is a waiting list for several of the other SJAA loaner telescopes.

Ken Ward with SJAA loaner #15, an 8" Dobson, reported serious strains in the diagonal mirror and had it checked a Chabot mirror grind laboratory. This was due to hard epoxy glue used to attach the mirror. So he replaced the diagonal mirror and attached it with silicon rubber adhesive.

Asking around shows that others know about epoxy adhesives vs strains. That is the way we learn. [I might add that there are epoxies which do not harden and become brittle. A call to one of the manufacturers may get you a data sheet and the name of a local rep]

The Eye piece

Continued from page 1

package. Ticket reservations are strongly recommended! Watch for more information in coming announcements in Astronomy Magazine.

Observing Sites

At our first Astronomy class, Terry Kahl gave me a map and short description, with comments, of an observing site she has found. As you know we have included several descriptions of near-by sites that have been used in the past. Also Rich Page and Don Machholtz compiled a venerable list many years back. It is time to update the sites we frequently use and those we hold secretly in our minds. I will attempt to publish a booklet of the observing sites within an hours driving distance. Please send me your suggestions, with a map and description, and the name of a person who can also vouch for the site. Just send them to your editor (address on the cover).

Observing Tools

How about an article on your observing tools, such as a list of the items taken with you and the preparations gone through for that particular session. You know what I mean - a watch cap, gloves, eyepieces, charged batteries, star charts, etc. How do you pack them so they can be found easily

Astro Ads

continued from page 6

Meade 8", W/Starbright coating, German Equatorial Mount. Metal accessory case, 26 mm, 40 mm, 13 mm eye pieces. Piggie-back camera mount, T-ring camera adapter, and eye piece projection system. Great telescope at \$1200 for every thing. Call Maria Petersen at (408) 263-2896. 3/93

Astro-Physics 6" StarFire, f9, air spaced triplet APO refractor tube assembly. Only 21 lbs and 50" long (dew cap retracted). Beautifully made, great views, about 1 and 1/2 yrs old. All Astro-Physics parts: 2.7" focuser, 2" & 1.25" adapters, 2.5" extension, sliding dew shield, cover, case, plus mounting rings - \$2550. Call Rich Neuschaefer Wk (408) 285-6818 Home (408) 446-0975 3/93

Refractor Objective for Sale. Excellent 5.7" f/8 achromat lens in black anodized aluminum cell. Figured by D&G Optical - \$550. Originally made by well-known ATM Alan Gee. William Cooke Wk (408) 492-5640, Hm (408) 295-6560 3/93

Meade 2080 LX-5 w/MCOG, field tripod and wedge. Inc 9X69 RA polar illum finder, AC/DC adapter and cable, Quartz/pulse drive, 2" star diag and 1.25 adap., Remote hand controller and Moto-dec, storage trunk, t adap for Yashica SLR, 1.25" 9mm, 26mm meade eyepieces, 2" 18 or and 60mm Celestron Kellner eyepieces, small reference library - entire package only \$1300. Call or write Steve DeMelo, P.O. Box 311 Shingle Springs, CA 95682 - (916) 677-9575 3/93

2 Tasco telescopes, both excellent condition. T-58 model \$100 and T - 48 model \$75. Call Rebeca Newell (408) 259-8027 3/93

Celestron 8 S/C, Super Polaris, manual drive, 6X30 finder, stool, but no case, star diag, 2X Barlow, Oculars of 7.5, 15, 26 and 36 mm - illumination reticle w/ battery back. Ask \$1,400/OBO. Call Carl Harris (408) 338-9580 3/93

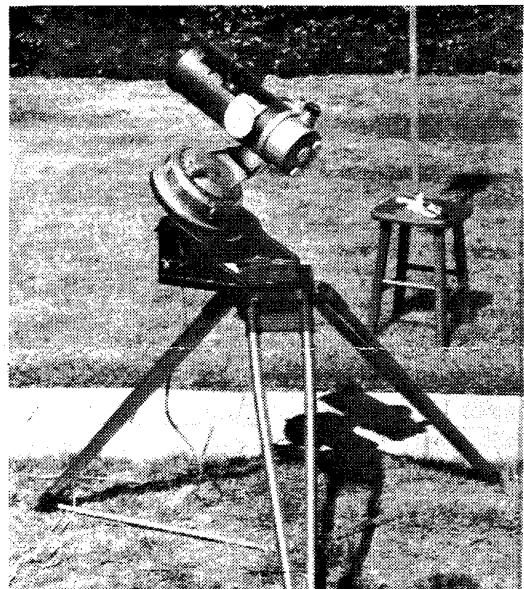
Yeager 3-1/4" Refractor on a Super Polaris Mount. Contact Phyllis Rose (408) 293-6611 3/93

be found when needed. Each observer has a different method of preparing for an observing session. Let us tell others what our secrets are. You write it..... I'll print it!

1993 SJAA Calendar

General Meeting	Houge Park Star Party	Observational Astronomy Class
March 6	26	27
April 3	30	17
May 1 Auction	28	29
June 5	25	26
July 10	23	31
Aug 14 Picnic	20	28
Sept 4 Slide/Equip night	24	25
Oct 2	22	30 Last one
Nov 20	19	none
Dec 18	17	none

Please read your *Ephemeris* each month for changes



SJAA Loaner Status

by Paul Barton

			Due Date
4-1/2"	Newt/P mount	Chung-Lin Lee	2/10/93
6"	Dobson	Terry Kahl	2/10/93
4"	Quantum	B. Madden (Ken Ward)	4/23/93
60mm	Cometron Ref.	Dave Simmons	3/11/93
C-8	Celestron	Bud Whitlin (T Kahl)	2/12/93
12-1/2"	Dobson	Mark Wagner	2/23/93
60mm	Tasco 44-T Ref.	[To be Auctioned]	Available
6"	Newt/P mount	Albert Chen (D. Petri)	3/17/93
8"	Dobson	Ken Ward (L. Courtney)	3/1/93
8"	Newt/P Mount	Richard Raw (on waiting list)	2/27/93

If you want to borrow a telescope call Paul Barton (number is on the credit Marque) and get your name on a general list (any telescope) or on a specific telescope list.

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. 95118-2825

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

Newtonian Telescope, F5-12.5 Parks mirror. 10X70 Celestron finder, 2" Meade rack and pinion focuser. 10" Byers drive gear on 2" shafts. Electronic drive with hand controller. This is an original Telescope World mounting. Priced to sell at \$1600. Contact Kim McElveen. Days (408) 974-4099 or evenings 510 487-7268.

11/92

Classic C-8, Starbright coatings, 8X50 finder, heavy duty tripod, deluxe adjusting kit, 36 and 45 Celestron Plossls, 2X Celestron Barlow, Orion 10.5 Megavista, Telrad w/extra base, updated Adv. Astromaster w/hi-res encoders, Digitrack corrector, Orion SkyGlow filter, vibration pads, stool and Rigel LED lamp. List approx \$2,150 now; asking only \$1600 for a nice combination. Will include Orion Giant 10X70 binoculars in excellent condition for \$150 or \$200 separately. Will discuss delivery. Call Robert W. Gage (Stockton) at (209) 474-1363.

1 / 93

Celestron 14 f/11 tube assy. w/Starbright coatings, 1979 vintage w/forks, drive base and wedge. Solid steel pier w/levelers, 2" diag w/1.25 adaptor. 11X40 finder, counterweights (4), Acutrack d/a drive corrector, no eyepieces - \$3200.

Takahashi FC 125 fluorite f/8 doublet refractor, beautiful, f/8 tube, massive 4" focuser, 2" diag w/1.25 adaptor. Full aperture Thousand Oaks solar filter, Cordura carrying case. Mount not inc, but ideal for G-11 or Losmandy 100. superb lunar, planetary, stellar images - \$3500 John Gleason (408) 720-2493 or (510)792-8248

1/93

Orion 10X70 Astronomical Binoculars Fully Coated. Call Ed Rible in Stockton at (209) 446-0924 during day; (209) 478-5795 evenings.

1/93

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CELESTIAL CALENDAR

March 1993

Lunar Phases Date Rise Tran Set
 FQ 07:46hr 01-3 1059 1824 0141
 FM 01:47hr 08-3 1841 0033 0626
 LQ 20:16hr 15-3 0101 0548 1033
 NM 23:16hr 23-3 0534 1148 1759
 FQ 20:10hr 31-3 1051 1800 0112

Nearer Planets

Mercury	07-3	0622	1222	1822
0.36 AU	17-3	0528	1115	1700
Mag +0.9	27-3	0459	1039	1619

Venus	07-3	0722	1408	2054
0.72 AU	17-3	0635	1324	2013
Mag -4.2	27-3	0544	1228	1911

Mars	07-3	1222	1954	0328
1.65 AU	17-3	1156	1926	0258
Mag +0.4	27-3	1133	1900	0230

Jupiter	07-3	1959	0156	0748
5.45 AU	17-3	1915	0112	0702
Mag -2.4	27-3	1829	0028	0623

Saturn	07-3	0535	1052	1610
9.85 AU	17-3	0459	1017	1536
Mag +0.9	27-3	0422	0942	1502

SOL Star Type	G2V	Mag - 26.72
	07-3	0628 1217 1805
	17-3	0612 1213 1814
	27-3	0557 1210 1823

Astronomical Twilight	rise	set
JD 2,449,053.5	07-3	0447 - 1917
9,063.5	17-3	0435 - 1930
073.5	27-3	0426 - 1948

Sidereal Time

Transit Right	07-3	0000 PST=1053
Ascention at	17-3	0000 PST=1134
Local Midnight	27-3	0000 PST=1213

Darkest Saturday Night Mar. 20

Sunset 1803

Twilight End 1934

Moon Set 1605

TIMES AND DATES ARE PACIFIC STANDARD

by Richard Stanton

Derivation of these values are from
*Astronomy with Your Personal
Computer*

by Peter Duffet-Smith

Voyager

by Carina Software

MacEphem

by Elwood Charles Downey

Observer's Handbook 1993

RASC

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Comet comments

by Don Machholz

Periodic Comet Schaumasse remains in our northern evening sky, well placed for observation. Meanwhile, a new comet has been discovered, it should be visible in our telescopes late this year.

Comet Mueller (1993a): Jean Mueller discovered this comet on January 2 from Mt. Palomar. It was found on a plate exposed on the 1.2 meter Schmidt as part of the Second Palomar Survey. Then at magnitude 14 and in the morning sky, the comet was 4.5 AU from the sun and more than a year from perihelion.

The comet will be closest to the sun next January 13 at 1.94 AU. By that time, if it behaves normally, it will attain magnitude 8. Over the next few months, however, it will remain near magnitude 12.

Periodic Comet Bus (1993b): Jim Scotti also recovered this comet from Kitt Peak on January 1. It appeared stellar at 22nd-magnitude. Perihelion will occur later this year, but it will remain out of reach of amateur's instruments.

Periodic Comet Tempel 1 (1993c): Jim Scotti also recovered this comet, on January 21. Perihelion is still more than a year away.

EPHEMERIDES

PERIODIC COMET SCHAUMASSE (1992x)

DATE(00UT)	R.A. (2000)	DEC.	ELONG	SKY	MAG
02-22	04h36.1m	+41°40'	100°	E	8.2
02-27	04h55.4m	+43°27'	98°	E	8.1
03-04	05h17.5m	+45°00'	98°	E	8.1
03-09	05h42.3m	+46°14'	98°	E	8.2
03-14	06h09.4m	+47°04'	98°	E	8.3
03-19	06h38.3m	+47°26'	98°	E	8.4
03-24	07h08.2m	+47°17'	98°	E	8.6
03-29	07h38.3m	+46°35'	99°	E	8.8
04-03	08h07.7m	+45°23'	100°	E	9.0
04-08	08h35.7m	+43°42'	101°	E	9.3
04-13	09h01.8m	+41°39'	101°	E	9.6

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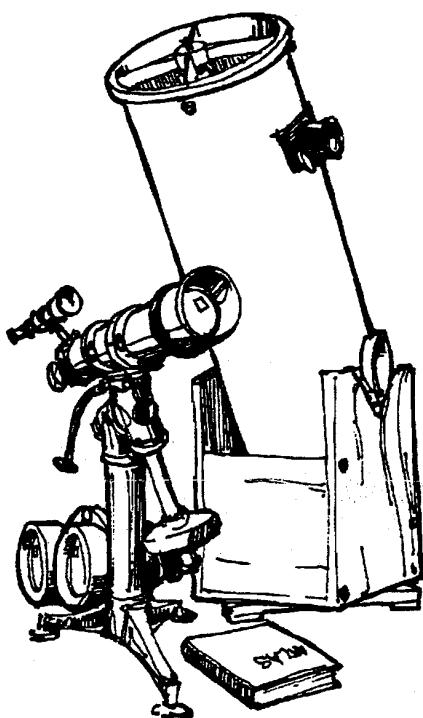
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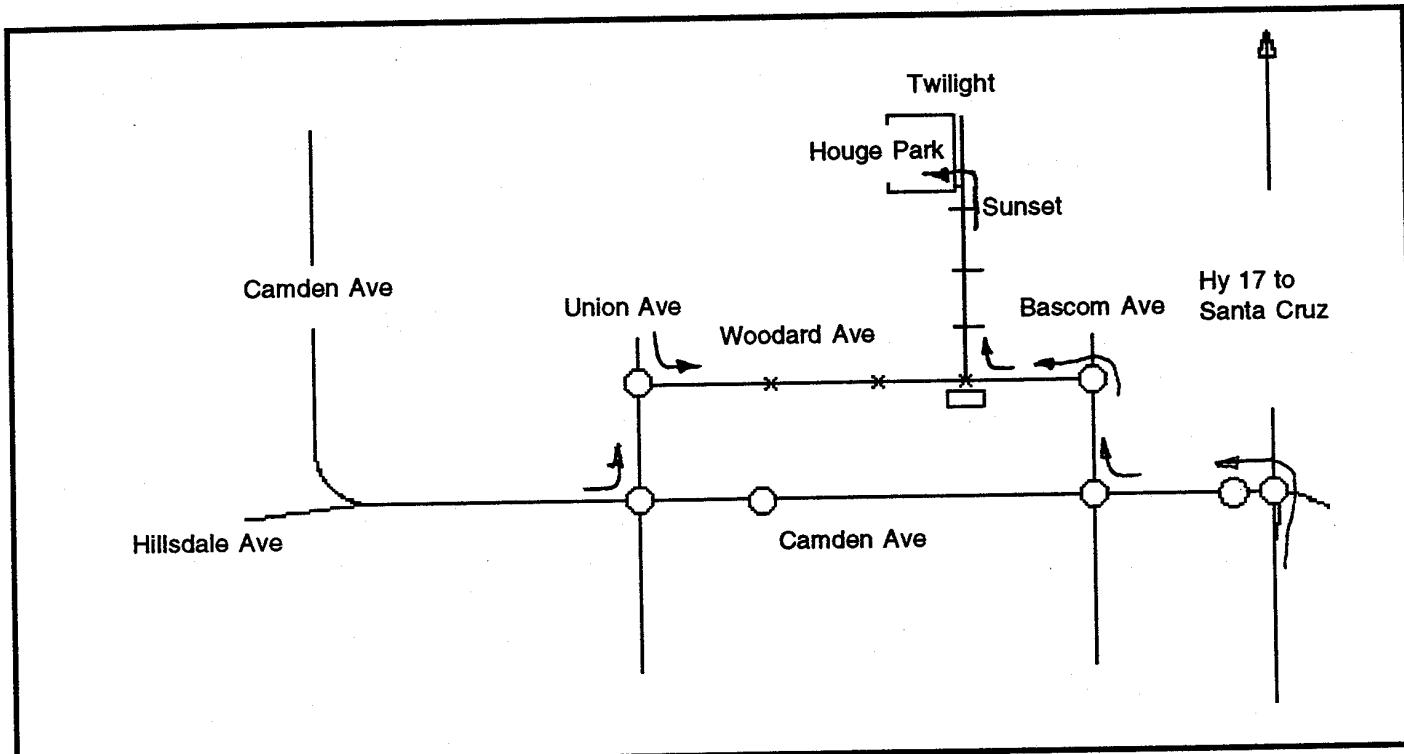
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