



SJAA EPHEMERIS

SJAA Activities Calendar

Jim Van Nuland

(late) July

- 25 Dark Sky weekend. Sunset 8:21 p.m., 23% moon sets 10:31 p.m. Henry Coe Park's "Astronomy" lot has been reserved. AANC Star-B-Q at Fremont Peak State Park
- 31 Houge Park star party. Sunset 8:16 p.m., 81% moon sets 2:07 a.m. Star party hours: 9:00 until midnight.

August

- 1 **General Meeting at 8 p.m.** Our speaker is TBA
- 14 Astronomy Class at Houge Park. 7:30 p.m. Topic is TBA
- 14 Houge Park star party. Sunset 8:00 p.m., 33% moon rises 12:47 a.m. Star party hours: 9:00 until midnight.
- 15 Dark Sky weekend. Sunset 7:59 p.m., 22% moon rises 1:49 a.m.
- 22 Dark Sky weekend. Sunset 7:50 p.m., 11% moon sets 8:58 p.m. Henry Coe Park's "Astronomy" lot has been reserved.
- 28 Houge Park star party. Sunset 7:42 p.m., 68% moon sets 1:53 a.m. Star party hours: 8:45 until 11:45.

September

- 5 **General Meeting at 8 p.m.** Slide and Equipment night. Latest images, latest equipment, being made by our members.
- 11 Astronomy Class at Houge Park. 7:30 p.m. Topic is TBA
- 11 Houge Park star party. Sunset 7:21 p.m., 48% moon rises 11:39 p.m. Star party hours: 8:15 until 11:15.
- 12 Dark Sky weekend. Sunset 7:19 p.m., 36% moon rises 12:44 a.m.
- 19 Dark Sky weekend. Sunset 7:09 p.m., 2% moon sets 7:25 p.m. Henry Coe Park's "Astronomy" lot has been reserved.
- 22 Autumn begins at 2:19 p.m. PDT.
- 25 Houge Park star party. Sunset 7:00 p.m., 49% moon sets 11:40 p.m. Star party hours: 8:00 until 11:00 p.m.

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

24 hour news and information hotline:

(408) 559-1221

<http://www.sjaa.net>

Ephemeris Delivery Change

Effective immediately, all new SJAA memberships will, by default, be notified by e-mail when a new issue of the Ephemeris is available online and will not receive the print version. Also, upon renewal, all continuing memberships will convert to the new default. For those who would prefer the print version, the membership forms will have a check-box to opt-in for the print version. The reason for this change is that printing the Ephemeris is the single largest expense the club incurs, and the board would prefer to apply funds toward other goals such as new and better equipment, speaker honorarium, etc. This decision to make the online version the default has been discussed for some time and the board decided to go ahead with this change at the July meeting.

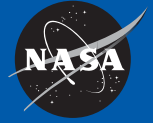
Observatory Fund

Greg Claytor

PUBLIC NOTICE IS HEREBY GIVEN that the San Jose Astronomical Association, a California nonprofit public benefit corporation 501(c)(3), will terminate its effort to obtain or construct an observatory using its Observatory Fund, that it no longer has any plan now or in the future to obtain or construct an observatory and that, without objection, its board of directors will re-direct the clubs Observatory Funds into other acquisitions and/or activities.

If you have contributed to this fund, have knowledge of others who may have contributed to this fund or have any interest at all in this fund, please contact the San Jose Astronomical Association by mail:

San Jose Astronomical Association
PO Box 28243
San Jose, CA 95159-8243







AUGUST 2009



"Cumulonimbus Hot Tower" by artist Graeme Stevens shows a storm brewing that could bring rain, hail, lightning and thunder. This type of cloud can grow to 40,000 feet high. Make a Cloud Mobile at spaceplace.nasa.gov/en/kids/clouds.

SPACEPLACE.NASA.GOV

SUNDAY MONDAY TUESDAY WEDNESDAY THURSDAY FRIDAY SATURDAY

| | | | | | | |
|--|-----------|---|--|---|---|--|
| | | | | | | 1 |
| Happiness Happens Month. Stay happy playing games with a friend on The Space Place. | | | | | | Sports Day. Like to play soccer? What if you could kick a soccer ball all the way to the Moon? |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| | | U.S. Coast Guard was established, 1790. Play the Wild Weather Adventure game and see some reasons we need the Coast Guard. | Friendship Day. Put your eyes together with a friend's to solve some wordfind puzzles about air, land, water, and life.  | | | The Date to Create! Create art using the online Space Place Coloring Book. |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| | | | | Perseids meteor shower at maximum tonight. Play a game, and learn about comets, the sources of meteor showers.  | | National Relaxation Day. Watch the clouds drift by, then make a Cloud Mobile. Just watching it will help you relax even more. |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| Joke Day. If no faces smile at your jokes, use the Emoticonstructor to "evolve" a face that does. | | | National Aviation Day. Did you know that a plane can be used to launch a rocket?  | | | |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| | | | Voyager 2 flew by Saturn in 1981. Its rings, several of its moons, and Earth have at least one thing in common. Ice! Where else has ice been found?  | | Dream Day. Martin Luther King, Jr. gave his famous speech in 1963. See Space Place Live! shows where folks tell how their dreams have come true. | First Scout camp opened, 1934. Earn Cub Scout and Girl Scout achievements and badges at The Space Place. |
| 30 | 31 | | | | | |

- Month of August: spaceplace.nasa.gov/en/kids/games.shtml
- Aug. 1: spaceplace.nasa.gov/en/kids/asteroid_naming.shtml
- Aug. 4: spaceplace.nasa.gov/en/kids/goes/www
- Aug. 5: spaceplace.nasa.gov/en/kids/earth/wordfind
- Aug. 8: spaceplace.nasa.gov/en/kids/coloring_book
- Aug. 13: spaceplace.nasa.gov/en/kids/stardust
- Aug. 15: spaceplace.nasa.gov/en/kids/clouds
- Aug. 16: spaceplace.nasa.gov/en/kids/st5/emoticon
- Aug. 19: spaceplace.nasa.gov/en/kids/galex/pegasus.shtml
- Aug. 26: spaceplace.nasa.gov/en/kids/ice
- Aug. 28: spaceplace.nasa.gov/en/kids/live
- Aug. 29: spaceplace.nasa.gov/en/kids/scouts.shtml

Penning Penumbral Predictions

Akkana Peck

Jupiter reaches opposition on August 14th, and Neptune on the 21st. They're about four degrees apart in eastern Capricornus. Uranus runs a bit ahead, in Pisces, so it's easy to pick up all three on any August evening.

Saturn is barely glimpseable at dusk — catch it early in the month before it fades away completely.

Venus and Mars compete for your attentions in the morning sky ... a battle that Venus, at magnitude -3.8, will surely win over the dim and currently distant Mars.

Pluto is up too, though unfortunately not very far up — it only transits at 35 degrees, and that happens before the sky gets fully dark. Still, it should be reachable by a dedicated Plutocrat: look for it in northwestern Sagittarius, about a third of the way from M23 to M17. Here in the heart of the Milky Way, you'll definitely need a good finder chart to tell it apart from background stars.

This month the moon gives us something of an oddity — *another* penumbral lunar eclipse, on the morning of the 5th. I wrote last month about July's penumbral eclipse and how unlikely you were to see anything. Well, this one's pretty much the same, except worse: this time, it happens during our day when the moon isn't even up. So why mention it at all? Only because it seems relatively unusual to have lunar eclipses two months in a row.

But is it really that unusual? In fact, having two of them close together almost guarantees that neither one will be impressive visually.

Eclipses, either solar or lunar, happen when the moon is on the ecliptic during the new or full moon. That's the only way the shadows can line up. Of course, the moon doesn't have to be centered on the ecliptic; it just has to be within a

few degrees. The moon takes up about half a degree in our sky, while the earth's umbra — the dark part of our shadow — spans about a degree and a half. So if the moon is within two degrees of the ecliptic, we'll see an umbral eclipse. Our penumbra is bigger, so we can get a penumbral eclipse, like the ones last month or this month, if the moon is within about three degrees of the ecliptic.

Of course, the moon's orbit isn't entirely in the ecliptic: it differs by an inclination of about five degrees. As the earth/moon system orbits the sun, the moon's height above or below the ecliptic at full moon will change from month to month.

Normally, it changes by enough that if the full moon is on the ecliptic one month — a lunar eclipse — then by the next month, it will have moved off. But in a case like last month, a penumbral eclipse where the moon was just barely skimming across one edge of the earth's shadow, it's not all that surprising that the following month might find the moon at the opposite edge of the penumbra.

So how common is this? I was curious, so I grabbed tables of lunar eclipses for the previous and current centuries from <http://eclipse.gsfc.nasa.gov> and wrote a Python script to analyze them.

First I looked at how many eclipses happened per year. I found that it really wasn't terribly unusual to have three eclipses in a year, with two in successive months: the 20th and 21st century each have 22 years in which that happens.

Less common is having four lunar eclipses in a year. That happens seven times in the 20th century and six in the 21st. 2009 is the first 4-eclipse year of this century, with

penumbral eclipses in February, July and August and an umbral (but not total) eclipse in December.

What about eclipses within a month of each other? There are 19 of those in the 20th century and 17 in the 21st. None are total, and almost all are penumbral; the only exceptions are May 1958 and April 2013. 1904 is the only year with two eclipses in the same month (March), while 1915, 1933 and 2096 each have two pairs of adjacent-month eclipses.

So this year's double penumbral eclipse is interesting, but not quite as unusual as I had first suspected.

Speaking of the moon, NASA's LCROSS mission has successfully launched. It will smack into the moon in early October (alas, probably during the wee hours of the morning here in San Jose) but meanwhile it should be sending back some nice pictures. So go to NASA's LCROSS site and check out the photos while you're not watching our invisible and only slightly rare penumbral eclipse on August 5th.

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.

Alien life on distant worlds. What would it be like? For millennia people could only wonder, but now NASA's Spitzer Space Telescope is producing some hard data. It turns out that life around certain kinds of stars would likely be very different from life as we know it.

Using Spitzer, astronomers have discovered the organic chemical acetylene in the planet-forming discs surrounding 17 M-dwarf stars. It's the first time any chemical has been detected around one of these small, cool stars. However, scientists are more intrigued by what was not there: a chemical called hydrogen cyanide (HCN), an important building block for life as we know it.

"The fact that we do not detect hydrogen cyanide around cool stars suggests that prebiotic chemistry may unfold differently on planets orbiting cool stars," says Ilaria Pascucci, lead scientist for the Spitzer observations and an astrophysicist at Johns Hopkins University in Baltimore, Maryland.

That's because HCN is the basic component for making adenine, one of the four information-carrying chemicals in DNA. All known life on Earth is based on DNA, but without adenine available, life in a dwarf-star solar system would have to make do without it. "You cannot make adenine in another way," Pascucci explains. "You need hydrogen cyanide."

M-dwarf and brown dwarf stars emit far less ultraviolet light than larger, hotter stars such as our sun. Pascucci thinks this difference could explain the lack of HCN around dwarf stars. For HCN to form, molecules of nitrogen must first be split into individual nitrogen atoms. But the triple bond holding molecular nitrogen together is very strong. High-energy ultraviolet photons can break this bond, but the lower-energy photons from M-dwarf stars cannot.

"Other nitrogen-bearing molecules are going to be affected by this same chemistry," Pascucci says, possibly including the precursors to amino acids and thus proteins.

To search for HCN, Pascucci's team looked at data from Spitzer, which observes the universe at infrared wavelengths. Planet-forming discs around M-dwarf stars have very faint infrared emissions, but Spitzer is sensitive enough to detect them.

HCN's distinctive 14-micron emission band was absent in the infrared spectra of the M-dwarf stars, but Spitzer did detect HCN in the spectra of 44 hotter, sun-like stars.

Infrared astronomy will be a powerful

tool for studying other prebiotic chemicals in planet-forming discs, says Pascucci, and the Spitzer Space Telescope is at the forefront of the field. Spitzer can't yet draw us a picture of alien life forms, but it's beginning to tell us what they could—and could not—be made of. "That's pretty wonderful, too," says Pascucci.

For news of other discoveries based on Spitzer data, visit <http://www.spitzer.caltech.edu>. Kids can learn Spitzer astronomy words and concepts by playing the Spitzer "Sign Here!" game at <http://spaceplace.nasa.gov/en/kids/spitzer/signs>.

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



Do alien planets around other stars have the right ingredients for a pre-biotic soup? This artist's conception shows a young, hypothetical planet around a cool star. A soupy mix of potentially life-forming chemicals can be seen pooling around the base of the jagged rocks. Observations from NASA's Spitzer Space Telescope hint that planets around cool stars — the so-called M-dwarfs and brown dwarfs that are widespread throughout our galaxy — might possess a different mix of life-forming, or prebiotic, chemicals than our young Earth.

Life on our planet is thought to have arisen out of a pond-scum-like mix of chemicals. Some of these chemicals are thought to have come from a planet-forming disk of gas and dust that swirled around our young sun. Meteorites carrying the chemicals might have crash-landed on Earth.

Confessions of an Alien Hunter by Seth Shostak

Paul Kohlmeier

Seth Shostak's humor and insight are well known to any who have read his previous works, listened to his SETI podcast, or heard him speak in person. His latest book is a great summary of the first 50 years of our search for extraterrestrial intelligence (ETI). He writes about the impact the world would see if we found evidence of ETI. Most likely we would absorb it with far less rioting than is found after a team wins the NBA championship. In fact, SETI has had practice dealing with this possibility already due to false alarms such as the one involving the star EQ Peg in 1997.

A lot of this book has to do with the extreme viewpoints on SETI. On the one hand are those who not only believe ET exists but that they are here already and it is only the government, that entity with the fantastic ability to keep a secret, which suppresses the evidence. Many of these have a particular tough time with Shostak because he has this habit of a) actually talking back to these folks and b) points out where they couldn't possibly be correct, at least based on current evidence. On the other hand there is scientific evidence available to show why we think ET looks a certain way (the way a baby sees his mother) and why people think they have been abducted (the paralyzed feeling during dreams). But I think one reason the Roswell crowd has a problem with Seth is that they see themselves in him. Specifically they see someone who believes ET exists (somewhere) and a person who really wants to find them. But Seth does it professionally and, more importantly, scientifically. So when he points out how bad their evidence is, his detractors call him closed minded and a lot of things worse than that.

The other extreme on the ET scale are those who think that we are the only intelligent (note: meaning smart enough to build a radio) species in the universe or practically speaking the only one.

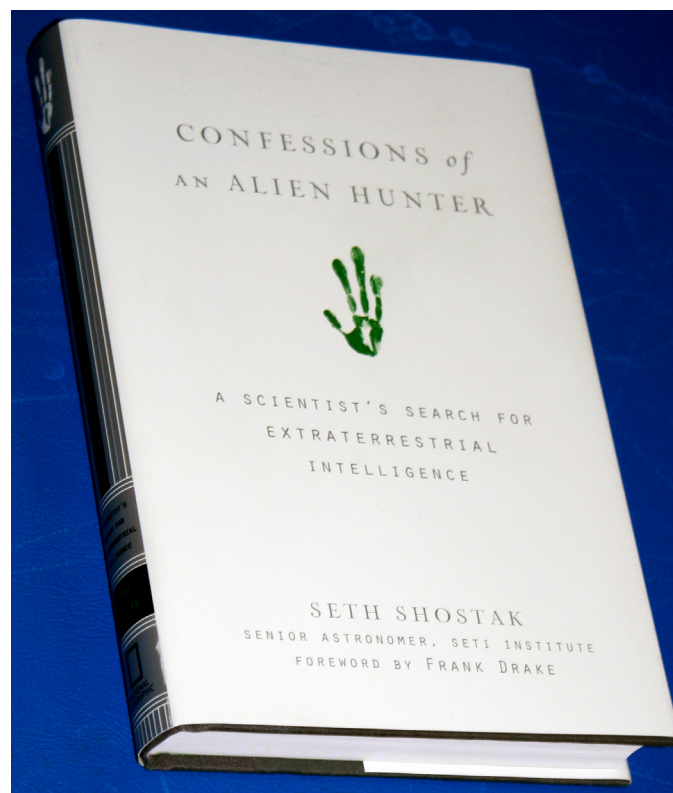
There is no evidence to support this claim except Fermi's Paradox and the possibility that earth-like planets are very rare (see Peter Ward's "Rare Earth" but Ward thinks SETI is a worthwhile endeavor). Fermi's Paradox asks the question "where are they?" Shouldn't ET have visited by now and, for that matter, shouldn't SETI have more to show for 50 years of looking? But astronomers tried for 2000 years to detect stellar parallax before finally succeeding in 1838. Until then, the lack of stellar parallax could be used to argue that all stars are equidistant. Those astronomers, when they get an idea like stellar parallax in their head they can be awfully stubborn. Add the advantages of Moore's Law to that stubbornness and you can see why SETI researchers are more optimistic today than ever.

The book also goes into many anecdotes in Shostak's career including the EQ Peg false alarm mentioned above, the "face" on Mars, the Allan Hills meteorite from Mars, the defunding of SETI by NASA, and the strange things people ask him in person or by e-mail. Shostak also gives concise but reasonably complete descriptions of Lowell's Martian canals, the 1947 Roswell incident, and the 1976 Viking experiment that was intended to detect life but most likely did not. The Ohio State "WOW" signal did not rate a mention.

I didn't find any typos in this book and I think I have a fairly early printing. The one error I think I see is on page 25 when he says that Copernicus's *De Revolutionibus* arrived

"half a century before Columbus's discovery of the New World". I think that 1543 is 51 years AFTER 1492. One other minor quibble is that the book did not discuss the idea that the ETI most likely to have detected us would be a civilization that can see the Earth transit the Sun. Shostak has worked on this theory with Richard Henry and Steven Kilston.

This book gets 5 stars because it concisely gives a complete summary of SETI and directly answers the naysayers. It does not unnecessarily rehash information from previous books such as "Sharing the Universe". Nor is the book intended to be an advocacy for SETI. (If you want that, please see their website at www.seti.org.) The combination of anecdotes and science and more than a few laughs make this a great read. Like Copernicus and Darwin, Shostak and colleagues may be close to a discovery that will forever change humanity's place within the cosmos.



The Last Month In Astronomy

JUN-13-2009 **Odds of Life Doubles** The chance of finding life on another planet has doubled. That's because scientists at Caltech believe that life increases the lifespan of the biosphere. Thus that factor in the Drake equation is doubled and thus so is the final result. How does this happen? Life can reduce the increased air pressure by removing large amounts of molecular nitrogen. This regulates surface temperatures and, in the case of Earth, could add 1.3 billion years to Earth's lifespan. <http://www.sciencedaily.com/releases/2009/06/090612203303.htm>

JUN-16-2009 **The Betelgeuse Diet** The star Betelgeuse has shrunk about 1 percent per year for the last 15 years. Of course, Betelgeuse had a lot to lose. It had a diameter of 5.5 AU. The distance to Betelgeuse is now set at 640 light years (previously thought to be 430 light years). <http://www.sciencedaily.com/releases/2009/06/090609220555.htm>

JUN-18-2009 **LRO/LCROSS Launched** The Lunar Reconnaissance Orbiter and the LCROSS impactor were launched and first images were available about 2 weeks later. <http://jpl.nasa.gov/news/news.cfm?release=2009-101>

JUN-24-2009 **Salt on Enceladus** Sodium has been detected by the Cassini spacecraft. This suggests that there might be salty oceans on Enceladus. But another ground-based study indicates no salt on Enceladus. These two findings might mean that there is some salt on this Saturnian moon but not a lot. <http://www.sciencedaily.com/releases/2009/07/090702170135.htm>

JUN-25-2009 **Shuttle finds Tunguska evidence** The 1908 Tunguska explosion was likely caused by a comet hitting the Earth's atmosphere. That is the conclusion from a NASA space shuttle. The connection between the two is that noctilucent clouds were found after Tunguska and after a shuttle launch. Every space shuttle flight puts 300 tons of water vapor into the atmosphere. This water vapor can move to the poles and form clouds. <http://www.sciencedaily.com/releases/2009/06/090624152941.htm>

JUL-06-2009 **New Details in NGC 7293** A new image taken with the infrared camera on the Subaru Telescope in Hawaii shows tens of thousands of comet-shaped knots inside the nebula. This nebula is one of the closest, only 710 light years away. The total number of these knots might be 40,000 in the whole nebula. The total mass of the knots is one-tenth the mass of the Sun. <http://www.sciencedaily.com/releases/2009/07/090705231958.htm>

JUL-07-2009 **Swan Nebula image**
A new picture of the Swan Nebula (aka Omega Nebula, M17) gives a glittering view of the stellar nursery. The photo was taken by the ESO telescope in La Silla, Chile. <http://www.astronomy.com/asy/default.aspx?c=a&id=8430>



JUL-09-2009 **Galileo discovered Neptune?**

It has been known for some time that some of Galileo's drawings show Neptune as a background star. The standard explanation is that Galileo didn't notice that Neptune was moving very slowly. But a new theory suggests that Galileo did know that he had found a new planet in 1613, 234 years before Neptune was really found. How to prove that? Galileo often wrote anagrams for some of his discoveries like the rings of Saturn. Perhaps another anagram is buried in his notes or letters. <http://www.sciencedaily.com/releases/2009/07/090709095427.htm>

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

September 12 - 16 - ASP Annual Meeting in Millbrae, California.

October 30 - Nov.1 - Advanced Imaging Conference in San Jose

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.Jun.09.html>

| Difficulty | Name | RA | Dec |
|---|----------|-------------|--------------|
| Easy | M17 | 18h 20m 45s | -16° 10' 00" |
| The Swan Nebula in Sagittarius. Mag 6.9 | | | |
| Medium | NGC 6440 | 17h 48m 54s | -20° 22' 00" |
| Globular in Sagittarius with planetary nearby. Mag 9.3. | | | |
| Difficult | Abell 44 | 18h 30m 11s | -16° 45' 28" |
| Planetary in Sagittarius. Use OIII filter. Mag. 15.8 | | | |

Q: What is the most interesting variable star?

A: In 2009-10, that would have to be Epsilon Aurigae, a variable that appears to be eclipsed once every 27 years. (RASC 2009, pg. 301)

Jane Houston Jones

My monthly NASA Podcast for International Year of Astronomy is about the Milky Way this month.

You can find the podcast series in many formats on my What's Up webpage here: <http://solarsystem.nasa.gov/news/whatsup-view.cfm?WUID=164>. More great IYA content is here http://astronomy2009.nasa.gov/observe_jul.htm.

“Life, or at least the building blocks from which it springs, is not rare. It is inevitable.” – Emma Bakes, NASA Ames Research Center

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San Jose Astronomical Association Membership Form

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

Membership Type:

- Regular — \$20
 Regular with Sky & Telescope — \$53
 Junior (under 18) — \$10
 Junior with Sky & Telescope — \$43

Subscribing to Sky & Telescope magazine through the SJAA saves you \$5 off the regular rate. (S&T will not accept multi-year subscriptions through the club program. Allow 2 months lead time.)

I prefer to get the Ephemeris newsletter in print form. The newsletter is always available online at <http://ephemeris.sjaa.net>
Questions?

Send e-mail to membership@sjaa.net

Bring this form to any SJAA Meeting or send to the club address (above). Please make checks payable to "SJAA".

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