



SJAA EPHEMERIS

SJAA Activities Calendar

Jim Van Nuland

(late) March

- 20 Spring begins at 4:44 a.m. PDT
- 20 Hogue Park star party. Sunset 7:20 p.m., 25% moon rises 4:30 a.m.
Star party hours: 8:30 until 11:30.
- 21 Dark Sky weekend. Sunset 7:21 p.m., 17% moon rises 5:01 a.m.
- 28 Dark Sky weekend. Sunset 7:27 p.m., 8% moon sets 10:12 p.m.
Henry Coe Park's "Astronomy" lot has been reserved. Best weekend for the Messier Marathon.

April

- 3 Hogue Park star party. Sunset 7:32 p.m., 69% moon sets 3:57 a.m.
Star party hours: 8:30 until 11:30.
- 4 Auction rehearsal, 6 p.m. until it all works.
- 5 Auction XXIX - Open at noon, selling 1 p.m. to about 4 p.m.
- 17 Astronomy Class at Hogue Park. 7:30 p.m. Pete Santangeli will speak on imaging for beginners.
- 17 Hogue Park star party. Sunset 7:45 p.m., 42% moon rises 3:00 a.m.
Star party hours: 9:00 until midnight.
- 18 Dark Sky weekend. Sunset 7:46 p.m., 33% moon rises 3:28 a.m.
- 25 Dark Sky weekend. Sunset 7:52 p.m., 2% moon sets 9:07 p.m. Henry Coe Park's "Astronomy" lot has been reserved.

May

- 1 Hogue Park star party. Sunset 7:58 p.m., 56% moon sets 2:32 a.m.
Star party hours: 9:00 until midnight. This is also SJAA's observation of Astronomy Day.
- 9 General Meeting. Our speaker is Dr. Christopher Mauche (LLNL), who will speak on The X-ray Universe.
- 15 Astronomy Class at Hogue Park. 7:30 p.m. Topic is TBD
- 15 Hogue Park star party. Sunset 8:10 p.m., 60% moon rises 1:28 a.m.
Star party hours: 9:00 until midnight.
- 16 Dark Sky weekend. Sunset 8:11 p.m., 50% moon rises 1:55 a.m.
- 23 Dark Sky weekend. Sunset 8:16 p.m., 0% moon rises 5:40 a.m. Henry Coe Park's "Astronomy" lot has been reserved.
- 29 Hogue Park star party. Sunset 8:21 p.m., 41% moon sets 1:05 a.m.
Star party hours: 9:30 until midnight.

The Board of Directors meets before each general meeting. Call the hotline for the exact time.

24 hour news and information hotline:

(408) 559-1221

<http://www.sjaa.net>

Stars over Yosemite

SJAA Yosemite Public Star Party 2009

Jim Van Nuland

The annual SJAA Yosemite star party will be held on July 17-18, at Glacier Point in Yosemite National Park. Up to 30 people will be given free admission and camping, in exchange for two public events on Friday and Saturday evenings. The rest of the time we can be tourists.

We are expected to have at least one scope per two people, and to attend both star parties, not just Friday or Saturday. For these reasons, this is not suitable for a family camping trip.

The camping is rough by modern standards: no dining room, no showers, no hot water. Read about it on the SJAA Yosemite page <<http://www.sjaa.net/school/yosemite.htm>>, then contact me with questions.

If you can tolerate the limitations, tell me the number of people you'll have, and the number of scopes that will be set up for the public. E-mail me at jvn@svpal.org, or phone 408-371-1307 11 a.m. to 11 p.m. Priority is given to SJAA members.

The moon will have been 3rd quarter on the previous Wednesday, so this is a fine date. Moonrises will be at 1:52 and 2:50 am, but it will be only 20% and 11% illuminated, so it will interfere very little if at all.

Clear High Skies!





Artist's idea of a black hole. The XMM-Newton X-ray space telescope studies many cosmic mysteries, including black holes and the origin of the universe. Learn a few things about these mysterious objects and play "Black Hole Rescue" at spaceplace.nasa.gov/en/kids/blackhole.

APRIL 2009

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
Mathematics Awareness Month. Check out our activities and articles combining math and space science. Math is fun!			1 April Fool's Day. You might be fooled by some of the inventions in our What's Older? game.	2 FIRST QUARTER 	3 National Find a Rainbow Day. You sure won't find a rainbow of colors in a laser, though. Find out why not.	4 National Reading a Road Map Day. Try the Vec→Touring game, where you navigate one little part of the journey at a time.
5	6	7	8	9 FULL MOON First public library opened in 1833 in New Hampshire. Find out if your local library is a Space Place partner.	10 Encourage a Young Writer Day. Ever been inspired by a brilliant blue sky or a starry black sky? Write about it in this activity.	11
12 First space shuttle was launched, 1981. They have carried most of the Int'l Space Station to orbit. Can you spot the Space Station?	13	14	15 Leonardo da Vinci born this day in 1452. Ever wonder how most inventors do their work?	16	17 LAST QUARTER 	18
19 Humorous Day. You will truly test your friends' sense of humor when you give them the Robot Puzzle to solve.	20	21 Kindergarten Day. If you know a kindergartener, show him or her The Space Place coloring book, online or printed.	22 Earth Day. You will find a treasure trove of games and fun facts on our Earth page.	23 Hubble Space Telescope launched, 1990. Other "Great Space Observatories" have been launched since then. Why so many?	24 NEW MOON U.S. Arbor Day. Plant a tree. Then check out the "camera" that can tell an oak from a maple—from space!	25
26	27	28	29	30		

Month of April: spaceplace.nasa.gov/en/educators/math.shtml
 Apr. 1: spaceplace.nasa.gov/en/kids/galex/whats_older
 Apr. 3: spaceplace.nasa.gov/en/kids/laser
 Apr. 4: spaceplace.nasa.gov/en/kids/st7/vectouring
 Apr. 9: spaceplace.nasa.gov/en/kids/museums
 Apr. 10: spaceplace.nasa.gov/en/educators/teachers_page2.shtml#bluesky

Apr. 12: spaceplace.nasa.gov/en/educators/teachers_page2.shtml#orbits
 Apr. 19: spaceplace.nasa.gov/en/kids/robots/robot_puzzle.shtml
 Apr. 21: spaceplace.nasa.gov/en/kids/coloring_book
 Apr. 22: spaceplace.nasa.gov/en/kids/cs_earth.shtml
 Apr. 23: spaceplace.nasa.gov/en/kids/cosmic
 Apr. 24: spaceplace.nasa.gov/en/kids/eo1_1.shtml

THE SPACE PLACE CALENDAR IS FOR EDUCATIONAL PURPOSES ONLY AND IS NOT TO BE SOLD

Pluto visits the states

Akkana Peck

In April Saturn, a month past opposition, gives us wonderful views with its rings inclined about four degrees to us. It transits at 60 degrees up at about 10pm.

Mercury moves away from the sun as April progresses, and into the evening sky, giving us our best view of 2009 by month's end.

All the other planets are morning objects this month: Jupiter and Neptune are far enough away from the sun to give us a decent look, while the others huddle together in the morning twilight.

Venus gives a good morning show, though. The crescent moon will occult a bright, thin crescent Venus on the morning of April 22: Venus disappears under the moon's sunlit side at 5:11 am and begins reappearing near the bottom of the crescent moon at 6:04. Sunrise on the 22nd is at 6:24.

Mars, also in the morning, has brief close encounters with two other planets: Venus on the 18th and Uranus on the 15th. The Mars/Venus encounter really isn't all that close — maybe they've been squabbling. The Uranus encounter is better, only half a degree,

so let relatively bright Mars point the way to much dimmer Uranus, currently just a hair above sixth magnitude.

And what about Pluto? The dim outer pl— er, whatever it is, rises a bit after midnight and is visible in the dawn hours.

So what is Pluto? Maybe you caught the news last month that Illinois, birthplace of Clyde Tombaugh, has declared Pluto a planet. It joins New Mexico, Tombaugh's longtime home, which made a similar declaration two years ago.

When I first heard about the New Mexico resolution, I was told that they had declared that Pluto would be a planet within the state's boundaries. That made me a bit curious: would Pluto even fit inside New Mexico? I looked it up: Pluto has a diameter of 2300km, while New Mexico is about 550km in longitude and a bit more in latitude. Not even close (Figure 1). Too bad — I liked the image of Pluto coming to visit and hang out with friends. Though at Pluto's orbital velocity (it takes it just under 248 years to complete its 18 billion kilometer orbit, meaning an average speed of 23 million km/year or 63,000 km/day) and its current distance of about 32 AU (4.8

billion km), it would take it about 207 years to get here.

But it turns out that's not what the resolution said anyway. Both states' resolutions said roughly the same thing:

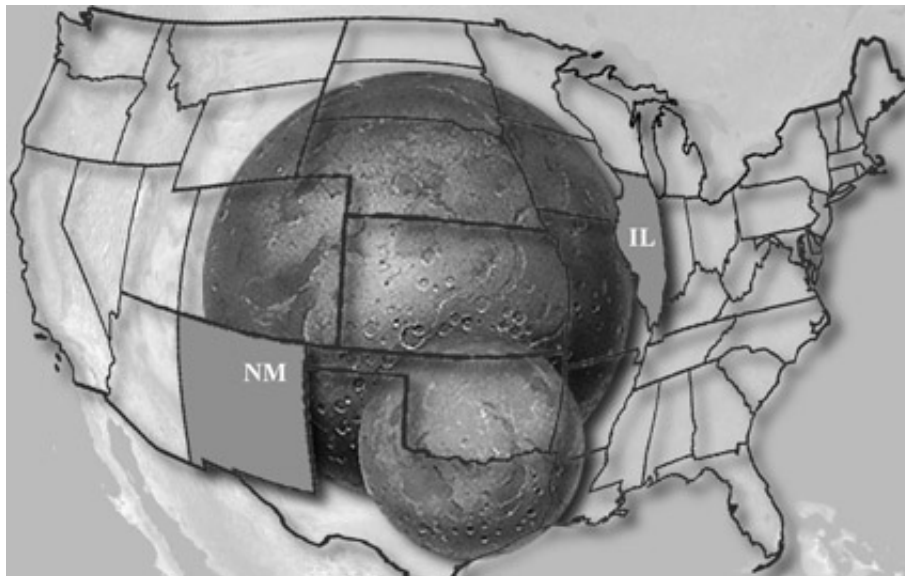
BE IT RESOLVED BY THE LEGISLATURE OF THE STATE OF NEW MEXICO that, as Pluto passes overhead through New Mexico's excellent night skies, it be declared a planet and that March 13, 2007 be declared "Pluto Planet Day" at the legislature.

RESOLVED, BY THE SENATE OF THE NINETY-SIXTH GENERAL ASSEMBLY OF THE STATE OF ILLINOIS, that as Pluto passes overhead through Illinois' night skies, that it be reestablished with full planetary status, and that March 13, 2009 be declared "Pluto Day" in the State of Illinois in honor of the date its discovery was announced in 1930.

So the law applies to anyone (though it's probably not enforceable outside state boundaries) — but only when Pluto is overhead in New Mexico or Illinois.

But wait — does Pluto ever actually pass overhead in those states?

Continued on page 5



Pluto and Charon visit a couple of friendly states.

Ion propulsion. Artificial intelligence. Hyper-spectral imagers. It sounds like science fiction, but all these technologies are now flying around the solar system on real-life NASA missions.

How did they get there? Answer: the New Millennium Program (NMP). NMP is a special NASA program that flight tests wild and far-out technologies. And if they pass the test, they can be used on real space missions.

The list of probes that have benefited from technologies incubated by NMP reads like the Who's Who of cutting-edge space exploration: Spirit and Opportunity (the phenomenally successful rovers exploring Mars), the Spitzer Space Telescope, the New Horizons mission to Pluto, the Dawn asteroid-exploration mission, the comet-smashing probe Deep Impact, and others. Some missions were merely enhanced by NMP technologies; others would have been impossible without them.

"In order to assess the impact of NMP technologies, NASA has developed a scorecard to keep track of all the places our technologies are being used," says New Millennium Program manager Christopher Stevens of the Jet Propulsion Laboratory.

For example, ion propulsion technology flight-tested on the NMP mission Deep Space 1, launched in October 1998, is now flying aboard the Dawn mission. Dawn will be the first probe to orbit an asteroid (Vesta) and then travel to and orbit a dwarf planet (Ceres). The highly efficient ion engine is vital to the success of the 3 billion mile, 8 year journey. The mission could not have been flown using conventional chemical propulsion; launching

the enormous amount of fuel required would have broken the project's budget. "Ion propulsion was the only practical way," says Stevens.

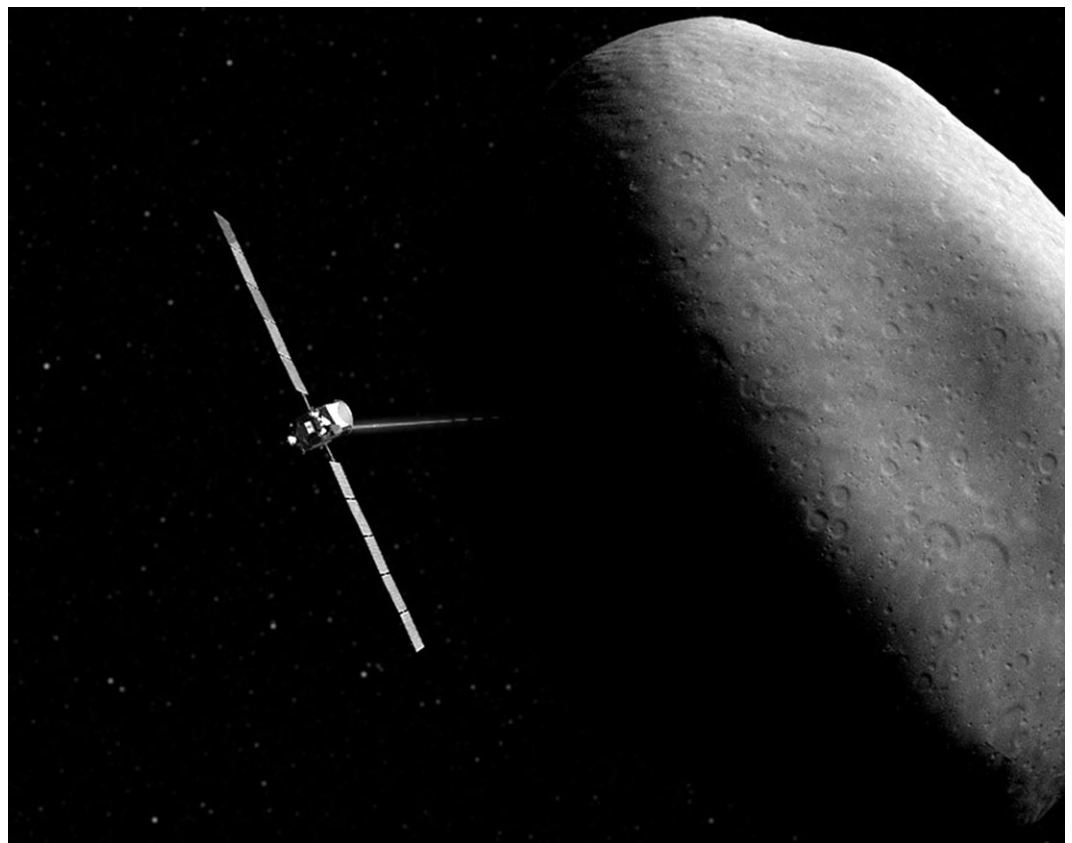
In total, 10 technologies tested by Deep Space 1 have been adopted by more than 20 robotic probes. One, the Small Deep Space Transponder, has become the standard system for Earth communications for all deep-space missions.

And Deep Space 1 is just one of NMP's missions. About a half-dozen others have flown or will fly, and their advanced technologies are only beginning to be adopted. That's because it takes years to design probes that use these technologies, but Stevens says experience shows that "if you validate experimental technologies in space, and reduce the risk of using them, missions will pick them up."

Stevens knew many of these technologies when they were just a glimmer in an engineer's eye. Now they're "all grown up" and flying around the solar system. It's enough to make a program manager proud!

The results of all NMP's technology validations are online and the list is impressive: http://nmp.nasa.gov/TECHNOLOGY/scorecard/scorecard_results.cfm. For kids, the rhyming storybook, "Professor Starr's Dream Trip: Or, How a Little Technology Goes a Long Way" at <http://spaceplace.nasa.gov/en/kids/nmp/starr> gives a scientist's perspective on the technology that makes possible the Dawn mission.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.



Dawn will be the first spacecraft to establish orbits around two separate target bodies during its mission—thanks to ion propulsion validated by Deep Space 1.

New Mexico stretches from 31.2 to about 37 degrees latitude, while Illinois spans 36.9 to 42.4. Right now Pluto is in Sagittarius, with a declination of $-17^{\circ} 41'$; there's no way anyone in the US is going to see it directly overhead this year. Worse, it's on its way even farther south. It won't cross into the northern hemisphere until the beginning of 2111. But how far north will it go?

My first thought was to add Pluto's inclination — 17.15 degrees, very high compared to other planets — to the 23 degrees of the ecliptic to get 40.4° . Way far north — no problem in either state! But unfortunately it's not as simple as that.

It turns out that when Pluto gets to its maximum north inclination, it's in Bootes (bet you didn't know Bootes was a constellation of the zodiac, did you! It's that 17° inclination that puts Pluto just past the Virgo border). That'll happen in February of 2228.

But in the Virgo/Bootes region, the ecliptic is 8° south of the equator, not 23° north. So we don't get to add 23 and 17 ; in fact, Pluto's declination will only be about 7.3° north. That's no help!

To find the time when Pluto gets as far north as it's going to get, you have to combine the declination of the ecliptic and the angle of Pluto above the ecliptic. The online JPL HORIZONS simulator is very helpful for running data like that over long periods — much easier than plugging dates into a planetarium program. HORIZONS told me that Pluto's maximum northern declination, 23.5° , will happen in spring of 2193.

Unfortunately, 23.5° isn't far enough north to be overhead even from Las Cruces, NM. So Pluto, sadly, will never be overhead from either New Mexico or Illinois, and thus by the text of the two measures, it will never be a planet.

With that in mind, I'm asking you to support my campaign to persuade the governments of Ecuador and Hawaii to pass resolutions similar to the New Mexico and Illinois ones. Please give generously — and hurry, because we need your support before April 1!

Mailing List Policy

Mark Wagner

The board mailing list is open for anyone to post to. All SJAA board members and certain committee can post directly to the list. All others, be they regular members, or even non-members, can post, subject to moderation. Any questions or comments may be posted, and, in fact, are encouraged and welcome.

My understanding is the recent limit on direct posting access was to ensure the list was there for use by the board (and necessary committee members), but also allowed for others a way to participate. Nobody has been excluded. It is little changed from when there were some non-board/committee subscribers, but anyone else posting to the list was allowed to do so, but was moderated.

One of the objections to the prior administration of the board list was apparently that other than for the administrator, there was no way to know who was on the list. Now it is known that it is only SJAA officials, while still allowing the ability for others to post.

As for it being "secret"... it is not, and is actually much more visible than ever before. The SJAA mailing lists are now linking at the top of the SJAA web-page, where they are very easy to find. On the mailing lists page, there are explicit links for posting, subscribing, and to the archives, as applicable to the two lists SJAA runs. It is more transparent than ever, as it should be.

You can see the link at the top of the SJAA page here:
<http://www.sjaa.net/>

And the explicit links (and explanations of each list) on the mailing lists page here:
<http://www.sjaa.net/majordomo.html>

Finally, in order that there is as much transparency as possible, the board list is now configured such that anyone may see the names of the list's subscribers.

I hope this puts to rest any concerns the recent transition of list administration may have raised. If there are any questions, or concerns, as stated before please feel free to express them. I would also suggest that all officers be moderators on the board list, in order that more than one person see and evaluate the incoming moderated posts.

The Last Month In Astronomy

MAR-06-2009 **Kepler Launches** The Kepler spacecraft was successfully launched and is heading for its Earth-trailing orbit around the Sun. This latest telescope in space will search the area between Cygnus and Lyra staring consistently at 10,000 stars looking for an Earth size planet to pass in front of a Sun-like star. If nothing else, this mission should give an accurate estimation of one of the Drake equation factors, what percentage of stars have planets that can support life as know it. http://www.nasa.gov/mission_pages/kepler/main/index.html

MAR-05-2009 **Binary Black Hole Found** A binary black hole has been found by astronomers at the National Optical Astronomy Observatory in Arizona. Such phenomena has been theorized before but the expected spectral signature has not been found until now. <http://www.astronomynow.com/090305Binaryblackholesystemidentified.html>

MAR-01-2009 **Chinese craft lunar crash** The Chinese lunar orbiter Chang'e 1 was deliberately sent crashing into the moon as its mission came to an end. This event was not widely publicized. Even though it occurred on the near side of the moon, it isn't clear that anyone saw or was even looking for the crash. <http://www.skyandtelescope.com/news/40536117.html>

FEB-24-2009 **OCO Fails** The Orbiting Carbon Observatory failed to reach orbit after launch. The crushing failure means that some critically important measurements of carbon dioxide in the atmosphere will be delayed by years. Initial reports say that the failure was caused because the ordnance that was supposed to separate the fairing didn't fire successfully and the spacecraft was then too heavy to reach orbit. A failure analysis is ongoing. http://www.nasa.gov/mission_pages/oco/main/index.html

FEB-23-2009 **Planck Mission Ready** The Planck spacecraft has arrived at French Guiana in preparation for its launch in April aboard an Ariane 5 rocket. This is an ESA mission with a lot of work done by NASA. Planck will be sent to an orbit around the second Lagrangian point along with another spacecraft, the Herschel mission, but they will be in different orbits and the two missions are otherwise unrelated. Planck will study the anisotropies (non-uniformity) of the CMB (Cosmic Microwave Background) to an unprecedented degree. This should tell us a lot about the Inflationary period of the Universe - a time when the size of the Universe increased at a fantastic rate. For a technical description of the Planck mission see http://www.rssd.esa.int/index.php?project=PLANCK&page=exec_summ but for a look at the spacecraft and its successful delivery to the launch site go to <http://planck.caltech.edu/news.html>. The Herschel mission is a 3.5 meter telescope looking in the far-infrared and submillimeter wavelengths. <http://herschel.jpl.nasa.gov/>

FEB-07-2009 **McKay at SJAA**
Christopher McKay came to the February General Meeting to speak to the SJAA. He discussed some findings from the Phoenix mission and other things that we are learning about Mars. During the Q&A he offered that he is somewhat skeptical of the claims concerning large amounts of methane in the Martian atmosphere.



It Must Be Astronomical ...

Loaners

The loaner program offers members a means to try scopes of various sizes and technologies before you buy. It is one of the real jewels of being a member of the club. Scopes are available for all experience levels. The inventory is constantly changing. The following list is a sample. For more information please see the loaner program web page: <http://www.sjaa.net/loaners>

Hot Dates

April 22 - Margaret Race speaks at Foothill College. Her topic is "Protecting the Earth and Other Planets". For more info see <http://www.foothill.edu/ast/SVL.htm>

May 12 - Scheduled launch date of STS-125, the shuttle mission to repair the HST.

May 20 - Patricia Burchat speaks at Foothill College. Her topic is "Dark Matter and Dark Energy"

June 20-24 - Golden State Star Party - <http://www.goldenstatestarparty.blogspot.com/>

[Wondering when and where other astronomers are planning to be? Check out the observer intentions site at: <http://observers.org/OI-calendar/>]

Deep Sky Objects

Here are three recommendations for deep sky objects in March. For more information see <http://www.resource-intl.com/Observing.Lists/Deep.Sky.Feb.09.html>

Difficulty	Name	RA	Dec
Easy	NGC 2567	08h 18m 30s	-30° 38' 42"
Open cluster of about 24 stars elongated N-S. Mag 7.4			
Medium	NGC 2613	08h 33m 22s	-22° 58' 24"
Edge-on spiral located in a rich star field. Mag 11.2.			
Difficult	Abell 29	08h 40m 18s	-20° 54' 36"
Planetary Nebula in Pyxis. Mag. 14.3			

“Does Sex Matter? Of course it does. But does it matter enough to Matter? That’s a different question.” - Vera Rubin, research astronomer who provided the best evidence of dark matter

Q: What is the star with highest apparent magnitude that is at least 1000 light years away?

A: That would be Deneb in Cygnus and part of the summer triangle. (RASC 2009, pg. 287)

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 San Jose, CA 95159-8243

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Articles for publication should be submitted by the 10th of the previous month. The PDF version is generally available by the 24th of the previous month and the HTML version by the last day of the previous month.

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New **Renewal** (Name only if no corrections)

I'll get the Ephemeris newsletter online

<http://ephemeris.sjaa.net> Questions?

Send e-mail to membership@sjaa.net

Membership Type:

- Regular — \$20
 Regular with Sky & Telescope — \$53
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or send to the club address (above).

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