SJAA EPHEMERIS

VOLUME 5 NUMBER 8 OFFICIAL PUBLICATION OF THE SAN JOSE ASTRONOMICAL ASSOCIATION October 1994

The Eyepiece
by Bob Madden

This month marks my third year as your editor. Maybe I can manage three more years. One thing I can state for sure is many of you actually read this stuff. I never get much feedback until I publish an "Abain" piece. Then I have to duck and run. Many provide support with short articles. I enjoy publishing articles by Don Machholz and Patrick Donnelly, which brings me to the point I would like to make. How about someone taking on the task of writing a regular article, such as, the back yard astronomer? Some thing each month that will present a challenge to the members who actually go out and observe.

This past week (9/1-9/10) I went observing with Lech and Gosia Jaszowski. Lech had a definite plan each night of the Messier objects he wished to see. It was quite an impressive list by my standards, but we tried to see all of them. We captured 14 the first night and 6 the following. The observing time started a sundown and lasted until 11:30 p.m. I must admit the location was at 7,400-ft and the seeing was good about 5 degrees above the horizon, with no automobile lights, only airplanes as the site was right on the airway to Denver, Salt Lake and Chicago. At one time I counted seven blinking lights of aircraft. Why doesn't someone take on the task of laying out several nights of observing for us? It seems to me that it would be fun.

Once again to those of you who do prepare articles, please send in your material before the 12 th of each month. A text file, on a Mac or PC diskette is greatly appreciated! If you can't do that, then a double spaced manuscript is desired as it is much easier to read when re-typing it.

Yes, I will edit it as necessary, but will try diligently to keep the intent of the author. When submitting material that has been previously printed, please obtain the author's permission to re-print his material or be sure the credit line is stated.

How about it? Who wants to sign the byline of The Star Chaser?

Oct 1: Star party, Coe Park. Sset 6:49. 12% moon rises 4:17 am. ALSO: Public star party at Grant Ranch County Park.
Oct 8: Star party, Fremont Peak. Sset 6:39 pm, 22% moon sets 9:33 pm.
Oct 14: Star Party, Houge Park. Sset 6:32 pm, 83% moon sets 3:42 am.
Oct 15: Descriptive Astronomy class, Houge Park, 8:00 pm. **FINAL ONE** This Year.
Oct 22: Board and General Meeting at Milpitas Library. Board of Directors meeting at 6:15 pm followed with the General Meeting at 8:00pm. Presentation by Paul Mortfield on Photography with the Schmidt Camera.
Oct 29: Star party, Coe Park. Sset 6:12. 25% mrise 3:02 am.
Oct 30: 2 am. -- Darkness Squandering Time ends as Perseus transits.
Nov 5: Star party, Fremont Peak. Sset 5:05 pm, 10% mset 7:18 pm. Also Public star party at Grant Ranch County Park.
Nov 11: Star Party, Houge Park. Sset 5:01 pm, 69%, mset 1:35 am.
Nov 12: No Activity. Catch up on Sky & Telescope magazine!
Nov 19: Board and General Meeting at Milpitas Library. Board of Directors meeting at 6:15 pm followed with the General Meeting at 8:00pm. Speaker to be announced
Nov 26: Star party, Coe Park. Sset 4:50. 41% mrise 0:51 am.

New Obsession
by Dean Linebarger

Took the new obsession 20" to the Peak on Saturday. Gary and "The Shadow" helped me dial in the collimation. Actually, they did all of the work and I just kind of looked over their shoulders. I ended up having to rotate and remount the mirror to get the glass oriented correctly. Contrary to the instructions sent by Obsession, there is an arrow on the back of the 20" mirror to show you how to orient the mirror to account for glass striations. The arrow used to only be on the 25" and larger mirrors. Gary and I also ended up collimating two more times. Once to move the primary forward to more fully illuminate the secondary, and a second time to move the mirror back slightly to prevent pinching it against the mirror clips.

After three collimations the end result was worth the effort. Although fine tuning will still improve the images, the initial results were very acceptable. I fact Gary felt the images were slightly better than he was getting with his 20" which he has had a year to work on (he now has the new coatings on both the primary and secondary). Cont. on pg 3

Newsgroups: sci.astro
From: jzuniga@zeus.dci.ubiobio.cl (Juan Paulo)
Subject: what is a diferen whit the GMT and UT time?
Date: Tue, 05 Jul 1994 23:30:40 GMT
Organization: Universidad del Bio-Bio, Concepcion - Chile

HI i'm juan paulo from Concepcion Chile and I want know the diferens whit the GMT and the UT time.
bye. JPZA.

Perhaps this reposting would be in order: A Few Facts Concerning RGO, GMT, and UT

Richard B. Langley
Geodetic Research Laboratory
Dept. of Surveying Engineering
University of New Brunswick
Fredericton, N.B., Canada E3B 5A3
E-mail: lang@unb.ca

(original version: 3 February 1990; revised: 6 July 1993)

In answer to the question "Does anyone know the exact difference between GMT and UTC?" here are a few facts concerning the Royal Greenwich Observatory, Greenwich Mean Time, and Universal Time.

o Prior to 1948, the observatory at Greenwich (located on a hill back from the Thames River with a view of the London Docks) was known as the Royal Observatory.

o In 1948, the observatory moved to Herstmonceux Castle in Sussex, becoming the Royal Greenwich Observatory (yes, even though it wasn't at Greenwich any more!).

o The site at Greenwich became known as the Old Greenwich Observatory and the historic buildings and instruments were progressively incorporated into the National Maritime Museum, the main buildings of which are located at the foot of Observatory Hill, close to the river. Highly recommended for a visit if you're in London!

o Greenwich Mean Time is a time scale based on the apparent motion of the "mean" sun with respect to the meridian through the Old Greenwich Observatory (zero degrees longitude). The "mean" sun is used because time based on the actual or true apparent motion of the sun doesn't "tick" at a constant rate. The earth's orbit is slightly eccentric and the plane of the earth's orbit is inclined with respect to the equator (about 23-1/2 degrees) hence at different times of the year the sun appears to move faster or slower in the sky. That's why an uncorrected sundial can be "wrong" (if it is supposed to be telling mean time) by up to 16 minutes. So if the mean (i.e. corrected) sun is directly over the meridian through Greenwich, it is exactly 12 noon GMT or 12:00 GMT (Prior to 1925, astronomers reckoned mean solar time from noon so that when the mean sun was on the meridian, it was actually 0:00 GMT. This practice arose so that astronomers wouldn't have a change in date during a night's observing. Some in the astronomical community still cling to the pre-1925 definition of GMT although it is recommended that the term Greenwich Mean Astronomical Time be used to refer to time reckoned from noon.)

o Mean time on selected meridians 15 degrees apart is generally known as standard time. For example, Eastern Standard Time (EST) is the mean solar time of the meridian at 75 degrees W.

o In 1928, the International Astronomical Union recommended that the time used in the compilation of astronomical almanacs, essentially GMT, or what was also sometimes called Greenwich Civil Time, be referred to as Universal Time. The terms "Universal Time" and "Universal Day" were introduced at the various conferences in the 1800's held to set up the standard time system.

o There are actually a couple of variants of UT. UT as determined by actual astronomical observations at a particular observatory is known as UT0. It is affected by the motion of the earth's rotation pole with respect to the crust of the earth. If UT0 is corrected for this effect, we get UT1 which is a measure of the true angular orientation of the earth in space. However, because the earth does not spin at exactly a constant rate, UT1 is not a uniform time scale. So rather than base our civil time keeping on the rotation of the earth we now use Atomic Time, time based on the extremely constant frequency of a radio emission from cesium atoms when they change between two particular energy states. The unit of Atomic Time is the atomic second. 86,400 atomic seconds define the length of the nominal day. But because of the variations in the earth's spin the length of the actual day can be shorter or longer than the nominal day of 86,400 seconds. The time scale based on the atomic second but corrected every now and again to keep it in approximate sync with the earth's rotation is known as UTC or Coordinated Universal Time. The corrections show up as the leap seconds put into UTC from time to time - usually on New Year's Eve (but this year on 30 June). With these leap second adjustments, UTC is kept within 0.9 seconds of UT1.

o In 1928, when the term Universal Time was introduced, variations in the earth's spin were not yet known. So the term GMT was, in essence, replaced by UT1. Despite the official adoption of the term UT, the navigational publications of English-speaking countries retained the term GMT as a synonym for UT1. So in astronavigation, GMT can imply UT1, but in general communications (as it is used by shortwave broadcasters for example) GMT usually means UTC.

o The BBC began transmitting time signals in 1924. The chimes of Big Ben were first broadcast at midnight beginning 1 January and on 5 February, at the recommendation of the then Astronomer Royal, Frank Dyson, the six pips time signal was inaugurated.

o Control of the BBC's six pips was taken over by the Royal Observatory in 1949 from Abinger to where the time service had moved during the war. The time service moved to Herstmonceux in 1957.

o The time service at Herstmonceux closed down during February 1990 when the BBC took over the generation of the six pips. The six pips are synchronized to UTC by using signals from the Navstar Global Positioning System (GPS) picked up by a receiver atop one of the BBC's buildings in London. Continued on page 3

SkyChart 2000 - A software review
by Bob Madden

Surfing the internet one day I came across a posting about SkyChart by Tim Debennidctus. I thought, "Wait a minute, I know that name!" So I copied the e-address and checked our membership roster. Yes, Tim is a member of our Association. Tim sent a beta version to me to test via the internet . I found it an exciting program for the Macintosh computer. Tim recently sent me his latest version, v2.1. The following is a rundown from Tim:

Date: Tue, 6 Sep 1994
From: timmyd (Tim DeBenedictis)
Subject: Re: SkyChart 2000.0 v2.1

Dear astronomer:

SkyChart 2000.0 version 2.1 is a new astronomy/spaceflight simulator for Macintosh computers. It was written for both amateur astronomers as well as professional educators and researchers, and it contains a number of features not found in any other program of its kind. With SkyChart 2000.0, you can:

* Track satellites and space shuttle missions using standard NASA satellite elements.
* View the outer planets and their moons from a passing Voyager spacecraft.
* Reproduce eclipses, transits, and occultations from anywhere in the solar system.
* Observe the constellations from star systems hundreds of light years away.
* Watch the stars move over thousands or millions of years.
* Witness the impact of comet Shoemaker-Levy 9 with Jupiter from the comet itself.
* Experience relativity as you approach the speed of light on an interstellar voyage.

SkyChart 2000.0 is extremely accurate; it uses the same algorithms as the Astronomical Almanac implemented in extended floating point precision. It is recommended that you run the program on a machine with a math coprocessor (FPU), although a non-FPU version that will run on any Macintosh is also provided. A native PowerPC version is also currently under development, and will be provided free of charge to registered users. For the serious user, SkyChart 2000.0's computing engine is also provided, as a portable source code library written in standard C.

SkyChart 2000.0 is also extremely easy to use, with an intuitive Macintosh interface. For instance, you can rearrange or create new constellations by clicking and dragging from star to star. You can easily add new objects to the program's database, and adjust a host of other user-customizable options.

The demo distribution of the program is free. When you are ready to upgrade to the complete distribution, register your copy by sending a check or money order for $29.95 to the author at the address given below. Your will receive the following:

* The complete 10,000-object database, containing the entire Yale Bright Star Catalog, hundreds of deep-sky objects, every major planet and moon in the solar system, plus dozens of asteroids and comets.
* The complete illustrated manual.
* The portable C source code library comprising SkyChart 2000.0's computing engine.
* Future upgrades and updates, including the native PowerPC version now under development. Additionally, your name will be added to the SkyChart 2000.0 mailing list.

I hope you enjoy using SkyChart 2000.0, and find it to be a useful and educational tool as well. Any comments, suggestions, or questions are welcome. Registration fees should be sent to the following US mail address:

Tim DeBenedictis
306 Kensington Pl.
Syracuse NY 13210

If you have internet access, I can also be reached at timmyd@netcom.com. I wish you good observing, and look forward to hearing from you!

Sincerely,

Tim DeBenedictis

All I have to say is, SJAA members get the $20 discount price, rather than the full $29.95.

-Tim

It is nice that Tim will give the SJAA members a discount. I believe the price is worth it and remember that Tim has put a considerable amount of time in to producing this professional application. The approach is shareware, but be sure you honor the approach.

Tim is planning to demonstrate SkyChart 2000 at the September General Meeting. Come and see for your self.

Obsession (continued from page 1)

The seeing Saturday was very steady, but not real dark. We did get some fog down over Watsonville, but not total coverage. Things were good enough that we stayed up all night. Needless to say I can't wait to get back next weekend. All of the old objects look new now, plus there is so much more that is visible in the 20". The vial was almost a complete circle, and a lot of NGC objects got confused with M objects in the same area. They were that much brighter. See you guys soon.

Dean

GMT (cont. from page 2

o In March 1990, RGo officially moved from Herstmonceux Castle to the grounds of Cambridge University's Institute of Astronomy. A laser ranging station and a GPS tracking station still operate at Herstmonceux but the castle itself has been sold — to a Canadian university, I think.

If you'd like to learn more about time you might look for the book "Greenwich Time and the Discovery of Longitude" by Derek Howse published in 1980 by the Oxford University Press. Although the book is out of print, you may be able to find it in your public library.

Newsgroups: sci.astro,alt.sci.planetary
Subject: Voyager Update - 09/01/94
Date: 5 Sep 1994 00:55 UT

PUBLIC INFORMATION OFFICE
JET PROPULSION LABORATORY
CALIFORNIA INSTITUTE OF TECHNOLOGY
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
PASADENA, CALIF. 91109. TELEPHONE (818) 354-5011

VOYAGER MISSION STATUS
September 1, 1994

Both Voyager spacecraft are healthy and are continuing their fields and particles experiments as they cruise through interplanetary space.

Flight controllers believe both spacecraft will continue to operate and send back valuable data until at least the year 2015. It is the loss of electrical power from their radioisotope thermoelectric generators (RTGs) that will eventually cause them to stop functioning. At launch, the three RTGs on each spacecraft had a power output of 475 watts. Today, that output is 348 watts for Voyager 1 and 351 watts for Voyager 2. The science experiments need between 210 and 220 watts to operate.

The other vital consumable onboard the spacecraft is the amount of hydrazine propellant which keeps the Voyagers stable and pointed toward Earth. Each spacecraft started out with 104 kilograms of propellant. Today, after 17 years on the job and multiple encounters and trajectory correction maneuvers, Voyager 1 is down to 34.8 kilograms and Voyager 2 is at 37.3 kilograms. However, during its current interstellar mission, each spacecraft uses only about six grams of fuel a week. Flight controllers stress the Voyagers will run out of electrical power long before they start spinning out of control due to loss of their attitude-adjusting propellant.

Both Voyagers continue to be tracked every day by the large antennas of the Deep Space Network. Voyager 1 receives about 120 hours of tracking time each week, while Voyager 2 receives about 90 hours a week. Voyager 2 is tracked less because it shares the resources of the DSN station in Canberra, Australia, with NASA's Galileo spacecraft. The Canberra station has the best "look angle" for both Voyager 2 and Galileo.

It is now estimated that Voyager 1 will pass the Pioneer 10 spacecraft in January 1998 to become the most distant human-made object in space.

Voyager 1 is approximately 8.5 billion kilometers (5.3 billion miles) from Earth, while Voyager 2 is 6.5 billion kilometers (4 billion miles) from home.

PUBLIC INFORMATION OFFICE
JET PROPULSION LABORATORY
CALIFORNIA INSTITUTE OF TECHNOLOGY
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
PASADENA, CALIF. 91109. TELEPHONE (818) 354-5011
Contact: Diane Ainsworth

During their brief moon walk 25 years ago, the Apollo 11 astronauts deployed a variety of scientific experiments, including a reflector array left in the fine powder of the Sea of Tranquility that continues to measure the moon's orbit around Earth to unprecedented accuracy.

Scientists who analyze data from the Lunar Laser Ranging Experiment have reported some watershed results from these long-term experiments, said Jet Propulsion Laboratory team investigator Dr. Jean Dickey. The team's findings appear in this week's issue of Science magazine, which commemorates the silver anniversary of the Apollo 11 lunar landing.

"Using the Lunar Laser Ranging Experiment, we have been able to improve, by orders of magnitude, measurements of the moon's rotation," Dickey said. "We also have strong evidence that the moon has a liquid core, and laser ranging has allowed us to determine with great accuracy the rate at which the moon is gradually receding from the Earth."

The laser ranging retroreflector was positioned on the moon in 1969 by the Apollo 11 astronauts so that it would point toward Earth and be able to reflect pulses of laser light fired from the ground. By beaming laser pulses at the reflector, scientists have been able to determine the round-trip travel time of a laser pulse and provide the distance between these two bodies at any given time down to an accuracy of about 3 centimeters (about 1 inch).

The laser reflector consists of 100 fused silica half-cubes, called corner cubes, mounted in a 46-centimeter (18-inch) square aluminum panel. Each corner cube is 3.8 centimeters (1.5 inches) in diameter. Corner cubes reflect a beam of light directly back toward the point of origin and, thus, allow scientists to measure the Earth-moon separation and study the dynamics of the Earth, the moon and the Earth-moon system.

Once the laser ranging experiments began to yield valuable results, more reflectors were left on the moon. A reflector identical to the Apollo 11 mission reflector was left by the Apollo 14 crew, and a larger reflector using 300 corner cubes was placed on the moon by the Apollo 15 astronauts. French-built reflectors were also left on the moon by the unmanned Russian Lunakhod 2 mission.

Several observatories have regularly ranged the moon with these reflectors: one is located at McDonald Observatory near Fort Davis, Texas; another is located atop the extinct Haleakala volcano on the island of Maui in Hawaii; another is located in southern France near Grasse.

The Lick Observatory in northern California also has been used in the past for the lunar laser ranging experiments and ranging programs have been carried out in Australia, Russia and Germany. Despite the difficulty of detecting reflected laser light from the moon, Dickey said, more than 8,300 ranges have been measured over the last 25 years.

"Lunar ranging involves sending a laser beam through an optical telescope," Dickey said. "The beam enters the telescope where the eye piece would be, and the transmitted beam is expanded to become the diameter of the main mirror, then bounced off the

Continued on the next page

Lunar Ranging (Cont from page 4)
surface toward the reflector on the moon."

The reflectors are too small to be seen from Earth, so even when the beam is precisely aligned in the telescope, actually hitting a lunar retroreflector array is technically challenging. At the moon's surface the beam is roughly four miles wide. Scientists liken the task of aiming the beam to using a rifle to hit a moving dime two miles away.

Once the laser beam hits a reflector, scientists at the ranging observatories use extremely sensitive filtering and amplification equipment to detect the return signal, which is far too weak to be seen with the human eye. Even under good atmospheric viewing conditions, only one photon — the fundamental particle of light — will be received every few seconds.

The range accuracy of these reflectors has been improved over the lifetime of the lunar laser ranging experiments, the team noted in Science. While the earliest ranges had accuracies of several meters (or several yards), continuing improvements in the lasers and the detection electronics have led to recent measurements that are accurate to about 3 centimeters (about 1 inch).

From the ranging experiments, scientists know that the average distance between the centers of the Earth and the moon is 385,000 kilometers (239,000 miles), showing that modern lunar ranges have relative accuracies of better than one part in 10 billion. "This level of accuracy represents one of the most precise distance measurements ever made," Dickey said. "The degree of accuracy is equivalent to determining the distance between Los Angeles and New York to one fiftieth of an inch."

Laser ranging has also made possible a wealth of new information about the dynamics and structure of the moon. Among many new observations, scientists now believe that the moon may harbor a liquid core. The theory has been proposed from data on the moon's rate of rotation and very slight bobbing motions caused by gravitational forces from the sun and Earth.

Other recent findings from the laser ranging experiments include:

— Verification of Einstein's theory of relativity, which states that all bodies fall with the same acceleration regardless of their mass.

— The length of an Earth day has distinct small-scale variations, changing by about one thousandth of a second over the course of a year. These changes are caused by the atmosphere, tides and the Earth's core.

— Precise positions of the laser ranging observatories on Earth are slowly drifting as the crustal plates on Earth drift. The observatory on Maui is seen to be drifting away from the observatory in Texas.

— Ocean tides on Earth have a direct influence on the moon's orbit. Measurements show that the moon is receding from Earth at a rate of about 3.8 centimeters (1.5 inches) per year.

— Lunar ranging has greatly improved scientists' knowledge of the moon's orbit, enough to permit accurate analyses of solar eclipses as far back as 1400 BC.

Continued improvements in range determinations and the need for monitoring the details of the Earth's rotation will keep the lunar reflector experiments in service for years to come, Dickey stated in her article.

"For the immediate future, we have under way the implementation of dramatically increased station computing power, offset guiding capability and hands-off auto guiding," she reported. "The benefits from these improvements will not only be an increased number of normal points spread over significantly more of the lunar phase, but also a significantly increased number of photons within a given normal range.

"Farther down the road, we foresee the availability of more precise and more efficient photon detectors, such as micro-channel plates, significantly improved timing systems and shorter-pulse, more powerful lasers," she added. "This will increase data, provide higher accuracy ranging and improve sensitivity to lunar signatures, or conditions brought about by the phases of the moon."

At JPL the lunar ranging analysis is carried out by JPL scientists Drs. Jean Dickey, James G. Williams, X X Newhall and Charles F. Yoder. The work is sponsored jointly by the Astrophysics Division of NASA's Office of Space Science and the Solid Earth Science Branch of NASA's Mission to Planet Earth Office, Washington, D.C.

Additional work is done at the Joint Institute for Laboratory Astrophysics at the University of Colorado at Boulder; at the University of Texas in Austin; and at Observatoire de la Cote d'Azur, Grasse, France.

Impromptu Star Party at Fremont Peak, Aug 31 st

by Paul Barton

An exceptionally fine outing organized by Bob Madden. The evening was clear, warm, dry, with good seeing. Nearly as good as it ever gets at the Peak. The Milky Way was very bright and sharp eyes could see Sagita and Vulpeculm.

The Mosquitoes, etc., seemed less voracious than usual (or are we just getting used to them?)

There is a new, very fine, large B-B-Q pit under the east Oak tree at Coulter Camp (telescope row). Four cars were at that spot early on, but left at sundown, leaving the site clear and tidy.

If you were not too busy driving, you could see the aftermath of the fire of a few weeks ago —— many acres of burn.

Camp Host Art Lloyd lives in a motor home just above the site. Art came by and chatted with us. Later he found a lost pair of glasses, to be returned via Mark Wagner at the Hogue Park outing.

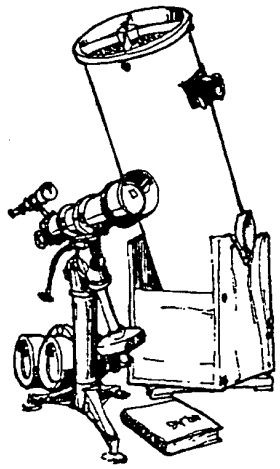
Donald Fairchild, a young friend, starting High School as a Freshman was with me. He is proving to be an ardent astronomer and operator of the Association's C-11. Attendees were:

	Bob Madden
C-4.5	Lech Jaszowski
	Gosia Jaszowski
10" Dob	Crazy Ed
14-1/2" Dob	Dean Linebarger
10" Dob	Mark Wagner
4" Fluorite	Rich Newschaefer
C-11	Paul Barton
	Lady
	Donald Fairchild

1994 SJAA Calendar

	General Meeting	Houge Park Star Party	Observational Astronomy Class
Oct	22	14	15
Nov	19	11	no meeting
Dec	17	9	no meeting

Please read your *Ephemeris* each month for changes



Telescope Loaner Status

by Paul Barton

SJAA no.		Name	User	Due
1	4-1/2"	Newt/P mount	---------->	available
2	6"	Dobson	John Paul Dasilva	10/3/94
3	4"	Quantum	---------->	available
5	60 mm	Refractor	---------->	available
6	C-8	Celestron	Bob Brauer	11/3/94
7	12-1/2"	Dobson	Tom Rice	Indefinite
8	14"	Dobson	Lee Courtney	9/9/94
14	6"	Newt/P mount	Steve Wincor	10/28/94
15	8"	Dobson	John Schoenenberger	8/13/94
18	8"	Newt/P Mount	Bob Maillot	10/11/94
19(B)	6"	Newt/P mount	Jerry Lovelace	10/7/94
20	4-1/4"	Dobson	---------->	available
21	10"	Dobson	---------->	available
23	6"	Newt/P mount	---------->	available

Solar telescope (#16). Available only to experienced members for special occasions such as day time public star parties, etc. Call.

(on waiting list)

No one

If you want to borrow a telescope call Paul Barton (number is on the credit Marquee) 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
1616 Inglis Lane
San Jose, Ca. 95118-2825
NO LATER THAN THE 12th OF EACH MONTH! Your Astro Ad will run approximately 3-months.

Like new Teleview Wide field eyepieces Teleview 19 mm wf, Teleview 15 mm wf, best reasonable offer. Call:
Rich Neuschaefer
work (408)-285-0730
home (408)-446-0975 7/94

Celestron SP-C8 (black Tube), Star bright coatings, 3 years old, nice images. Super Polaris GE mount (improved), motor drives RA and DEC, Celestron 8X50 convertable finder (illuminated). Also comes with: 1.25" and 2" visual backs, Celestron 26 mm pl eyepiece, 1.25 star diag., mounting bracket, hand controls, and footlocker case. $925
Rich Neuschaefer
work (408)-285-0730
home (408)-446-0975 7/94

8" Meade, Schmidt Cassegrain, Multi Coated corrector plate, GEM, w/26mm eyepiece. Call Maria Peterson
(408)-262-1457 (after 6pm or leave message) 7/94

6" Mirror Blank/Grinding tool. Any reasonable offer. Call Richard Roupe
(408)-253-2393 7/94

Takahashi FC 100H, 100mm, f-8 Apo refractor, multicoated, 2.7" Focuser, 7X50 Illuminated finder. Em-10 mount - all electric, built-in drive corrector. $3800 OBO. Still in Warranty. Call Edward
(209) (31-0486 8/94

10.1" f4.5 Coulter reflector, Telrad, Lumicon 2" helical focuser with 1 1/4" adapter, Novak primary mirror cell, lighter weight seconday support, unique paint job (you'll know it's yours anywhere). $399. Mark at (408) 356-1125 days,
(408) 356-1072 eves,
mgwagner@netcom.com by Internet. 9/94

Wanted: Drive Mechanism for 1-1/2 inch shaft - GEM mount. Will pay a modest amount. please call Paul Krukar at: (408) 286-5728 9/94

CELESTIAL CALENDAR

September 1994

LunarPhases	Date	Rise	Tran	Set
NM 20:56hr	04-10	0634	1233	1825
FQ 12:18hr	11-10	1402	1919	-NS-
FM 0518hr	19-10	1832	0042	0732
LQ 0945hr	27-10	-NR-	0659	1356

Nearer Planets

Mercury	07-10	0904	1414	1923
0.671 AU	17-10	0801	1318	1836
Mag -0.20	27-10	0625	1204	1744
Venus	07-10	1008	1454	1940
0.310 AU	17-10	0930	1415	1859
Mag -5.00	27-10	0831	1321	1812
Mars	07-10	0109	0820	1531
1.455 AU	17-10	0056	0803	1511
Mag 0.40	27-10	0042	0745	1448
Jupiter	07-10	0946	1459	2017
6.290 AU	17-10	0917	1428	1939
Mag -1.70	27-10	0848	1357	1906
Saturn	07-10	1708	2237	0410
9.000 AU	17-10	1628	2156	0329
Mag 0.80	27-10	1548	2116	0248

SOL Star Type G2 V Mag - 26.72

RA	DEC				
12.52	-05:36	07-10	0707	1255	1843
13.29	-09:21	17-10	0717	1253	1829
14.07	-12:52	27-10	0726	1251	1816

Astronomical Twilight		Dawn		Dusk
JD 2,449,633.5	07-10	0542	-	2008
,643.5	17-10	0551	-	1955
,653.5	27-10	0600	-	1943

Sidereal Time

Transit Right	07-10	0000 PDT=2355
Ascention at	17-10	0000 PDT=0034
Local Midnight	27-10	0000 PDT=0114

Darkest	Saturday Night Oct 1
Sunset	1852
Twilight End	2017
Moon Set	1637
Dawn next morning	0537

TIMES AND DATES ARE PACIFIC DAYLIGHT

Times are Local Civil

Planet distance and Magnitude for 17th of month

Derivation of these values are from

Astronomy with Your Personal Computer

by Peter Duffet-Smith

MacEphem

by Elwood Charles Downey

Offices and Board of Directors		*Ephemeris Contributors*	
Pres: Bob Brauer-	408-292-7695	Don Machholz -	916-346-8963
Vice Pres: Jack Petersen	408-262-1457	Paul Barton -	408-377-0148
Sec: Jim Van Nuland-	408-371-1307	Pat Donnelly -	408-778-2741
Treas: Jim Hodgers-	408-287-2324	Jim Van Vuland -	408-371-1307
Dir: Gene Cisneros-	408-923-6800	David Smith -	408-978-5503
Dir: Paul Barton-	408-377-0148	*Editor*	
Dir: Bob Madden-	408-264-4488	Bob Madden -	408-264-4488
Dir. Bill O' Shaughnessy	408-984-3985	*Distribution*	
Dir: Jack Zeiders -	408-281-0220	Bob Madden and Paul Barton	

Comet Comments

by Don Machholz

One new comet has been discovered and a returning comet recovered. Meanwhile, comet Nakamura-nishamura-Machholz (1994m) fades in the evening southern sky.

I am presently looking for a computer bulletin board to carry this column each month. It should be easily accessible to anyone wanting to download it for use in their newsletters, or for their own personal use. The board that I had been using is no longer available.

Periodic Comet Machholz 2 (1994o): I discovered this comet on the morning of Aug 13, using my 10-inch reflector at x36. At that time the comet was on the morning northern sky, a few degrees north of the open cluster NGC 1502. It was moving quickly, 2.5 degrees per day, and the appearance seemed to be changing as I watched it. This find occurred 46 search hours and 21 sessions after my previous comet.

The orbit is rather unusual, the period is 5.44 years and the perihelion is at 0.75 AU on Sept 13. About ten days after discovery the comet outburst, and the brightness changed from magnitude 10 to magnitude 7. Finally, over the past week four companions - faint - comets - have been found traveling with the main comet. They are magnitudes 11-15 and located in the north-east quadrant in respect to the comet. All parts are within 0.8 degree of the comet.

My article concerning Periodic Comet de Vico is still available. To receive it, send me $2.00 in postage stamps and/or money for the complete 15 page report. Reach me at P.O. Box 1716, Colfax, CA. 95713

EPHEMERIDES

PERIODIC COMET BORRELLY (19941)

DATE(00UT)	R.A.(2000)	DEC	EL	SKY	MAG
09-20	05h51.2m	-02d13'	89d	M	9.0
09-25	06h04.1m	-00d51'	91d	M	8.9
09-30	06h16.9m	+00d39'	92d	M	8.7
10-05	06h29.8m	+02d18'	93d	M	8.5
10-10	06h42.7m	+04d07'	95d	M	8.4
10-15	06h55.7m	+06d08'	97d	M	8.2
10-20	07h08.7m	+08d22'	99d	M	8.1
10-25	07h21.7m	+10d50'	101d	M	8.0
10-30	07h34.8m	+13d33'	103d	M	7.9
11-04	07h47.9m	+16d32'	106d	M	7.8
11-09	08h00.9m	+19d47'	108d	M	7.7
11-14	08h13.9m	+23d17'	111d	M	7.7

PERIODIC COMET MACHHOLZ 2 (1994o)

DATE(00UT)	R.A.(2000)	DEC	EL	SKY	MAG
09-20	08h52.1m	+24d37'	49d	M	7.5
09-25	09h06.4m	+20d55'	49d	M	7.7
09-30	09h20.0m	+17d32'	50d	M	8.0
10-05	09h32.9m	+14d26'	51d	M	8.3
10-10	09h45.1m	+11d34'	52d	M	8.6
10-15	09h56.6m	+08d55'	53d	M	8.9
10-20	10h07.4m	+06d28'	55d	M	9.3
10-25	10h17.5m	+04d11'	57d	M	9.6
10-30	10h26.9m	+02d03'	59d	M	9.9
11-04	10h35.5m	+00d03'	61d	M	10.2
11-09	10h43.3m	-01d49'	64d	M	10.4
11-14	10h50.4m	-03d34'	67d	M	10.7

COMET NAKAMURA-NISHIMURA-MACHHOLZ (1994m)

DATE(00UT)	R.A.(2000)	DEC	EL	SKY	MAG
09-20	21h10.6m	-30d23'	133d	E	9.2
09-25	21h03.0m	-35d16'	124d	E	9.7
09-30	20h58.1m	-38d41'	117d	E	10.1
10-05	20h55.2m	-41d09'	111d	E	10.6
10-10	20h54.2m	-42d57'	106d	E	11.0
10-15	20h54.5m	-44d17'	101d	E	11.3
10-20	20h56.1m	-45d17'	96d	E	11.7
10-25	20h58.5m	-46d01'	92d	E	12.0
10-30	21h01.8m	-46d36'	88d	E	12.3
11-04	21h05.8m	-47d01'	84d	E	12.6
11-09	21h10.4m	-47d19'	80d	E	12.8
11-14	21h15.5m	-47d32'	77d	E	13.1

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.

SAN JOSE ASTRONOMICAL ASSOCIATION MEMBERSHIP

Membership only: $12 Membership / S&T: $32 Junior (under 18): $20

Name: _____

Address: _____

_____

Telephone: _____

Please bring this form to any SJAA Meeting or send to
Jim Hodgers, Treasurer
San Jose Astronomical Assoc.
240 S 12TH Street
San Jose, CA 95112
Telephone: (408) 287-2324

MAKE CHECKS PAYABLE TO "SJAA"
Please check **type** of membership and if **New** or **Renewal**

New ___ Renewal ___

Membership Only ___ Membership/S&T ___ Junior (under 18) ___

SAN JOSE ASTRONOMICAL ASSOCIATION
240 S 12TH Street
San Jose, CA 95112

NON-PROFIT ORGANIZATION
U.S. POSTAGE PAID
PERMIT NO. 5381
SAN JOSE, CALIFORNIA

SJAA HOTLINE
24 HOUR INFORMATION
408-559-1221