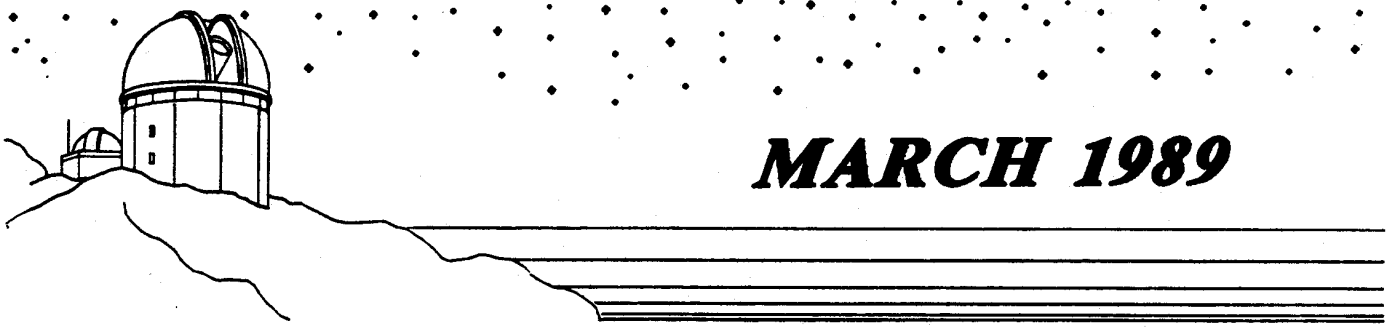
EPHEMERIS

OF THE SAN JOSE ASTRONOMICAL ASSOCIATION.



MARCH 1989

MARCH 11TH 8 PM
STEVE KILSTON
PREDICTING EARTHQUAKES

MARCH 4 STAR PARTY AT HENRY COE STATE PARK. SUNSET AT 5:59 PM. TO REACH HENRY COE PARK TAKE HWY 101 SOUTH TOWARDS GILROY AND TAKE THE EAST DUNNE EXIT. CONTINUE EAST TOWARDS THE HILLS (AROUND AND PAST ANDERSON RESERVOIR) OR ABOUT 12 MILES TO THE PARK. PAST THE PARK ENTRANCE YOU WILL SEE OLD RANCH TYPE BUILDINGS ON YOUR RIGHT AND A HORSE TROUGH. LOOK FOR A GATE ON YOUR LEFT. IT WILL BE LOCKED BUT THE CLUB COMBINATION IS 4565. ALWAYS LOCK THE GATE AFTER YOURSELF. IF ARRIVING AFTER DARK, PLEASE PARK OUTSIDE THE GATE AND HIKE IN FIRST TO FIND AN OBSERVING SITE BEFORE DRIVING IN. JUST A SHORT DISTANCE UP THE HILL BEYOND THE GATE IS WHERE THE SJAA SETS UP TELESCOPES.

MARCH 11 GENERAL MEETING. THE INSTALLATION OF OFFICERS WILL BE CONDUCTED AT THE BEGINNING OF THE MEETING. THEN ON TO THE MAIN COURSE! OUR GUEST SPEAKER WILL BE STEVE KILSTON WHO WILL DISCUSS EARTHQUAKE PREDICTIONS IN CALIFORNIA FROM SOLAR AND LUNAR TIDES.

MARCH 18 SJAA BOARD MEETING AT THE RED CROSS, 6:00 PM. THEN AT 8:00 PM THE INTRODUCTORY ASTRONOMY CLASS. HOW TO USE BINOCULARS FOR ASTRONOMY.

MARCH 25 INDOOR STAR PARTY AT THE RED CROSS, 6:30 PM. COME DOWN FOR AN INFORMAL GET-TOGETHER AND ASTRO-GAB.

APRIL 1 STAR PARTY AT FREMONT PEAK STATE PARK. SUNSET 6:28 PM; ASTRONIMICAL TWILIGHT, 7:57 PM. MORNING TWILIGHT, 5:23 AM; SUNRISE, 6:52 AM. THE 19% MOON RISES 4:49 AM, SHORTLY BEFORE TWILIGHT. DARKNESS SQUANDERING TIME BEGINS 2:00 AM SUNDAY. THESE TIMES ALLOW FOR THAT; ADVANCE YOUR WATCHES WHEN ARCTURUS CROSSES THE MERIDIAN.

APRIL 8 GENERAL MEETING AT THE RED CROSS BUILDING; SPEAKER TO BE ANNOUNCED. 8 PM.

APRIL 15 PAY YOUR TAXES DUE AND COME TO THE SJAA BOARD MEETING AT THE RED CROSS, 6:30. THEN AT 8:00 PM, THE INTRODUCTORY OBSERVATIONAL ASTRONOMY CLASS. MEMBERS ARE WELCOME AT THE BOARD MEETING, TO PARTICIPATE IN THE RUNNING OF THE SJAA.

APRIL 22 NINTH ANNUAL BAY-AREA ASTRONOMICAL FLEA MARKET AND AUCTION, 2:00 PM TO 11 PM. MORE DETAILS AND PRE-REGISTRATION INFORMATION INSIDE.

APRIL 29 STAR PARTY AT GRANT RANCH COUNTY PARK. SUNSET, 7:56 PM; ASTRONOMICAL TWILIGHT, 9:33 PM. MORNING TWILIGHT, 4:38 AM; SUNRISE, 6:15 AM. THE 30% MOON RISES 3:20 AM, BEFORE TWILIGHT.

FIELD OF VIEW
BY: JOHN GLEASON and JIM VAN NULAND

PREDICTING EARTHQUAKES

The ability to predict when and where earthquakes will happen may at first appear to be an odd subject for an astronomy club. However, when the prediction technique is tied to the positions of the Sun and Moon and their tidal effect on the Earth, we suddenly have a talk of vital interest to all of us. I have personally experienced four (4) minor earthquakes during New Moon astrophotography sessions in the last 10 years. A coincidence? To find out the answer to this question and may others, come down and join us March 11 as Steve Kilston presents the latest theories on this fascinating and informative subject.

NEW (OLD?) SJAA OFFICERS APPOINTED

Your 1989 officers were announced at the February Board Meeting. They are President; Tom Ahl, Vice President; Paul Mancuso, Secretary; Jim Van Nuland, and Treasurer; Jack Peterson. The new officers will be officially installed at the March 11 General Meeting.

DARKNESS SQUANDERING TIME

Daylight "savings" time begins during the star party on April 2. Advance your clock one hour, and apologize to your sundial.

1989 MESSIER MARATHON IN APRIL

A Full Moon on March 22 hinders our Messier Marathon this year. Good weekends are March 11/12 and April 1/2. Since our General Meeting is March 11, we'll be holding the Marathon April 1/2. Some members of our club will be at Fremont Peak that night. If there is clear weather, Don Machholz will be at Henry Coe Park, at the overflow parking lot one-half mile before the gate. Don invites members to join him.

Because of the locations of the galaxies, clusters and nebulae in Charles Messier's Catalog, mid-march through early April is the best time to hold the dusk-to-dawn observing session. Between March 5 and 20, 109 of the 110 objects can be seen, with only M 30 missing. From our latitude, we lose M 74 around March 21, meaning we'll see 108 objects until March 30. On March 31 we can pick up M 30 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 Don Machholz (408-448-7077), for observing order sheets which can be used with almost any star chart. After the Marathon, please let Don know how it went.

NEW ASTRONOMY ORGANIZATION

The Halls Valley Group is conducting a series of star parties at Grant Ranch County Park on first Saturdays of the month. The public and SJAA are invited to attend. These are in addition or as an alternate to the SJAA-scheduled events.

An organization called the Friends of Grant Ranch has been assisting in the care and operation of Grant Ranch for some years. The Halls Valley Group has been formed within the Friends, to conduct astronomical lectures and public observing sessions at the park. A 10-inch scope has been purchased, and work is underway to provide a building to house it. Eventually, a site within the campground will be used, but for now, it's the parking lot. The dates will probably change in 1990, to accommodate the new moon.

FEES AT PUBLIC PARKS

There has been some confusion regarding the day-use fees at the three parks where we have our star parties. In each park, the ranger has agreed that we are "day use", not camping, so long as we are set up in the star party site. This covers sleeping in a vehicle at the site. If you occupy a regular campsite, pay the camping fee. At Henry Coe State Park, when we come for an officially-scheduled star party, we are considered to be putting on a public

session and no fees apply. If you go to Coe by yourself at another time, the $3 day-use fee applies.

In each park, there is an honor system pay slot for use when the park office is closed. We'll want to save our $$$ for new oculars and charts, but the ranger must show that the park is being used -- and that means gate receipts! So, let's all do our part and keep the parks open.

THIRD INSTALLMENT OF ASTRONOMY CLASS - MARCH 18TH

The Introductory Amateur Astronomy class is another big success. In February, about 45 students heard Jack Peterson discuss the use of celestial coordinate systems. This month, Dr. Jay Freeman will present information on how to purchase and use binoculars for celestial observation. In addition to the coverage of constellations, future class subjects will cover; double and multiple star observing, beginning astrophotography, occultation observing, types of telescopes and their use, and advanced astrophotography. There is also a field trip planned to Fremont Peak to use the 30-inch telescope. The SJAA Board of Directors is investigating the use of either the Minolta planetarium at De Anza Jr. College or the West Valley Jr. College planetarium for at least one of the classes this year.

MARCH STARRY NIGHTS
BY; RICHARD STANTON

METEORS - March brings only two showers, both of them minor. The Southern event for the months is the Corona Australids with an hourly count rate of around five. Maximum for this one is March 16th and the radiant coordinates are 16h20m-48. The second minor shower for the month is the Virginids radiating from 12h40m-0. The count rate for this one is less than five and by some is considered to be an extinct event. Maximum, if there is one, will be around March 20th. One of the best therapies I know of in today's helter-skelter world is setting up the lawn chair, a little enlivened coffee, Mozart in the background and enjoying the enchantment of a starry night. Who knows? ... might even see a few meteors.

GALILEAN SATELLITES - For those who only haul their telescopes out on for primetime Saturday nights, March is a 'tad' sparse. In fact your only hope is Saturday the 25th, provided you get set up early.

03-25 16:35 hrs Io Transit Ingress
17:45 hrs Io Shadow Ingress
18:49 hrs Io Transit Egress
19:56 hrs Io Shadow Egress

I noted in Jim Van Nuland's column that the Great Red Spot has been atypically jumping about in longitude. This phenomenon could be very important to those studying the meteorology of Jupiter. In encourage all of you to get out and do some timings, photos, and drawings. Please send you data to Jim for processing.

PLANETARY CONJUNCTION - On Friday, March the 3rd, Saturn will be traveling along in Sagittarius with Neptune. Their separations should be only 12 arc minutes. Saturn's magnitude will be +0.57 at 18h51.4m -22 deg, while Neptune will be magnitude +7.8 at 18h53m -21 deg 58'. If you're like a good many of our members and have never seen Neptune, this will be an easy opportunity.

VERNAL EQUINOX - Monday, March 20th, Spring will begin at 15:28 UT (07:28 PST). This is the point at which the Ecliptic intersects the Celestial Equator and the Sun crosses from South to North of the Equator. Nowadays we call this the "Dynamical equinox" because it's more romantic than the "Vernal equinox." Yeah, sure.

SOLAR ECLIPSE - There will be a Partial solar Eclipse on Tuesday, March 7th. Yes, it will be visible from our locale. The moon's penumbral shadow will first contact the Earth out over the Pacific at 8:16 PST. The first contact from our location in Pacific Standard Time will be 08:53 with maximum eclipse at 09:52 and last contact at 10:54. DO NOT watch this eclipse without proper screening equipment. I know this is a work day but I think I feel something sickly coming on. Perhaps some of our astrophotographers would grace us with some photos for publication?

DEEP SKY CHALLENGE - This month we'll poke our scope into Gemini and try to track down the elusive "Medusa Nebula" (Abell 21). This is more or less a 13th magnitude Planetary Nebula for which you will need a minimum of 20-25 cm. It's 2000 coordinates are 07h29m+13:15 and its size is about 700". It's reported to be quite impressive with a OIII filter. Hunt for this one about 7 degrees south of the "Eskimo" nebula also in Gemini.

SPACE STATION - THE FIRST STEP
BY: DENISE HUTSON

Cold January weather kept most people at home as the SJAA broke in the New Year with its first General Meeting of '89. Those of us bold souls that did brave the elements were rewarded with an update on Lockheed's participation in the Space Station Program. LMSC's Ron Dere, Assistant Program Manager - Controls, was the guest speaker on hand.

At an estimated weight of 400,000 pounds, it will take 20 shuttle flights to deliver the full compliment of Space Station hardware to its weightless destination 200 miles above the Earth. Upon estimated completion in 1998-9, the orbiting research lab will act as home to astronauts from the U.S., Japan and the European Space Agency (ESA).

Of the four modules being worked on, the U.S. is supporting two: a Life Sciences Lab and a Habitation Module which all station residents will utilize. In the remaining modules, Japan and the ESA will each work in benefiting material sciences.

In the Life Sciences department, the U.S. will provide considerable resources to the study of sustaining life in space. Plans are to keep the station manned 24 hours per day, 365 days per year -- but not with the same crew. Due to the effects of zero gravity on human bone marrow and muscle systems, crews will have to be rotated every 90 days.

Once mastered however, long term goals focus on using the station as a transportation node for launching space vehicles to the planets and into geosynchronous orbit 22,000 miles above our planet. With a target date of 2010 for landing a man on Mars (aka today's 6th grader), there is much to be done in assuring sustained life for the 3 year round trip!

Personalizing crew quarters in a small weightless environment is another Space Station project that Lockheed is working on. In the sleeping area, astronauts will be strapped vertically to a wall rather than lying down in a bed! There will be a personal work station, a galley and storage compartments built into each area. Stereo and TV components will be added for off-hours enjoyment, as well as lot of windows for the breathtaking view. And for "new moon star parties," a viewing copula will be available.

Indeed, the Space Station will be the first step in our journey to other worlds. Perhaps living in space will become so commonplace, that in our lifetimes, one of us will have the opportunity to say, "Just park over by the Hubble Space Telescope, I'll be right back!"

Our sincere thanks to Mr. Dere for visiting the SJAA and sharing an exhilarating presentation with us.

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.

FOR SALE: Mint condition Celestron Super C8 plus with Starbrite. Optical tube made in late '88, illuminated 8 x 50 right angle finder, camera bracket, dew zapper, Jim's Mobile Motofocus, multicoated right angle prism, Byers drive, Meade Tripod, new style Samnsonite type carrying case. $1,190. Edward Hillyer, P.O. Box 6065, Salinas, CA. 93912. (408) 424-0460 3/89

8-INCH f/12 3-ELEMENT APOCHROMATIC REFRACTOR! A once in a lifetime opportunity to own a true "observatory quality" telescope. Complete with massive Astro Works German equatorial mounting and pier. Optical performance is superb. This is the same telescope that thrilled hundreds of observers during the Fremont Peak Observatory Assn's. Mars watch program. $12,000. For additional information Contact: Kevin Medlock (415) 654-6796 or (415) 784-0391 3/89

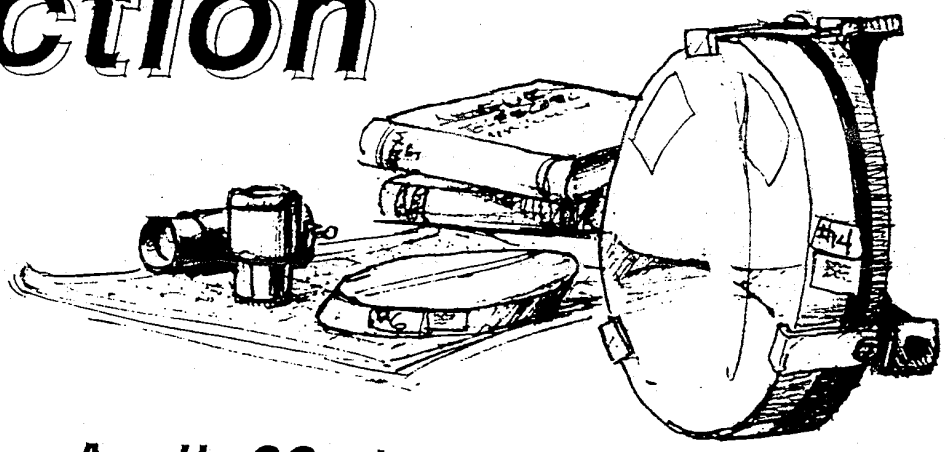
SKY SENSOR COMPUTER CONTROL for Super Polaris mount - works perfectly. Includes instructions, charts, and is in original box. $175. Celestron photographic LPR filter (fits T-threads, off-axis guider). New condition, $35. Contact: Jim Molinari (408) 298-7557 (W), (408) 255-7030 (H) 3/89

WANTED: Used Astroscan. Call Don or Laura (408) 448-7077 3/89

MOVING SALE: Back issues of Sky and Telescope, Mercury, and Scientific American. For S&T: April 1971, April-July 1973, July-June 1974, Nov.-Dec.

The 9th ANNUAL

Bay Area Astronomical Auction



Will be:

Saturday April 22nd

at the Los Gatos Red Cross bldg.

16011 Los Gatos-Saratoga Rd.

Doors will open at 1:00 PM

Swap-Meet 2:00 - 5:00 PM

Auction 6:00 pm -10:00 PM

Presented by the San Jose Astronomical Association

The 9th annual Bay Area Astronomical Auction is approaching, so now is the time to start looking around for those items not earning their space, or brought back from Riverside, or whatever is astronomical or telescope-making related that you would like turn into cash.

Pre-registration makes it easy. Just fill in the form below or a copy of it. List each different item you have. If there are several of one item, use a single line and show the quantity. Enter a minimum bid, even if you wish to let it go really cheap. Indicate whether the item is an outright donation; if not, a minimum commission of 10% of the selling price is requested. The SJAA share of all sales is tax deductable, and goes to further public education in astronomy.

Next, and most important, MAIL the completed form with a SASE to Jim Van Nuland at 3509 Calico Ave., San Jose, Ca. 95124. You may wish to keep a copy for your files. Jim will assign a bidder/seller and item numbers, and return the form to you promptly. If you omit a SASE Jim will assign numbers but hold the form for your pickup at the auction. Please arrive early in this case as there is always a last minute pile-up, if you are too late your items may not be entered into the auction.

You will now have the numbers to label each item before the day of the auction. Use self adhesive labels and please indicate the minimum bid and item number on each item.

To accommodate the increasing volume of "good stuff" we will have a Flea Market or Swap-Meet in the afternoon from 2:00 to 5:00 pm. The auction will run from 6:00 pm until we finish. No registration is required for participation in the Flea Market.

Items having a realistic minimum bid of about $5 probably should be swap-meet material, as auction time is limited. Items of limited or highly specialized application, even if valued above the $5, should be considered for the swap-meet.

A silent auction will run concurrently with the main auction. This is primarily for big ticket items such as complete telescopes. A sheet with the minimum bid is attached to the item, you can write in a new higher bid and line out the old. Silent auction results will be made final at the break and the winning bids announced.

DIRECTIONS TO THE AUCTION

Take HWY 17 (880) toward Los Gatos. Take the Los Gatos- Saratoga Rd (HWY 9) exit and continue West about 6/10 Mi. Turn right on Rose Ave. then another immediate right into the parking lot. The address is 16011 Los Gatos-Saratoga Rd.

Doors open at 1:00 pm. a $1:00 donation is requested for registration to buy or sell. Refereshments will be available. It is always a lot of fun.

1989 Bay Area Astronomical Auction Pre-registration

Bidder # from SJAA	Name:			City:
	Addr			Zip:
Item # from SJAA	Qty:	Min Bid	Donation 10% min	Description (40-50 Characters)

NOTE: This form will be returned to you with the shaded areas filled in by the SJAA

1975, All of 1976 (except Nov. and Dec.), Jan. 1977, Jan.-June 1979, April-Dec. 1980, All copies 1981-1987. For Mercury: All copies from 1979-1988, excepting Jan/Feb 1979, Sept/Oct and Nov/Dec 1983, and the first 3 of the 4 1984 issues. For Scientific American: June, July 1968, Aug.-Dec. 1979, all of 1980-1987 with these exceptions - Sept. '83, March '84, Aug. '86. Offers sought on all or part. I may be able to deliver locally. Contact: Dave Goodwin, (408) 247-9163. 3/89

CELESTRON POWERSTAR FORK MOUNTINGS. I have two (2) Powerstar fork mounts for Celestron 8, complete with dual-axis drive correctors and AA battery packs. These units are ideal for C8 owners wishing to upgrade from a Super Polaris mounting or simply want to upgrade to a DC stepper motor drive base for convenience and portability. Best Offer. Also, Celestron C8 wedge with deluxe latitude adjuster. $25. Contact: John Gleason (415) 792-8248 3/89

CELESTRON SUPER POLARIS MOUNT with single axis stepper motor drive corrector, tripod, accessory tray, and Polaris finder with illuminator. Ideal for small refractors, or can be used as a camera tracking platform. Mint condition. Best Offer. Call: John Gleason, 415-792-8248 2/89

CELESTRON SUPER C8, eyepieces, accessory case, tripod, drive, and much more. Like new. $1500 or best offer. Call: 408-338-3503 6:00 pm sharp. 2/89

3-INCH EQUATORIAL REFRACTOR, superb resolution, "Passed" from J.T.I.I (Japan Telescope Inspection Institute); with 12 x 40 finder and star diagonal. $400 firm. Contact: Edward Hillyer, P.O. Box 6065, Salinas, Ca. 93912 408-424-0460 1/89

CELESTRON C-11 SPECIAL, one of ten made for NASA laser ranging program, special precision optics and focuser. Wedge and tripod included. Best offer over $4000. Numerous accessories, eyepieces and Anvil cases also available, prices negotiable. Write 110 Sutter Street, Suite 200, San Francisco, CA. 94104 or call 415-492-9169. 1/89

WANTED: 10.1" Coulter Odyssey telescope or 10" Newtonian with Dobsonian mount. Maximum price $350. Contact Roger Hall at 408-732-2803 or 408-245-1741, 11:00 a.m. to 8:30 p.m. 12/88

MEADE 8-inch f/6 Model 628 Newtonian Reflector with RA and DEC motors, drive corrector with slow motion control joystick, 40mm wide-field eyepiece, 50mm f/12 guide telescope, 6 X 30 finderscope, equatorial mount, accessory tray, transportation cradle for scope. All for $800 or best offer. Contact: David Ferry, 408-259-2366 after 5:00 p.m. 12/88

MEADE 2080 LX-5, like new, used 4 times. includes: Meade counter weight set, Meade Variable polarizing system, Meade variable focus camera adapter, Meade focus back, Meade super Plossl 20mm eyepiece, Meade dewshield, Meade piggyback camera mount, Orion t-mount & adapter, Orion moon, orange, violet, blue, and yellow/green filters, Orion sky glow filter, Celestron 26mm Plossl & 25mm Kellner, Tel-Rad view finder, Jim's Moto-Focus, Orion dew zapper, Orion accessories case (large), Olympus OM-1 camera with f/1.8 50mm lens, deluxe flexible cable release, misc. extras, and Tele-Vue 9mm Nagler & 55 Plossl. (most original boxes available.) Sold as package deal only! $1750.00 FIRM!! Don Grabski. 408-292-9144 (home), 408-925-9650 (voice pager). 12/88

THE GREAT RED SPOT OF JUPITER
BY: JIM VAN NULAND

The much-needed rainy weather has permitted few glimpses of our favorite Jovian feature. When clouds permitted, I was able to find a nice orange or pink Great Red Spot, readily seen when the air was at all steady.

A few people have reported that they were uncertain whether they had actually seen the Spot. If you are uncertain what to look for, study some of the photos that have appeared recently in Sky & Telescope and Astronomy magazines. In many of the photos, one sees mostly a long, shallow dent in the southern edge of the South Equatorial Belt. It's really very large -- about 1/4 of Jupiter's diameter! Study some of the spacecraft photos, too. The dent is easily seen even with mediocre seeing, and guides the eye to find the Spot during moments of good air. But get out and look, as Jupiter is setting earlier, and will soon be gone!

The predictions are corrected for the changing aspect, phase, and light-time. At the given times, the Spot will be facing directly toward Earth, and thus will appear central on the apparent disk of the planet. Observations may be made for over an hour before and after that time.

Great Red Spot on Meridian PST/PDT

da	mo	d	h	m		da	mo	d	h	m		da	mo	d	h	m	
W	3	1	9	54	pm	M	3	13	10	1	pm	Sa	3	25	9	55	pm
Sa	3	4	7	27	pm	Th	3	16	7	31	pm	Tu	3	28	7	26	pm
M	3	6	9	3	pm	Sa	3	18	9	7	pm	Th	3	30	9	6	pm
W	3	8	10	45	pm	Tu	3	21	6	38	pm	Su	4	2	7	39	pm
Th	3	9	6	39	pm	Th	3	23	8	16	pm	Tu	4	4	9	12	pm
Sa	3	11	8	15	pm												

SPACE PROGRAM UPDATE
BY: BOB FINGERHUT

OXYGEN TURBOPUMPS REPLACED ON DISCOVERY

The No. 3 engine on Discovery was found to have a cracked bearing race on the last shuttle flight that was present at launch. The cause is believed to be stress corrosion caused by trapped moisture. As a precaution, all of the oxygen turbopumps on Discovery are being replaced as the shuttle sits on the launch pad. As a result, the launch has been slipped to at least March 12. The launch must take place by March 18 or Discovery will be removed from the pad to make way for Atlantis. Atlantis is scheduled to launch the Magellan mission to Venus on April 28.

FIRST DELTA II LAUNCHES NAVSTAR SATELLITE

The first of the new commercial expendable boosters, the Delta II, made it first flight on February 14. The Navstar Global Positioning Satellite it carries is part of a series of satellites that will be used to locate objects on the Earth to within 50 feet.

PHOBOS 2 ENTERED MARS ORBIT JANUARY 29

The Soviet spacecraft began operations Feb. 1, when magnetometers and plasma wave instruments were used to study the planet's structure and atmosphere. In early April, the spacecraft's orbit will be altered to fly within 165 ft. of the moon Phobos and drop two landers on its surface.

GOES-WEST WEATHER SATELLITE FAILS

The failure of a light bulb in the image scanning encoder system has rendered the spacecraft useless. A replacement satellite will not be ready for launch until mid 1990. The remaining satellite, GOES-East, is being moved to 108 W longitude for the winter storm season. In the spring it will be repositioned to 98 W longitude to better observer the development of hurricanes in the Atlantic Ocean.

FINAL SHUTTLE SOLID MOTOR TEST COMPLETED

The final full-scale, full-duration test of a shuttle SRM motor was successfully completed on January 28. The final test was needed to certify the re-designed rocket motor over its full temperature range. The motor had been chilled to a propellant temperature of 40 deg. F.

NEW SOLAR ARRAYS FOR HUBBLE SPACE TELESCOPE

The new arrays will produce 10% more power. The arrays currently installed on the spacecraft. The additional power is needed to charge the batteries as the arrays age, and during the times when the satellite experiences long eclipse periods. There are two periods each year when the satellite spends increased time in the Earth's shadow. The arrays are scheduled to be delivered to Lockheed in March, in time for installation and launch of the satellite in December.

DOUBLE, TRIPLE AND MULTIPLE STARS
BY: PATRICK DONNELLY

In the past I have mentioned from time to time, while observing, you should take some time to think about the objects you are observing through the eyepiece. For multiple stars this is especially true. Those true binary or multiple star systems are incredible systems revolving about each other. Kepler would probably be overjoyed to know that his laws apply equally to these stellar systems just as they do to our solar system.

As a continuation of this theme let us examine in detail this month a single but very interesting triple system. On these February evenings Alpha Geminorium, (Castor) rides almost overhead. To the unaided eye this star is just a ordinary first-magnitude star gliding along the firmament beside his brother Pollus. Through a pair of 7 x 50 binoculars the star is still only a single point of light. Under dark skies it may be possible to see the 9th magnitude "C" component of the system, due to its 72.5" separation from the "A & B" components. Using the large 11 X 80 binoculars the "C" component is clearly visible.

Through almost any telescope with an objective greater than 2.4 inches, the star will resolve itself into the triple configuration. The "A" and "B" components are magnitude 2.0 and 2.9 separated by about 3". At present, this angular separation is widening; so your grandchildren will be able to see these two stars easier.

All three stars are visible in just about all high power eyepieces. It is one of the best triple star sights in the sky. It is always fun to observe, and one does not need exceptionally good seeing or expensive equipment to resolve the trio. However, this is only the beginning.

The Castor system is a true multiple star system, located approximately 45 light-years from the sun and earth. The "A" and "B" components revolve about their center of mass with a period of approximately 380 years. The distance between these components is 8.4 billion miles (90 AU). The "C" component orbits the other two stars every 10,000 years. The "C" component is located about 100 billion miles (approximately 1000 AU) from the "AB" pair. If one were living on a planet orbiting the "A" component about 5 AU from the star, the "B" component would appear as a -19 magnitude object, and the "C" component would appear as a -8 magnitude star relatively fixed against the background sky. Over one human lifetime the "C" component would only move about 3 degrees in the sky.

If this were not spectacular enough, it is also known that each component of the Castor system is also a spectroscopic double. Therefore, there are a total of six stars in this system. The "A" component of Castor consists of two A3 Spectral Type stars of approximately the same size and luminosity. The period of revolution of these two stars is 9.2128 days, and they are separated by about 4 million miles. Our hypothetical observer on the planet revolving about "A" would see a double star in the sky similar to the one seen the the "Star Wars" movie. For the "B" component the spectral types are both A5 revolving about each other in 2.93 days, separated by about 3 million miles. Our observer would see a pair of 30" in diameter stars in the sky separated by about 1 arc minute.

Finally, for the "C" component the system consists of two red dwarfs, spectral types K6 and M1. They revolve about each other in only 19.5 hours, and they are separated by only 1.67 million miles. Our imaginary observer would need a telescope to resolve these two, since their separation would be only about 3.5". I'm not sure any amateur telescope could resolve two -7.5 magnitude stars separated by 3.5". From Earth the "C" component is an eclipsing binary with a magnitude drop of .5 during the eclipse. For our imaginary observer probably all three components would be eclipsing binaries, and thus presenting a never ending pattern of light variations to the observer.

All of this can be considered, while viewing the triple star "Castor" in the sky. On the next clear night take a good long look and consider the stellar system you're observing.

COMET COMMENTS
BY: DON MACHHOLZ

Two new comets have been found and one more recovered, but they will not get very bright. Meanwhile, Comet Yanaka (1989a) is at magnitude 11, slowly dimming.

The year 1988 saw three visual finds and one photographic discovery by amateurs. Professional astronomers found five comets, three were by the Shoemakers. Three returning comets were recovered. The greatest comet discoverer of 1988, however, was the Solar Max Satellite, with five photographic finds. All took a one-way trip to the sun, and none were seen by observers on the Earth. The satellite is expected to enter the Earth's atmosphere later this year.

Comet SSM 7 (1988q): This is the latest comet to be found by the Solar Max Satellite. It was closest the Sun on Oct. 24.8 and was not seen leaving the solar vicinity. It was brighter than mag. -4 and is believed to have been a

Sungrazer comet.

Comet Bradfield (1989c): William Bradfield found this on Jan. 6, 164 search hours after his previous find. It was closest the Sun last Dec. 5 at 0.42 AU. At that time it was on the far side of the Sun and undiscoverable. It is now dimming as it pulls away from both the Earth and the Sun.

Periodic Comet Russell 3 (1989d): Jim Gibson of Palomar used a 1.5M reflector with a CCD to recover this comet on Jan. 1. At that time it was mag. 20 and still 17 months away from perihelion (2.52 AU). It might reach mag. 13 next year.

Comet Shoemaker (1989e): Carolyn Shoemaker discovered this comet on plates taken on Jan. 13 with the 18" Schmidt. It was mag. 14. It will dim as it is now leaving the inner solar system.

Comet Shoemaker (1989f): Carolyn Shoemaker found this, her sixteenth comet, on plates taken Jan. 11. It was then at mag. 16 and will not get any brighter.

SEEKING COMETS

During what phase of the Moon are comets generally found? This depends on whether we are looking for comets in the morning or in the evening sky. With a few exceptions, comet hunters normally do not seek comets when the Moon is in the sky.

Let's look at data from visual comet discoveries from 1975-1988. Below I present two tables, one for the 27 comets found in the morning sky, and the other for the 18 found in the evening sky. The number of comets found during each day of the lunar month is listed along the vertical axis, the Moon's phase is stated along the bottom.

EVENING DISCOVERIES

```
4  .       .       .       .       .  4
3  .   XX  .       X.      .       .  3
2  .   XXX .X      X.      .       .  2
1  .X  XXXXXX     XXX      .       .  1
0  +-------+-------+-------+-------+  0
   FM      LQ      NM      FQ      FM
```

MORNING DISCOVERIES

```
4  .       .       .       .       .  4
3  .       .       .       .X      .  3
2  .       X       XX XXX   .XXX    .  2
1  .     XXX   XXXXXXXXXXX  XXXX    .  1
0  +-------+-------+-------+-------+  0
   FM      LQ      NM      FQ      FM
```

During Full Moon, comet hunters don't hunt for comets. The Moon rises at sunset, set at sunrise, and therefor is up all night long. The following day it rises about 50 minutes later (this is an average, but it can range from 20 to 70 minutes), leaving no truly dark sky. By two days after Full Moon we have up to an hour of darkness after evening twilight. This time period increases each night. It is during these nights that comets are found in the evening sky. After New Moon phase we find an ever-increasing moon in the evening sky, drowning out faint nebulous objects (like comets). Comets were not found in the evening sky after New Moon phase.

At Full Moon the morning sky is also washed out. Over the next four or five nights the Moon is still bright and hampering morning observations. Occasionally comet hunters will hunt at large elongations covering the eastern sky near midnight but before moonrise.

A moon at Last Quarter is near the middle of prime search areas, this obscures all but the brightest comets. As the Moon heads toward the New Phase, it crescent grows small and it becomes less bright. I have found that from my observing site I lose too much contrast when the Moon is more than about 40% illuminated. On hazy mornings a 25% Moon may be too bright. Contrast also decreases when you sweep in the vicinity of the moon. On the other hand, this part of the heavens hasn't been swept for about ten days, so this rapidly-changing morning sky might hold an undiscovered comet that has recently brightened or emerged from the solar region. So we try to get out to the morning sky as soon as the moon "clears out".

Both the morning and evening graphs show a second peak near the end of each window. This is because comet hunters also try to get out and cover a region just before the moon moves in.

SJAA MEETING AND STAR PARTY LOCATIONS

GENERAL MEETINGS

Once a month the SJAA holds a General Meeting at the Red Cross building in Los Gatos California. Guest speakers are invited to give talks on a wide range of astronomical topics which have included equipment and slide presentations. This is also the location for the SJAA's "Indoor Star Parties", informal sessions where members gather to share their astronomical interests. Whatever your interest, astrophotography, deep sky observation, telescope making, or just arm chair observing, you'll find a friendly atmosphere at all of our meetings.

The Red Cross building is located at 18011 Los Gatos-Saratoga Rd. From Hwy 17 take the Hwy 9 (Saratoga) exit and continue west up the Los Gatos-Saratoga road for about 0.6 miles. Turn right at Rose Ave. Then turn right immediately into the parking lot of the Post Office and Red Cross building. Doors open at 7:45 PM, with General meetings beginning at 8 PM. General Meetings are currently held on the 1st Saturday of each month.

INDOOR STAR PARTIES

Occasionally there are a few Saturday evenings set aside for informal gatherings of amateur astronomers to share their common interest in astronomy, to "talk shop", or to simply enjoy the company of friends. Members are encouraged to bring in telescopes and accessories to share with the group. Typically there will be several telescopes operating in the parking lot or there will be a slide show of recent astrophotography and star party events in progress in the meeting hall. The SJAA also holds it board meetings during this time as well as an introductory astronomy workshop that is conducted once a month.

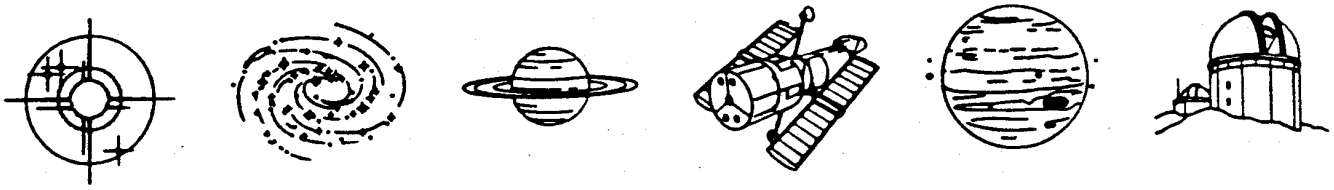
FIELD EXPEDITIONS

On the Saturdays closest to the New Moon, the SJAA will conduct a "Star Party" for astronomical observation at a designated location. Several times a year these star parties are held close to San Jose while others are held as far away as Yosemite national Park. Watch the EPHEMERIS for star party locations.

FREMONT PEAK STATE PARK

The most popular of locations for bay area amateur astronomers is Fremont Peak State Park. Located 70 miles south of San Jose near the town of San Juan Bautista, Fremont Peak rises nearly 3000 ft. above the valley floor. For two decades amateurs have gathered at the "Peak" during New Moon weekends for serious deep sky observing and astrophotography. To get to Fremont Peak for San Jose, take Hwy 101 south towards Salinas. Then take Hwy 156 east (San Juan Bautista exit) for 3 miles to a yellow flashing light. Turn right and go about 1/4 mile to where the road reaches a "Y". Veer left for about 25 yards and then go right. (Watch closely for the Fremont Peak sign) Follow the Canyon Road for about 11 miles up into the park. The SJAA sets up in Coulter Camp. It's visible on your right as you first drive onto the main area of the park. Expect to find a lot of astronomical activity here every clear New Moon weekend. Arrive early if you are setting up equipment. 50 to 100 telescopes are not uncommon at Fremont Peak during the summer months.

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 Gleason, 5361 Port Sailwood Dr. Newark, CA. 94560.



SAN JOSE ASTRONOMICAL ASSOCIATION MEMBERSHIP APPLICATION

MEMBERSHIP ONLY: $10 MEMBERSHIP/S&T: $26 JUNIOR (UNDER 18): $18

Name:_____

Address:_____

_____

Telephone (____)_____

MAKE CHECKS PAYABLE TO **"SJAA"**

Please bring this form to any SJAA meeting, or send to:

Jack Peterson, Treasurer
San Jose Astronomical Association
1840 Yosemite Dr.
Milpitas, CA. 95035

Telephone: (408) 262-1457

Please check type of membership and if New or Renewal

Membership only___ Membership/S&T___ Junior (Under 18)___ New___ Renewal___

SJAA EPHEMERIS
1840 YOSEMITE DR.
MILPITAS, CA 95035

NON-PROFIT ORGANIZATION

U.S. POSTAGE PAID

PERMIT NO. 5381

SAN JOSE, CALIFORNIA

TIME VALUE - DATED

NEWS MATERIAL