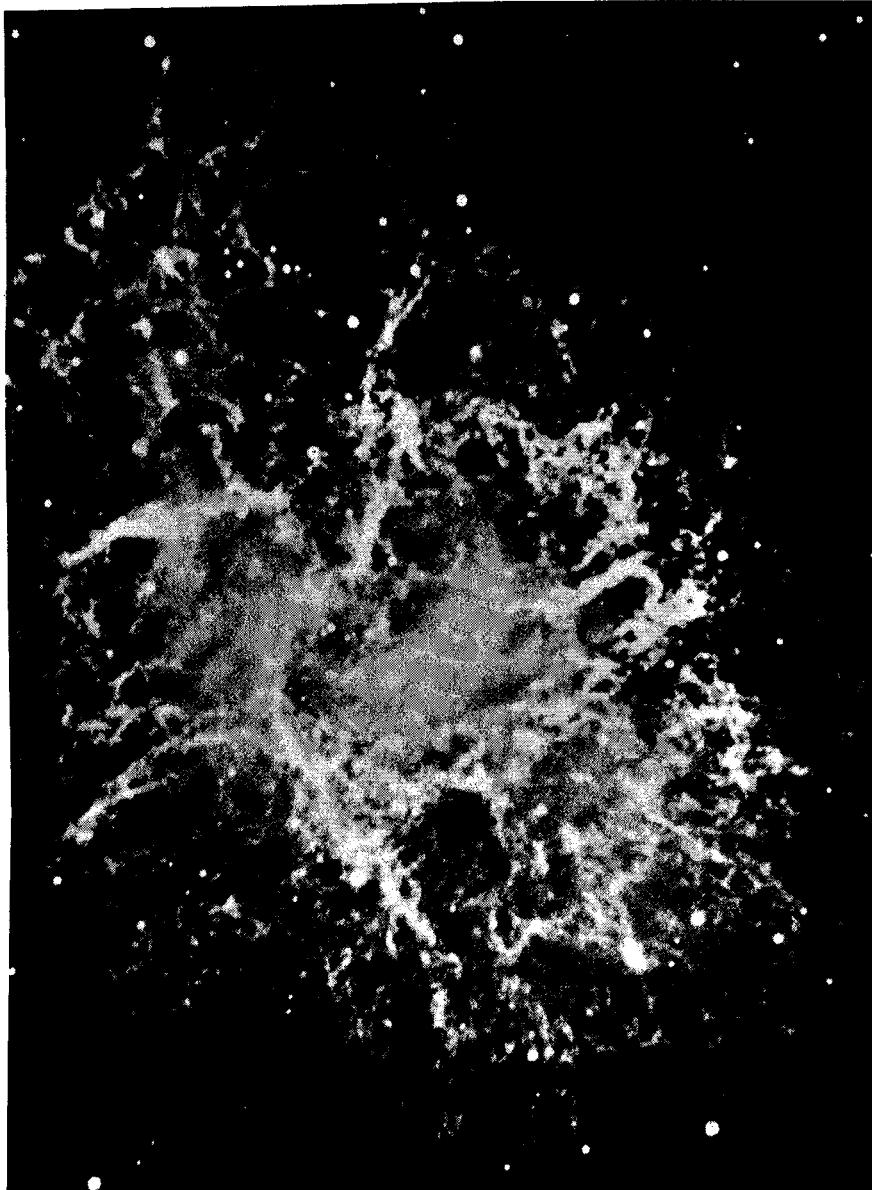


NOVEMBER '83

SJAA

# EPHEMERIS



# Observations

## UPCOMING EVENTS

November 5 will see a SJAA star party at the J.D. Grant Ranch County Park, located halfway between San Jose and Lick Observatory on Mt. Hamilton Road. This is a new site for the club and is considered fairly dark skied besides being easily located from most members. We have permission to use the main parking lot. If you arrive after sunset you will probably find the main gate closed, but the SJAA combination lock will be in place and can be opened using 4565. Please lock the gate behind you coming or going. Remember, since this is our first official star party there let's fully cooperate with the park officials. We may want to go back! There is a possible \$3 a night fee, but we may be able to negotiate that into a group rate. Please be prepared for that, just in case.

If you can't make the November 5 star party, we will try it again on December 3rd., weather always permitting.

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The November 12 SJAA General Meeting should be one to attend. The club is always fortunate to obtain a speaker whose topic is at the forefront of modern astronomy. Jeff Scargle from NASA will be with us to speak on "The Detection of Extra-Solar Planets." The search for other planetary systems has been, in the last few years, one of excitement in popular astronomy because of its "other intelligent life" implications. Come attend and find out what methods are used to detect other planets, how other systems are chosen as candidates for having planetary systems circling them, and what to expect in the future.

The meeting will be held at the University of Santa Clara in the Alumni Science Hall, room 102. 8:00 PM. Please attend.

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The grazing occultation expedition mentioned in the October's Ephemeris has hit a slight snag in the planning stages. The star to be occulted is a double star. Jim van Nuland has receive location and timing information from David Dunham, head of IOTA, the organization that distributes and gathers occultation data, but has not been able to receive word from IOTA whether or not the times and place are for the primary star or the average of the two. Jim is still willing to lead a dedicated group out into the Livermore valley area the evening of November 13 but wants those people to be aware they could be a possible twenty + miles away from the proper center line. If still interested, call Jim van Nuland at 371-1307.

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## CLUB TELESCOPES

The SJAA maintains three telescopes for the use by its members. Loan periods are two months, and all arrangements must be made between the person wanting to borrow the scope and the person having it. If your two months are up and no one indicates an interest in borrowing the telescope at that time it's yours until someone does. All that is asked is that a board member or bulletin editor is notified when a telescope changes hands.

Ready for borrowing are: 6" newtonian on a equitorial mount. Contact George Diewert at (408) 257-6658; a 12" Dobson, which is with Tom Stravolone at (408) 277-4711; and a 14" f/6 Dobson-type is with Chris & Shea Pratt, at (408) 629-2994. They would love to get rid of it!

Other club equipment notes: Bill Cooke has the club's mount for a 14"

Cassegrain/refractor-type (high pier) telescope and really needs to get it out of his parent's garage. If there are any volunteers please call Bill at (408) 733-9773.

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#### ENDING NOTES

As always, the editor would like to thank the many contributors to the monthly Ephemeris. I am always looking for articles and black and white astronomy photographs for the front cover. Please don't hesitate to contribute!

Many apologies to the membership for suffering through a very late bulletin last month. Due to editor, printer, and post office problems it managed to arrive in your mailbox three weeks late.

Clear skies,  
Denni

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## ADS

For sale: Basic Celestron C-5 package, special coatings, wedge, 1 $\frac{1}{4}$ " oculars, tripod, T-adaptor, T-rings for Canon and Konica cameras, tele-extender, eye-piece filter set, lens hood and weights, Tele-Phase IV drive, all in mint condition. Value \$1600, sale price \$750.  
Contact Lloyd E. West at (408) 274-4382

\*\*\*\*\*

For Sale: C-8 with 8 X 50 right angle finder, special coatings. altitude adjusters, Barlow and 25mm eyepiece, tripod, clock drive. Asking \$850.  
Contact Ken Gardner at (408) 266-4616

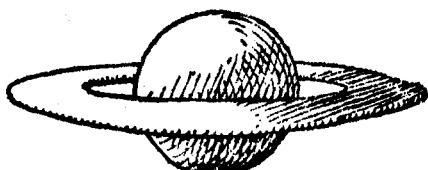
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For sale: Tube for 6" mirror, 48" focal length - \$12.00; Brandon 5 piece ocular set with wood case and 4 filters - \$200.00; Meade variable barlow - \$30.00; Eyepieces - 12mm Celestron Ortho - \$18.00, 40mm Celestron Kelner - 12.00, 25mm Celestron Kelner - 12.00; Right angle finder for Celestron - \$75.00; Tuthill pole finder - \$35.00; C-8 latitude adjuster - \$25.00; 32mm Konig eyepiece - \$40.00; 6" f/1.8 reflector with 20mm Erfle - \$55.00; 8X50 University finder with Celestron bracket- \$50.00; 2X elbow scope with illuminated reticle - \$3.00.  
Contact Jim Eiselt at (408) 984-8687.

(With all of that stuff maybe we should have the auction early!)

\*\*\*\*\*

Concerning want ads: All SJAA members and friends may place astronomically-related ads in the Ephemeris free of charge. All ads will run for two months unless the editor is notified otherwise. Please submit by sending to : Ephemeris, 15022 Broadway Terrace, Oakland, Ca. 94611, or calling Denni at (415) 654-6796 day/eve. Thanks.



# COMET COMMENTS

BY DON MACHHOLZ

In the past month six comets have been reported, three being new discoveries and three being recoveries of returning comets. Comet Cernis remains visible in the evening sky, although it is fading as it moves southward. And, in our Past Discoveries department, we look at three more comets discovered by amateurs during the past few years.

Comets IRAS (1983o): The IRAS satellite discovered its fifth comet on July 28, but it wasn't until the object was again detected by IRAS on September 1 that its nature was confirmed. This 16th magnitude object will closest the Sun (2.2 AU) late this month but is not expected to get any brighter.

Comet Shoemaker (1983p): This comet was discovered by Carolyn Shoemaker using the 18-inch Schmidt at Mt. Palomar on Sept. 7. But as with the last discovery, this one wasn't simple either. First, R. Dunbar discovered an asteroid on plates taken Sept. 12 with the 48" Schmidt. While looking for (and finding) pre-discovery images of this asteroid, Carolyn happened to find this comet on the same plate, taken in an area of the Great Square of Pegasus. The comet will be closest the Sun late this month (3.3 AU) and will remain fainter than magnitude 11.5.

Periodic Comet Arend (1983q): This periodic comet was recovered by J. Gibson with the 48" Schmidt at Palomar at magnitude 20.5. This comet will not be very well seen since it will be opposite the Sun when it is closest the Sun next year.

Periodic Comet Harrington-Abell (1983r): Recovered by Gibson on Sept. 17, the day after the previous discovery. Then at magnitude 20.5, this comet is also expected to remain quite faint.

Periodic Comet Wild (1983s): Recovered by Gibson Sept. 18, this 20th magnitude object presently has a short tail. It may be visible in smaller telescopes next year.

Comet Kowal-Vávrová (1983t): On Sept. 23, it was announced that Charles Kowal had picked up a comet on a few plates taken between May 8 and 15 of this year. It was magnitude 16 and in Libra at the time, not far from Comet Kopff. Several days later it was noticed that this comet is the same object identified as asteroid 1983JG, on plates taken by Zdenka Vávrová on May 14. The orbit is presently uncertain.

## PAST DISCOVERIES

Comet Bradfield (1975p): This comet was discovered by William Bradfield of Australia on Wednesday morning, November 11, 1975. This was his fourth comet discovery; he has since found seven more. He found it 106 search hours since his previous discovery eight months before. The comet was magnitude 9.5 and 58° from the Sun at the time of discovery., two days after first quarter Moon. It was discovered at R.A.: 10hr 57m, Dec. -37° 41'.

One month before discovery the comet was at 9hrs 09m, -18°, some 61° from the Sun. At that time it was in a good position to be discovered by both North and South Hemisphere observers but its faintness (magnitude 12.3) made it difficult. Two weeks later it had brightened to magnitude 10.7 but its more southerly declination (-27°) made it more difficult for Northern Hemisphere observers but easier for those in the South.

It seems that the comet's faintness while above the Northern observers' horizons and the lack of comet hunters to the South prevented the discovery

of the object for the month prior to its actual discovery date. Bradfield found it on one of his last morning observing sessions before the full moon interferred.

Comet Sato (1975q): This comet was found December 5, 1975 by Yasuo Sato, early on this Saturday morning, two days after New Moon. The comet was at magnitude 9.0 at 12hr 14m,  $+19^{\circ}15'$ ,  $74^{\circ}$  from the Sun. At this time it was rapidly approaching the earth.

Three weeks previous, just before the Full Moon, the comet was due north 20 degrees from its eventual discovery position and at magnitude 11.3. It would have been a difficult object to discover, but possible. There were a few reasons why it wasn't found earlier. First, it was brightening rapidly. Second, it was bordering the Coma Bernenices galaxy region, an area which many comet hunters avoid. Thirdly, there were several other bright comets visible and vying for attention of comet hunters.

Some 12 hours before Sato discovered this comet, I swept within 5 degrees of it. I stopped sweeping due to dewing of the optics as a fog bank was moving in as I swept from the small town of Clyde, California, six miles north of my (then) home in Concord. I stopped sweeping near the 12hr R.A. line, some some four sweeps from the then-undiscovered comet.

Comet Meier(1980q): Rolf Meier of Canada discovered this comet on Wednesday evening, November 5, 1980. That was the day of New Moon. The comet was  $75^{\circ}$  from the Sun, at RA 18:06, Dec.  $+42^{\circ}09'$ , about  $5^{\circ}$  from the star Vega. The comet was magnitude 10.3. This was Meier's third comet discovery. He was using a 16", f/5 reflector.

For nearly two months prior to discovery the comet was brighter than magnitude 11.0. It was traveling through Cassiopia and Cepheus at that time, yet remained undiscovered. A good question is: Why?

There may be several reasons for this. First, we are assuming the comet did not brighten rapidly before it was found - we guess that its magnitude curve was normal. But if the comet did brighten rapidly this could explain why it remained undetected. Secondly, it was in the Milky Way for those two months. This background made it difficult to see. Finally, being more than  $100^{\circ}$  from the Sun, the comet was not in the usual comet hunting grounds during most of this time.

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#### Comet Ephemeris

##### Comet Cernis (1983L)

Date(UT)	R.A.	Dec.	Est. Mag.	
10-23	00:45.5	-23°11'	10.4	Comet Cernis is some $3\frac{1}{2}$ AU
11-02	00:26.8	25 58	10.6	from the Sun as it goes back
11-12	00:10.6	27 58	10.7	into deep space. It may be
11-22	23:57.7	29 19	10.9	about 1.0 magnitudes brighter
12-02	23:47.9	30 09	11.1	than predicted here.
12-12	23:41.2	30 39	11.3	Data from Cir. 3869

Don Machholz  
(408) 448-7077

## COMPARISON TESTS of NEW POLAROID 35mm AUTOPROCESS FILM

by Jack Marling

Polaroid has introduced a new 35mm auto process slide film. Called Polaroid Polagraph 35mm film, it is developed into a slide in only 1-2 minutes, using a convenient Polaroid autoprocessor. The new Polaroid 35mm films come in 3 types: ASA 40 color film, medium contrast ASA 125 B+W film, and high contrast ASA 400 B+W film. Since high speed and high contrast film is ideal for astronomical photography, I tested the speed of the Polaroid ASA 400 film in 20 minute duration exposures. This is representative of a typical deep-sky astronomical exposure.

If it worked, the Polaroid film would be ideal for education and testing, since the finished slide would be rapidly available for evaluation and feedback. Also, the ASA 400 B+W film comes in convenient 12 exposure rolls, just the right size. To test the Polaroid film, I exposed it successively through 3 different filters to measure blue, green, and deep red sensitivity (H-alpha light). To hypersensitize the film, I baked it 8 hours in 8% Forming Gas at 50° C. 16 hours baking time was too much, and it fogged the film. Test results are shown in Table 1 compared to other popular films. Neutral density filters reduced the light level to achieve 20 minute exposures, and the energy required to achieve identical densities served as the measure of relative film speed.

Table 1 - Film Speed Comparison in 20 Minute Exposures

	Blue Speed	Green Speed	H-Alpha Red Speed
ASA 400 Polaroid HC-1 5-12	0.07	0.2	0.06
Kodak Technical Pan 2415	n.m.	0.4	1
Ektachrome 400*	1	3	1.5
Fujichrome 400*	2	3	4

\*Developed as a negative in Unicolor K-2 Kit

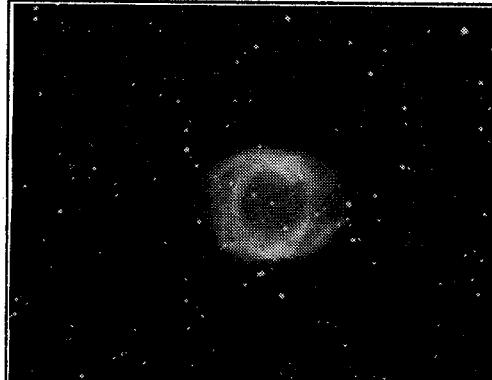
Table 1 shows that the new Polaroid is a dismal failure in long exposure, and is NOT SUITABLE for Deep-sky astrophotography. It is ten times slower than other common films, and apparently suffers from reciprocity failure that is not overcome by hypersensitization in forming gas.

Incidentally, Table 1 shows why Ektachrome 400 gives green slides; namely it has a much higher green response compared to its blue and red response. 2415 film is relatively insensitive to light pollution precisely because it has weak response in the green pollution band. Fujichrome 400 is the fastest color film, and would be the best choice in deep-sky color photography. I developed the color films as a negative to provide a better comparison with other films, but Table 1 shows that this is in fact a way to get high performance from Fujichrome 400. Deep-Sky photos taken with Fujichrome 400 show incredible detail in faint nebulosity due to its extremely high speed for red H-Alpha light. I can highly recommend Fujichrome 400 for all deep-sky photography.

The new Polaroid ASA 400 35mm B+W is not suitable for Deep-Sky photography because of its severe reciprocity failure, but would be excellent for exposures of bright objects like the Moon and planets, and may be ideal as an educational tool.

For further information, please call me at (415) 447-9570 or write to me at LUMICON at 2111 Research Dr., Suite 5, Livermore, CA. 94550.

Commercial ads are priced according to size and may be placed by contacting:  
Gene Cisneros at (408) 923-6800.



Helix Nebula NGC7293 in Aquarius. This faint nebula is seen best visually with a LUMICON UHC Filter. Photo by Dr. J. Marling using a LUMICON DEEP-SKY Filter and hypered 2415 film prepared in a LUMICON Model 300 HYPER-KIT. 40 min exp on an 8 1/4" telescope using a LUMICON Newtonian EASY-GUIDER.

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## CALENDAR

- Nov. 5 Star Party at J.D. Grant Ranch County Park. This site is a new one for the SJAA so come and try it out. Located on Mt. Hamilton Road, halfway between San Jose and Lick Observatory. To get to Mt. Hamilton Road take Hwy 101 (either direction) to Alum Rock Rd. Go east up Alum Rock Rd. to Mt. Hamilton Rd. and follow it. After sunset the park front gate will be locked with the SJAA's combination lock. Use the sequence 4565 to open, but be sure to lock gate behind you, coming or going.
- Nov. 12 SJAA General Meeting at the University of Santa Clara, Alumni Science Hall, room 102. 8:00 PM. Our speaker will be Jeff Scargle from NASA, the title of the lecture, "Detection of Extra-Solar Planets." Come enjoy this talk on the state-of -the-art astronomy pursuits in finding other planetary systems "out there".
- Nov. 13 A possible grazing occultation located out near Danville-Dublin area. If interested, please contact Jim van Nuland at 371-1307.
- Nov. 19 Indoor star party at the Los Gatos Red Cross building. Come enjoy an informal evening with friendly conversations, food, maybe some slides and a parking lot star party if it's clear. SJAA Board meeting, also. Everyone welcome. IDSP starts at 7:30 PM on, board meeting starts at 8:00.
- Nov. 26 Thanksgiving weekend -- no club activities planned. Enjoy the holiday!
- Dec. 3 Star Party at the Grant Ranch Park on Mt. Hamilton Rd. If you didn't get a chance to try out this new site in November, try it now. Again, if the main gate is locked the SJAA combination lock will be there and can be opened using 4565.
- Dec. 10 Indoor star party at the Los Gatos Red Cross building, 7:30 PM on. SJAA Board Meeting at 8:00 PM.
- Dec. 17 SJAA General Meeting at the University of Santa Clara, Alumni Science Center, room 102. 8:00 PM. Speaker and subject to be announced.
- Jan. 7 Indoor Star Party at the Los Gatos Red Cross building. 7:30 PM on. There will be a star party in the parking lot for everyone to attend if the weather is clear. Bring your new Christmas telescopes and equipment!
- Jan. 14 SJAA General Meeting at the University of Santa Clara. Topic to be announced. (We're trying to get Gene Cisneros to give a slide show on his December archeo-astronomy trip to the Yucutan Penisula!)

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DIRECTIONS AND MAPS TO ALL REGULAR SJAA ACTIVITIES ARE LOCATED ON BACK

## DIRECTIONS & MAPS TO ALL SJAA REGULAR EVENTS

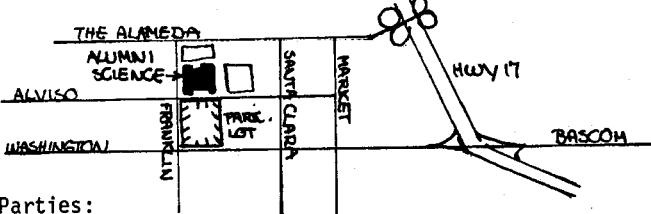
### General meetings:

University of Santa Clara, Alumni Science Hall, room 102

Heading north on Hwy 17, exit at Bascum/Washington Ave (north), proceed to Franklin, then turn right.

Heading south on Hwy 17, exit at the Alameda (north), proceed to Franklin, then turn left.

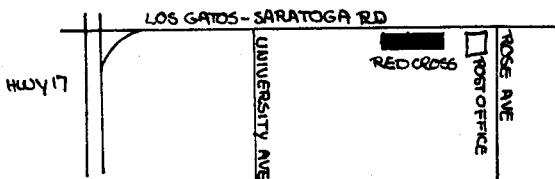
Go two blocks and turn left into parking lot. Alumni Science Hall is the 3 story building that borders the east end of the lot. Room 102 is on the ground floor and is best gotten to by entering the first door on the right side of the building when walking in from the parking lot.



### Indoor Star Parties:

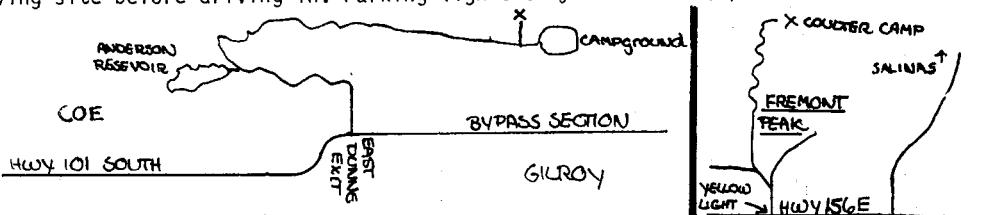
Los Gatos Red Cross Building, 18011 Los Gatos-Saratoga Rd., Los Gatos

From Hwy 17 south take the Hwy 9 (Saratoga) exit and continue up Los Gatos-Saratoga Rd. for about 1.5 miles. Turn right at Rose Ave., and turn right immediately into the parking lot of the Red Cross Building.



### Henry Coe State Park:

Take Hwy 101 south towards Gilroy and take the East Dunne exit. Continue east towards the hills (past Anderson Reservoir) for about twelve miles to the park. Past the park entrance you will see old ranch buildings on the right and a horse trough on the left. The gate to the SJAA site is on a dirt road just before the trough. The gate is locked but the club combination is 4565. Always lock the gate after yourself. If arriving after dark, please park outside gate and hike in first to find an observing site before driving in. Parking lights only after dark, please.



### Fremont Peak State Park:

Take Hwy 101 south towards Salinas. Take Hwy 156 East (San Juan Bautista) for two miles to a yellow flashing light. Turn right and go about  $\frac{1}{4}$  mile to where road curves slightly to left and splits. Stay left for about 50 yards and then bear right when road splits again. Follow road for about 11 miles into park. SJAA sets up at Coulter Camp overflow area - it's visible as you drive up into main area of camp. Parking lights after dark, please.

# SPACE PROGRAM UPDATE

BY BOB FINGERHUT

## Spacelab Flight Delayed

The Space Shuttle, with orbiter Columbia, has been moved back from the pad to the Vehicle Assembly Building (VAB) due to a possible defective nozzle on one of its solid propellant motors. The nozzles' carbon phenolic insulation comes from the same batch which almost caused a catastrophic burn through on the last shuttle flight. The options being pursued are to mount Columbia to a new booster and tank stack and try to launch between November 26 and 28, or to ship new solid booster nozzles to the Kennedy Space Center and launch in late February.

## STS-9/SPACELAB 1 to Conduct Research 24 Hours A Day

The Spacelab crew will split into two 12 hour work shifts for nine working days of the 10 day flight. The mission commander will be John Young and the pilot Major Brewster H. Shaw. The mission specialists will be Owen K. Garriott and Robert Parker. The payload specialists will be Byron K. Lichtenberg and Ulf Merbold, a West German scientist.

The Spacelab 1 will carry 38 experiments of which 25 are sponsored by the European Space Agency, ESA, and 13 by NASA. Experiments will be conducted into the fields of astronomy and solar physics, space plasma physics, atmospheric and Earth observations, life sciences, and materials science.

## Seventh Ariane Launch Successful

The ESA Ariane Rocket successfully put an Intelsat telecommunications satellite into orbit October 18.

## Soviet Spacecraft in Orbit Around Venus

Two Soviet spacecraft have gone into orbit around Venus, Venera 15 on October 10, and Venera 16 on October 14. They are in highly elliptical, 24 hour orbits. They are expected to image the surface with radar.

## Insat 1B Deployed

The solar array in the Indian communications satellite, Insat-1B, was finally deployed September 10. The satellite has been positioned in geosynchronous orbit at 74° east longitude.

## TDRS-1 Moved to a Permanent Location

The tracking and data relay satellite, TDRS-1, was moved to a 41° west longitude orbit between September 23 and October 17 from the position where it underwent testing. Included in previous tests was operation with the STS-8 shuttle mission in which the TDRS demonstrated the ability to lock on and track an orbiter automatically.

## Satcom 2R Operation in Geosynchronous Orbit

The Satcom 2R, which was launched September 8, is now operation in geosynchronous orbit at 72° west longitude.

## Soviet Booster Explodes on Pad

A Soviet SL-4 booster exploded on the pad at Tyuratam on September 27, seconds after its two-man Soyuz spacecraft was pulled off the booster by the launch escape system. The cosmonauts were not injured seriously.

The launch accident followed a serious propellant leak September 9 on the Salyut 7 space station. The space station failure occurred when a main oxidizer line ruptured, spilling the propellant in two of three nitric oxide tanks into space. The accident forced the station's two cosmonauts to put

on their space suits, enter their Soyuz capsule and prepare for return to Earth. When the hazard abated the crew was allowed to remain on the Salyut. The Salyut 7 now has minimal maneuvering propellant, 16 of 32 attitude control thrusters and its back-up main engine unusable.

#### Manned Maneuvering Units Delivered

Two manned maneuvering units have been delivered to NASA for use on shuttle missions 11 and 13. Mission 11 is scheduled for January 19, 1984 and mission 13 is the Solar Maximum satellite repair which is scheduled for April 4, 1984.

#### Space Telescope Instrument Delivered for Testing

Jet Propulsion Laboratory has shipped the wide field and planetary camera to Goddard Space Flight Center for testing

#### Senate Opposes Satellite Sale

The Senate has passed unanimously a resolution to disapprove the Reagan Administration's plan to sell Earth remote-sensing satellites to private industry. The sense of the Senate resolution has no force in law but is important because the sale cannot proceed without a bill passed by both houses of Congress.

#### Plans to Store Columbia Reversed

The NASA head, James M. Beggs, has reversed a previous decision that would have put the orbiter Columbia in storage for two years and made it available for spare parts cannibalization after the Spacelab 1 flight. Beggs characterized the previous decision as bad political and engineering policy.

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#### THE 1983 AMERICAN WORKSHOP on COMETARY ASTRONOMY *by Don Machholz*

This workshop was held Saturday, October 1, at the Jet Propulsion Laboratory in Pasadena, California. Although registration was to be limited to 100, some 130 comet enthusiasts attended. There were tours and talks, with an emphasis on Halley's Comet.

Some of the JPL staff, such as Ray Newburn, Zdenek Sekenina, and Paul Weissmann talked about cometary photometry, comet nuclei, and spacecraft missions to comets. The amateur astronomers took most of the afternoon session. Comet photography was displayed by John Sanford, and then Dan Tidwell introduced a super-fast Polaroid 35mm film. Jack Marling discussed a filter which enhances most comets; it is now available from Lumicon. The final two hours were devoted to a talk by John Bortle and Charles Morris on techniques for visual comet observing. Efforts are being made to standardize observations of comets so that the data will be of better use to the professional astronomers.

As you might have heard, Halley's Comet is not predicted to be very bright this time around. However, John Bortle announced that the comet may be 2 magnitudes brighter than previously predicted. This follows revision of some of the 1910 observations of Halley's, the most recent apparition of the comet. If this is true, the comet could be an easy naked-eye object from dark skies in 1986 ---- if dark skies can be found in 1986.

Finally, an observing session was planned, but cloudy weather limited it to an indoor evening session followed by observation of and through the two instruments set up outside the auditorium.

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## SJAA COMPUTER by Bruce DeGraaf

Having weasled two grants from the San Jose Astronomical Association (SJAA) board, I felt that at the least it would be courteous to explain just what I have done and what I plan to do with the SJAA's granted capital. Please note that I would appreciate any feedback regarding these efforts.

The SJAA computer is an outgrowth of the SJAA charge injection device (CID) camera project. The camera was purchased through a grant from International Business Machines Corporation (IBM) while I was an employee. Via a personally designed and constructed interface, Pete Manly connected the CID critter to an oscilloscope and showed that it could outperform an ordinary television camera and be useful on telescopes such as a Celestron International Corporation's C-8.

When Pete moved to New Mexico, I took over the camera development and started to design a TV interface which would present the camera's images on a domestic TV receiver. I wangled a sample of a "flash" analog to digital convertor (A/D) from the Radio Corporation of America (RCA) and planned to digitize the image so that the camera could be used with relatively long exposure times while the image remained visible and flicker-free on the TV receiver.

Thieves nearly ruined everything. Along with my microwave oven and a few other items (They IGNORED my audio system!), they stole the camera, A/D, and the plans. Luckily, the insurance company covered the losses, and I purchased a new camera (supposedly with only one 10% down blemish) and conned RCA out of another A/D chip.

I started work on the camera control box, initially planning to do all of the processing in hardware and provide a simple, computer interface. Along came the Atari rebate offer on the 400 computer, and I realized that there was no way I could complete the camera box for less than the \$150 for the home computer. Also, the 400 has the advantage of being able to run from nine volts and is therefore suitable for field work!

I requested the former grant for \$132 to purchase the 400 before it became unavailable due to demand. The \$50 rebate was aimed at Jim van Nuland because I was already receiving a rebate (due to buying another 400 to replace a video game which was stolen) and because I was not sure that Atari would honor a rebate to the SJAA. I then started searching for a way to upgrade the 400's memory so that it could handle the data produced by the camera. An agreement with Austin Franklin Associates yielded a memory upgrade for \$70.95 and the latter grant was requested.

Except for an optional purchase of an Atari 822 printer, the two grants described are all that are expected: no additions to the SJAA computer are planned. The idea is to provide an inexpensive controller for some of the SJAA's functions. Some of the key points to the design of the system are:

-Low Cost

This was covered above

-Long Term Reliability

The design is for a computer system with no moving parts such as a diskette or tape drive. This should yield significant improvements in reliability. My only worry involves the special nature of some Atari parts; I will obtain some replacements just in case Atari decides to stop manufacturing them.

-Ease of Use

The planned programs are "canned" and in cartridges, which are far easier to use than diskettes or tapes. The SJAA computer is not planned to be a development machine; rather, it is to be a controller for some of our activities.

## Programs

The three programs planned for the computer are described below. Note that these may take some time to develop and one has a known technical problem.

### Camera control

The camera program runs the CID camera. A special interface is being built by David Mathis and myself to digitize the camera's output and present it in a compatible form to the 400. The CID sensor contains 16,384 elements (128 by 128) and the signal from each one is to occupy one cell (one byte) in the 400's memory. Two pictures are extracted from the camera at any one time: the actual image and a noise image. The latter is used to improve the dim light capability of the camera. As a result, the 400 must have more than 32,768 (2 x 16,384) bytes of memory. The next step above 32,768 is 49,152: the full capacity.

The camera cartridge is expected to contain 8,192 bytes of read only memory (ROM). Since this memory disables an equivalent portion of the random access memory (RAM) in the 400, only 40,960 bytes of RAM will be active. That is expected to be enough to store the camera's images and to provide the necessary working area for the program.

The system will be able to generate "exposures" of 1/15 through four seconds per image pair. The 400 will display the picture at TV rates so that there will be no flicker. The exposure times are pretty conservative, the design goal is from 1/30 second through eight seconds. This is beyond the range of the earlier package, which was known at least to be adequate.

All information regarding the camera will be presented on the TV screen. Also present will be the SJAA logo. As a result, the program should be suitable for astrophotographic guiding purposes and for public presentations. It may be possible to add code to effect automatic guiding.

A special portion of the code will drive an 822 printer to produce a semi-permanent copy of the image. The 822 is a thermal printer capable of producing 40 character lines and graphics. It is inexpensive (\$100) and marginally reliable. The thermal paper is commonly available and provide a means to put CID images into the "Ephemeris". Note that the 822 is NOT SUITABLE for mastering the entire document! Don't get your hopes up regarding a word processor! If desired, another printer can be supported; I just need to know its characteristics.

### Other programs

The obvious question of "What about the Ephemeris?" must be answered. Yes, with the "AtariWriter" cartridge, the 400 can act as a word processor. There exists some problems:

#### -Printer

The 822 is not suitable for masterinf the Ephemeris. This has nothing to do with its dot matrix characteristics. Instead, the problem is that it uses paper which is just too narrow for the articles.

#### Storage

I know of no useful word processor program (regardless of machine) which does not require some form of mass storage (a diskette, for example). A diskette drive for the 400 can be obtained for \$240, complete. I recommend against it as it would surely break if loaned to the membership. That may sound a bit harsh; let me say I would not loan it to me!

#### -Keyboard

The 400 comes with a keyboard (if you can call it that) which must have been designed by the Nazi SS! Everybody, who can, replaces their 400 keyboard with something like the Inhome Software Company's

B-Key 400 keyboard. This is certainly an option. However, the improved keyboard may not be suitable for field work. The standard 400 keyboard has the advantage of being able to be cleaned with a damp cloth.

Conclusions? I think they are obvious. We now have the means to build a device which can act as:

- An inexpensive camera controller
- An inexpensive occultation aid
- An inexpensive auction controller

We do not have a word processor or program development package. While I agree that the former is very useful and desirable, I suggest that the SJAA does not need the latter. Maybe some grants from Atari (or perhaps Apple, Hewlett-Packard, or IBM) can be arranged for the "word-smithing" activities.

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