



EPHEMERIS

Vol. 2 No. 2

Official Publication of the San Jose Astronomical Association

MARCH 1990

FIELD OF VIEW

-JOHN GLEASON

Our speaker March 3rd will be Dr. William Straka of the Lockheed Palo Alto Research Laboratory who will present: "How do you get to Mars, land safely, and bring your samples back without contaminating the Universe?"

Other events this month include several star parties, including a public program at Branham Lane Park on March 2nd. March 17 will find the SJAA at Grant Ranch (weather permitting) in another of our continuing series of "Freeze Parties". March 24th is a scheduled Star Party at Henry Coe State Park, Dusk till Dawn Messier Marathon event. See Don "Marathon Man" Machholz's feature article.

ELECTION RESULTS

The Board of Directors was elected at the February meeting. Four members were elected or re-elected: Jack Peterson and Gene Cisneros (returning), Wolfgang Hanish and Del Johnson (new). Continuing for another year are: Steve Greenberg, Jim Van Nuland, Tom Ahl, Duncan Munro, and Paul Mancuso.

Leaving the Board are Connie Fleenor and Brian Zehring. We thank them for their contributions during the last two years.

The Board elected officers at the Feb. 10 meeting, to serve one-year terms. Nothing changed: President, Tom Ahl; Vice-pres, Paul Mancuso; Treasurer, Jack Peterson; and Secretary, Jim Van Nuland. In addition, John Gleason continues as Bulletin Editor, a non-elective position. (These guys are going to keep at it until they get it right!)

INDOOR STAR PARTY

March 31 is designated an "Indoor Star Party". Held at the Red Cross, the ISP is an opportunity to do what YOU want at a meeting. There is no formal agenda; bring new books, eye-pieces., etc., to show around; perhaps some photos that you'd like to show off, or perhaps ask for help with; perhaps a list of questions! One never knows what interesting things may

happen. Come one, come Ah!

ASTRONOMY DAY

April 28 is National Astronomy Day, intended to publicize astronomy and telescope making. The Astronomical Association of Northern California provides regional publicity, to assist all clubs get the word out. We will be at Branham Lane Park during the afternoon and evening.

10TH ANNUAL ASTRONOMICAL AUCTION

The 10th Annual Astronomical Auction will be held on May 5th at the Red Cross building in Los Gatos. As was done last year, we will have a Flea Market or Swap Meet during the afternoon from 2:00 to 5:00. Silent-bid sales may be conducted, too. Then from 6:00 until we finish, material will be auctioned. The building will be open by 1:00 pm. Come early, stay late.

Items having a (realistic) minimum bid of \$5 or less probably should be offered during the flea market, rather than the auction. Very specialized items, even if valued above \$5, should also be sold at the flea market, as auction time is limited. A silent bid sale could be used.

Items of general interest should be entered in the auction. The \$5 minimum is a guideline, but if the item is of wide interest, it could be auctioned. Pre-registrations is urged; forms will be published next month.

As before, SJAA's sales commission will be 10%, and a donation of \$1 is requested when registering to buy or sell. Please remember that everything is subject to prior sale.

BRANHAM LANE STAR PARTIES

Don't forget that the SJAA is holding public star parties on the following Fridays. Here are the upcoming dates:

March 2, April 6, May 4, June 1, June 29, July

27, August 31, September 28, October 26, December 28. Bring a telescope and tell your friends. For more information please contact Tom Ahl or Jim Van Nuland. Their telephone numbers are listed elsewhere in this issue.

ELECTRONICS SEMINAR III

Sponsored by the Orange County Astronomers, a full program of speakers is lined up including professionals James Janesick (JPL)

MARCH 3RD GENERAL MEETING DR. WILLIAM STRAKA "TO MARS AND BACK"

MARCH 2: (FRIDAY) PUBLIC STAR PARTY AT BRANHAM LANE PARK. STARTS AT SUNSET.

MARCH 3: GENERAL MEETING, 8 PM.
TO MARS AND BACK !

MARCH 10: SJAA BOARD MEETING AT THE RED CROSS, 6:30 PM, FOLLOWED BY THE INTRODUCTORY OBSERVATIONAL ASTRONOMY CLASS, 8 PM.

MARCH 17: STAR PARTY AT GRANT RANCH COUNTY PARK. DUSK TILL DAWN.

MARCH 24: STAR PARTY AND MESSIER MARATHON AT HENRY COE PARK. DUSK TILL DAWN EVENT HOSTED BY DON MACHHOLZ

MARCH 31: INDOOR STAR PARTY (ISP)
LOS GATOS RED CROSS BUILDING, 8PM

APRIL 1: (SUNDAY) DARKNESS SQUANDERING TIME BEGINS: ADVANCE YOUR SUNDIAL ONE HOUR AT 2:00 AM.

APRIL 6: (FRIDAY) PUBLIC STAR PARTY AT BRANHAM LANE PARK. SUNSET, 7:35 PM.

APRIL 14: SJAA BOARD MEETING AT THE RED CROSS, 6:30 PM, FOLLOWED BY THE INTRODUCTORY OBSERVATIONAL ASTRONOMY CLASS AT 8:00 PM.

and Beverley Oke (Hale). Program will stress acquisition and processing of imagery. CCD cameras and other modern sensors will be covered. Video for amateurs is a hot topic today! Papers are on amateur level, so we'd like to see you. Proceedings will be printed. Seminar admission, refreshments at 2 coffee breaks, proceedings book, \$25. Proceedings only, post paid: \$15. Program chairman: Wayne Johnson 714-734-8475, Papers chairman: John Sanford 714-639-8446, Registrar: Charlie Oostdyk, P.O. Box 1762, Costa Mesa, CA 92628, 714-751-5381

MARCH STARRY NIGHTS

- RICHARD STANTON

METEORS - I've been having a little debate with myself about the meteor section of this column. The problem is that after a couple of years of writing this section it begins to feel repetitive as the events for each month are the same as the prior years with the exception of minor variations. It would be more fun if some of our readers would send in occasional results from their meteor watches. Oh well.

MARCH METEOR SUMMARY

MAR 16 - CORONA AUSTRALIDS - MINOR/EXTINCT?

MAR 20 - VIRGINIDS - MINOR/
EXTINCT?

GALILEAN SATELLITES - The two optimum observing Saturday nights for this month are March 17th and 24th and there are no projected Galilean events during the normal "convenience" window. However, on the night of Friday, March 16, morning of Saturday, March 17th, there is one event.

MAR 16 - 21:29 HR - GANYMEDE - Occ. Dis.

MAR 17 - 01:52 HR - GANYMEDE - Ecl. Reap.

MARCH DEEP SKY CHALLENGE - This month we'll wander off to Leo and push some of our larger instruments. Our target is Ambartsumian's Knot, a nice little galaxy at magnitude 14.5. Also known as NGC3561 you'll find it lurking at (J2000) 11:11+28:42. When you find it you will see that it's but one of several galaxies showing in the same field which may have something to do with its name. Of course you'll know which one is Ambartsumian's Knot because of its overwhelming brightness at 14.5. Good Luck.

ENCYCLOPEDIA GLACTICA - Most of us are reasonably familiar with the British Astronomer, Mathematician, and Philosopher, Sir John Herschel (1792-1871). I'll bet you a doughnut that you've never run across his meteorological chart known as Herschel's Lunar Chart. In the summer, if the new moon, first quarter moon, full moon, or the last quarter moon occurs at the times listed below on the left, the weather conditions on the right will prevail. The items listed below are from his summer chart. I wonder if we could predict conditions for our field observation plans this way?

00-02 hours - Fair
02-04 hours - Cold and showers
04-06 hours - Rain
06-08 hours - Wind and rain
08-10 hours - Changeable
10-12 hours - Intermittent showers
12-14 hours - Heavy rain
14-16 hours - Changeable
16-18 hours - Fair
18-20 hours - Fair (if wind NW)
20-22 hours - Rain (if wind S or SW)
22-24 hours - Fair

Good Observing Until Next Time!

1990 MESSIER MARATHON

- DON MACHHOLZ

The 1990 Messier Marathon will be held Saturday evening March 24 at Henry Coe Park. Weather permitting, I'll be at the overflow parking lot one-half mile before the gate. I invite you to join me. Other observing sites are often used by SJAA members - Fremont Peak and Loma Prieta being two of them.

Because of the location of the galaxies, clusters, and nebulae in Charles Messier's catalog, mid-March through early April is the best time to hold the dusk-till-dawn observing session. Between March 5 and 20, 109 of the 110 objects can be seen, with only M30 missing. From our latitude, we lose M76 around mar. 21, meaning we'll see 108 objects until March 30. On March 31 we can pick up M30 in the morning sky, this gives us 109 objects again. After April 3 we lose several objects in the evening sky, decreasing the count. Observers in the southern United States may be able to observe all 110 of the Messier Objects, from our latitude the limit seems to be 109. Other factors include the Moon phase, which can't be too bright, and picking a weekend, since we're usually awake all night long.

The SJAA began the Marathon in March 1979, and we've been holding it every year since then. In some years the Moon has given us trouble, while sometimes the weather fails us. Many other active clubs across the nation also "Marathon".

Contact me for observing order sheets which can be used with almost any star chart. And after the Marathon, please let me know how it went. 408-448-7077

COLLIMATION, THE ETERNAL QUEST

- STEVE WALDEE

PART TWO: THE STARS, REAL AND ARTIFICIAL

In my first essay on collimation, I nostalgically recalled my happy, ignorant fumblings before coming under the grip of Collimation Anxiety, a clinical condition now recognized by psychiatrists as a nearly inevitable consequence of pursuing advanced visual astronomy. How I envy my blithe and content astrophotographer friends, lazy about collimation but frenzied on focusing and grappling with guiding.

The true homebrew fanatic or the astronomer on a tight budget may not choose to opt for a \$95 tool like the Tectron set, and instead attempt collimation on a night-time star image. Beware: this way truly leads to madness, as your precious Fremont Peak observing time is occupied not in gleaning the Sculptor system, but in jumping back and forth between the eyepiece and the mirror cell wing nuts, trying in vain to recenter the scope on your bright test star, while the image shifts, the Earth turns, and the finder goes further and further astray from the proper field.

Luckily, I always take two scopes with me to my favorite site, as I usually wreck my first instrument beyond any usefulness in my first two hours on the mountain before giving up and retiring to my alternate (and smaller) scope, reconciled to a night of counting the Galilean moons of Jupiter over and over again on my fingers and toes while the twilight looms.

But in attempting to use actual starlight for collimation, I learned some essential tricks before finally abandoning this frustrating practice. I assume that you have done rough but careful initial alignment during the day, preferably employing a center spot on your Newtonian's primary mirror as described in part 1.

When you're finally out under the stars, begin aligning on Polaris, as the pole-star eliminates almost all the rotation of the night sky. You may have to fiddle a bit with polar alignment and latitude adjustment to permit easy re-aiming of an equatorially-mounted scope, as we are concerned not with right ascension tracking but rather quick repositioning of Polaris after the mirrors are shifted.

At our local latitude, Polaris is elevated only 37 degrees, and air pollution is likely to cause some image wobble and instability. Select an eyepiece that gives about 30 power per inch of aperture; finer alignment at full power may be made later on a bright star near the zenith. Be sure your finder is properly aligned when you begin, so that you can get back to the ball park if you lose the star, but remember that with the slightest adjustment of the primary mirror, your finder is no longer in agreement with the main scope, and Polaris will get farther and farther away from the crosshairs.

The problem with every book or set of instructions on collimation is that you are told to defocus until the secondary mirror appears as a dark blob in the center of the primary's circle of starlight. Then you are supposed to make adjustments until this blob is "exactly in the center." Unfortunately, this is far too crude, as the eye cannot possibly gauge when the blob is lined up precisely right, and bad collimation with fuzz and flares inevitably results. My technique is only to slightly defocus, until the stellar image breaks up into several concentric diffraction rings. If the sky is blurry or unsteady, the rings may be intermittently broken or tearing. Try to adjust for the best average seeing, or give up until a better night arrives.

My big scope is so long that I have to run back and forth between the mirror cell and the eyepiece. The slightest turn of the wing-nuts throws Polaris off center, so be prepared to discover how far you can go each time before you lose your test star from the field of view. If you do, then you may even have to put in a low-power eyepiece, re-focus, and re-aim your scope, so start with absolutely minuscule adjustments at first.

Turn only one of the three mirror-cell screws at a time, watching the image to see which direction of rotation makes the rings and center dot most circular and concentric; to reduce coma and other distortions, be sure to center the test star in the eyepiece each time you adjust. If you cannot get a partner to help turn the screws for you while you watch, then you'll probably forget which one you've just turned. I finally resorted to muttering "clockwise" or "counterclock-

wise" over and over again until I'm ready to go back to the screw, so that I'll know what I've just done. Playing the 1812 Overture on the cassette player is definitely not recommended at this point.

When we finally give up on Polaris in frustration, we re-calibrate the finderscope and try for finer adjustment on a bright star right overhead, using full potential magnification. I try to use a star that is much brighter than Polaris, since I am now fighting the rotation of the Earth as well as the image shift from mirror adjustments. With an eyepiece giving 50 to 60 power per inch of aperture, I may have to make only slight touch-ups of one screw to get things (relatively) perfect. But there have been times when I discover that all is lost, and my scope is now so fuzzy that philately seems a better and more soothing occupation.

I finally recommend that collimation under the stars not be attempted on those wonderful new-moon nights with their naked-eye sightings of M33's arms. Then you're wasting precious observing time with the neurotic pursuit of a task that can be better done at home in the daytime. Choose instead a cool and steady afternoon, and set up your scope in a shady, sheltered spot on the lawn, as free from the breezes as possible. Place a piece of aluminum foil over the front of a clamp-on lamp, and carefully puncture the foil a few times with a sewing needle. One of your holes will be suitably small, and at a distance of, say 50 feet will resemble the image of a star in your scope's optics. If you're lucky, wind won't blow the image around too much, and heat waves won't break up the diffraction rings too severely: just don't attempt this over hot pavement or asphalt! Some experts suggest using the Sun's reflection in a thermometer bulb or Xmas tree ball, but I find the resulting asymmetrical image does not give clean round diffraction patterns. My best tries at creating an artificial star did not give me the perfect, consistent rings seen around Vega on a summer night, but did permit me to work back and forth through the good point until a finely-focused real star had a beautiful Airy disk surround it at high power in my 10" f/5.6 Newtonian. Unfortunately, my neighbors are now convinced that I am probably a Peeping Tom at best, a nuclear terrorist at worst!

In my last installment, I recount the delicious horrors of aligning Schmidt-Cassegrains, the ultimate in collimation torture and satisfaction.

DOUBLE, TRIPLE & MULTIPLE STARS

- PATRICK M. DONNELLY

It seemed appropriate at this time to do something new. I just realized last week (2/1/90) that for over 30 months I've been involved in studying double stars about 90% of my observing time. I've done a few other things, but mainly it was double stars. There was also a recent question that was asked of me. One of my co-workers wanted to know why the winter sky had so many more bright stars than summer, considering the fact that the center of the Milky Way was in the summer sky. I explained that the position of our solar system was on the inner edge of a spiral arm called the "Orion Arm", and that in the winter we look out across it. Because of the concentration of stars in this arm, we see more stars, and bright ones, in this direction. Since we look this way in winter what better way to tour the spiral arm than to observe its star rich multiple stars, the Open Clusters.

In the winter the Orion Arm stretches before us from Perseus down into Puppis. Along the way are many fine Open Clusters to view. Begin in Perseus. Perseus has three very fine clusters. Eta and Chi Persei are centered on the Milky Way and are a fine sight in any optical instrument from binoculars to telescope. Near the border with Andromeda in M34, a small open cluster of approximately 60 stars. It contains two very fine doubles, as I identified last month. Below Perseus are two of the most spectacular and important of the Open clusters, the Pleiades and the Hyades in Taurus. Use binoculars for these two clusters for the best view. The Hyades is the closest open cluster to the Earth with the exception of the Ursa Major cluster, which our solar system is moving through at this time.

Adjacent to Taurus are the constellations of Auriga and Gemini, and they point to the center of the Orion Arm. Embedded in this area are the "Magnificent Four" M35, M36, M37, and M38. M37 is the biggest and brightest, but all four are relatively the same in appearance. These clusters should be viewed with a telescope, and their circular appearance is similar to globular clusters.

Unlike the others M35 has two small open clusters near it, NGC 2158 and IC 2157. Look for these in the same area near M35. It is said that if NGC 2158 were at the same distance as M35 it would be the most spectacular Open Cluster in the sky. While in the area move your telescope east and visit M44 (the Praespe or "Beehive" cluster) and M67. M67 is the oldest

of the clusters (above 5 billion years) of this group. It is interesting that it has stayed together for so long.

Underneath Gemini is Monoceros, within its borders are three Open Clusters, NGC 2264, NGC 2244, and M50. NGC 2244 is the open cluster within the Rosette Nebula, and NGC 2264 is part of the Cone Nebula complex. NGC 2244 and NGC 2264 contain quite a few close double stars, so use high power on them. M50 is just a small cluster with the Milky Way for the background. It seems a bit lonely where it is located. Below M50 in Canis Major is M41 and NGC 2362. M41 is just south of Sirius and always worth the view. NGC 2362 surrounds Tau Canis Major, a lovely triple star system. Use low power for these clusters. After Canis Major check out Puppis. Puppis also contains three wonderful open clusters, M46, M47, and M93. Within M46 is the planetary nebula NGC 2438 and worth hunting for. M47 contains several nice close doubles. M93 completes the tour as the most southerly of the open clusters.

Finally, don't forget to check out M42 and M43 in Orion. These are Open clusters in the making as we watch them. If you're really hungry you can view only globular star cluster M79 just below Orion. It points the way to NGC 2017 or h3780 another Open Cluster. While viewing these, imagine our place in space along the inner edge of the "Orion Arm".

GREAT RED SPOT

- JIM VAN NULAND

You may have read reports that the Great Red Spot has suddenly reversed direction. I am slightly puzzled by this; my ongoing observations show the Spot sort of bouncing about an average position, with little indication of east or westward trend.

How long will the South Equatorial Belt be absent? I searched through Sky & Telescope and found a photo on March 3, 1957 that looks just like our present Jupiter! The observer states that the Great Red Spot is more prominent than he had seen 30 years (!). There was also a photo dated March '56 with normal belts. July, 1960 S&T has two drawings that show normal belts, with no mention of previous fading. So the SEB might have been faded for two to three years.

Good seeing and a power of about 200-300 are needed. Begin half an hour before the given time. Focus carefully, then scan the southeast quadrant of Jupiter. Watch carefully for those moments when the air is especially stable, and the Spot will show itself in all its glory. Let me

know of your results, especially if you are using an instrument smaller than 8-inches, or if you try various filters.

COMET COMMENTS

- DON MACHHOLZ

There is no lack of comets to observe over these next few months, even the first discovery of 1990 is visible in moderate-sized scopes. Due to the length of this month's comet news, "Seeking Comets" will not be included.

It is hard to predict how well Comet Austin will do. It is looking strong as it nears its April 9 perihelion, so perhaps a close approach of 0.350 AU from the Sun will not destroy it. However, since it appears to be a new comet to the solar region, possibly its present brightness is due to the more volatile chemicals which will burn out by perihelion. If this occurs, and this is a fate shared by Comet Kohoutek in 1973, the it will be dimmer than expected in April and May. As it now looks, however, it should appear best in late April through May as it travels across the northern morning sky. During this time it dims from near magnitude 1.5 to magnitude 3. The tail may be quite long too, but since the comet will be near the Earth, you may need dark skies to see it well.

Between now and early April the comet is in our evening sky. It sets near astronomical twilight. Comet Austin passes north of the Sun, and it should always be visible to northern Hemisphere observers, although in twilight near perihelion. If you are planning public star parties, Comet Austin rises about 50 minutes before astronomical twilight on Saturday morning April 21. A crescent moon will also be up. The following week it rises nearly two hours before astronomical twilight. For those wanting evening observation, On Saturday May 19 the comet rises just before midnight (Daylight Time) in a moonless sky. The following Saturday, Memorial Weekend, the comet rises around 10:30 PM. I've prepared a special Comet Austin Observer's Packet which is available to the readers of this column for \$0.65 in postage stamps.

Periodic Comet Wild (1990a): Discovered by Paul Wild on a photographic plate exposed Jan 21, this comet has an orbital period of 6.24 years, never getting closer than 1.95 AU from the Sun. It is presently magnitude 12, possibly a bit brighter. It reaches perihelion on July 4.

ASTRO ADS

ASTRO ADS are free to all non-commercial advertisers wishing to sell astronomically

related products or services. Please send your ad directly to the Editor, John P. Gleason, 5361 Port Sailwood Dr. Newark, CA 94560 NO LATER THAN THE 15TH OF EACH MONTH. Your Astro Ad will run approximately 3-months.

MEADE 8800 8-inch Newtonian reflector telescope with equatorial mounting and wooden tripod. 25mm, 9mm eyepieces, cleaning accessories, etc. Color - Blue and in excellent condition. \$650 or best offer, Ask for Steve, 408-267-4291 3/90

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SUPER GIANT FINDERS - 100mm f/3.1 w/2" - 25mm Plossl, \$225. Also, 95mm f/4.8 w/2" - 40mm Plossl, \$200. Mike Schartman, (209) 544-8828 2/90

CELESTRON 22 ORIGINAL PARTS - 22" Hayward C3 full thickness mirror blank, cast aluminum mirror cell, tube, fork, polar housing, bearings, etc. Almost a kit telescope. \$3500 OBO. Gene Cisneros, (408) 923-6800 2/90

FOUND - Blue cord hat at Fremont Peak with UCSC Lick Observatory Patch. Contact Nick at (408) 462-4249 2/90

CELESTRON 11 with Starbright coatings and many accessories including CAT computer. \$3500 firm. Nick Doukas, (408) 462-4249 2/90

MEADE DS10-A 10-inch Newtonian with Telrad, 9.7mm Super Plossl eyepiece, equatorial mount with motor drive. Asking \$750 Contact Larry Vito, 415-491-0327. 1/90

MEADE DS10-A 10-INCH F/4.5 Newtonian telescope with 25mm eyepiece, clock drive, setting circles 1.25"/2" deluxe focuser, equatorial mount. Other accessories include: 9mm Nagler eyepiece, Telrad viewfinder with batteries, Accutrack mini drive corrector, Lumicon

vinyl dust covers/plugs, deluxe metal-clad accessory case, astronomer's flashlight, misc. items (charts, filters, etc.). Asking \$1100 for entire package. Telescope is less than a year old and has been only used five or six times. Unable to use so must sell. For more information please contact Captain Scott R. Allen, 415-399-9718 home, 415-437-3750 work. 1/90

CELESTRON C-6 Newtonian Reflector with 26mm PL, Tele Vue 10.5mm 1.25", Celestron 7.5mm, Tele Vue 4.8 Nagler, Tele Vue 2.5X Barlow, Lumicon Premium UHC & Lumicon Deepsky filters, Polaris Equatorial Mount w/ polar finder scope, Standard lens case. Excellent condition (Must Sell) \$1200 or best offer. Contact: Anna Brown, 408-252-5546 after 12:30 weekdays or all hours weekends. 1/90

CELESTRON 4-INCH reflecting telescope in excellent condition. Three eyepieces, accessories, tripod. \$250 or best offer. Contact John 1/90

MEADE Barlow #140, 2X, \$50; Orion Slo-motion control, #7012, \$35; Orion 18mm Kellner .965" eyepiece, \$19; all like new w/box, call Paul at 408-942-3515 1/90

SPACE PROGRAM UPDATE

- BOB FINGERHUT

REVISED SHUTTLE MANIFEST DELAYS SPACE TELESCOPE

Changes to the shuttle manifest were made necessary by the delays in the last flight and budget problems. The DOD launch of Atlantis is now scheduled for Feb. 22. The launch of the Hubble Space Telescope on Discovery has been delayed until April 19. The Astro-1 space lab is now scheduled for launch on Columbia on May 9. The Gamma Ray Observatory launch on Atlantis is now scheduled for November.

COLUMBIA DEPLOYS SYNCOM AND RETRIEVE LDEF

Columbia was launched on January 9. The Syncrom 4-F5 communication satellite was deployed on January 10. On January 12, Columbia rendezvoused with the Long Duration Exposure Facility (LDEF), documented its condition with photographs and stowed it away in Columbia's payload bay. LDEF had been in space since 1984, collecting data on how the materials used on spacecraft hold up in space. The rest of the nearly 11 day mission was spent conducting medical experiments that will lead to longer missions in the future.

JAPAN LAUNCHES MUSES-A TO THE MOON

The Muses-A satellite was launched on January 24. The satellite was placed in a highly elliptical Earth orbit that will intersect the Moon's orbital path. When the spacecraft crosses the Moon's orbit in mid-March, the Muses-A lunar orbiter will be separated and placed in a 10,000 mile high lunar orbit. The main spacecraft will continue to make swing-bys of both the Earth and Moon in its elliptical Earth orbit.

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COMET EPHemeris

Comet Austin (1989c₁)

DATE (UT)	RA (1950)	DEC	RA (2000)	DEC	ELONG	SKY	MAG
02-23	01h03.5m	-22°45'	01h06.0m	-22°29'	41°	E	7.3
02-28	01h09.7m	-19°00'	01h12.1m	-18°44'	38°	E	6.9
03-05	01h16.1m	-14°58'	01h18.6m	-14°42'	35°	E	6.4
03-10	01h22.7m	-10°37'	01h25.2m	-10°21'	32°	E	5.8
03-15	01h29.3m	-05°52'	01h31.8m	-05°37'	28°	E	5.2
03-20	01h35.7m	-00°39'	01h38.3m	-00°24'	25°	E	4.5
03-25	01h41.4m	+05°07'	01h44.0m	+05°22'	22°	E	3.6
03-30	01h45.6m	+11°29'	01h48.2m	+11°44'	20°	E	2.7
04-04	01h46.2m	+18°23'	01h48.9m	+18°38'	19°	E	1.7
04-09	01h40.2m	+25°11'	01h43.0m	+25°26'	20°	E	1.0

Comet Skorichenko-George (1989e₁)

02-23	23h01.5m	+38°38'	23h03.9m	+38°54'	50°	E	8.5
02-28	23h22.6m	+39°39'	23h25.0m	+39°55'	49°	E	8.4
03-05	23h44.6m	+40°32'	23h47.1m	+40°49'	48°	E	8.3
03-10	00h07.4m	+41°16'	00h10.0m	+41°33'	47°	E	8.3
03-15	00h30.9m	+41°50'	00h33.6m	+42°06'	46°	E	8.2
03-20	00h54.8m	+42°11'	00h57.6m	+42°27'	45°	E	8.2
03-25	01h19.0m	+42°19'	01h21.9m	+42°35'	44°	E	8.2
03-30	01h43.1m	+42°14'	01h46.1m	+42°29'	42°	E	8.2
04-04	02h06.8m	+41°55'	02h09.9m	+42°10'	41°	E	8.2
04-09	02h30.1m	+41°25'	02h33.2m	+41°38'	39°	E	8.2

JUPITER'S RED SPOT

Great Red Spot on Meridian PST/PDT

da	mo	d	h	m	da	mo	d	h	m	da	mo	d	h	m
Th	3	1	7	25 pm	Th	3	15	1	6 am	Tu	3	27	8	55 pm
Sa	3	3	1	13 am	Th	3	15	8	57 pm	Th	3	29	10	34 PST
Sa	3	3	8	55 pm	Sa	3	17	10	34 pm	Su	4	1	1	9 PDT
M	3	5	10	40 pm	Su	3	18	6	28 pm	Su	4	1	9	4 pm
Tu	3	6	6	33 pm	Tu	3	20	0	15 am	Tu	4	3	10	47 pm
Th	3	8	0	19 am	Tu	3	20	8	9 pm	Th	4	6	0	23 pm
Th	3	8	8	4 pm	Th	3	22	9	47 pm	F	4	6	8	16 pm
Sa	3	10	9	44 pm	Sa	3	24	11	24 pm	Su	4	8	9	48 pm
M	3	12	11	31 pm	Su	3	25	7	12 pm	Tu	4	10	11	33 pm
Tu	3	13	7	15 pm										

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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