

EPHEMERIS

April 2011

SJAA Activities Calendar

Jim Van Nuland

March (late)

- 19 **General Meeting.** Board meeting at 6:30; General Meeting at 8:00. Our speaker is Brian Day of NASA/Ames, on: The New Moon. Discoveries from The latest generation of robotic lunar missions.
- 25 Houge Park star party. Sunset 7:24 p.m, 54% moon rises 2:26 a.m. Star party hours: 8:15 until 10:15 p.m.
- 26 Dark-Sky weekend. Sunset 7:25 p.m, 43% moon rises 3:10 a.m.
- Open at noon, Auction starts at 1:30.
- 22 Astronomy Class at Houge Park. 7:45 p.m.
- 22 Houge Park star party. Sunset 7:49 p.m, 70% moon rises 1:05 a.m. Star party hours: 8:45 until 11:45 p.m.
- 23 Dark-Sky weekend. Sunset 7:50 p.m, 60% moon rises 1:45 a.m.
- 30 Dark-Sky weekend. Sunset 7:56 p.m, 4% moon rises 5:04 a.m. Henry Coe Park's "Astronomy" lot has been reserved.

April

- 2 Dark-Sky weekend. Sunset 7:31 p.m, 1% moon sets 7:05 p.m. Henry Coe Park's "Astronomy" lot has been reserved. **This is the secondary weekend for a Messier Marathon.**
- 8 Houge Park star party. Sunset 7:36 p.m, 27% moon sets 12:45 a.m. Star party hours: 8:30 until 11:30 p.m.
- 17 **Annual Auction (replaces General Meeting this month).**

May

- 13 Houge Park star party. Sunset 8:08 p.m, 85% moon sets 3:46 a.m. Star party hours: 9:00 until midnight.
- 14 **General Meeting.** Board meeting at 6:30; General Meeting at 8:00.
- 27 Astronomy Class at Houge Park. 8:30 p.m.
- 27 Houge Park star party. Sunset 8:19 p.m, 20% moon rises 3:06 a.m. Star party hours: 9:30 until midnight.
- 28 Dark-Sky weekend. Sunset 8:20 p.m, 20% moon rises 3:06 a.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>

The Shallow Sky

Life in Meteorites

Akkana Peck

Or at least that's what the headlines said last week. Yes, a NASA astrobiologist published a paper claiming he'd found convincing evidence of life as fossils in a meteorite.

Hey, wait. Didn't we go through this already a few years ago? In fact, it's been 15 years — can you believe it? — since NASA's David McKay reported that the markings in a meteorite named ALH 84001 looked like they had been made by living bacteria. Since ALH 84001, found in Antarctica's Allan Hills, was thought to be a chunk that had been blasted off the surface of Mars and sent on a trip to Earth, that was big news. It was even bigger news since ALH 84001 was very old — from a time when Mars was wet enough that it's plausible that bacteria might have lived there.

Except that it probably wasn't true. ALH 84001 was subjected to a battery of tests over the years following the initial paper, and there was no trace of biologic compounds. And plenty of other scientists came up with alternate theories for how the meteorite's strange markings might have come about. To this day nobody knows for sure what caused those marks — but there's no convincing evidence they were caused by life.

Continued on page 2

Fast-forward to March 5 of this year, when the new “life in a meteorite” story broke — in an exclusive on Fox News, of all places. Doesn’t that give you a warm and fuzzy feeling already? Dr. Richard B. Hoover, of NASA’s Marshall Space Flight Center, published a paper in the *Journal of Cosmology* claiming he’d seen convincing evidence of microfossils similar to cyanobacteria in several carbonaceous chondrite meteorite. The story came with scanning electron microscope photos that looked like giant worms — or at least something you might buy in plushy form from GiantMicrobes.com.

And about that journal — why is a study that mixes biology and meteor astronomy showing up in a cosmology

journal? The *Journal of Cosmology* turns out to be a small open-access publication, and doesn’t seem to get a lot of respect in scientific circles.

About the Hoover paper it makes some grandiose claims, such as ““No other paper in the history of science has undergone such a thorough vetting”. Apparently the paper was rejected from a few other publications before Hoover settled on the *J. of Cosmology*. That doesn’t make it wrong — but it does call for a skeptical eye. Those markings in the rock could have come from bacteria after the meteorite landed on Earth — or they could be something else entirely, and have nothing to do with bacteria.

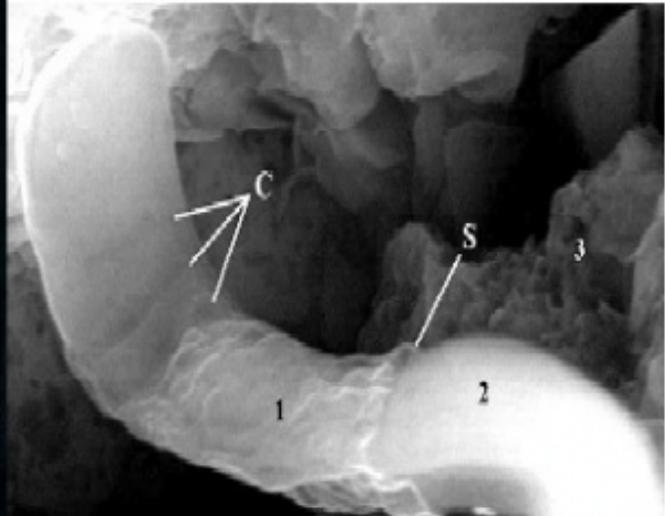
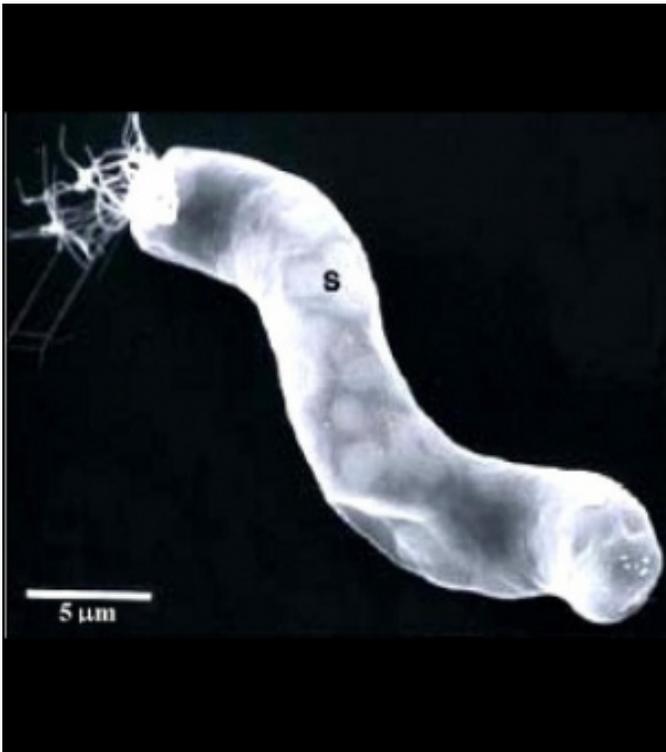
Most of the experts seem skeptical about this one, too. Let’s sit back and watch how it all shakes out; but I don’t

think we should expect a rain of little blue-green microbes from space any time soon.

Meanwhile, there’s not much to look at in the April evening shallow sky. Mars, Venus, Neptune and Pluto are all in the morning sky, joined late in the month by Jupiter, Mercury and Uranus. That leaves Saturn as the only planet visible in the evening. Of course, Saturn’s always lovely, with its rings tilted at a bit over 8 degrees.

So be content with Saturn, the moon, and an increasingly active sun — there were some spectacular solar prominences last month, for those who own an H-alpha filter (or borrowed one from the club). And if you want to see cyanobacteria, head to your nearest reservoir instead of your meteorite collection.

“Let’s sit back and watch how it all shakes out; but I don’t think we should expect a rain of little blue-green microbes from space any time soon.”



On the left is a microphotograph of a bacterium called *Titanospirillum Velox*. This image was taken by Ricardo Guerrero et al. in 1999. On the right is a photo from Richard Hoover’s paper showing a fossil that appears similar.

On the Value of a (teensy, weensy) Photograph

Paul Kohlmler

The author of the article "Fossils of Cyanobacteria in CI1 Carbonaceous Meteorites" mentioned in Akkana Peck's article, Richard Hoover, gave an exclusive interview with the SJAA Ephemeris as quoted in the September 2010 issue. At the time it was clear that Hoover was looking at bacteria in meteorites as evidence of life outside of Earth.

Hoover has written about bacterial fossils before. He presented a paper titled "Microfossils of Cyanobacteria in the Orgueil Carbonaceous Meteorite" on July 12, 2007. More on this paper below but if you want to read it go to http://gammaray.msfc.nasa.gov/colloquia/abstracts_summer07/rhoover.html.

There have been other claims of ET life detection. Mars is most often the site of these claims. First was the claims of canals, actually a mistranslation of the Italian word "canali" meaning "channels".

Then the Viking probe in 1976 (Levin & Straat) included a test that was supposed to detect life and the experiment returned positive results. Those results are not generally held to be valid forms of life. The evidence dropped over time suggesting a chemical reaction rather than the reaction of ongoing life.

More recently a meteorite found in Antarctica in 1984 was found to be from Mars and contained what looked like bacterial fossils (David McKay et. al. 1996). That was not convincing because the shapes that are that small are just not convincing. Why not?

Take the current case as presented by Hoover (and please, check my math). He starts with a meteorite that is roughly the size of a 10 centimeter cube. That's a cube that is 10^{-1} meters on a side or a volume of 10^{-3} meters. The shapes that are being considered are 1 micron in length which is 10^{-6} meters and a

micron cube would be 10^{-18} meters. Am I right so far? That means there are 10^{15} potential samples. That's 1 quadrillion chances to see something that looks like a bacterial fossil or anything else. When you see a dinosaur bone the shape is compelling evidence that it is related to life of some kind but a shape that is about 1 micron is not. At least, not yet.

Consider a few other items in this case. As noted earlier, Richard Hoover made much the same case 3 and half years ago. But this time he got hold of a technology called FESEM (Field Emission Scanning Electron Microscopy). His previous paper used just ordinary SEM (Scanning Electron Microscopy - you know - the kind you have in your kitchen). FESEM may be up to 6 times better than SEM with resolution down to the nanometer (according to <http://www.photometrics.net/fesem.html>).

Consider the journal where this paper is published. At a recent talk at Foothill College, Christopher McKay (who calls himself a friend of his fellow NASA colleague Richard Hoover) called that journal "sketchy". It is interesting that the journals *Nature* and *Science* both declined to publish this paper.

It does not appear that Hoover's detractors are people who don't want to find evidence of extraterrestrial life. The biggest detractors are those who do! Seth Shostak of the SETI Institute says "It looks very, very doubtful." A lot is based on how swayed you are by a picture. The pictures on the right show an optical illusion. Did the first picture fool you? If you are viewing this in HTML, see the video version at: <http://www.youtube.com/watch?v=SErHthEGTDc&feature=related>. What's the point? Well, if a "macro" picture can fool you then what about a microphotograph?

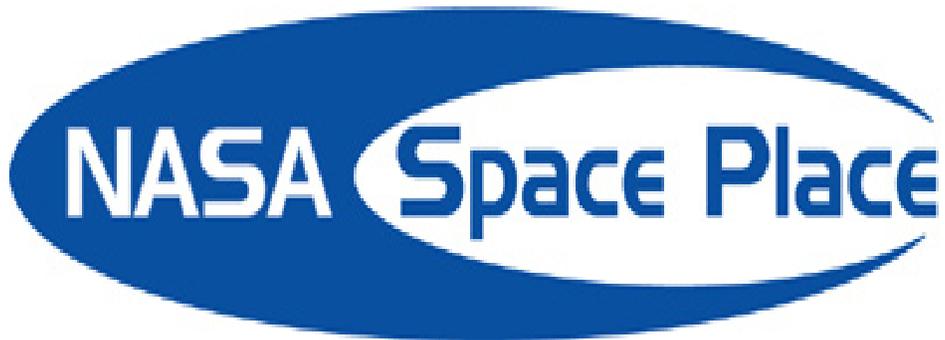
If the photograph doesn't persuade you then should the fact that Richard Hoover is a highly regarded NASA

scientist be compelling? Well, it isn't to NASA itself. Paul Hertz of NASA (he has the title of Chief Scientist of NASA's Science Mission Directorate in Washington) put out a statement on March 7 that says in part "NASA is a scientific and technical agency committed to a culture of openness with the media and public. While we value the free exchange of ideas, data, and information as part of scientific and technical inquiry, NASA cannot stand behind or support a scientific claim unless it has been peer-reviewed or thoroughly examined by other qualified experts. This paper was submitted in 2007 ..." The statement goes on to say that the peer review was not completed but others say it was completed and the paper was rejected. Still, that 2007 paper is still out on the web.



This is the optical illusion box created by the late great Jerry Andrus. Above you see a box that is, well, impossible, and yet there it is. Do you have to accept that the impossible is really possible? Or do you insist on being just a bit more skeptical? Below you can see how Andrus created the box.





GOES-R, Zombie Fighter

Dr. Tony Phillips

On April 5, 2010, something eerie happened to the Galaxy 15 telecommunications satellite: It turned into a zombie.

The day began as usual, with industry-owned Galaxy 15 relaying TV signals to millions of viewers in North America,

when suddenly the geosynchronous satellite stopped taking commands from Earth. It was brain dead! Like any good zombie, however, its body continued to function. Within days, Galaxy 15 began to meander among other satellites in geosynchronous orbit, transmitting its own signal on top of the others'. Satellite

operators scrambled to deal with the interference, all the while wondering what happened?

In horror movies, zombies are usually produced by viruses.

"In this case, the culprit was probably



The Galaxy 15 communication satellite was "brainless" for several months in 2010 after being exposed to a geomagnetic storm. The new GOES-R satellite will warn of such dangers.

the sun,” says Bill Denig of the National Geophysical Data Center in Boulder, Colorado. He and colleague Janet Green of NOAA’s Space Weather Prediction Center recently led a study of the Galaxy 15 anomaly, and here are their conclusions:

On April 3rd, a relatively minor solar flare launched a cloud of plasma toward Earth. Galaxy 15 had experienced many such events before, but this time there was a difference.

“Galaxy 15 was just emerging from the shadow of Earth when the cloud arrived and triggered a geomagnetic storm,” explains Denig. Suddenly exposed to sunlight and the ongoing storm, “the spacecraft began to heat up and charge [up].”

Electrons swirling around Galaxy 15 stuck to and penetrated the spacecraft’s surface. As more and more charged particles accumulated, voltages began to rise, and—zap!—an electrostatic discharge occurred. A zombie was born.

“At least, this is what we suspect happened based on data collected by GOES satellites in the vicinity,” he says. “We’ll be able to diagnose events like this much better, however, after GOES-R is launched by NASA in 2015.”

GOES-R is NOAA’s next-generation Geostationary Operational Environmental Satellite. One of the instruments it will carry, a low-energy electron counter, is crucial to “zombie fighting.” Low energy-electrons are the ones most likely to stick to a spacecraft’s surface and cause brain-frying discharges. By monitoring these particles in Earth orbit, GOES-R will provide better post-mortems for future zombie outbreaks. This could help satellite designers figure out how to build spacecraft less susceptible to discharges. Also, GOES-R will be able to issue alerts when dangerous electrons appear. Satellite operators could then take protective action—for example, putting their birds in “safe mode”—to keep the zombie population at bay.

Meanwhile, Galaxy 15 is a zombie no more. In late December 2010, after 9 months of terrorizing nearby spacecraft, the comsat was re-booted, and began responding to commands from Earth again.

All’s well that ends well? True zombie fighters know better than to relax. Says Denig, “we’re looking forward to GOES-R.”

You and the kids in your life can learn about space weather at <http://scijinks.gov/space-weather-and-us>.

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

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.

SJAA Yosemite Public Star Party 2011

Jim Van Nuland

The annual SJAA Yosemite star party will be held on August 26 and 27, 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 probably 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/yosemite.shtml>> and the FAQ page at <<http://www.sjaa.net/yosefaq.shtml>>. Then contact me with remaining questions. That first page also has sun and moon rise and set times.

We will again have scheduled times to drive up to remove our gear.

The first “leaving window” will start at midnight. The next time window will be 3:00 am or by general agreement.

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@sjpc.org, or phone 408-371-1307 11 a.m. to 11 p.m. Priority is given to SJAA members.

Clear Skies!

The Last Month In Astronomy

MAR-09-2011 **Discovery's last landing** The Space Shuttle Discovery completed its last planned mission. Discovery is now expected to go take up residence in the Smithsonian Air and Space Museum. However, at this time that is not guaranteed. The next shuttle flight, Endeavor's final flight, is scheduled for April 19. <http://spaceflightnow.com/shuttle/sts133/landing/>

MAR-08-2011 **Enceladus Power** New estimates of the power fueling the water geysers on Enceladus suggest that it is the equivalent of 20 coal-fueled power stations. This new estimate is 10 times higher than the previous estimate. That earlier pegged the power at 1.1 gigawatts from the tidal interactions with the moon Dione and another 0.3 gigawatts from radioactivity. The newer number, 15.8 gigawatts, is based on observations from 2008 covering the south polar area. The higher output increases the likelihood of liquid water below the surface. <http://www.astronomy.com/en/News-Observing/News/2011/03/Cassini%20finds%20Enceladus%20is%20a%20powerhouse.aspx>

MAR-04-2011 **No success, no Glory** The NASA mission named Glory failed ignominiously when the fairing, a protective shell around the intended satellite, failed to separate from the rocket. After more than 50 years of experience in launching rockets, the idea that NASA cannot get the cover to pop off is galling. But it is all the worse when the same thing happened on the same Taurus XL rocket dooming the Orbiting Carbon Observatory in 2009. After the OCO failure, an Investigation board developed a corrective action plan and the fairing separation was radically different on this mission. However, the final effect was exactly the same. The result of these two launches is nothing except losses of \$700 million. <http://www.astronomy.com/News-Observing/News/2011/03/NASAs%20Glory%20satellite%20fails%20to%20reach%20orbit.aspx>

MAR-03-2011 **Sunflower in IR** The Spitzer telescope team has released a new photo of M63, the Sunflower galaxy. This photo shows the dust lanes in the galaxy's spiral arms. To make this image, light with a wavelength of 3.6 microns is printed as blue; 4.5 micron light is printed as green; and 8 microns becomes the red component. Then the starlight measured at 3.6 microns is subtracted from the 8 micron image to produce a result that enhances the dust features. <http://www.jpl.nasa.gov/news/news.cfm?release=2011-063>

FEB-24-2011 **Superconductor in space** The NASA Chandra X-ray observatory is studying the neutron star that is in the supernova remnant Cassiopeia A. One finding is that Cas A has cooled by about 4% over the last 10 years, a surprisingly large amount. In a neutron star the pressure is so high that electrons are forced to merge with protons, thus creating neutrons. "The rapid cooling in Cas A's neutron star ... is the first direct evidence that the cores of these neutron stars are, in fact, made of superfluid and superconducting material." A superfluid is a friction-free state of matter. Superconductors allow electric current to flow with no resistance. <http://www.astronomy.com/News-Observing/News/2011/02/Superfluid%20and%20superconductor%20discovered%20in%20stars%20core.aspx>

FEB-21-2011 **Taking the universe's measure** Quick, what astronomical instrument gives the highest resolution, Hubble, Keck with adaptive optics, Chandra? The answer is the Very Long Baseline Array Telescope (VLBA), a radio telescope. The VLBA uses 10 25-meter diameter dish antennas distributed from Hawaii to St. Croix to the Caribbean and operated by the NRAO in Socorro, New Mexico. The antennas work together allowing them to act like an antenna that has the diameter equal to the longest distance between dishes. The latest measurements place galaxy NGC 6264 at a distance of 450 million light-years with an uncertainty of 9%. The previous longest direct measurement of a galaxy was 160 million light-years. <http://www.astronomy.com/News-Observing/News/2011/02/Super-sharp%20radio%20eye%20is%20remeasuring%20the%20universe.aspx>

FEB-16-2011 **Herschel and Dark Matter** The Herschel Space Observatory, a project led by the ESA but strongly supported by NASA, has made an important determination about dark matter and galaxy formation. According to Asantha Cooray (from U.C. Irvine), "If you start with too little dark matter, then a developing galaxy would peter out. If you have too much, then gas doesn't cool efficiently to form one large galaxy, and you end up with lots of smaller galaxies." The right amount of dark matter is a mass equal to about 300 billion suns. <http://www.jpl.nasa.gov/news/news.cfm?release=2011-057>

FEB-14-2011 **New spectrograph complements Kepler** A new spectrograph has been built at the Harvard-Smithsonian Center for Astrophysics. The spectrograph is designed to detect the stellar wobbles created by earth-size planets that closely orbit their stars. The idea is to use this instrument to better characterize the planets found by the Kepler spacecraft. <http://www.astronomy.com/News-Observing/News/2011/02/New%20instrument%20will%20help%20confirm%20Keplers%20planet%20finds.aspx>

It Must Be Astronomical ...

Loaners

The loaner program offers members a means to try scopes of various sizes and technologies before you buy. For more information please see the loaner program web page: <http://www.sjaa.net/loaners>

Election

All directors on the board whose seats were up for reelection decided to run again. At that February General Meeting they were all reelected. Selection of the officers takes place at the board meeting in March.

“Any sufficiently advanced technology is indistinguishable from magic” – Arthur C. Clarke’s Third Law

At Foothill

April 20 - Dr. Thomas Berger from Lockheed on New Views and New Understanding of the Sun at 7 p.m.

School Star Parties

Completed Events					
	Total Sched.	Good Sky	Partial Success	Cloudy Fail	Cancel at noon
Jul	1	1			
Aug	4	4			
Sep	0				
Oct	7	5	1		1
Nov	13	9	3		1
Dec	8	1	2	0	5
Jan	8	2	2	0	4
Feb	6	6			
Mar	8	2	1		5
Total	55	30	9	0	16
Scheduled Events					
	Total	Firm	Workin'		
Mar	2	2			
Apr	2	1	1		
Total	4	3	1		

As of mid-March

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Sec Mark Wagner
Tres Robert Armstrong
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Dir Gordon Reade
Dir Rod Norden
Dir Kevin Roberts
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<http://www.sjaa.net/contacts.html>

Members Email Lists:
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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)

Membership Type:

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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 (Add \$10 to the dues listed on the left). The newsletter is always available online at <http://ephemeris.sjaa.net>
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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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