

SJAA EPHEMERIS

February General Meeting

Follow The Water – Talk by Dr. Jeffrey Moore

February 11, 2006 at 8 p.m.

David Smith

Spirit and Opportunity have been roving Mars for more than a Martian year, coming up on two Earth years. Mars Global Surveyor, Odyssey, and Mars Express continue to study our neighboring planet from orbit. What are they telling us? At our February 11 meeting, SJAA member Dr. Jeffrey Moore will give us the scoop on the history of water on Mars. A scientist at NASA's Ames

Research Center, Jeff is currently a member of the Mars Exploration Rover team, as well as the New Horizons Pluto mission. He is Principal Investigator of a NASA-funded Martian brines and evaporites aqueous chemistry experiment, and has recently investigated the evolution of the Martian south polar deposits, and the nature of lacustrine and hydrological processes on Mars.

Stardust Returns

Congratulations to the Project Stardust team on the successful completion of Stardust's voyage and meteoric finish. Dr. Peter Jenniskens organized and even raised funds for the DC-8 flight that chased and photographed the Stardust Return Capsule (SRC) in the early morning hours of January 15. Peter was interviewed often by local and national media before and after this effort. He said it exceeded all his expectations. SJAA President Mike Koop was onboard and also featured on some of the coverage.

Stardust's journey was just short of 7 years and 3 billion miles. It rendezvoused with the comet Wild 2 and collected comet particles in a material called Aerogel. Aerogel is a sponge-like material that is 99% empty space.

A good friend of the SJAA, Dr. Scott Sandford pulled one serious all-nighter (39 hours) during the SRC return. Despite those long hours he still found time to tell us that recovery of the capsule went perfectly. He says "Everything in the SRC was clean as a whistle, so many of my contamination concerns are going away." On Wednesday, January 18 it was confirmed that the cometary samples were in good shape with thousands of impacts visible in the aerogel. The largest particles found are about a millimeter in size.

Club member Charles Pillers saw and photographed the return from San Jose. We saw it in Gilroy, an orange streak of constant brightness during the few seconds it appeared between houses. We were using binoculars. Look for pictures and more info at <http://ephemeris.sjaa.net>.

SJAA Activities Calendar

Jim Van Nuland

February

- 3** Houge Park star party. Sunset 5:35 p.m., 40% moon sets 11:59 p.m. Star party hours: 7:00 – 10:00 p.m.
- 4** ATM Class at Houge Park. 7:30 p.m.
- 11** **General meeting** at Houge Park. 8 p.m. Dr. Jeff Moore of NASA will be speaking.
- 16** ATM Class at Houge Park. 7:30 p.m.
- 17** Houge Park star party. Sunset 5:50 p.m., 78% moon rises 10:18 p.m. Star party hours: 7:00 – 10:00 p.m.
- 17** Astronomy Class at Houge Park. 7:30 p.m. Rob Hawley on Care and Feeding of Dobsonian Telescopes (part 2)
- 18** Dark sky weekend. Sunset 5:51 p.m., 70% moon rises 11:20 p.m.
- 25** Dark sky weekend. Sunset 5:58 p.m., 4% moon rise 6:10 a.m.

March

- 3** Houge Park star party. Sunset 6:04 p.m., 24% moon sets 10:52 p.m. Star party hours: 7:00 to 10:00.
- 3** Astronomy Class at Houge Park. 7:30 p.m.
- 4** ATM class at Houge Park. 7:30 p.m.
- 11** **General meeting** at Houge Park. 8 p.m. Paul Zurakowski and Richard Ozer will talk about the Telescope-Maker's workshop at Chabot Observatory in Oakland.
- 16** ATM class at Houge Park. 7:30 p.m.
- 24** Houge Park star party. Sunset 6:23 p.m., 21% moon rise 4:03 a.m. Star party hours: 7:30 to 10:30
- 25** Messier Marathon. Sunset 6:24 p.m., 12% moon rises 6:02 a.m.

The Board of Directors meets at 6:00 p.m. preceding each general meeting. All are welcome.

24 hour news and information hotline: (408) 559-1221

<http://www.sjaa.net>

Procyon

Paul Kohlmiller

Procyon (PRO-see-on) is the brightest star in the constellation Canis Minor. Its name (originally from the Greek) means "before the dog". This is in relation to the fact that Procyon rises just a bit before Sirius, the dog star. Canis Minor is a relatively small constellation with only one other relatively bright star, Gomeisa, a variable star. Procyon has magnitude 0.38 while Gomeisa is around 2.8. I can't see what the ancients saw in constellations but I'm completely baffled as to how a small dog can be seen in just two stars.

Procyon is a double star, though it is difficult to resolve. However, as early as 1844 it was known to be a double star because of the wobbles caused by its companion. Procyon might be so large, about the twice the diameter of the sun, that it is currently shedding material that is captured by its smaller but hotter companion. The white dwarf companion is called Procyon B. This dwarf is roughly earth size but has more than half of a solar mass. Procyon A is one of the largest stars within 20 light-years of the sun.

Procyon is intrinsically brighter than the sun – most visible stars are. But the real reason that Procyon appears to be so bright, about as bright as Rigel, is that it is just over 11 light years away. Rigel, by comparison, is 775 light years away. In a list of the most visible stars, Procyon is the least intrinsically bright star visible from San Jose.

Procyon is a type F star – its surface temperature is 6500 kelvins.

Procyon is part of the winter circle of stars. It is closer to Pollux than to Castor in Gemini which is one way to remember which of the major Gemini stars is which. Pollux is closer to Procyon

and Castor is closer to Capella - P near P; C near C. Others consider Procyon part of the Winter triangle along with Betelgeuse and Sirius.

Procyon is also known as Antecanis, another version of "Before the dog". Its Arabic name is Al Shira.

Canis Major and Canis Minor are separated by another constellation, Monoceros. How that constellation managed to horn in between the dogs, I don't know. But if you draw a line between Sirius and Procyon you will find the open cluster M50 along that line – closer to Sirius than to Procyon but inside of Monoceros.

References

<http://www.astro.uiuc.edu/~kaler/sow/procyon.html>

<http://www.glyphweb.com/esky/default.htm?http://www.glyphweb.com/esky/stars/procyon.html>

http://www.dibonsmith.com/cmi_con.htm

http://en.wikipedia.org/wiki/Canis_Minor

**Andrah Foundation
supports SJAA**
Jim Van Nuland

As in previous years, the Andrah Foundation of Michigan, through it's local representatives, Paul and Ann Summers, have given \$500 to SJAA.

This grant is to promote education and public awareness of Astronomy. We thank Paul and Ann, and the Andrah Foundation, for their generosity.

Editor's Dark Matter

Once in a while we like to mention a few things about the publication you are now reading, the SJAA Ephemeris. The Ephemeris comes in 3 formats: printed, Adobe Acrobat (.pdf file) and HTML.

All articles donated to this newsletter are considered for publication. In the last year the only articles refused were due to our size limitations and that was very rare. In nearly all cases the article appeared in our online HTML version. We request all articles be submitted by the 10th day of the month, the issue goes to the printer around the 15th-18th day and, at least San Jose addresses receive the printed copy by the last day of the month. The web versions are generally available by the last day of the month.

The Ephemeris may use many different fonts but most headlines use an Adobe font called Kepler and the body of most articles uses an Adobe font called Cronos Pro. Page layout is currently done with Adobe PageMaker 7.0 but that may change within the next year. The printer uses an Adobe Acrobat file. Our printer is Accuprint and we appreciate the special consideration they give us.

Photos credited to NASA (including all divisions such as JPL) are used according to NASA's policy. We cannot officially give permission for others to use these photos but you may be able to use them according to that same policy. The article from NASA on page 4 is a press release. The "Space Place" article on page 5 is provided by NASA as a special service to astronomy clubs and similar organizations.



Board Election

The Board election is held each year at the February General Meeting. This year, long time board member Jim Van Nuland has decided not to run again. Those interested should write to membership@sjaa.net.

Close Encounters with the Six Lazy Boys

Akkana Peck

Over the holidays I read a Barbara Kingsolver novel called "Pigs in Heaven". The title comes from the Cherokee

name for the Pleiades, the star cluster we call the Seven Sisters. The Cherokee call it Ani'tsutsä (The Boys). According to legend, there once were seven boys who were disobedient and played games rather than helping their mothers. Scolded by their mothers, the boys danced to call the spirits to support them. The spirits responded by drawing the dancing boys into the sky. Their

mothers tried to grab hold and save them; one succeeded, but the other boys rose into the sky and became the six bright stars we see today.

(Where do the pigs come in?

Kingsolver's version of the story has the boys turning into pigs before they become stars, but other versions I've found skip that part.)

In February, several planetary spirits have close encounters with the six lazy boys and some of their fellow pigs — er, stars.

Just after midnight on the night of Feb 5-6, the moon passes through the Pleiades in a near-repeat of last month's close encounter. This month's will be even better, though (despite the less convenient time of evening): this time we should be able to see the

disappearance of some of the brighter stars of the cluster as the moon's dark side covers them. Reappearance will be



The Pleiades Star Cluster. Picture Credit: Mount Wilson Observatory

much more challenging, since the bright side of the first quarter moon overwhelms the light from the second and third magnitude stars of the Pleiades.

Then around the middle of the month Mars passes only a couple of degrees from the Pleiades — probably not close enough for most telescopes to show both at once, but it should make a nice binocular view.

Mars moves into Taurus this month, offering a nice comparison between the red planet and the nearby red star Aldebaran. Mars has faded to roughly magnitude .5, not that much brighter than first-magnitude Aldebaran. How do the colors compare? Can you easily tell with the naked eye which is a planet and which a star?

Saturn is perfectly placed for observing this month: high in the sky at nightfall and remaining high for most of the evening.

Throughout the first week of February it continues this month's theme of planets near bright open clusters, passing very close to the Beehive cluster (M44) — a very nice combination for either visual or photographic observers.

The second half of February gives us the best evening apparition of Mercury that we'll have all year. Start looking for it in

early twilight around mid-month, and watch its height above the sun at sunset increase as the month progresses. It moves from gibbous to roughly half phase during this time.

Jupiter rises shortly after midnight and is visible until morning, but it's fairly far south so it never gets very high this month.

Venus emerges into the morning sky as a slim crescent early in the month, rising earlier as the month progresses.

Uranus, Neptune, and Pluto are all too close to the sun for good observing this month.

So focus your attentions on Saturn, Mars, and the moon this month — and if your mother needs your help this month, think of Ani'tsutsä, the Boys, before going off to play games.

NASA's Rovers Continue to Explore and Amaze

Guy Webster

NASA's durable twin Mars rovers have successfully explored the surface of the mysterious red planet for a full Martian year (687 Earth days). Opportunity starts its second Martian year Dec. 11; Spirit started its new year three weeks ago. The rovers' original mission was scheduled for only three months.

"The rovers went through all of the Martian seasons and are back to late summer," said Dr. John Callas of NASA's Jet Propulsion Laboratory, Pasadena, Calif. He is deputy rover project manager. "We're preparing for the challenge of surviving another Martian winter."

Both rovers keep finding new variations of bedrock in areas they are exploring on opposite sides of Mars. The geological information they collect increases evidence about ancient Martian environments including periods of wet, possibly habitable conditions.

Spirit is descending from the top of "Husband Hill" to examine a platform-like structure seen from the summit. It will then hurry south to another hill in time to position itself for maximum solar-cell output during the winter.

"Our speed of travel is driven as much

by survival as by discovery, though the geology of Husband Hill continues to fascinate, surprise, puzzle and delight us," said Dr. Steve Squyres of Cornell University, Ithaca, N.Y., principal investigator for the rover's science instruments. "We've got this dramatic topography covered with sand and loose boulders, then, every so often, a little window into the bedrock underneath."

From the composition and texture of more than six different types of rock inspected, scientists deduced what this part of Mars was like long ago. "It was a hot, violent place with volcanic explosions and impacts," Squyres said. "Water was around, perhaps localized hot springs in some cases and trace amounts of water in other cases."

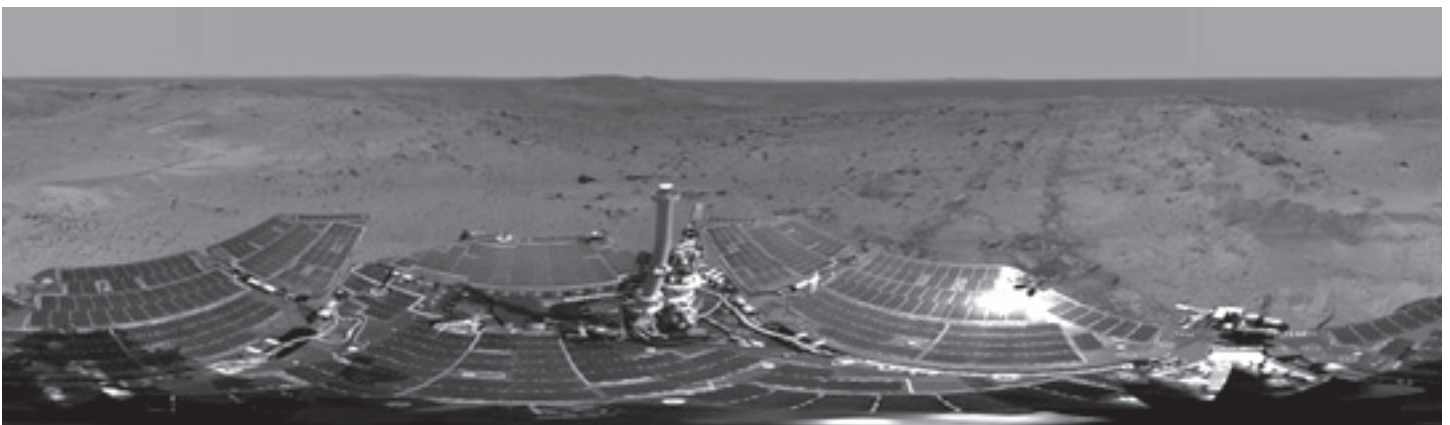
Aided by a good power supply from Spirit's solar cells, researchers have been using the rover at night for astronomical observations. One experiment watched the sky during a meteor shower as Mars passed through the debris trail left by a passage of Halley's comet. "We're taking advantage of a unique opportunity to do some bonus science we never anticipated we would be able to do," said Cornell's Dr. Jim Bell, lead scientist for the rovers' panoramic cameras

Opportunity is examining bedrock exposures along a route between Endurance and Victoria craters. It recently reached what appears to be a younger layer of bedrock than examined inside Endurance. In Endurance, the lowest layers of bedrock were deposited as windblown dunes. Some of the upper layers were deposited as underwater sediments, indicating a change from drier to wetter conditions over time.

The bedrock Opportunity began seeing about two-thirds of the way to Victoria appears to lie higher than the upper layers at Endurance, but its texture is more like the lowest layer, petrified sand dunes. This suggests the change from drier to wetter environmental conditions may have been cyclical.

Iron-rich granules are abundant in all the layers at Endurance but are much smaller in the younger bedrock. These granules were formed by effects of water soaking the rocks. One possibility for why they are smaller is these layers might have spent less time wet. Another is the material in these layers might have had a different chemistry to begin with.

– From a NASA Press Release dated December 5, 2005.



The panoramic camera on NASA's Mars Exploration Rover Spirit took the hundreds of images combined into this 360-degree view, the "Husband Hill Summit" panorama. Image credit: NASA/JPL-Caltech/Cornell.

Snowstorm on Pluto

Dr. Tony Phillips

There's a nip in the air. Outside it's beginning to snow, the first fall of winter. A few delicate flakes tumble from the sky, innocently enough, but this is no mere flurry.

Soon the air is choked with snow, falling so fast and hard it seems to pull the sky down with it. Indeed, that's what happens.

Weeks later when the storm finally ends the entire atmosphere is gone. Every molecule of air on your planet has frozen and fallen to the ground.

That was a snowstorm—on Pluto.

Once every year on Pluto (1 Pluto-year = 248 Earth-years), around the beginning of winter, it gets

so cold that the atmosphere freezes. Air on Pluto is made mainly of nitrogen with a smattering of methane and other compounds. When the temperature dips to about 32 K (-240 C), these molecules crystallize and the atmosphere comes down.

"The collapse can happen quite suddenly," says Alan Stern of the Southwest Research Institute. "Snow begins to fall, the surface reflects more sunlight, forcing quicker cooling,

accelerating the snowfall. It can all be over in a few weeks or months."

Researchers believe this will happen sometime during the next 10 to 20 years. Pluto is receding from the warmth of the Sun, carried outward by its 25% elliptical orbit. Winter is coming.



So is New Horizons. Stern is lead scientist for the robotic probe, which left Earth in January bound for Pluto. In 2015 New Horizons will become the first spacecraft to visit that distant planet. The question is, will it arrive before the snowstorm?

"We hope so," says Stern. The spacecraft is bristling with instruments designed to study Pluto's atmosphere and surface. "But we can't study the atmosphere if it's not there."

Furthermore, a layer of snow on the ground ("probably a few centimeters deep," estimates Stern) could hide the underlying surface from New Horizons' remote sensors.

Stern isn't too concerned: "Pluto's atmosphere was discovered in 1988 when astronomers watched the planet

pass in front of a distant star—a stellar occultation." The star, instead of vanishing abruptly at Pluto's solid edge, faded slowly. Pluto was "fuzzy;" it had air. "Similar occultations observed since then (most recently in 2002) reveal no sign of [impending] collapse," says Stern. On the contrary, the atmosphere appears to be expanding, puffed up by lingering heat from Pluto's waning summer.

Nevertheless, it's a good thing New Horizons is fast, hurtling toward Pluto at 30,000 mph. Winter. New Horizons. Only one can be first. The race is on....

Find out more about the New Horizons mission at <http://pluto.jhuapl.edu>. Kids can learn amazing facts about Pluto at spaceplace.nasa.gov/en/kids/pluto.

Scott Sandford to talk on March 1, 2006 at 7 p.m.

Andrew Fraknoi and Eph. Eds.

Dr. Scott Sandford from NASA Ames will give a non-technical illustrated talk on Project Stardust – the comet studying spacecraft that made a successful landing in Utah on January 15. This talk will be at 7 p.m. on Wednesday, March 1. It will be in the Smithwick Theater, Foothill College, El Monte Road and Freeway 280, in Los Altos Hills, California. This event is free and open to the public. Parking is \$2 at Foothill College. Call the series hot-line at (650) 949-7888 for more information.

The series is co-sponsored by NASA Ames Research Center, Foothill College Astronomy Program, SETI Institute, and the Astronomical Society of Pacific.

Dr. Sandford works at the Astrophysics Branch at NASA's Ames Research Center and is a renowned expert in the field of meteoritics, the study of rocks that fall from space. He has helped discover a number of such rocks in Antarctica. Among his other scientific interests are molecules in the great clouds of cosmic raw material among the stars – some of which may be connected with the development of life in the universe.

Dr. Sandford has kept us informed on Project Stardust. He spoke as part of this lecture series in April of 2003 and he has spoken twice at the SJAA General Meetings.

Solar System Stats for February 2006

Adapted from the Observer's Handbook published by The Royal Astronomical Society of Canada which in turn gets this data from the U.S. Naval Observatory's Nautical Almanac Office and Her Majesty's Nautical Almanac Office and contributions by David Lane, St. Mary's University, Halifax NS.

		Mercury	Venus	Mars	Jupiter	Saturn	Uranus	Neptune	Sun
RA	1	21 ^h 15 ^m	19 ^h 06 ^m	3 ^h 16 ^m	15 ^h 00 ^m	8 ^h 40 ^m	22 ^h 44 ^m	21 ^h 18 ^m	20 ^h 57 ^m
	11	22 ^h 23 ^m	19 ^h 11 ^m	3 ^h 35 ^m	15 ^h 04 ^m	8 ^h 37 ^m	22 ^h 46 ^m	21 ^h 20 ^m	21 ^h 38 ^m
	21	23 ^h 21 ^m	19 ^h 29 ^m	3 ^h 56 ^m	15 ^h 06 ^m	8 ^h 34 ^m	22 ^h 48 ^m	21 ^h 21 ^m	22 ^h 16 ^m
Dec.	1	-18°07'	-15°25'	19°59'	-15°52'	19°05'	-8°52'	-15°54'	-17°13'
	11	-11°26'	-15°50'	21°08'	-16°03'	19°18'	-8°39'	-15°47'	-14°10'
	21	-3°32'	-16°15'	22°13'	-16°10'	19°29'	-8°26'	-15°40'	-10°43'
Dist (AU)	1	1.38	0.31	1.06	5.44	8.13	20.95	31.04	0.985
	11	1.25	0.37	1.16	5.28	8.16	21.01	31.04	0.987
	21	1.02	0.44	1.26	5.12	8.22	21.06	31.01	0.989
Mag	1	-1.4	-4.4	0.2	-2.0	-0.2	5.9	8.0	
	11	-1.1	-4.5	0.4	-2.1	-0.2	5.9	8.0	
	21	-0.8	-4.5	0.6	-2.1	-0.1	5.9	8.0	
Size	1	4.9"	53.0"	8.8"	36.2"	20.5"	3.3"	2.2"	32'28"
	11	5.4"	45.2"	8.1"	37.4"	20.4"	3.3"	2.2"	32'25"
	21	6.6"	38.3"	7.4"	38.5"	20.3"	3.3"	2.2"	32'21"

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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
(koopm@best.com) or by phone at work (408) 473-6315 or home (408) 446-0310
(Please leave message, phone screened).

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
3	4" Quantum S/C	Hsin I. Huang
6	8" Celestron S/C	Karthik Ramamurthy
7	12.5" Dobson	Tom Fredrickson
8	14" Dobson	Colm McGinley
10	Star Spectroscope	Jim Albers
12	Orion XT8 Dob	Kevin Roberts
14	8" f/8.5 Dob	Colm McGinley
15	8" f/9 Dobson	Mike Koop
19	6" Newt/P Mount	Daryn Baker
23	6" Newt/P Mount	Wei Cheng
24	60mm Refractor	Al Kestler
26	11" Dobson	Vivek Kumar
27	13" Dobson	Steve Houlihan
28	13" Dobson	Anupam Dalal
29	C8, Astrophotography	Mark Ziebarth
32	6" f/7 Dobson	Sandy Mohan
33	10" Deep Space Explorer	Jack Zeiders
34	Dynamax 8" S/C	Yuan-Tung Chin
35	Meade 8" Equatorial	Ethan Romander
37	4" Fluorite Refractor	Carl Ching
38	Meade 4.5" Digital Newt	Tej Kohli
41	18" Sky Designs Dob	Len Bradley
42	11x80 Binoculars	Ritesh Vishwakarma
43	Orion XT4.5 Dob	Gary Mitchell

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
13	Orion XT6 Dob	Rajiv Vora	01/20/06
16	Solar Scope	Ken Frank	02/13/06
36	Celestron 8" f/6 Skyhopper	Charles Santori	02/17/06
40	Super C8+	Sander Pool	12/23/05

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
11	Orion XT6 Dob	Ravi Shankar Erram	12/10/05
21	10" Dobson	Michael Dajewski	Repair
39	17" Dobson	Steve Nelson	01/02/06

Waiting list:

(lots of scopes available!!!)

San Jose Astronomical Association Membership Form

You can join or renew with the SJAA online at <http://www.sjaa.net/SJAAMembership.html>

New **Renewal** (Name only, plus corrections below)

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 \$10 off the regular rate. (S&T will not accept multi-year subscriptions through the club program. Allow 2 months lead time.)

Bring this form to any SJAA Meeting or send (with your check) to

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Make your check payable to "SJAA"
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