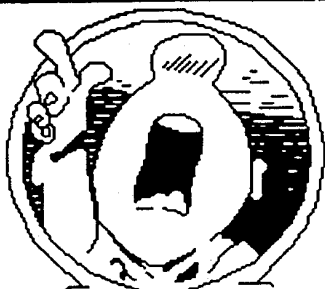


SJAA EPHEMERIS

VOLUME 6 NUMBER 6 OFFICIAL PUBLICATION OF THE SAN JOSE ASTRONOMICAL ASSOCIATION June 1995



The Eyepiece
By Bob Madden

Again the Auction and Swap was a success. Kevin Medlock, Epoch Instruments, had an 8-inch Schmidt Camera (\$1000) and a CCD (\$320). There were many telescopes and eyepieces this year for the swap.

About the time I take this to the printer we will have tried our new meeting location, Houge Park. We think this location will be more available to the members. Come visit with us.

As I promised, Ernie Piini's article on Flash Spectrometry of the sun begins. We also have a report from H. Coe State Park (by Jim Van Nuland) and one on Mars and Saturn. Hopefully I will begin an article on "How Do You 'DEW' It". The regulars, Forty Years and Comet Comments are included.

There is a movement to get the Telescope Making Magazine series republished into a best-of-series book. You too can help in this campaign by writing Astronomy magazine, Atten: Robert Burnham, to indicate your desire for a copy. I believe we should also start the same campaign to have the "Gleanings" in Sky and Telescope also published as a best-of-series. There is such a legacy to amateur telescope making that it should not be lost on those of us who do not have back copies. A side bar here; the rumor is that Willmann-Bell has purchased the right to publish the

June 2: Star Party, Houge Park. Set 8:23 pm, 20% moon down 11:32 pm.

June 3: No activity. Too much moon, sets at midnight.

June 10: General Meeting at Houge Park 8:00 pm preceded by the Board meeting at 6:15. Speaker To Be Announced.

June 17: Observational Astronomy Class, Houge, Jack Petersen

June 24: Star party, Coe Park. Set 8:30 pm, 7% moon up 4:11 am.

ALSO: Public star party at Grant Ranch County Park.

July 1: Star party, Fremont Peak. Set 8:29 pm, 16% moon sets 10:41 pm.

July 7: Star Party, Houge Park, Set 8:31 pm, 75% moon down 2:21 am.

July 8: General Meeting at Houge Park 8:00 pm preceded by the Board meeting at 6:15. Speaker To Be Announced.

July 15: Observational Astronomy Class, Houge Park 8:00 pm, Jack Petersen instructing.

July 22: Star party, Coe Park. Set 8:22 pm, 17% moon up 2:54 am.

ALSO: Public star party at Grant Ranch County Park.

July 27: Star party, Fremont Peak. Set 8:15 pm, 6% moon sets 9:17 pm.

Yosemite Star Party: July 28 - 29 Space available. Good moon for observing

Lassen Star Party: Aug. 24 - 28 Space filled.

The Ephemeris is published by
The San Jose Astronomical Association
5380 Pebbletree Way
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Forty Years Ago this month by Jim Van Nuland

For the June 20 meeting, San Jose State College was between terms, so our usual room was unavailable, so we set up chairs outside in the quad. Present were 24 people, including 6 new persons who found their way via the announcement in the San Jose News and Fiesta handouts.

The June 20 meeting opened at 7:30 with the Constellation of the Month, Scorpio, given by Stephen Bieda. Steve followed out the outline of the constellation giving data on each of its main stars, then data on other objects of telescopic interest within the boundaries of Scorpio. Walter Krumm carried on the the feature talk on telescopes. He gave the basic features of reflectors and refractors, then went on into formulas and basis for focal lengths, magnifications, etc. The club is interested in stimulating the building of scopes and speeding up some of those that are in process. Not with any personal implications, but just that until we get a more representative group of scopes, we can't put on the show that we need for our organization. Walt's talk and question and answers led us into twilight and the appearance of Arcturus; also a chill wind for which as a group of astronomers were were rather inadequately prepared.

Informal discussion afterward centered on the comet now in the northwest at dusk and northeast in early morning. Also on the eclipse — longest for another 213 years — which was total for a large portion of Asia.

famous Scientific American series of Amateur Telescope Making by Ingals. What a delight they are. Making them available again to the public is terrific.

Mars and Saturn by Andrew M. Sorenson

This article started at 2:30 a.m. on a freezing April morning that wind had swept clear of clouds. It's now 3:30 and I'm still searching for words to express my feelings. Saturn's rings will disappear this summer and I'm looking forward to this event almost like I looked forward to Voyager photos, the comets hitting Jupiter or the total eclipse of the Sun in 1991. A "disappearance"? Am I daft?

Outside is Jupiter near a waning gibbous moon in a crystal-clear sky, but the wind howls like a hungry predator and that's it in a nutshell. There are limits. This introspection I'm going through, I think, started in 1994 and maybe reached crisis proportions. Actually 1994 was a great year for me and astronomy. But of all the great events, there were two that seemed unusual. In preparing a talk for my daughter's grade in school, I made drawings of the planets and comets, I've observed, to show them variety and change. One of those drawings was of Saturn as it appeared in December of 1968. I noticed that the rings were oriented differently than the other Saturn drawings and it struck me that I really was seeing change. I had recorded Saturn's rings in notes made decades ago. I was getting older. A year was about to pass for me—on Saturn. Where were other drawings of Saturn from the 70's and early 80's? I hadn't kept notes. I was busy with other things in life. Later that year I had a chance to see through an 8" f/10 Newtonian I had built myself. In the late 60's, before people used ladders to reach the eyepiece and used vans to haul their scopes around, when a 4" Edmund refractor seemed like a rare and expensive Renoir, I thought an 8" f/10 was something I could possibly make. I could maybe afford that and if made perfectly would probably be the scope to observe Mars with at the close apparitions of '69 and '70. But it didn't happen. School and a family kept me busy it seems, and the astronomy projects drifted to other areas and times. Mars in '88 was a faint reminder, but other things overshadowed it.

I went out to do battle with the mosquitoes again July 28, 1994 as I had done many times before but this time with a scope about to see first light. This was the 8" f/10 and it brought about strange, unfamiliar, and uncomfortable feelings. By 3 a.m. the next morning I had things arranged and after a couple of mistakes—looked at Saturn. The image was sharp, the rings were going flatter and the scope seemed to hold higher powers ok. I couldn't write in my notes about it until a few days later—I generally don't spend the

space in my notes to write about the psychological effect the equipment has on me. Saturn was naturally one of the first things I looked at in 1965 with my 4" telescope. On July 28, 1994 Saturn wasn't just beautiful, but haunting as well. It was all in the 8". It had taken so long. It reminded me of all the things that had happened—things I'd learned, of naive dreams, and I didn't want to go backwards.

I'm not sure if it was a relief to be able to do astronomy again after heavy activities in other areas in the fall of '94 or more of an obligation to use the 8" on Mars and get that "behind me", but I observed Mars as much as I could in February and March. Judging by some of the February temperatures, I don't think the "relief" theory would hold much water. Generally the air was not as steady as I would have liked, but it was good enough to study Mars—to get a better idea of it than I ever had before. How ironic to use my "dream scope" on one of Mars' worst apparitions. I did recognize features on Mars, picked out details with difficulty on a low contrast distant, world half the size of Earth. A real place. I thought I saw fog, clouds, some detail slightly different from the maps of '93. Illusion? I started to feel a constancy. Lowell looked at the same planet. Cassini and others saw the same world, only slightly changed. One hundred years ago, to Mars, a 24" refractor didn't matter; there has never been a '57 Chevy there, a 386 that was made obsolete by a 486. Mars was ancient when the Greeks were refining democracy and the Sumerians wrote in clay. I had only seen a little.

Sky & Telescope's article on Saturn's disappearing rings caught my curiosity when it said that for many of us this may be the last time to see some of these events. I was, just starting out in '66. In '80, I was in school. For me now, this is a once in a lifetime event. Still, if I kissed a pig next week that probably would be too. What was the big deal about something you can't see?

I started reading a book I've had for years but seldom paid much attention to. Dover published a great book, *The Planet Saturn* by A.F. O'D. Alexander. Many observations made in the mid 1800's with "amateur" size scopes showed a variety of unusual sights. Rev. W.R. Dawes saw an extremely thin coppery ring, and no shadow on the globe. (the Sun passed through the ring plane) Huggins and Birt, each with 8" refractors saw the ring as broken points of light. Huggins felt they marked inner + outer edges of the rings (seeing through gaps?) and on May 16, 1862 described the rings as a deep bluish purple. That would be seeing "under" the rings lit from "above" by the Sun. On May

13, 1862 Birt described an ansae as shorter than the other and noted "projections on the illuminated plane of the ring." !?

Carpenter on March 26, 1863 saw the dark space between the rings and the planet as "much contracted." Apparently the crepe ring reflects much better at shallow angles when the rest of the rings are also less glaring. Jacob with a 9" refractor on December 4, 1861 described the rings and their shadow as a dark streak across the planet with separation between them that "could not have been much more than 0.04 arc-seconds"!! (Okay, so that was a 9" refractor.) December 17, 1861 William Wray using a 7" refractor didn't expect to see much but "to my utmost surprise, with power 110, I instantly perceived the whole of the edge (sic) of the ring, not only where it crossed the dark shade on the body, but also extending on each side of the planet's margin. It was irregularly broken". He had seen the dark side obliquely, saw it distinctly again December 23rd, "and suspected (it) to be thicker and somewhat nebulous about the region on either side where it joined the planet's limb."

Others wrote of ansae broken into points of light that remain fixed. Some saw ansae of varying lengths and points of light that changed in several hours implying a rotation of the rings and seeing detail associated with ringlets and clumps of material in the ring system.

I felt I should pass this information on for those who would be interested. I have in the past talked with some friends of "burn-out". I've never much worried about it in the past. For me astronomy isn't a career, it's more a love, a part of my life that I know will always be a part of me; if I missed something, I can always see something else. But now another part of my life seems to be creeping into my awareness and education. There are all sorts of limitations in life and we do miss opportunities. You can't go back to some things. When my kids are out of the house that part of my life will not be open to be redone. When the Hayes' move to Texas, star parties will be different. We'll be sad at the loss of friends, but at the same time, thankful for having met enjoyable people. The stars may always be there, but we are not simply observers—we are a part of all this and an awareness of the events color and shape our lives.

Being scatter-brained and disorganized as I am, I feel awkward giving advice. But I'd like to recommend that you watch Saturn for whatever you can or cannot see, write it down in notes and drawings, however.

Camcorder Eclipse Devices

by Ernie Piini

My first view of the Flash Spectrum, a thrilling experience, came near 3rd contact at the 1973 total eclipse over the Sahara Desert. I was using a borrowed objective grating from NASA, a device which fits directly in front of the telescope objective lens, forming a slitless spectrograph. The very thin crescent of the sun forms a natural slit. Although I was successful in recording the spectrum of emission lines on film, I found the photograph did not capture the entire phenomenon, which lasts only a few seconds. Since the advent of camcorders, I decided to try to capture these few exciting and colorful moments on video tape. Besides, the audio of the eclipse crowd's yelling and screaming around 2nd and 3rd contact, recorded simultaneously by the camcorder's microphone, added an exciting bonus.

My first opportunity to try this was at the 1991 Baja eclipse. I borrowed my brother's Canon 8 mm camcorder and outfitted it with an Edmond Scientific transmission type diffraction grating. The grating was mounted inside a cardboard barrel that slip-fit over the lens of the camcorder. My wife Barbara operated the camcorder during 2nd contact and made a good recording of the Flash Spectrum. However, we reviewed the results only once. After the first playback, I failed to forward the tape to the blank portion and unknowingly later recorded over those precious inches of tape. (I painfully learned never to show eclipse results until the red safety curtain has been set to the play only position—and kept there.) For the 1992 Uruguay eclipse I experimented by mounting one-half of a Tasco 7x35 binocular to my brother's camcorder to magnify the size of the eclipse image during totality. We did not obtain the desired results because the sunrise eclipse was clouded out.

The next great opportunity arose for trying both of the aforementioned experiments with a camcorder, when my daughter wanted a project to work on during the Bolivian Eclipse. She and her husband own a Sony Hi-8 and were willing to use it for this occasion.

This camcorder has no lens shade hood or protrusion that would make it easy to attach any extra gadgets but it does have a one 32-per-inch thread on the very edge for attaching a protective UV or other type camera filter. I made a 3/4-inch long aluminum barrel with matching threads to screw onto the protective filter. This gave me a convenient hood to mount gratings or other eclipse devices in front of the camcorder lens.

Some of my requirements for the camcorder were that eclipse attachments could quickly be inserted or removed, and that the camcorder could quickly be detached from the tripod for panning the eclipse site or the horizon. For this I built a wooden base that attached to the tripod with a 1/4 20 bolt. It provided beveled railings allowing the camcorder base and/or monocular base to slide in or out smoothly and quickly. It was held in place by locking screws on one side of the beveled railing to secure the camcorder and/or monocular. The base for both the camcorder and the Tasco 7x35 monocular was made from wood and beveled to slide smoothly within the tripod base. The eyepiece end of the monocular slipped inside the newly-made hood squarely and optically in-line with the camcorder lens.

This special holder includes both a diffraction grating and a prism. The prism guides the sun's light into the diffraction grating at an angle such that the latter produces the first order spectra on the camcorder screen without having to point the camcorder away from the direction of the eclipsed sun. Without this prism-grating combination, or using a prism alone, capturing the flash spectrum would require pointing the camcorder at some awkward angle away from the sun. This angle would be quite difficult to find if you're in a hurry to bring the spectra into the camcorder lens.

The grating breaks down the incoming chromospheric light from the nearly eclipsed sun into its spectral components. This is the moment when the sun's bright photosphere is finally covered by the moon and only the faint chromosphere remains visible. The flash spectrum is so named because this phenomenon lasts only a few seconds.

Construction Details: "Flash Spectrum" Device

A low-cost holographic diffraction grating, recommended by Stephen J. Edberg in his article, "Observing the flash Spectrum at a Total Solar Eclipse" published in the first issue of the Eclipse Chaser's Digest, was used. This grating material is available from Learning Technologies Incorporated (59 Walden Street, Cambridge, MA 02140) for about \$8 per 5X9 inch sheet. The shape of this grating surface produces a dispersion angle of 23.5° and a groove separation of 750 lines per millimeter.

A small piece of this material, 1-3/8 inch long, was cut to the width of 35 mm film and mounted into a 2x2-inch standard slide frame. On one side of this grating mount, the output side, I glued (using Barge Glue) a 2-inch diameter by 5/8 inch long PVC tube. The inside diameter was sized to allow a smooth fit over the newly made lens hood that screws onto the front of the camcorder lens. On the input side of this device I glued a 1-3/4 inch square x 1-1/8 inch long wooden assembly which encloses a 1 inch 1 inch right angle glass prism (see foot note 2) purchased from Edmund Scientific Company, Barrington, NJ, 08007-1380, part number B39,123 for about \$8. The choice for this prism is calculated below.

The following equation was obtained from the Amateur Astronomer's Handbook by Sidgwick, 1957 edition, and rearranged to obtain the desired prism angle directly:

$$\sin A = L (\lambda) / x(n-1)$$

where:

A = Angle of Prism (in degrees) required for in-line matchup with grating

L = Wavelength of color desired for straight through transmission

(I chose the middle of the spectrum = yellow at 5700 Å.)

x = Groove separation of grating used
(750 grooves/mm = 13,330 Angstroms)

n = Index of refraction of prism glass
(1.505 for crown glass)

Solving for sin A using parameters given in parentheses above:

$$\sin A = 0.846 \text{ or } 48^\circ$$

Instead of building a 48° prism, I experimented with using a common right angle prism that has two 45° angles (prisms from binoculars work well too). The prism's hypotenuse was positioned facing outward (see diagram), the slope perpendicular to the grooves on the grating. This configuration put the first order spectrum well within the view of the camcorder. Only a slight correction in azimuth/altitude was required for perfect centering.

I also discovered that the base of the prism projects a second image below the desired image. This was eliminated by baffling the lower one-fourth of the entrance to the prism with a piece of cardboard pasted across the front of the box housing the prism (see diagram).

Continued on page 4 (see Flash)

Flash (continued from page 3)

I had Elaine position the spectrum on a diagonal of the viewing screen with the red end at the lower left and the blue-purple end at the upper right. She controlled the length of the spectrum display, and thus the line resolution, with the camcorder's zoom control.

Elaine's instructions were to perform the flash spectrum experiment at both 2nd and 3rd contacts, and the monocular experiment during partials and parts of totality. The results were good but could have been better had we operated the camcorder in the MANUAL mode rather than in AUTO.

Even though Elaine's total results were not perfect (because of totality addition) there was enough good video to indicate that both the monocular and grating devices worked surprisingly well.

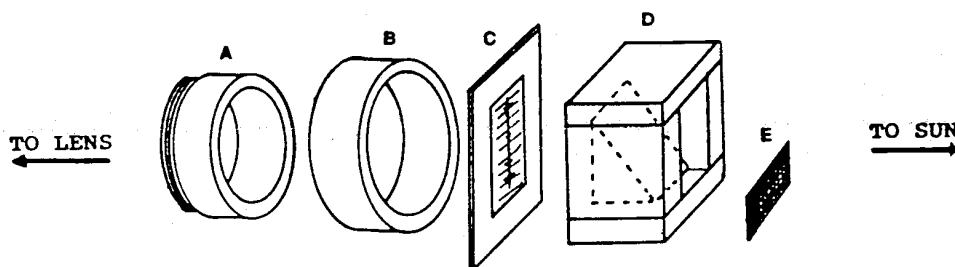
I would recommend the prism-grating combination to anyone interested in recording the flash spectrum with a camcorder. The combination will also work well with a 35 mm camera using a 135 mm or longer focal length lens, if still photos are desired.

NOTES:

1. During a normal study of the solar spectrum, the Spectrum appears as a continuous array of light called continuum with an overpowering photosphere and only the dark absorption lines visible. During an eclipse, however, the Moon blocks out the blinding bright photosphere allowing the bright emission lines of the reddish chromosphere to flash at various wavelengths. Under these conditions the full spectral display lasts only few seconds during the short period of time when the lower chromosphere is exposed. As the Moon's limb moves out at the average rate of 310 kilometers (192 miles) per second and continues to cover parts of the upper chromosphere, various emission lines disappear indicating certain the Sun's gases are only found below limited height above the photosphere while other gases exist only at higher elevations. The reverse of this occurs the end at totality.

2. The prism's hypotenuse faces the Sun and the opposite (output) side is mounted even with the back of the wooden assembly and flush with the grating holder. Prior to installing the prism, paint all surfaces flat black.

PIINI FLASH SPECTRUM GRATING DEVICE



CONSTRUCTION DETAILS: (A) Lens Hood for Sony Hi-8 Camcorder. (B) 2-inch diameter x 1/2-inch long barrel (paper/plastic), Inner diameter made to slip-fit over lens hood. (C) Holographic Grating mounted in slide holder; spectral image parallel with long side. (D) Mount Prism inside wood block, flush with back side. Two side pieces are 3/8-inch thick x 1-inch high x 1 1/8-inch long. Top and bottom pieces are 3/8-inch thick x 1 3/4-inch wide x 1 1/8-inch long. Paint all surfaces flat black. Use Elmer's glue to assemble block encompassing prism. (E) Make front baffle using card stock, cut piece 5/8 x 1 3/4 inches, Paint flat black.

Sandwich (C) with (B) and (D) using Barge glue. Prism side must be flush with grating holder, prism hypotenuse aligned with long side of slide. Glue baffle (E) to front (input side) of box (D).

Problems/questions; call Ernie Piini, (408)252-3609 or write him at 1356 Longfellow Way, San Jose, CA 95129

Apr. 22 star party at Coe Park by Jim Van Nuland

Conditions at Coe were good on April 22: cool with a small breeze, a pleasant day. Many other people thought so too, as the parking areas were nearly full! Mostly day visitors, enjoying their first outing of the spring, as well as some scout groups.

I arrived early as usual, to invite people to see the Sun; but there were no spots to show. I invited them back after dark. Some actually did so! As darkness fell, only three of us were on the hill, joined by 4 park visitors. The temperature quickly dropped to 50, then stayed there. With no dewing and no wind, it was comfortable.

The sky was reasonably steady and clear, though the light from the nearby cities has become intrusive. One estimate was that it was about one magnitude darker at the Peak. We showed the tourist objects to the tourists: Mars, then M38, M36, M37, especially lovely. The 4 inch's wide field was especially useful on M44, the Beehive cluster. M67 was better at 76x than at 61 or 98; it's useful to try several magnifications on each object. Even for the same object, one finds that the optimum magnification depends on current conditions.

We launched a considerable attack on NGC5139, the Omega Centauri globular cluster. But there was appreciable low haze, and we were unable to resolve any stars at all, though at 122x some mottling was suspected. In the past, I'd noted resolution around the edges, and of course from Florida it was spectacular even with a small scope. Turning to the north, M81 and M82 presented well, together in a 61x field, and some structure was readily seen at that power. The visitors took it all in, had a great time, thanked us profusely, and promised to return. We told them about the SJAA Hot Line.

I talked to one of the rangers in the morning. The road grader of last summer is gone. One of the big water tanks is up at the spring (source of the Park's water), and the other is temporarily installed on "our" hill. A temporary is needed because the old redwood tank had to be removed first. There are problems with cracked welds on both tanks, but when that's fixed, both will be placed at the spring, so we will again be able to use both sides of the hill. I didn't have the heart to ask how long that was going to take, but I gather that it's a matter of weeks, not months. The leaks must be eliminated soon, as the spring's output drops off sharply once the rain stops.

Leap Year Calculations (from the internet)

I know that there is something special about leap-years on century years like 1900, 2000, 2100 etc. Either there is an extra leap day or Feb 29 is deleted in some (but not all) century years.

Can anyone tell me what the rule is, and tell me if 2000 is a leap-year?

Years divisible by 400 are leap years. Years divisible by 100 but not by 400 are not leap years. The year 2000 "will" be a leap year. The year 1900 was not.

The "real" length of a year is almost (but not quite!) 365.25 days. A leap day is added every four years to keep the calendar and the seasons from falling out of sync with each other.

However, since the actual length is not quite 365.25 days, these added days result in slight over-correction. The solution is to delete a leap day every fourth century year.

The decision as to "which" century year is made by dividing the first two digits of the year by 4. If the division is even, the century year "is not" a leap year.

Therefore, 2000 and 2400 are not leap years. 1900, 2100, 2200, and 2300 were not (or won't be).

It goes like this: years divisible by 4 are leap years, except those divisible by 100, but then years divisible by 1000 are for sure leap years.

leap years = (divisible by 1000) or (divisible by 4 AND NOT divisible by 100)

Boy, did I ever goof. Mea culpa, mea culpa, mea maxima culpa. As I was lying in bed this morning, I realized I got it backwards. Here is the correct(ed) explanation:

The "real" length of a year is 365.242 days — almost (but not quite!) 365.25 days. A leap day is added every four years to keep the calendar and the seasons from falling out of sync with each other.

However, since the actual length is not quite 365.25 days, these added days result in slight over-correction. The solution is to add a leap day only every fourth century year.

The decision as to "which" century year is made by dividing the year by 400. If the division is even, the century year is a leap year..

Therefore, 2000 and 2400 are leap years. 1900, 2100, 2200, and 2300 were not (or won't be).

Essentially the same rule applies to centuries as to common years: If divisible by

4, then it is a leap year, otherwise not. 20 is divisible ==> 2000 is a leap year.

A year is a leap year if it's a multiple of 4, unless it's a century year, except when the century year is a multiple of 400. So 2000 is a leap year.

Books

From: ketelsen@as.arizona.edu
(Dean Ketelsen)

Some interesting books I have found are collections of "Selected Papers" collected and published by the Society of Photo-Optical Instrumentation Engineers (SPIE). They collect milestone papers, usually by the discoverer or developer from the original source. My favorites are "Selected Papers on" Astronomical Optics, Optical Shop Metrology, and Optomechanical Design. For instance, the collection of astronomical optics papers has the original publications of Ritchey and Chretien, Schmidt, coma correctors by Ross and Wynne, and many large telescope designs and auxiliary optics by Meinel, Angel and many others. 66 papers in all on 600 plus pages. While you could go look up all the references in a good science library, these are great collections. Lots of advanced stuff, but all interesting. Softbound, they sell for about \$85 each from SPIE, P.O. Box 10, Bellingham, Washington, 98227-0010 (206) 676-3290.

-Dean

[Editor's note: Dean works in the University of Arizona Mirror Making Lab]

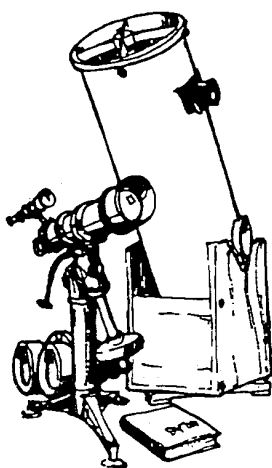
YOSEMITE STAR PARTY

our Yosemite date is July 28 - 29, with a 1 to 2 day moon. Rules will be as in previous years: no vehicles left in the observing area; camping at the group site in Bridalveil Campground. It is not yet known if we will actually use the site above the Ranger's residence at Glacier Point. Jim Van Nuland is taking reservations: 371-1307 afternoons or evenings, or catch him at a meeting. The guideline is to have at least one scope for each two people. The limit is 25 people (not cars).

1995 SJAA Calendar

General Meeting	Houge Park Star Party	Observational Astronomy Class
June 10	2	15
July 8	7	17
August 12 (picnic)	4	26
Sept 9	1 and 29	16
Oct -	-	- Last one
Nov -	-	-
Dec -	-	-

Please read your *Ephemeris* each month for changes



Telescope Loaner Status by Paul Barton

No.	Name	User	Due Date
1	4-1/2" Newt/P Mount	----->	available
2	6" Dobson	John Paul Dasilvia	6/3/95
3	4" Quantum	----->	available
6	C-8 Celestron	Bob Maillot	6/16/95
7	12-1/2" Dobson	Tom Rice	indefinite
8	14" Dobson	Lee Courtney	7/8/95
15	8" Dobson	Bob Elsberry	7/8/95
18	8" Newt/P Mount	Jerry Lovelace	6/10/95
19	6" Newt/P Mount	----->	Available
21	10" Dobson	Steve Wincor	6/11/95
23	6" Newt/P mount	Jim Marquis	7/8/95
24	60 mm refractor	----->	Available

Solar telescope. Available only to experienced members for special occasions such as day time public star parties, etc. Call.

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

ASTRO ADS

ASTRO ADS are free to all noncommercial advertisers wishing to sell astronomically related products or services. Please send your ad directly to the Editor:

Bob Madden

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Retiring: ATM stock of lenses, objectives, eyepieces, hardware, etc (no mirrors). Most items are surplus in good condition. One lot. Interested persons should send a SASE with 55 cents postage for complete list. Robert F. Jensen, 524 Ivy Pointe Circle, San Ramon, CA 94583. (510) 736-8562 2/95

TeleVue Pronto 70mm ED f6.8 telescope. LN, comes with a 2" diagonal, 1 1/4" adapter, 21mm plossl, and soft sided travel case. Plus, a screw-on. Full aperture Thousand Oaks solar filter. \$785 Call Rich. (408) 446-0975 3/95

TeleVue Plossl Eyepieces, 32 mm, 26 mm, 21 mm, 17 mm, 13 mm, 10.5 mm, 2.5x Barlow, 1.8x Barlow, all in a case. Also, Meade 8.8 mm UWA (84 deg field). Every thing in perfect condition. Sacrifice all for \$500 (1/2 retail). Call Edward at (209) 892-8926 Evening. 3/95

Meade 8-inch SC, MC Corrector, GEM Mount, Pole align Scope, 26 mm EP, RA drive. Asking \$900. Call Maria Petersen (408) 262 1457 after 6 pm 4/95

8-inch Newtonian, f/8, Equ. Mount, Clock Drive, portable. \$400 obo call (408) 629-7741 5/95

Celestial Calendar - June 1995

by Richard Stanton

Lunar Phase	Date	Rise	Trans	Set
FQ 03:26	06	13:03	19:08	01:15
FM 21:03	12	19:46	00:43	05:39
LQ 15:01	19	00:20	06:16	12:10
NM 17:50	27	05:20	12:25	19:33

NearPlannets

Mercury	07	05:46	12:51	19:57
0.45 A.U.	17	05:00	12:01	19:02
Mag. -1.6	27	04:32	11:39	18:45

Venus	07	04:39	11:43	18:47
0.72 A.U.	17	04:40	11:54	19:08
Mag. -4.0	27	04:45	12:06	19:28

Mars	07	12:02	18:38	01:17
1.62 A.U.	17	11:48	18:17	00:49
Mag. +0.7	27	11:35	17:58	00:22

Jupiter	07	19:42	00:40	05:33
5.33 A.U.	17	18:57	23:51	04:49
Mag. -2.5	27	18:12	23:07	04:06

Saturn	07	01:57	07:47	13:37
9.63 A.U.	17	01:19	07:09	13:00
Mag. +0.9	27	00:40	06:31	12:21

SOL Star Type G2V

RA	DEC			
04:59	+22:43	07	05:44	13:07 20:29
05:41	+23:22	17	05:43	13:09 20:34
06:22	+23:20	27	05:46	13:11 20:36

Astronomical Twilight

	Begin	End
JD 2,449,875	07 03:51	22:22
885	17 03:49	22:28
895	27 03:51	23:30

Siderial Time

Transit Right	07	00:00	=	15:53
Ascension at	17	00:00	=	16:32
Local Midnight	27	00:00	=	17:12

Darkest Saturday Night 24 June 1995

Sunset	20:35
Twilight End	22:30
Moon Set	17:51
Dawn Begin	03:50



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COMET COMMENTS

By Don Machholz

Periodic Comet d'Arrest brightens in our morning sky as it approaches perihelion on July 27. Meanwhile, the faint Comet Chiron remains in our evening sky.

You might have recently heard about the Kuiper Belt, a band of material in orbit around our sun near the orbit of Neptune. A couple of dozen such objects have already been discovered from earth, they are at about magnitude 22. This translates to a diameter of about 100 km. While many consider them to be comets rather than minor planets, their orbits seem to be rather circular and it seems unlikely that they will approach close the sun and develop cometary features. A question arises: How many objects are there in the Kuiper Belt?

According to IAU Circular 6163, the Hubble Space Telescope conducted a limited search for objects in the Kuiper Belt. The test covered a small section of sky, four square arc-minutes in size. The limiting magnitude was 28, about the brightness of the nucleus of Halley's Comet at that distance. Thirty-four images were recorded over two days last August, they were stacked after the galaxies and stars were removed. Of the many objects remaining, statistical studies were done to determine which "spots" matched up with objects in a typical Kuiper Belt orbit. Some 244 objects were found in such paths, compared to only 185 in a "control" group. The result: "If our 59 excess candidates are indeed real members of the Kuiper Belt, there must be about 60,00 such objects per square degree, or at least a total of 100 million comets brighter than our limiting magnitude in the restricted range of orbits similar to the ones studied here."

EPHEMERIDES

95/CHIRON

DATE(00VT) R.A.(2000) DEC EL SKY MAG

05-23	11h17.3m	+00d18m	109d E	15.7
05-28	11h17.6m	+00d20m	104d E	15.7
06-02	11h18.2m	+00d21m	99d E	15.7
06-07	11h18.8m	+00d21m	95d E	15.8
06-12	11h19.7m	+00d19m	90d E	15.8
06-17	11h20.7m	+00d16m	85d E	15.8
06-22	11h21.9m	+00d13m	81d E	15.9
06-27	11h23.2m	+00d08m	77d E	15.9
07-02	11h24.6m	+00d02m	72d E	15.9
07-07	11h26.2m	-00d05m	68d E	15.9

GP/d'ARREST

DATE(00VT) R.A.(2000) DEC EL SKY MAG

05-23	20h23.0m	+08d02m	109d M	12.1
05-28	20h34.8m	+08d39m	110d M	11.8
06-02	20h47.0m	+09d09m	112d M	11.5
06-07	20h59.4m	+09d31m	113d M	11.2
06-12	21h12.2m	+09d44m	114d M	10.9
06-17	21h25.3m	+09d45m	116d M	10.6
06-22	21h38.8m	+09d31m	117d M	10.4
06-27	21h52.7m	+09d01m	119d M	10.2
07-02	22h06.8m	+08d12m	121d M	9.9
07-07	22h21.3m	+07d01m	123d M	9.7

ORBITAL ELEMENTS

6P/d'ARREST

1995 July 27,36197
1.34587 AU
178.0504 deg.
138.9874 deg.
019.5232 deg.
0.6140404
6.51 yrs.
MPC 20122

OBJECT

PERIHELION DATE
PERIHELION DIST. (AU)
ARG. OF PERI. (2000)
ASCENDING NODE (2000)
INCLINATION (2000)
ECCENTRICITY
ORBITAL PERIOD
SOURCE

95P/CHIRON

1996 Feb. 14.75375
8.439422 AU
339.55286 deg.
209.38540 deg.
006.92994 deg.
0.3831118
50.73 yrs.
MPC 22797

Don Machholz (916) 346-8963

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 to the editor, Bob Madden, 1616 Inglis Lane, San Jose, California 95118. A text file on a 3-1/2" IBM or MAC diskette is preferred, but written is accepted.

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