

ABOVE THE FOG

• BULLETIN OF THE SAN FRANCISCO AMATEUR ASTRONOMERS •

VOL. 49, No. 4 – April 2001

Speaker, General Meeting, April 18

James C. White II

"The Universe Has No Center, And You're Not There!"

San Francisco
Amateur Astronomers



Sharing the Wonders
of the Universe



Information Hotline
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Dr. James C. White II is the Executive Director of the historic Astronomical Society of the Pacific, the nation's oldest and largest general astronomy society. His astronomical research deals primarily with eruptive interacting binary stars, particularly accretion structures in these systems, but of equal interest to him is study of the sociology and politics of science—particularly the practice of science in developing countries and the intersection of science, popular culture, and education. He is the author of a number of professional publications and popular articles and is a frequent guest lecturer around the world. A member of the American Astronomical Society and a Fellow of the International Astronomical Union (IAU) and the Royal Astronomical Society, White has been a scientific reviewer for the National Science Foundation, served on Advisory Committees for the American Institute of Physics, and worked for the IAU the past few years in Vietnam. In 1984 White received his B.S. degree in physics from Birmingham-Southern College in Birmingham, Alabama, and in 1993 he received a Ph.D. in astronomy from Indiana University, Bloomington.

Abstract of Talk

Our notion of finding our way in the Universe has often come down to locating ourselves at the center. Whether it be our tiny world or our enormous (to us) home galaxy, we have attempted to place "us" at the locus of all universal activity. To be sure, observations of the heavens have suggested through the scientific generations that we might be at the Cosmic center, but improvements in technology and in our theoretical descriptions of the Universe have constantly displaced us from that preferred location. Indeed, living in a scientific age that will soon span two millennia, we are jostled out of the center by the cosmological principle, a guiding cosmic doctrine, which technically says that on the large scale, the Universe is both isotropic and homogeneous—and simply says that the Universe has no center.

Speaker, City Star Party, April 28

Bob Berta

"Astronomy for Children"

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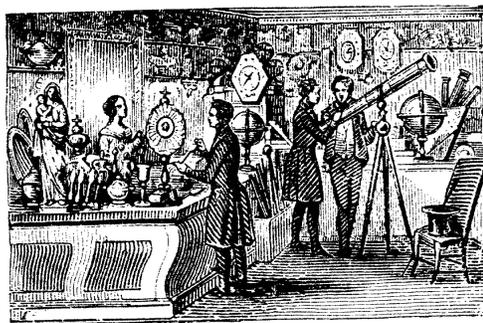
Ray Cash (415) 665-8666

SFAA Website Update

For those of you with online access, don't forget to visit the club's website. The bulletin board area especially is a great place to post info and ask questions. Go to <http://www.zennla.com/sfaa>.

Above the Fog is the official bulletin of the San Francisco Amateur Astronomers. It is the forum in which club members may share their experiences, ideas, and observations. We encourage you to participate by submitting your articles, announcements, letters, photos, and drawings. We would also like to hear from our new members. Tell us about yourself – what you have done in the past and what other clubs you have joined. **The deadline for the next issue is the seventh day of the month.** Send your articles to Lorrie Boen at 765 Geary Street #302, San Francisco, CA 94109 or at LorrenLee@aol.com.

Club Telescopes



Long time member Ray Cash-LePennec has 3 loaner telescopes for club member use and is in charge of loaning them out. If you are interested in borrowing a club telescope, give Ray a call. There are many new members in the SFAA and they ask what kind of telescope to buy or use and this is a good way to get to know the Dobsonian type of scope and learn the sky as well.

CLUB DATES

Board Meeting – April 11

7:00 p.m. Western Addition Library – corner of Scott & Geary Sts. SF – 7:00 p.m.

SFAA General Meeting – April 18

Refreshments at 7:00 p.m.

Speakers begin at 7:30 p.m.

Morrison Planetarium, Golden Gate Park

Mt. Tam Star Party

April 21 at 8:00 p.m.

City Star Party

March 31 at 6:00 p.m.

April 28 at 7:30 p.m.

From the President

I would like to thank all of those who participated in the KQED pledge drive night on March 6th. It was a real success. We all had a good time taking pledges, being on TV, having dinner, and seeing how the KQED pledge drive process works in the studio. We plan on participating again, so if you would like to do this we will announce our intent again when KQED offers it to us.

As usual there are a lot of things coming up soon. Those of us who signed up early will be going to Hume Observatory on March 23rd thanks to some good work by Renita and Kirsten. We will try for a second time to have the first city star party, on March 31, at point Lobos just above the Cliff House. As we swing into April we start with the AANC Conference at Chabot Space and Science Center on Saturday April 7. It is a good chance to meet a lot of bay area amateur astronomers and find out what other clubs and what other people are doing in the bay area. We also will have some fun at the conference with various events.

Our first Mount Tam. star party of the year will be on April 21. Bring your telescopes and have a good time. Become a State Park Volunteer and help us put the starparty on by contacting Bill Stepka. April 28th will be Astronomy day and we will again be helping out with our activities at Morrison Planetarium during the day and with our, hopefully, second star party at Point Lobos that night. We always have a good time there so please come and join the fun.

Ray Cash has for a long time run our telescope loaner program and would like to turn the job over to someone else. Thanks Ray for your time spent working on the program. Anyone interested in taking over these duties please contact Ray, myself or a board member.

Please come a support these events.

Al

SFAA SPEAKERS CALENDAR 2001

March 21, 2001	Michael Barber, the CEO of SBIG (Santa Barbara Instrument Group), will discuss CCD imaging for beginners and intermediate users, show some incredible photos and answer your many questions about CCD imaging. SBIG is the manufacturer of a variety of CCD Cameras that have become the instruments of choice for most astro imagers
April 28, 2001	Dr. James C. White II will discuss the center, or lack thereof, of the Universe
May thru August 2001	Speakers to be announced
September 19, 2001	John Dobson, the originator of the Dobsonian telescope mount design; the guru of the side walk astronomy movement; and teacher of telescope making and cosmology classes will be answering our questions. The meeting will be a question and answer session so bring your questions for John.
October & November 2001	Speakers to be announced.
December 19, 2001	Members' night. SFAA members talk about their astronomical experiences.

**SFAA General Meeting
March 21, 2001**

A large function at the Academy of Sciences forces a change in entering the Planetarium this month. We are going to need people to enter the Academy by the rear entrance (off Middle Drive). Those who take the bus will be escorted around to the back somehow -- either through the basement or around the building. (There is/was a path through the trees to the left of the building, going past a freight dock and in the back door.)

Morrison Planetarium's
Benjamin Dean Lecture Series
presents

April 24
Dr. Kenneth Neelson
JPL

Searching for Life in the Universe: Lessons from Earth
With life on Earth as our only model, can we develop non-Earth-centric methods for detecting extraterrestrial life elsewhere in the solar system?

May 15
Dr. Chris McKay
NASA Ames Research Center
Life in the Cold and Dry: Earth, Mars and Europa
Studies in the polar regions of Earth may provide a basis for the search for life on Mars and Europa.

All programs begin at 7:30 p.m. in the Planetarium - Tickets are \$3.00 each
DEAN LECTURE INFORMATION LINE at (415) 750-7141



International Astronomy Day

Saturday, April 28, 2001
10:00 a.m. to 5:00 p.m.
Cowell Hall, in front of Academy

Bring your astronomical questions to the Academy and find out how to get involved in astronomy as a hobby or as a career. Weather permitting, solar telescopes will give you a safe view the Sun in front of the Academy. Then drop by the displays in Cowell Hall. Afterward, join the San Francisco Amateur Astronomers and the GGNRA for nighttime telescope viewing at Point Lobos, starting at 7:30 pm.

If you have a telescope with a solar filter, please bring it along and join the fun!

Silicon Valley Astronomy Lecture Series
April 11, 2001 at 7 pm
Smithwick Theater, Foothill College,
Los Altos Hills, CA

The Long-term Future of the Sun, the Earth, and the Solar System

Speaker: Dr. Gregory Laughlin, NASA Ames Research Ctr.

A nontechnical program focusing on the ultimate fate of our planet over billions of years. Come and find out if a giant Sun will someday melt or even swallow the Earth, and what nature has in store for the solar system.

Sponsored by:

NASA Ames Research Center

Foothill College

SETI Institute

Astronomical Society of the Pacific

Call 650-949-7888 for more information. Admission is free and open to the public.

Please bring \$2 for the parking meters.

Santa Cruz Astronomy Club at Bonny Doon Airport

From Chris Angelos

I just talked to my contact at Bonny Doon Airfield. There are no objections to amateur astronomers from areas outside Santa Cruz. Joining the Santa Cruz Astronomy Club at Bonny Doon Airfield on the club's regularly scheduled Saturday observing nights.

17 March ---- It can't rain forever

24 March ---- Last one out always locks the gate

Find directions to Bonny Doon Airfield at the SCAC web site - <http://astro.santa-cruz.ca.us/>

SFAA 2001 Literary Award

The Literary Award is on again for 2001! Put your thinking caps on, start your outline. There will be some changes in the rules this year, which will be described in the next bulletin, not the least of which is an increase in the word count limit. Stayed tuned for final details, but sharpen those pencils.

Herman Fast Tribute

I would like to thank the San Francisco Amateur Astronomers for honoring me with the Y2K 2000 Herman Fast Award, handed by president Al Stern at the club awards banquet in January. Several members of our club gave some first-hand remembrances of Herman during the dinner. None of us who were there will ever forget the eloquent words of Bill Cherrington as he told us about his friend, Herman Fast. Afterwards we talked about Herman Fast at our table, then again at the club meeting the next month.

I thought it would be a good idea to honor Herman Fast with a virtual living history of sorts. So, here's what I'd like to do. I'd like to start off documenting some of the memories that were shared at the dinner by those who remember Herman Fast. Then, other club members can add their words and memories to this beginning tribute. You can send them to me, or our newsletter editor Lorrie Boen. Then we can all put together a handout, a poster, and a web page honoring our special founding member. As this year's awardee, I am honored to get the ball rolling.

Herman Fast was one of the group of astronomers who sat around the North Beach San Remo restaurant in 1952, when the SFAA was founded. EAS member Betty Neal was there - she is 93 now and I saw her last Saturday night at the EAS dinner. I think Lew Epstein was there with his father, but he must have been a little kid then! :-). The infant club name was kicked around, and they decided the group would never be big enough to call a society, so they called the new club the San Francisco Amateur Astronomers.

John Dobson recalls Herman Fast from the sixties. John tells us he met Herman on Mount Tamalpais, when the mountain was open to astronomers all the time. John called Herman a hard-core observer. A walking Burnham's Celestial Handbook. A most "full of information" person. He had a 6 inch telescope, and he hid the telescope under a log, and carried his mirror to and fro'. John calls Herman "a real hero". "If you wanted to know something, like how far to Vega, you would ask Herman Fast", he recalled in fondness.

Each night Herman had an observing plan, hand-written on a piece of paper. More than one member recalls Herman's papers blowing away one night. He also observed in his suit coat, and at the end of the night of observing, when others went to their warm beds, Herman Fast placed newspaper on the ground and slept right there.

Bill Cherrington tells us that during World War 2, Herman took the bus from San Francisco and went to the top of Mount Hamilton on nights of blackout. Here, in these dark wartime conditions, Herman Fast would observe and log binary stars. Over 12,000 of them. Back then, the Skalnate Pleso Atlas of the Heavens was one of the few observing guides available. When I look at my 1950.0 version of this atlas, I think of Herman pouring over it, making his observers notes for the evening.

Edwina Cherrington told us that Herman was afraid that he would die and no one would know. So Edwina and Herman talked on the telephone every day. The day that Herman Fast died, his daughter was with him, so he didn't die alone. His ashes were scattered on Mount Hamilton by his friends in the San Francisco Amateur Astronomers. Some friends couldn't make it to Mount Hamilton, but were with him in spirit. Bill Cherrington told me that he does not miss Herman. "I see him every day", Bill whispered. Now that's a tribute!

I hope some of you share your remembrances with me, by mail or email. When the 2001 Herman Fast is given out at the next Awards Banquet, we'll have Herman there with us as recalled by the SFAA members.

Jane Houston Jones
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San Rafael, CA 94901
jane@whiteoaks.com

SJAA AUCTION XXI

On Sunday, April 8, 2001, an astronomical auction and swap meet will be conducted at Hogue (city) Park in San Jose. Sponsored by the San Jose Astronomical Association, this is our only fund raiser. The Auction will be conducted prior to the Swap Meet, instead of afterward. Any items that do not sell may be offered at Swap. More important, it is hoped that the delays will be shortened. Doors open at 10:30 am (or only slightly before) to register material for the Auction, and view the auction material. Selling will begin at noon, and will run as long as needed. Settle-up is done afterward by one check to (or from) SJAA, then the items may be claimed. Seller pays 10% commission, with a cap of \$50 for any one item. Seller specifies minimum bid; if not met, it goes back to the seller with no commission applied.

We suggest pre-registering as much as possible; this will avoid a crush at the registration table. See our web page at www.sjaa.net or e-mail Jim Van Nuland at JVN@sjaa.org. There are no table fees other than a \$1 requested donation for the auction bidder/seller number. We do not handle charge cards. The commissions are tax-deductible, as SJAA is a 501(c)(3) educational organization.

After the auction, material for the Swap Meet will be allowed into the hall, about 2 pm or perhaps earlier. Each buyer pays the seller. Sellers are to keep track of their sales, and pay a 10% commission, as for the Auction.

There are no table fees other than a \$1 requested donation for the auction bidder/seller number. We do not handle charge cards. The commissions are tax-deductible, as SJAA is a 501(c)(3) educational organization.

For more about SJAA, visit our web site at <http://www.sjaa.net>

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Northern California Astronomy Club Conference Chabot Space and Science Center, Oakland April 7th, 2001

April 7th is the date for the annual one-day conference sponsored by the AANC, the Astronomical Association of Northern California. This year the event will be held at the new Chabot Space and Science Center in Oakland. The theme this year, The Northern California Astronomy Club Conference, will showcase the astronomy clubs and give everybody the opportunity to exchange ideas and get to know each other.

Astronomy clubs from all over Northern California will give brief presentations of their unique club activities or pretty much what ever they'd like to talk about. Everyone will be able to see and hear about the telescope restoration of Rachel, Leah and the Transit Telescope. There will be plenty of time to check out the new Chabot, of course! Everybody will receive a ticket for the planetarium show, and some of the day's events will take place in the planetarium. There will be workshops for astronomy club newsletters, and much more.

There will be a speaker or two, and more information will be available soon.

One special planned feature will be the first annual? Full Moon Daytime Indoor Messier Marathon, using the Ask Jeeves Planetarium Zeiss Universarium Mark VIII star-ball projector (and binoculars).

Pre-registration by April 1 is \$20 for adults, \$10 for ages 10-18. Registration is available at the door for \$25. More information is available online at <http://www.aanc-astronomy.org>.

For more information about Chabot space and Science Center, including directions, please visit the website <http://www.cosc.org/default.htm>

Home (Garage?) Needed!

Ray Cash
Shop Foreman, SFAA

As many of you know, our club is very fortunate to have three wonderful telescopes to loan out to our members at no charge. They are all Newtonians: a 6" f/10; an 8" f/7; and a 10" f/8.

A few years back, I volunteered my carpentry skills to rebuild these scopes (two of which were unusable) into functional Dobsonian-Newtonians... I have been acting as the SFAA "shop foreman" ever since: loaning out these telescopes to interested members, collimating them, cleaning their optical surfaces, fixing any 'worn and torn' parts, and storing them when not in use.

I am now ready to 'pass the baton' to another SFAA member.

The advantages of storing, maintaining, and loaning these scopes are:

- 1) It is VERY rewarding to meet new folks interested in astronomy/telescopes! Most of these SFAA members were new to the club; wanted to look through a telescope and contribute to our star parties. In short, these were *interesting* people! Some wanted access to a larger telescope (one of the loaners is a ten-incher, e.g.), to see if they *really* wanted to buy one... Still: interesting folk.
- 2) When not loaned out, they are yours to use! ...And, let me tell you, our scopes perform extremely well!

By contrast, the downside of maintaining these scopes are minor: As you have probably guessed by now: storage space. Now, the 6" and 8" Dobs have a very small footprint, but the 10" is a bit of a beast. One should have a garage, or some other adequate storage facilities for these scopes, in (the unlikely) occasion when all three will be spending time in your garage/storage space. However, as just implied, these scopes are rarely "home": usually ALL THREE of them are loaned out at any given time (like now, for example). The

logistics are simple: I "call them back" when another SFAA wants to borrow one.

Of course, anyone interested in assuming the "shop foreman" position should be mechanically inclined, have a working knowledge of Dob/Newts, and know how to collimate and clean these optics when needed. (I would be happy to teach anyone that might be interested—it ain't rocket science, after all)! The ability to communicate enthusiasm for the hobby, is a given, of course.

All three scopes (6" f/10, 8" f/7, 10" f/8) are perfectly usable, and all are equipped with "Telrads." Eyepiece selection and beginner books/starmaps are a bit thin, however, as the SFAA owns very few of either... I usually loan out my own eyepieces and books (this has not been a problem)... The SFAA Board allocating funds for such a purpose could remedy this—I will help in lobbying for just such an "eyepiece/book/planisphere" fund.

Anyhows... I do hope I can work with an upstanding SFAA member to take over these responsibilities; I can assure you: you won't regret it! Call me at: (415) 665-8666, or E-mail me: raycash@aol.com ...and we can take it from there.



Planetarium, for the Palm

Computing Platform

Review by Michael Portuesi

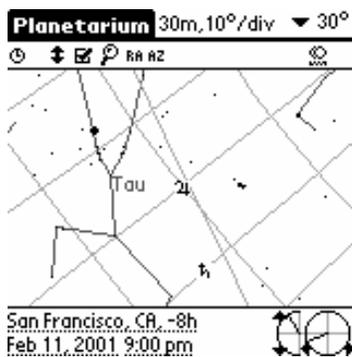
Palm handheld organizers are great gadgets for tracking phone numbers, schedules, and other bits of information. But for us skygazers, they're especially useful, since they can also serve as portable star computers!

Planetarium, a \$19 shareware program from Andreas Hofer Software (<http://www.aho.ch/pilotplanets>), is an astronomy tool for Palm handheld organizers, as well as the Handspring Visor and Sony Clie compatibles. Like most planetarium software, Planetarium does what you might expect - draw star charts for a given place and time, complete with solar system and deep-sky objects. The latest version, 2.0.3, sports the essential features you would expect in a desktop star charting program.

Palm organizers have very small screens, challenging software designers to display information effectively. Planetarium uses the tiny Palm screen in some very novel and creative ways. The author thought carefully about how to make the displays meaningful and useful, yet attractive. This careful design is evident in the program's two main screens, Sky View and Compass View.

Sky View

Sky View draws sky charts like those you find in traditional planetarium programs. The field of view is adjustable between 2 and 180 degrees. You navigate by clicking on compass menus that move in alt/azimuth, or by dragging the display with the pen. A 'full screen' option hides the information displays and shows only a thin strip of controls atop the screen.

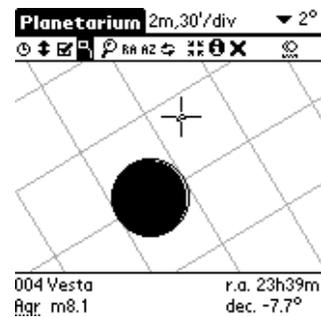


Sky View, showing Jupiter and Saturn in Taurus.

Chart guides and the ecliptic are shown in the background. A compass in the lower corner shows the viewer's orientation.

Sky View identifies stars, constellations, and deep and shallow-sky objects when you tap on them. It displays Flamsteed and Yale catalog numbers and proper names for stars. Planets appear as traditional symbols. You can choose deep or shallow-sky objects by name or catalog number, and Sky View will immediately center on the object.

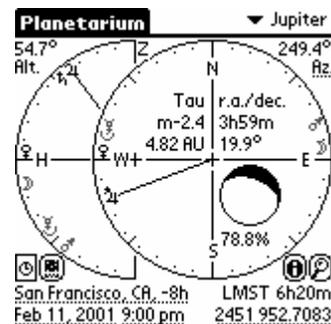
The display continuously tracks current time, or you can set any date, time and place. The Palm's arrow buttons step forwards and backwards through time. Minute, hourly, daily, weekly, monthly and yearly time scales are available, including sidereal versions of each. The sidereal time intervals focus on one spot as the time progresses, ideal for animating solar system bodies such as planets and comets.



February 24, 2001 near-occultation of asteroid 4 Vesta by a young Moon, seen from San Francisco in mid-day. 4 Vesta is in the crosshairs.

Compass View

Compass View is an object finder, and the most innovative display in the program. It looks very complicated at first glance, but it is easy to learn and quite useful. Choose an object from the drop-down menu in the corner, and the compass displays where to find the object in the sky.



Compass View. Jupiter is in the WSW, just over

halfway to the zenith. Tap on any item to jump to detail screens.

The overlapped half-circle on the left displays altitude. Objects in the lower quarter of the half-circle are below the horizon. The full circle on the right displays azimuth. Inside the azimuth circle you can read particulars about the target object, such as the constellation, right ascension/declination, and distance from Earth. You can also find Moon information, including its phase and orientation in the night sky.

Information Screens

Several information screens display vital statistics for each shallow-sky object. You can get rise, transit and set times, angular size and magnitude, as well as distance from Earth and Sun.



This statistics screen for Jupiter shows a mini-map of Jupiter's moons.

The views are customized; for instance, Jupiter's screens display a small map of the Galilean moons, and the inner planet screens (Mercury, Venus and Mars) all display a graphic showing current phase as seen from Earth.



One of several statistics screen for Mars shows the planet's phase.

Saturn's screens are missing the Saturnian moons, and I would appreciate a central meridian indicator in the Mars screen. But overall, the statistics screens are fairly complete.

Object Catalogs

Planetarium comes with several star and object catalogs, as separate files. You can install as many or as few as you like, depending on your needs and available memory. The largest star catalog available is the Yale Bright Star Catalog, with all 9096 naked-eye stars. A 1600-star catalog is an alternative if memory is tight.



Deep Sky object catalog. You can turn each object on and off in the charts.

You get the complete Messier and Caldwell catalogs, a catalog of double stars, and a catalog of comets and asteroids. You can import or export other object catalogs from your desktop computer and you can also directly enter orbital elements for asteroids and comets.

One big downside to using so many object catalogs is that the program becomes sluggish. The Palm's processor wasn't built for heavy-duty computing tasks, and so you have to limit the sky objects in use to get good performance. I don't have a newer, faster Palm unit such as the Handspring Platinum. But performance is acceptable, if not blazing, on my older Palm IIIx unit.

External Hardware Support

Planetarium supports external hardware, through the Palm's HotSync port. If you have a GPS unit, you can connect it for precise and accurate location readings. If you have a Meade LX, ETX, or Celestron NexStar telescope, you can control your scope directly from Planetarium using the appropriate cable. Since I have neither a GPS unit nor a computerized telescope, I can't judge how well Planetarium performs here.

Resource Usage

Planetarium is very frugal with memory usage, such that the cheapest Palm units such as the Palm M100 (\$149) and the Handspring Visor standard edition (\$179) can run Planetarium with all its

catalogs and features. It has a nice red night vision mode, but this is only available on color units such as the Palm IIIc and Handspring Visor Prism. With a monochrome model, you are limited to the green glow of the Palm's backlit LCD display. Because the program performs heavy-duty calculations, it will drain the battery faster than other applications. Even so, you aren't in danger of running through an entire battery during an evening's observing session.

The Verdict

Planetarium is handy for checking sky information when I'm out and about. On the way home from work, I often use Planetarium to see what's happening in the sky while waiting at the train station. The rise, set and transit information is useful for planning observing schedules. The object catalogs are useful for beginners and binocular observers, as well as owners of small and medium-sized telescopes. If you are serious

deep-sky observer with a large-aperture scope, the supplied star and object catalogs are not really complete enough for your needs.

Planetarium is currently the most full-featured general-purpose astronomy application for the Palm OS. It provides charts, an object finder, object statistics, user-expandable object databases, and external hardware control all under one roof. The user interface is attractive, easy to use, and tailored to the limitations of the hardware it runs on. The quality of the interface makes it superior to other star charting software available for the Palm platform.

I use Planetarium quite often, because it can do a great deal and it is always instantly available and ready to go. For \$19, it is the best value around in Palm astronomy software. If you have a Palm, Sony or Handspring organizer, it's a great buy.

Mountain Lion Alert

By Alice Katzung

Astronomers, take note—the constellation Leo may not be the only lion you see at a remote viewing site. During the past year, mountain lion sightings were reported in all the Bay Area counties. Although some of the sightings later turned out to have been bobcats or large dogs, it's reasonable to assume that there *are* mountain lions in the local counties. Certainly there are lions in rural areas in the foothills and mountains.

Experts say mountain lions prefer to avoid confrontations with humans, and statistics confirm this. According to the Department of Fish & Game, there have been only 12 mountain lion attacks on people in California since 1890, over 110 years, and none at all in the last five years.

Common sense rules apply when you go into an area that may be mountain lion habitat. Go with another person or a group. Be aware—mountain lions may be active day or night. Keep small pets and children with an adult. Talk or make noise so you don't take a lion by surprise. If you do encounter a mountain lion, DO NOT RUN. Stand your ground, make eye contact with the lion, shout loudly, and make yourself as large as possible by raising your arms or spreading your jacket wide open. Young mountain lions are often curious about human activities and may be less likely than adult lions to back away from an encounter immediately. In this case, if your vehicle is within 10 feet, back up SLOWLY, and enter the vehicle. Otherwise, remain where you are and continue being loud and large—the lion will eventually satisfy his curiosity and leave.

Footnote: Alice Katzung is the retired director of a wildlife rehabilitation center in Marin and monitors the wildlife scene in general. She is the wife of club-member Bert Katzung.

Founded in September 1952, the San Francisco Amateur Astronomers (SFAA) is an association of people who share a common interest in astronomy and other related sciences. Our membership consists of people from all walks of life, educational backgrounds and ages. Many SFAA members own their own telescopes; some have been made by hand in local telescope-making classes and vary in size from 6 to 25 inches.

Treasurer, SFAA, 13 Mabry Way, San Rafael, CA 94903

make checks payable to **San Francisco Amateur Astronomers** and mail to:

- \$25 enclosed, individual membership
- \$30 enclosed, foreign membership
- \$30 enclosed, family membership
- \$30 enclosed, institutional membership
- \$8 enclosed, youth membership (under 18)

Select one category:

Email address:

Address:

Name: Telephone:

San Francisco Amateur Astronomers Membership Application

San Francisco Amateur Astronomers

c/o Morrison Planetarium
California Academy of Sciences
Golden Gate Park, San Francisco, CA 94118

**In This Issue of SFAA's
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