SJAA EPHEMERIS

Observing from JPL

Jane Houston Jones

The Space Flight Operations Facility (SFOF) at JPL is the destination point for all the data beamed back to earth via NASA's worldwide Deep Space Network (DSN) – from NASA's planetary and earth-orbiting spacecraft as well as spacecraft of other space agencies around the world. The SFOF is also the departure point for real time commands to spacecraft.

The SFOF, constructed in 1964, was designated a historic landmark in 1986 by the US Department of the Interior. The facility is designed to support and protect critical spaceflight operations activities and data in the event of a general power outage, earthquake or other disaster.

It is also where I work. My first day of work, Monday November 24th, was like everybody's first day at work...almost. I drove onto Oak Grove Road from the 210 freeway near Pasadena, CA, and parked in the visitor parking lot. From there I walked to the visitor center, where the public JPL public tours originate. The eight new JPL employees that Monday morning arrived and were ushered into an auditorium for orientation, paperwork and a welcome from the JPL deputy director General Tattini.

"Whole walls on every floor are painted with planetscapes, festooned with flybys, pasted with posters and splattered with stars."

Then it was off to the Red Planet cafe for lunch. Soon I was clearing space and finding my desk in the historic Space Flight Operations Facility. It was covered with scale models of half a dozen spacecraft currently or previously touring the solar system. And layers of bookmarks, DVDs of Saturn, Mars and Venus missions, lithographs, posters, Saturn Program pocket references and other cool stuff.

I took a walk around the building and gazed in wonder at the "darkroom," the circular hub of monitors and mission teams also known as the Deep Space Operations Center. A little later I visited Cassini Mission Control and watched monitors showing communications with the Cassini spacecraft. Ironically, the flight operations engineer for Cassini is also a sidewalk astronomer and a member of the JPL Astronomy club.

Whole walls on every floor are painted with planetscapes, festooned with flybys, pasted with posters and

Continued on next page

SJAA Activities Calendar

Jim Van Nuland

January

2 Houge Park star party. Sunset 5:02 p.m., 77% moon sets 4:01 a.m. Star party hours: 7 to 10 p.m.
3 ATM class at Houge Park. 7:30 p.m.
10 **General meeting**, Dr. Elinor Gates, Lick Observatory, speaks on adaptive optics. 8 p.m.
15 ATM class at Houge Park. 7:30 p.m.
16 Houge Park star party. Sunset 5:15 p.m., 26% moon rise 3:03 a.m. Star party hours: 7 to 10 p.m.
16 Astronomy class at Houge Park. 7:30 p.m.
17 Deep sky weekend. Sunset 5:16 p.m., 17% moon rise 4:18 a.m.
24 Deep sky weekend. Sunset 5:23 p.m., 8% moon sets 8:47 p.m.
30 Houge Park star party. Sunset 5:30 p.m., 70% moon sets 2:51 a.m. Star party hours: 7 to 10 p.m.
31 ATM Class at Houge Park. 7:30 p.m.

February

7 **General meeting**, Dr. Alex Filippenko, UC Berkeley. ***This is the Annual Meeting, election of Board of Directors.*** 8 p.m.
12 ATM class at Houge Park. 7:30 p.m.
13 Houge Park star party. Sunset 5:45 p.m., 41% moon rise 2:05 a.m. Star party hours: 7 to 10 p.m.
13 Astronomy class at Houge Park. 7:30 p.m.
14 Deep sky weekend. Sunset 5:46 p.m., 30% moon rise 3:17 a.m.
21 Deep sky weekend. Sunset 5:53 p.m., 1% moon sets 7:32 p.m.
27 Houge Park star party. Sunset 5:59 p.m., 52% moon sets 1:39 a.m. Star party hours: 7 to 10 p.m.
28 ATM Class at Houge Park. 7:30 p.m.

The Board of Directors meets at 6:30 p.m. preceding each general meeting. All are welcome.

24 hour news and information hotline: (408) 559-1221
http://www.sjaa.net

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splattered with stars.

As soon as I get a little more settled, I'll tell you about the Cassini mission outreach programs I will be managing, and request those of you who like this sort of thing to join me! Until then, enjoy and share a view of Saturn!

Cassini Mission Control: http://saturn.jpl.nasa.gov/mission/mc-responsibilities.cfm

Order outreach material here: http://saturn.jpl.nasa.gov/gallery/products/order-form.cfm

JPL tours: http://www.jpl.nasa.gov/pso/pt.cfm

Images of the Canberra Deep Space Network: http://www.whiteoaks.com/Australia2000/pg33.html

Grand tour of NSW, Australia observatories: http://www.whiteoaks.com/Australia2000/pg33.html

Directions to Houge Park

Houge (rhymes with "Yogi") Park is in San Jose, near Campbell and Los Gatos. From Hwy. 17, take the Camden Avenue exit. Go east 0.4 miles, and turn right at the light, onto Bascom Avenue. At the next light, turn left onto Woodard Road. At the first stop sign, turn right onto Twilight Drive. Go three blocks, cross Sunrise Drive, then turn left into the park.

From Hwy. 85, take the Bascom Avenue exit. Go north, and turn right at the first traffic light, onto White Oaks Road. At the first stop sign, turn left onto Twilight Drive. You will now be passing the park. Turn right at the first driveway, into the parking lot.

Mooning

Extreme Mooning

Dave North

Caught a cold and finally got around to opening Gerald North's *Observing The Moon* which is subtitled "The Modern Astronomer's Guide."

Modern? Dude! Get a clue. This book is bo-ring.

I mean it's like, half the book is droning on about how this next stuff won't be all that hot because it's not what this book is all about and there's not enough room anyway ... come on, Gerry! If you'd choke that dross you might have enough room! Sheesh. How lame is that?

"... there is no air. Steady doesn't even begin to cover it. We run out of eyepieces trying to magnify the view."

But hey, something in my skull pops to the obvious: everybody who writes about the Moon suffers from this same awful disease. We're all a of stuffups.

No more.

For-practically-ever January has been the Romper Room Noobee Corner with a couple of dopy hints for getting a shot at your piece of the Moon with your new toy.

Maybe I'll just toss that in at the end, but lock'n'load kids, we're going Extreme this month.

Well, dull x-treem. A good part of the lingo that doesn't dribble from Hep Marketing Droids is expletivedeleted and that's just not gonna work on the ol' Ephem. So insert <PG -- Some Language> here and there to taste if the wattage seems dim.

Maybe your first taste of Extreme Mooning is accidentally cruising up to Fremont Peak when the Moon is up because you forgot to look at the sky.

Whastup? Craig Wandke set up at Coulter Row with his entire library spread out, toonz on the headphones, cooler, fully-loaded mac software grinder, refractor and naglers tracking ... with a whitelight to peruse by 'cuz there ain't nobody else there screaming "hey jerk, turn off the light."

He's protected by the moonsheep.

Something clicks.

You're up the hill with Rich Neuschafer and his newish 180mm AP Starfire Triplet incredoScope packing your own 12.5-inch cheapoGlass and blam-o the air just sits down and there's the Moon.

The Moon's up. Get real; there's nobody else there. You can't type out a list of ngc numbers after a night like that, and if you want some serious dull, that's your war'n'peace.

But I mean it turns out, there is no air. Steady doesn't even begin to cover it. We run out of eyepieces trying to magnify the view ... somewhere around 1000x it seems like the AP image is breaking down but it's not the air, it's just running out of resolving power because of the laws of physics.

Bumping up against the laws of physics is where extreme begins.

Click.

Car chases! Yeah, that's where the real extremes crank!

Some geezoid figgers Mare Orientale will look good tonight, but those dorks always get it so that when something cool is happening the sky plugs up like a goose's ...

Anyway you chuck your dob and whatever else somebody's got in the back of Taylor's CRV and head up toward Montebello looking for a hole, sucker, and neither up nor down does it, though thin spots show up ... and suddenly a break!

Gotta stop somewhere, oh well, narrow road and all the but there's just enough room on this curve ... aahh! The fog come up! Then as you get ready to move it drops again. Out with the stuff, quick setup, no cooldown, there it is woo!

Sucker is rotated all around looks like an eyeball from the side and there's

Continued on next page

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this Big Weird Mountain poking up the edge whazzat about...? Boom, the clouds close down again.

Click.

I mean, really. Set up under an overhang and check out Copernicus through rain and lightning sometime. It's tres kewl.

Click.Eclipses are extreme Mooning. There are people in Antarctica running across ice flows to get a view! Getting zoned in Zimbabwe.

Click. And sometimes you just see weird stuff go across the face of the Moon, balloons, birds, planes -- other stuff you just can't figure.

Click. Click. Click.

The most extreme Mooning is right up front. It's like this: you haven't seen it through a scope before, and don't know much about it.

Use a lowpower eyepiece. It will make more sense that way.

Point. Look.

That's as extreme as it gets.

Maybe you can still do that. Suck it up when it comes. That's your newbie hint for this year, and it really isn't going to matter much what scope you use, where you are, or even if the seeing is steady or it's cold or any of that.

I'm jealous.

A distinctly not-extreme photo of the moon, October 3, 2003 by Paul Kohlmiller – ASA 800 film with a Canon AE-1 attached to the rear cell of a Meade 10" LX-200.

Astro Quips

Two brothers were discussing astronomy. One said, "Can you explain to me how a planet's orbit always sweeps out the same area per unit time?" The other replied: "What? Am I my brother's Kepler?" – Written by a student in Alex Filippenko's Astro 10 Class at U.C. Berkeley.

* * * * * * *

Sure it's a once-in-a-lifetime-event. The thing about astronomy is that you get 5 or 6 of those per year. – Morris "Mojo" Jones

Editor's Semi-Dark Matter

Ø Gibor Basri's article in the November/December issue of Mercury gives us three new words to learn: fusor – an object that achieves core fusion sometime during its existence; planemo – a non-fusor whose self-gravity is sufficient to make it round; planet – a planemo whose primary orbit is around a fusor.

Ø Those interested in running for the club's board should contact Jim Van Nuland.

Ø The Silicon Valley Astronomy Lecture Series will continue on February 11. More details in the February Ephemeris.

Ø Missing Jane and "Mojo" Jones? Check out the November 11, 2003 version of Let's Talk Stars by David Levy – a webcasted radio show found at www.letstalkstars.com/cgi-bin/archive.pl.

Ø The SJAA website is moving to a new server. The only difference that you should notice is somewhat better response time but look for future web improvements including the ability to renew your membership online.

January Speaker

Dr. Elinor Gates

Dr. Elinor Gates is a support scientist at the University of California's Lick Observatory, specializing in natural and laser guide star adaptive optics instrumentation and operations. Under ideal circumstances, large telescopes have higher resolution than small telescopes. However, the Earth's atmosphere is turbulent and blurs images, so that even the largest telescope typically sees no more detail than an 8" backyard telescope. Either you can put the telescope above the Earth's atmosphere to avoid the blurring, such as the Hubble Space Telescope, or you can use adaptive optics. Adaptive optics (AO) is a technique where the atmospheric turbulence is measured in real time and corrected using a deformable optic.

Lick Observatory and the Center for Adaptive Optics are at the forefront of the field in designing and applying AO systems and techniques to astronomy. Dr. Gates will describe the Laser Guide Star Adaptive Optics system at Lick Observatory, as well as some of the current astronomical AO research results from the Shane 3-meter telescope.

The shallow sky

January Rings and Rocks

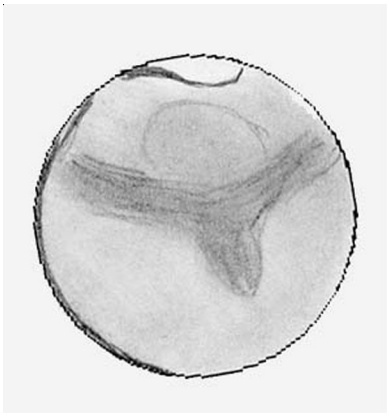
Akkana Peck

We begin the new year with a lovely sky full of planets to look at: Venus, Saturn, and Jupiter will all be well placed this month.

Saturn rides high in the sky all night, hitting opposition on the first day of 2004. The ring tilt — we'll be looking at the southern face of Saturn's rings all year — is 25-26 degrees, plenty to show all the ring features we can see from earth (see last month's Ephemeris for details). Keep an eye on the ringed planet, as JPL's Cassini probe draws closer to its July rendezvous.

Jupiter rises in mid-evening to join Saturn in the January sky, gradually brightening as it approaches its March opposition. Don't wait for opposition, though — you can see Jupiter's cloud belts, storms, and red spot, and the Galilean moons and their shadows, whenever Jupiter is in the sky.

Venus dominates the evening twilight, setting around 8 p.m. At magnitude -4, it vastly outshines Mars,



Sketch of Mars from San Rafael, CA at 2AM, 8/9/03 by Jane Houston Jones

which sits some 6 degrees west of Venus as the month begins; the gap will widen throughout January, as Venus sinks lower into the twilight, its apparent size shrinks, and its crescent fattens.

Mars may still show a little detail, but its apparent size has shrunk to only five arcseconds (compared to 25 arcseconds at opposition). You'll see the polar cap and a few of the more prominent details, like dark Syrtis Major and light Hellas, but don't expect the rich detail we saw last summer.

Mercury is visible in the morning sky but by month's end will sink back into the twilight glow.

Uranus, Neptune, and Pluto are lost in twilight this month, though it might be fun to try searching for Uranus on the evening of the 15th, when Venus passes less than a degree north of it. Can you spot Uranus' faint green disc near bright Venus?

Ceres reaches opposition on the 9th, at magnitude 6.8 — within reach of binoculars and a fairly easy target for a telescope. Now is a good chance to see the brightest and first-discovered asteroid. It's 1.6 AU away, and at 1.4 arcseconds diameter, it might even be resolvable as something other than a point. Does it look different from a star? It might be interesting to try Ceres even on a night of poor seeing: does it twinkle less than nearby stars?

Dr. Jeffrey Moore and Mark Taylor discuss the NASA Pluto mission at the December General Meeting, 12/6/2003. The December meeting included potluck desserts and a White Elephant gift exchange. Photo courtesy of Morris "Mojo" Jones.

Mars Landing Schedule

Beagle 2 - Dec. 24, 2003 18:54 (PST)
Isidis Planitia

Spirit - Jan. 3, 2004 20:35 (PST)
Meridiani Planum

Opportunity - Jan. 24,2004 21:05 (PST)
Gusev Crater

First pictures from Mars at Exploratorium website: January 4, 2004 at 2pm.
http://www.exploratorium.edu/mars/webcasts.html

Later

Cassini (in Saturn Orbit) - July 1, 2004
Huygens (Titan) - Jan 14, 2005

Exploratorium Happenings

Linda Dackman

Throughout January, including January 3&4, 6-11, 13-18, 23-25

Spirit, the new, rugged Mars Exploration Rover (MER), lands on Mars, January 4, 2004, to find out what happened to the water once believed to be on Mars and to identify any evidence of life. The entire month of January at the Exploratorium is dedicated to this Mars exploration from the first Spirit images webcast from the Exploratorium, to visitor-controlled robots that can go on missions in "Mars yards" in the museum, to a full-scale model of MER, as well as almost daily in-museum events and special weekend programs and films and webcasts. Information, links and Mars highlights will be available on our website, www.exploratorium.edu/marsrover, which launches December 1, 2003. All live events and special weekend programs are free with museum admission. This program is made possible by the National Science Foundation, with support from the McBean Family Foundation.

To bring the space experience down to earth, the Exploratorium has acquired a full-scale, movable model of the actual MER from the Jet Propulsion Labs (JPL). On view in the Phyllis C. Wattis Webcast Studio through January 18th, it has all the features of the MER: unfolding solar panels, rocker bogie suspension and aluminum wheels. It will also display the stereo and infrared cameras, sensors and other instruments (non-operational) that will be on board the MER. This replica is the only way for visitors to see the innovative robots that JPL scientists "drive" across the Martian landscape.

Adding to the space experience, the Exploratorium features two robots, built by Carnegie-Mellon Robotics Institute, in "Mars yards." These areas simulate the red planet's sandy, rocky terrain. Museum visitors will be able to send the small robots on missions by directing them and operating the on-board cameras, viewable at a kiosk in the webcast studio, as well as on the Exploratorium website.

2003 EH1 is the Quadrantid shower parent comet

Peter Jenniskens

The Quadrantid meteor shower in early January is our most intense annual shower. The Quadrantids are named after the now defunct constellation *Quadrant Murales* where the radiant was located during its discovery in 1835. Its alternative name, the *Bootids* refers to the modern constellation of *Bootes*. The Quadrantid shower is hard to observe because the radiant is in lower culmination at midnight. Under good circumstances, however, when the peak of the shower is in the early morning and there is no disturbing moonlight, rates can increase up to Zenith Hourly Rate = 130 meteors/hr. In fact, viewing will be good for US-based observers this coming January 03. We plan to observe from Fremont Peak Observatory that night and invite you to join us.

For long, the Quadrantids were without known parent. The object should be a short-period comet, revolving around the Sun every 5-7 years. However, those tend to evolve rapidly due to frequent close encounters with Jupiter. During the first attempts to calculate the changes in the orbit it was discovered that the orbit rotates over a period of 1,500-4,400 years from a more typical low-inclination i = 13 degrees and low perihelion distance q = 0.10 AU, to the very high inclination i = 71 degrees and the q = 0.78 of the present orbit. Bruce McIntosh suggested in 1990 that comet 96P/Machholz has a sibling relationship with the Quadrantid shower. More recently, Williams and Collander-Brown concluded in that same vein that asteroid 5496 (1973 NA) is a possible candidate. The idea was that comet and stream could evolve at different rates and so spread out over time in a large region of the solar system.

Part of that assumption was based on rather imprecise orbits measured in the past. When we started our meteor program in 1994, a program in which SJAA members have played a big role in the past years, our fellow observers of the Dutch Meteor Society stumbled on a clear night on January 03 1995, with no disturbing Moon light. This rare occasion led to a rich harvest in multi-station photographed and video orbits, which were reduced by Hans Betlem and Marc de Lignie. I analyzed those results to find that all good trajectories clustered near the same radiant and speed, implying that this is a very young shower, no older than about 500 years. In our paper, published in *Astronomy Astrophysics* in 1997, I predicted that the comet was still among the meteoroids and now hidden from plain view by ceasing to be active and looking like a mere asteroid. Only if the age of the shower is very young may we expect to find the parent still among the meteoroids. Sadly, such an extinct comet nucleus is thought to be dark, and this one was in a high inclination orbit that only rarely put it in the same direction as other asteroids on the sky. Although the Quadrantids provide an approximate orbit, the position of the object in that orbit remained unknown.

In recent years, several large surveys for near-Earth (q < 1.3 AU) asteroids have produced a rich harvest of discoveries. At this moment, it is believed that about half of all large (D>1km) such asteroids have been found. While working on a book chapter on the Quadrantid shower two weeks ago, I came across my 1997 writings and decided to check the catalog of asteroid orbits again to see if a near-Earth asteroid had been found in an orbit close to that of the Quadrantids. To my great excitement, there was.

On March 6, 2003, the Lowell Observatory Near-Earth Object Survey - LONEOS telescope (Observer B. A. Skiff) discovered near-Earth asteroid 2003 EH1. I found that the aphelion of 2003 EH1 is precisely at the peak of the meteoroid distribution. The orientation of the orbit is close to that expected, with no significant discrepancy in the argument of perihelion and inclination, and only a slight offset in

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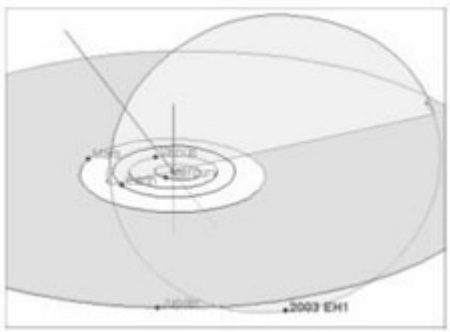
the rapidly evolving node. Indeed, the theoretical radiant and speed for a shower from 2003 EH1 falls in the middle of those measured for the Quadrantids by the Dutch Meteor Society observers.

2003 EH1 is now passing relatively far outside of Earth orbit (Figure 1). The minimum distance between comet orbit and Earth (0.213 AU) is larger than typical for other annual showers (<0.04 AU). However, back-



Orbit and position of 2003 EH1 on January 4,2003.

ward integration of the orbits using the JPL/Horizons software shows that the orbit of 2003 EH1 evolved in the recent past from a much smaller perihelion distance in the same manner as found for typical Quadrantid orbits by authors in the past. The predicted decrease of the node over the past centuries is exactly that observed, as long as the meteoroids are ejected with small enough speed to not get trapped in the 2:1 mean motion resonance. The meteoroid orbits show a progressive scatter as a function of time since ejection, but overall follow the evolution of 2003 EH1, as required for this object to be still associated with the stream. By calculating the dispersion since 1600, and comparing with the observed dispersion from our photographic observations, I estimate the time of release of the particles occurred within a few hundred years prior to 1600.

There is no doubt that the meteoroids originate from a comet. The Quadrantids end as high in the atmosphere as the Lyrid meteors with similar entry speed but originating from a known comet, and higher than Geminid meteoroids, which have been sintered by a small perihelion distance, appearing more asteroid-like and penetrate deeper in the atmopshere.

Comet breakups can occur quite silently, but this one may have had a record. Ishiro Hasegawa calculated a parabolic orbit for comet C1490 Y1 from observations made in China, Korea and Japan between Dec 31.5, 1490 and Feb. 12.5, 1491, and pointed out the similarity with the orbit of the Quadrantids. Indeed, Iwan William and Zidian Wu first demonstrated that some backward integrated Quadrantids have orbital elements consistent with C1490 Y1 if that comet had an eccentricity of 0.77, rather than 1.00. Williams and Wu continued to proposed that a close encounter with Jupiter in 1650 ejected this bright comet into a much different orbit (leaving the Quadrantid shower in place), in order to explain that the comet has not been observed since. The age of the shower was estimated at 5,400 years, based on earlier meteoroid orbits that had a larger observational error. It now appears that the comet may still be there.

The identification of the Quadrantid parent was announced on an IAU Circular on December 08. The identification of the Quadrantid parent is more than just a curiosity. NASA's Deep Impact mission is scheduled to visit comet P/Wild 2 in July 2005 to probe the internal structure of that comet nucleus. The discovery of a cometary nucleus fragment in the orbit of a meteoroid stream makes it possible to investigate the mineralogical and morphological properties of cometary dust originating from much deeper inside a comet nucleus than is typically observed in meteor showers. Moreover, the identification of 2003 EH1 as an extinct comet nucleus could provide a new target for future missions. Hence, it becomes more important to study the shower as well as we can. We will therefore go out in early January and hope you will join us. Please contact Mike Koop for further information.

Editor's note: Space requirements shortened the printed version of this article. See the full article on the SJAA website at http:// ephemeris.sjaa.net/0401/e.html.

Celestial calendar January 2004

Richard Stanton

Lunar phases:	Date	Rise	Trans	Set
FM 07:40 PST	07	16:13	23:58	06:54
LQ 20:46 PST	14	23:56	05:36	11:31
NM 13:05 PST	21	07:34	12:20	17:14
FQ 22:03 PST	28	11:09	17:55	00:11

Nearer planets:				R. A.	Dec.
Mercury, 1.01 A.U., Mag. -.20					
07	05:51	10:48	15:45	17:44	-20:28
17	05:45	10:36	15:28	18:11	-21:57
27	06:00	10:49	15:38	19:03	-22:42
Venus, 1.20 A.U., Mag. -3.8					
07	09:28	14:40	19:52	21:35	-16:11
17	09:21	14:47	20:14	22:22	-11:47
27	09:11	14:53	20:35	23:06	-06:54
Mars, 1.26 A.U., Mag. +0.7					
07	11:33	17:55	00:11	00:47	+05:18
17	11:08	17:32	00:02	01:10	+07:52
27	10:44	17:19	23:54	01:33	+10:22
Jupiter, 4.74 A.U., Mag. -2.4					
07	22:05	04:25	10:45	11:20	+05:33
17	21:25	03:45	10:05	11:19	+05:42
27	20:42	03:03	09:24	11:17	+05:58
Saturn, 8.09A.U., Mag. +0.5					
07	16:27	23:44	07:01	06:39	+22:27
17	15:44	23:01	06:18	06:36	+22:32
27	15:02	22:19	05:36	06:33	+22:36

SOL Star Type G2V Intelligent Life in System ?

Hours of Darkness						
11:13	07	07:24	12:15	17:06	19:10	-22:26
11:03	17	07:22	12:19	17:16	19:53	-20:51
10:50	27	07:17	12:22	17:27	20:36	-18:36

Astronomical twilight:		Begin	End
JD 2,453,011	07	05:53	18:39
021	17	05:52	18:48
2,453,031	27	05:44	18:53

Sidereal time:

Transit Right Ascension at local midnight

07 00:00 = 06:57
17 00:00 = 07:36
27 00:00 = 08:16

Darkest Saturday Night: 24 Jan 2004

Sunset	17:23
Twilight	18:53
Moon set	20:47
Dawn begin	05:47
Hours dark	10:54

Officers and Board of Directors

Pres	Mike Koop	(408) 446-0310
VP	Bob Havner	(408) 723-2559
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Dir	David Smith	(408) 978-5503
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Ephemeris Staff

Editors Paul & Mary Kohlmiller (408) 848-9701

Circulation

Bob Brauer	(408) 292-7695
Lew Kurtz	(408) 739-7106
Dave North	north@znet.com

Printing Accuprint (408) 287-7200

School Star Party Chairman

Jim Van Nuland (408) 371-1307

Telescope Loaner Program

Mike Koop (408) 446-0310

Web Page

Paul Kohlmiller pkohlmil@best.com

SJAA Email Addresses

Board of Directors	board@sjaa.net
Announcements	announce@sjaa.net
Chat List	chat@sjaa.net
Ephemeris	ephemeris@sjaa.net
Circulation	circulation@sjaa.net
Telescope Loaners	loaner@sjaa.net

Members Email Lists:
http://www.sjaa.net/mailman/listinfo

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Submit
Submit articles for publication in the SJAA Ephemeris. Send articles to the editors via e-mail to ephemeris@sjaa.net. **Deadline, 10th of previous month.**

SJAA loaner scope status

All scopes are available to any SJAA member; contact Mike Koop by email (loaner@sjaa.net) or by phone at work (408) 473-6315 or home (408) 446-0310 (Leave message).

Available scopes

These are scopes that are available for immediate loan, stored at other SJAA members homes. If you are interested in borrowing one of these scopes, please contact Mike Koop for a scope pick up at any of the listed SJAA events.

# Scope	Description	Stored by
1	4.5" Newt/ P Mount	Annette Reyes
7	12.5" Dobson	Tom Fredrickson
8	14" Dobson	Craig Colvin
10	Star Spectroscope	Keng Teh
16	Solar Scope	Bob Havner
19	6" Newt/P Mount	Daryn Baker
23	6" Newt/P Mount	Wei Cheng
24	60mm Refractor	Al Kestler
26	11" Dobson	John Bunyan
28	13" Dobson	Jim Albers
35	Meade 8" Equatorial	Patrick Lewis
38	Meade 4.5" Digital Newt	Tej Kohli

Scope loans

These are scopes that have been recently loaned out. If you are interested in borrowing one of these scopes, you will be placed on the waiting list until the scope becomes available after the due date.

# Scope	Description	Borrower	Due Date
3	4" Quantum S/C	Hsin I. Huang	12/19/03
6	8" Celestron S/C	Richard Savage	1/24/04
11	Orion XT6 Dob	Harshavardhan Kuntur	11/22/03
12	Orion XT8 Dob	Jason Yoon	1/8/04
13	Orion XT6 Dob	Kosha Ganatra	12/1/03
29	C8, Astrophotography	Tajinder Singh	11/22/03
32	6" f/7 Dobson	Sandy Mohan	1/28/04
33	10" Deep Space Explorer	Glen White	12/19/03
34	Dynamax 8" S/C	Yuan-Tung Chin	1/24/04
37	4" Fluorite Refractor	Gary Hansen	1/15/04
39	17" Dobson	Ron Gross	12/3/03
N	6" f/8 Dobson	Luen Lin	12/16/03

Extended scope loans

These are scopes that have had their loan period extended. If you are interested in borrowing one of these scopes, we will contact the current borrower and try to work out a reasonable transfer time for both parties.

# Scope	Description	Borrower	Due Date
2	6" f/9 Dob	John Paul De Silva	?
9	C-11 Compustar	Bill Maney	Indefinite
14	8" f/8.5 Dob	E. Clay Buchanan	11/23/03
15	8" Dobson	Mike Koop	Repair
21	10" Dobson	Michael Dajewski	Repair
27	13" Dobson	Steve Houlihan	1/5/04
36	Celestron 8" f/6 Skyhopper	Ion Coman	1/19/04

Waiting list:

13	Orion XT6 Dob	Michael Hewett
39	17" Dobsonian	Frank Williamson
	8" Dob	Vinod Nagarajan
	Any telescope	Mike Van Meter, Al Garcia

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