EPHEMERIS

Vol. 2 No.12 Official Publication of the San Jose Astronomical Association December, 1990

LOOKING AHEAD

For 1991, the general meetings will remain on 1st Saturdays until September, when they will be moved to the 4th Saturdays. This optimizes our meeting schedule around the star parties, which in turn will be 2nd and 3rd, and later 1st and 2nd Saturdays.

The Introductory Astronomy class will again be conducted in two parts: the indoor (lecture) part on 4th Saturdays (Jan - Sept), and the outdoor part at Grant Ranch County Park on 2nd Saturdays, along with the Halls Valley Group public session.

Meetings of the Board of Directors will be moved to precede the General Meetings, to (hopefully) combine some trips for the Directors.

The Branham Lane public presentations will remain on 4th Fridays only through March 1991, then 3rd Fridays through November, and then 2nd Fridays. Extension into 1992 has not been studied.

It would be nice if a fixed schedule could be set; but since the New Moon creeps upward in the month, we must accommodate. The alternative would soon have indoor meetings falling on the new moon -- stepping on the star party. If you are making long-range plans, call Jim Van Nuland for details regarding the club calendar.

1973 SOLAR ECLIPSE?

With the big '91 eclipse just around the corner, we thought it would be nice to have Ernie Piini come in and share a few solar eclipse experiences. Specifically, Ernie will be sharing his journey to Mauritania for the 7 minute total solar eclipse in 1973. As an accomplished eclipse photographer, Ernie's talk will be of interest to all photographers and observers. Meeting begins at 8 p.m..

STAR HUSTLER

A letter from Station KQED advises that they are considering running Jack Horkheimer's program on Channel 32 before sign-off, starting January 1991. Watch for it, and tell your friends.

SPACE PROGRAM UPDATE

- BOB FINGERHUT

DECEMBER 1ST
ERNIE PIINI
1973 TOTAL
SOLAR ECLIPSE

DECEMBER 1: GENERAL MEETING, 8 PM, LOS GATOS RED CROSS.

DECEMBER 8 : BOARD MEETING, 8 PM AT THE LOS GATOS RED CROSS.

DECEMBER 15: HALLS VALLEY GROUP PUBLIC STAR PARTS AT GRANT RANCH. SJAA INVITED.

DECEMBER 22: NO ACTIVITY. MOON TOO BIG, RED CROSS BUILDING NOT AVAILABLE.

DECEMBER 25: SOMETHING HAPPENS THIS DAY. I'M NOT EXACTLY SURE.

DECEMBER 28: (FRIDAY) PUBLIC STAR PARTY AT BRANHAM LANE PARK.

JANUARY 1: HAPPY NEW YEAR!!! (AND I JUST GOT USED TO WRITTING 1990 ON MY CHECKS!)

JANUARY 5: GENERAL MEETING AT THE RED CROSS. SPEAKER TO BE ANNOUNCED. 8 PM. BOARD OF DIRECTORS MEETS AT 6:30 PM.

JANUARY 12: HALLS VALLEY GROUP PUBLIC STAR PARTY AT GRANT RANCH. SJAA INVITED.

ULYSSES ON WAY TO STUDY SUN - The Ulysses space craft was launched on the shuttle orbiter Discovery on October 6. After release from Discovery, the spacecraft was propelled out of Earth orbit by a two-stage inertial upper stage booster and a payload assist module. The boosters increased Ulysses velocity to 34,130 mph relative to the Earth and 101,880 relative to the Sun. Ulysses trajectory will take it to Jupiter where it will receive a gravity assist that will hurl it over the Sun's south pole.

Ulysses nine solar physics instruments will be operational and will begin collecting data on the heliosphere in November. Following the deployment of Ulysses, the shuttle crew worked on commercial materials processing experiments and space technology investigations that demonstrated how fire acts in zero-g. Discovery landed at Edwards AFB on 10 October.

ATLANTIS AND COLUMBIA CLEARED FOR FLIGHT - Both orbiters passed leakage tests in which they were fueled with cryogenic hydrogen. On past launch attempts, unacceptable levels of hydrogen leakage occurred in the engine compartment during fueling, halting launch preparations. Atlantis is now scheduled for a mid-November launch carrying a classified Department of Defense payload. Columbia is scheduled for an early December launch with the ASTRO-1 Spacelab mission.

SOVIET SPACE PROGRAM - Cosmonauts were not successful in an attempt to fix the hatch on the MIR space stations' Kvant-2 building block module during a spacewalk on 29 October. The problem surfaced when cosmonauts attempted to reenter the MIR after repairing loose thermal blankets on their Soyuz space capsule on 17 July. The inability to make the repair is not critical because the Kvant-2 hatch is not the only exit available for crew members

when they perform an EVA.

EUROPEAN SPACE PROGRAM - Arianespace launched two telecommunication satellites on an Ariane 44L booster on 12 October. This was the fifth Ariane launch in 1990. One more is scheduled before the end of the year.

CHINESE SPACE PROGRAM - China launched a retrievable satellite on a Long March 2 booster on 5 October. It was the fifth satellite that China has orbited this year. The satellite carried animals and plants to study their reactions to weightless environment and was scheduled to remain in orbit for eight days.

NASA PURSUING SHUTTLE UPGRADES TO IMPROVE RELIABILITY AND CAPABILITY - NASA is going to replace the shuttle instrument panel with nine identical liquid crystal active matrix devices as part of the Assured Shuttle Availability Program. The new display system has reduced weight and power requirements and required fewer spare parts to be stocked. A new shuttle main engine high-pressure fuel turbopump in under development. The new pump will increase pump life to 10,000 seconds or 20 flights. The current pump develops cracks in as little as 4000 seconds and is therefore limited to 2000 seconds or four flights. Two extended duration orbiters will have the capability to remain in orbit for up to 16 days. Columbia will be modified and is scheduled for its first extended duration flight in March 1992. The second orbiter will be the Endeavour which is currently under construction. To extend orbiter duration, NASA has developed a pallet containing liquid hydrogen and oxygen tanks that will be installed in the aft portion of the shuttle cargo bay to provide supplies for the fuel cells. The fuel cells produce electricity and drinking water. Other elements of the extended mission kit include a regenerative carbon dioxide removal system, a waste compactor and collection system, additional nitrogen tanks and increased toilet storage capacity.

DESIGN CHOSEN FOR THE NATIONAL AEROSPACE PLANE - All of the airframe and engine contractors have formed a single team and reached a decision on the NASA or X-30 design. The NASA design is a directionally stable lifting body that incorporates short wings, dual stabilizers, and a two-man dorsal crew compartment. Propulsion will be provided by three to five scramjet engines and a single 50,000 - 70,000 lb. thrust rocket engine. The single stage to orbit X-30 aircraft is expected to be 150 -200 ft. long and have a gross weight of 250,000 - 300,000 lbs. If the government funds the construction of two flight test vehicles in 1993, flight test could begin in 1997 and the first single stage-to-orbit would be attempted in 1999.

CONGRESS PASSES NASA FY 1991 BUDGET - The biggest cut was made in Space Station Freedom. NASA received $1.9 billion of the $2.4 billion requested for the space station. NASA was also ordered to redesign the station within 90 days so that deployment will take less shuttle flights. NASA will probably have to break the U.S. laboratory module and habitation module into two smaller modules each. The Space Exploration Initiative to return to the Moon and go onto Mars has all funding deleted. ($37 million had been requested) Congress also deleted funding for the Lunar Geoscience Orbiter, the Assured Crew Return Vehicle (the "lifeboat" for space station astronauts) and the Orbital Maneuvering Vehicle. Missions that escaped the major cuts were comet Rendezvous Asteroid flyby (CRAF), Cassini spacecraft, the Earth Observing System and the advanced solid rocket motor for the shuttle.

THE EYE AND ITS ABILITY TO VIEW DIM CELESTIAL OBJECTS

-STEPHEN R. WALDEE

Part 6: Light Pollution Filters

Now you're all set to enjoy great deep-sky astronomy! You've got a new 8" f/4.5 scope with a mirror that the manufacturer guaranteed would have a 20th-wave figure. Your eyepiece case is fitted out with a splendid set of multicoated premium Plossls, and you repair to the Santa Cruz mountain range skyline, miles from the Silicon Valley lights, and gaze up at a decently dark sky nearing 6th magnitude naked-eye visibility, at least opposite the remaining glow from San Jose. The Milky Way looks great, and you're anticipation mounts as a trembling hand inserts the 32mm eyepiece, chosen for that magic 7mm exit pupil view of a resplendent "Lagoon" nebula.

But the promises of the telescope salesman and his advertising literature, and the expectations aroused by the fabulous observatory photos decorating his showroom walls far outstrip the image you see in the eyepiece. Sure, it's lots better than your old 60mm refractor offered, but the dramatic dark lanes are washed out into a dull blotchy glow that fades out into a gray-blue background. No amount of waiting for better dark adaptation seems to provide a better view; in fact, it just seems to get worse as M8 dips steadily lower into the atmospheric muck.

No doubt about it: you're ready to add a light pollution filter to your bag of tricks. The insidious spread of wasted photons belching from garage door lights, street lamps, and advertising signs has raised the visual "noise level" to unacceptable levels. The telescopic images resemble the unsatisfying performance of old, cheap black-and-white TV sets without "DC restoration": when the scene gets dim, it just fades out to gray, not a dark and velvety black.

A filter can't make an image brighter: in fact, by introducing more optical components into the light path it darkens ALL images. However, it darkens some more than others. In the standard "gentle" light pollution reduction (LPR) filter, such as the Lumicon "Deep Sky" (tr), a small band of light frequencies in the range of colors produced by street lights is blocked, while the important radiation emitted by nebulae is passed with more than 95% efficiency. contrast is enhanced, and faint shadings and details are clear, not buried in washed-out sky glow.

For viewing dim planetary nebulae, especially the wee tiny ones that can scarcely be told apart from stars, the greater cut-off of the so-called "nebular" filter, such as Lumicon's "UHC" (for

Ultra High Contrast) (tr) will block more of the unwanted light, but will also dim stars and galaxies. Other nebular filters will pass the critical "Hydrogen beta" bandwidth of the nebular stream that contains the Horsehead, or the delicate details of "O-III" (triply ionized oxygen) lines in the Veil Nebula.

Even a pristine dark sky still contains some unwanted skyglow that will be knocked out by LPR filters. Of late I've undertaken a search for the fascinating dark nebulae catalogued near the beginning of the century by Edward Barnard. He at first thought these dark starless blotches were merely "holes" in the stellar realms, but after 30 years of study, Barnard concluded that they were indeed masses of gas that were blocking out the light of more distant stars.

No photograph can make these mysterious dim cloud seem as palaply real as a visual sighting under the right conditions. One night last fall the clouds and fog came in to blanket all but the tip of the mountain where I was observing, just fifteen mile south of San Jose. All the Earth's lights went out as if bay a switch. I scanned through the Milky Way until I came to a patch discovered in Sagittarius over a century ago by Barnard when a mere amateur observer. The "barefoot" view was impressive, but with the LPR filter the cloud stood out with a dim a brooding dimensionality that was almost palpable. It was a moment both scary and exalting that I'll long remember!

COMET COMMENTS

- DON MACHHOLZ

No new comets have been discovered recently, but the two found in September by Jean Mueller are periodic. Comet 1990j is now known as Periodic Comet Mueller 3. Presently visible in our sky are three comets: Periodic Comet Wild 2, Comet Tsuchiya-Kiuchi, and Comet Levy.

The Seeking Comets section ends with this issue. For these past four and one-half years I've enjoyed writing about the art of finding comets and I've tried to cover nearly every aspect of it. Us comet hunters find this information fascinating, but the feedback I've seen indicates that few other readers are interested in this data and in the style of presentation.

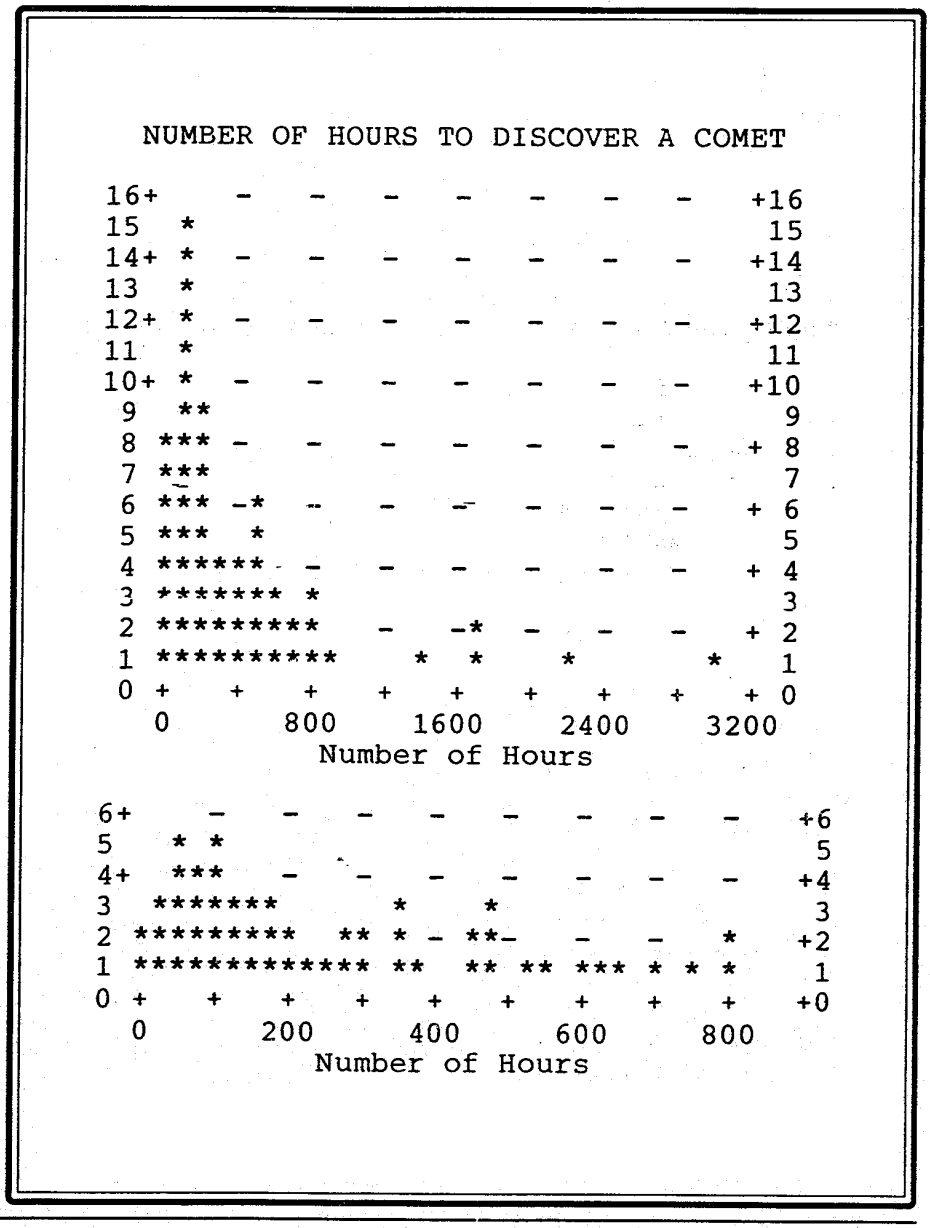
SEEKING COMETS

How long does it take to find a comet? When I began comet hunting in 1975, I was under the assumption that it took about 300 hours of searching to find a new comet. One of the reasons I undertook this hobby was to see if this was really true, and to see if it could be made more efficient.

Using data from the last two installments of this column, we find that the number of hours needed to find a comet range from 0 to 3024. The average is 423; this is high due to a few large numbers. Indeed, half of the comets were found in under 220 hours. The total number of hours for 60 discoveries totaled 24,356.

I should also point out that some comet hunters never discover a comet. Their totals are not, of course, included here. But I have always felt that if someone wants to discover a comet, they can, if they are willing to sweep often, and sweep smartly.

In the data box I show the number of hours to find a comet using two graphs. One shows all comets, the other shows only those found in under 900 hours. The vertical axis displays the number of comets (denoted by a "*") in each interval.



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TELESCOPES AND ACCESSORIES - Meade model 622 6-inch f/3.6 wide field Schmidt-Newtonian on Meade equatorial mount. 2" focuser, 25mm eyepiece. Used twice. Excellent condition, $700. Telrad Finder, $30. Lumicon 80mm Super Finder, $150. Celestron 5X24 orange finderscope with bracket for C5, $20, Celestron 6X30 orange finderscope with bracket for C8, $20. Celestron 10X40 orange finderscope with bracket for C14 $45, Celestron 10X70 giant finder with bracket for C14, $140. Declination motor for sandcast C8, $20. Celestron T-Adapter for camera (T-ring for your camera not included), $15. Celestron tangent assembly for C8/C14 $175. Orion Telescope Center Dew gun, $5. 1 1/4" Optica filter set, green, red, yellow, orange, violet, blue, and Moon filter, 19mm clear aperture, $25. .965" star diagonal from C90, $5. Tuthill polar axis finder, $45. Meade #603 D.C. cord 25' with cigarette plug for use with #784 motor, $15. Meade #604 A.C. converter with 25' cord for use with #784 motor, $20. Home made 8-inch f/4 Newtonian optical tube assembly with Novak spider and mirror cell, Meade 680 focuser, end rings, dust caps, 2.60" secondary. Optical performance unknown (my first and last mirror). No finder or eyepeice included. Make Dobsonian mount and your all set, $175. (hardware alone a $164 value) All above equipment is in new or very good condition. Bill Dellinges, 415-792-9206

10-inch NEWTONIAN telescope with equatorial mount, motor drive, Richfield scope, spotter scope and is on a tripod with casters. $1500/obo. Contact Nancy Piekarczyk 415-632-6542. 10/90

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CELESTRON SUPER C8 w/tripod, wedge, 8 X 50 finder, 26mm Plossl, 7 mm Ortho eyepieces, 120/12 V. TeleDrive R.A. & Dec. drive, counter weights, original case...seldom used. $900/obo. Herb Builtemen, 867-3917 10/90

DECEMBER STARRY NIGHTS

- RICHARD STANTON

BLUE MOON - You may have noticed that there will be two full moons during the month. Whenever this happens, the second full moon is called a Blue Moon. this is really not all that rare of a phenomenon as it occurs every couple of years or so. The average is 2.7 years between Blue Moons. The last Blue Moon was in May of 1988 and the next will be in September 1993. Out of curiosity I tried to research the origins of the phrase "once in a Blue Moon." I was surprised to find that most of the better known quotation references did not contain this phrase. At last a minor reference was turned up that alludes to an anonymous rimester who in 1528 published the lines:

"Yf they saye the mone is blewe, We must beleve that it is true."

It appears there were two schools of thought as in 1529 when another writer published "They would make men beleve...that ye Moone is made of grene cheese", and two schools were firmly planted, holding that "Ye Moone" was made of either "grene" or "Blewe" cheese. How the author of this little reference decided that this is related to "once in a blue moon" was apparently a mystery to him and I assure you it is a mystery to me. If any of you come up with a better trail to the source of the phrase please share it with us.

GEMINIDS - Take note that the major meteor shower, the Geminids will reach maximum during the wee hours of December 14th under near New Moon conditions. The event may show as many as 75 meteors per hour near maximum, so at least poke your head out the window to see what you're missing.

NEW YEAR'S EVE DELAYED - I noticed that the International Earth Rotation Service (wonder how much they charge to rotate the Earth?) have decided to slow the Earth's rotation by one second at 23:59 on December 31st. In other words the last minute of the year will have 61 seconds instead of 60. Actually they're just adjusting clocks to account of the naturally slowing rotation of the Earth. The annual Geek Award will be given to anyone who misses tooting their horn because they're adjusting their watch.

THE END - Well the Ghosties and Gobblins have all but disappeared. The axe wielding turkey chaser was last seen eating Flaming Turkey Balls that looked like was. But Cherry 'ol St. Nick will soon be out clanging his bell. Thus another year has gone by in a flash, or was that Comet, or Cupid, or Dash? A very merry holiday season to you all. GOOD OBSERVING UNTIL NEXT TIME!

:::CELESTIAL CALENDAR - DEC-1990::::

by Richard Stanton

LUNAR PHASES	Date	Rise	Tran	Set
FM 23:50hr	01-12	1544	2249	0555
LQ 18:04hr	08-12	2344	0544	1145
NM 20:22hr	16-12	0640	1145	1600
FQ 19:16hr	24-12	1117	1748	0009
FM 10:35hr	31-12	1635	2400	0700

NEARER PLANETS

Mercury.....	07-12	0854	1320	1741
0.75 A.U.	17-12	0804	1253	1737
Mag +3.0	27-12	0630	1138	1642
Venus.....	07-12	0746	1230	1709
1.66 A.U.	17-12	0801	1241	1717
Mag -3.9	27-12	0810	1251	1729
Mars.....	07-12	1549	2256	0604
0.58 A.U.	17-12	1503	2209	0516
Mag -1.2	27-12	1421	2127	0434
Jupiter.....	07-12	2050	0347	1043
4.58 A.U.	17-12	2008	0306	1002
Mag -2.5	27-12	1925	0224	0921
Saturn.....	07-12	0933	1427	1916
10.8 A.U.	17-12	0858	1352	1842
Mag +0.5	27-12	0822	1317	1807

SOL Star Type G2V Mag -26.72

1653-2233.....	07-12	0705	1155	1641
1737-2320	17-12	0709	1156	1640
1821-2320	27-12	0710	1157	1641

ASTRONOMICAL TWILIGHT

JD 2,448,232.5..	07-12	0526	-	1815
242.5	17-12	0533	-	1817
252.5	27-12	0539	-	1822

SIDEREAL TIME

Transit Right...	07-12	0000 PST=	0456
Ascension at	17-12	0000 PST=	0535
Local Midnight	27-12	0000 PST=	0615

DARKEST Saturday Night...December 15

TIMES & DATES ARE PACIFIC STANDARD

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COMET EPHEMERIS

DATE (UT)	RA (1950)	DEC	RA (2000)	DEC	ELONG	SKY	MAG
Periodic Comet Wild 2 (1989t)							
11-25	12h45.9m	-03°38'	12h48.5m	-03°54'	50°	M	11.1
11-30	12h59.9m	-04°57'	13h02.5m	-05°13'	51°	M	11.0
12-05	13h13.9m	-06°15'	13h16.5m	-06°18'	53°	M	11.0
12-10	13h28.0m	-07°30'	13h30.6m	-07°46'	54°	M	10.9
12-15	13h42.1m	-08°43'	13h44.7m	-08°58'	55°	M	10.9
12-20	13h56.1m	-09°53'	13h58.7m	-10°08'	57°	M	10.8
12-25	14h10.1m	-11°00'	14h12.8m	-11°14'	58°	M	10.8
12-30	14h24.0m	-12°02'	14h26.7m	-12°16'	60°	M	10.8
01-04	14h37.8m	-13°01'	14h40.6m	-13°14'	61°	M	10.8
01-09	14h51.6m	-13°55'	14h54.3m	-14°08'	63°	M	10.8
Comet Tsuchiya-Kiuchi (1990i)							
11-25	09h02.9m	-30°47'	09h04.1m	-30°59'	91°	M	7.6
11-30	08h25.4m	-35°56'	08h27.3m	-36°05'	99°	M	7.6
12-05	07h39.6m	-40°22'	07h41.3m	-40°29'	105°	M	7.7
12-10	06h46.5m	-43°19'	06h48.0m	-43°22'	110°	M	7.9
12-15	05h51.7m	-44°17'	05h53.2m	-44°16'	112°	M	8.1
12-20	05h02.1m	-43°25'	05h03.7m	-43°21'	112°	E	8.4
12-25	04h21.6m	-41°22'	04h23.2m	-41°15'	111°	E	8.7
12-30	03h50.4m	-38°46'	03h52.2m	-38°37'	107°	E	9.1
01-04	03h27.0m	-36°02'	03h29.0m	-35°51'	103°	E	9.4
01-09	03h09.8m	-33°24'	03h11.8m	-33°13'	99°	E	9.7
Comet Levy (1990c)							
12-05	14h05.1m	-40°36'	14h08.1m	-40°50'	38°	M	6.8
12-10	13h58.4m	-40°36'	14h01.4m	-40°51'	43°	M	6.9
12-15	13h51.0m	-40°36'	13h54.0m	-40°50'	48°	M	7.0
12-20	13h42.7m	-40°33'	13h45.7m	-40°48'	54°	M	7.1
12-25	13h33.1m	-40°28'	13h36.0m	-40°44'	60°	M	7.1
12-30	13h22.0m	-40°18'	13h24.9m	-40°34'	66°	M	7.2

THIS MONTH'S METEORS

EPHEMERIS is published monthly by the San Jose Astronomical Association - 3509 Calico Ave., San Jose California 95124. Members are encouraged to submit articles for publication. These should be typed and submitted no later than the 12th of the previous month. All submissions should be sent directly to the Editor, John P. Gleason, 5361 Port Sailwood Dr. Newark, California 94560 415-792-8248

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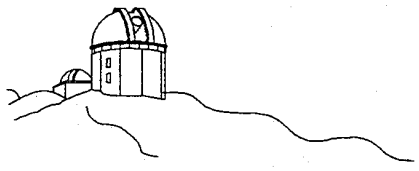

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