



The Refractor

The Bulletin of the Eastbay Astronomical Society
Founded in 1924 at Chabot Observatory, Oakland, California

Volume 79
Number 4
December 2001

Member's Night & Holiday Pot Luck Dinner Meeting

Saturday, December 22, 2001

Physics Lab, 2nd Floor, Spees Bldg
Chabot Space & Science Center, Oakland

- Dinner – 5:30 pm
- Elections/Presentations – 7:30 pm on



Being this close to Christmas, our poor Procurer of Meeting Speakers (Dave Rodrigues) couldn't find anyone willing to speak for our Christmas meeting, so, he has declared a "**Member's Night With Potluck Dinner.**" Bring food or drink to share, and if you have anything you'd like to bring to the meeting to show, feel free. Both Carter Roberts and Don Saito will at least have photos, video, and stories to tell about their trip

to Australia to see the 2001 Leonids meteor storm, and hopefully there will be others who witnessed and recorded the Leonids here in the Bay Area who will want to share their pictures and stories, too.

This will also be Election Night, so be prepared to vote for those brave souls who are willing to carry the workload (and share in the glory of) keeping this club going strong. ★

Chabot/Zoo/Museum bond measure okay for Spring 2002

Hooray! We made it with signatures to spare! For the last two months, several bunches of us from Chabot Space and Science Center, the Oakland Museum, and the Oakland Zoo, have all been out on the streets pestering the good people of Oakland, and gathering signatures. They couldn't be just *any* signatures, either: they had to be residents of Oakland, *and* registered voters. We needed a minimum of 25,000 of these signatures, and we not only got that many, we got an additional 9,000 more, to ensure we really made our goal. This is a record for Oakland: no other petition has ever had *that* many signatures to get a

bond measure into the ballots for a vote! As Karen Powers, overall Project Coordinator recently stated:

"The clerk declared 34,096 signatures. All signatures will be assigned a number and randomly checked with the aid of their computer system for accuracy. The validity rate is expected to be approximately 73% which should allow for plenty of left over signatures...After certification, the measure will be officially accepted by City Council for the March ballot."

It was a lot of hard work by a lot of very dedicated people from all three facilities who gave up their free time for two months to ensure this got done. Very well done! ★

Thanks for the meteor memories!

Conrad Jung

I want to say a big THANK YOU to all of those who came out to help with our Leonid Meteor Shower evening. I know a few of you were getting a little wobbly there near the end but, you all stayed in there. From what I was hearing from the visitors from that evening as well as from staff and volunteers that night was that the event was a big success. Serving up snacks and hot beverages, making available your telescopes, bringing munchies to share, answering questions, sharing experiences, etc, and most of all being there to help with whatever the situation demanded and making the visitors experience as pleasant as can be. A big "Thank You" also to Tami for rallying up extra volunteers to help us out, Ops Dept. for working out the lighting, security, and logistics issues, and the Astronomy Dept.-staff for being there extra hours. I would like to personally thank Ralph (one half of the Requa-Jung Telescope assembly team- "Fastest Telescope Assemblers in the West") for helping get our new 10-inch Dobsonian out on deck and Debbie and Joe for staying WAY past the end to help get the plaza and the parking lot space back into some kind of normal condition. ★

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A Pilgrimage To Pluto

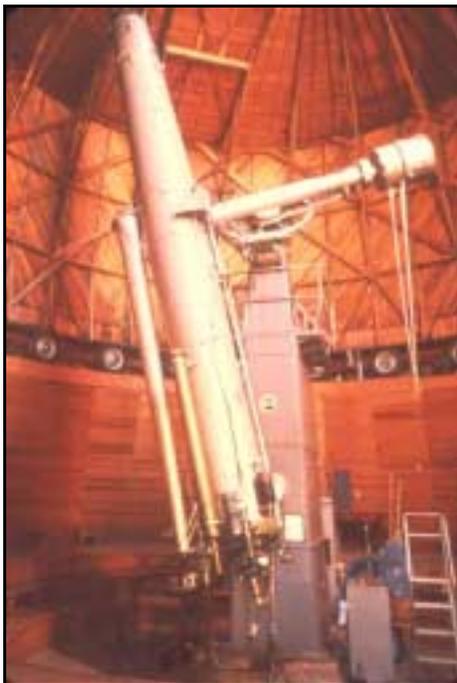
By Ellis Myers

To most astronomy aficionados, the name of Percival Lowell brings to mind three events in the history of astronomy: the possibility of life on Mars and the questionable Martian canals, the founding of the Lowell Observatory, and the search for Planet X. These events are interrelated, for Lowell created the observatory in furtherance of his ideas about extra-terrestrial life, and the telescopes gave him the opportunity to investigate his observation that some force other than Neptune's gravity was affecting the orbit of Uranus.

Although Lowell died in 1916, his preliminary studies on the possibility of a trans-Neptunian planet led to the discovery of a ninth planet, Pluto. That discovery is credited to the young observatory aide and amateur astronomer Clyde Tombaugh, and it was made by comparing photographic plates he exposed with the 13-inch telescope built for that express purpose at the Lowell Observatory in Flagstaff, Arizona.

Today, a visit to Mars Hill in Flagstaff will allow you to walk up the pathway from the Visitor Center to the dome that houses the Pluto Discovery telescope. It's a worthwhile pilgrimage. Inside, learn the interesting history of this special telescope. Percival Lowell's brother, Harvard University President A. Lawrence Lowell, gave \$10,000 for the project. The 13-inch triplet photographic lens was ground by C. A. R. Lundin, an experienced optician with Alvan Clark & Sons. It was installed in February, 1929, and was put to use immediately, scanning the skies near the opposition point with 14x17-inch glass photographic plates.

Just a year later, on February 18, 1930, Tombaugh analyzed plates made on January 23 and 29, using a Zeiss blink comparator. According to Tombaugh, "After scanning a few fields to the left, I turned the next field into view. Suddenly I spied a fifteenth magnitude image popping out and disappearing in the



The 24-inch refracting telescope, purchased by Percival Lowell for \$20,000 in 1896, was built by famed telescope maker Alvan Clark in Boston, Massachusetts. Percival Lowell used this telescope to study Mars and Halley's Comet with this instrument. In the 1920s, V.M. Slipher used it to discover the first evidence of receding galaxies. Lowell Observatory Photo

rapidly alternating views. Then I spied another image doing the same thing about 3 millimeters to the left." This was a separation inconsistent with the motion of an asteroid, and indeed, was suggestive of an object in retrograde motion, farther away than Neptune. After careful confirmation with images taken with the Observatory's 42-inch reflector and the 24-inch refractor, the new planet was announced to the public on March 13, the 75th anniversary of Percival Lowell's birth (and the 149th anniversary of Herschel's discovery of Uranus).

The Lawrence Lowell Pluto Discovery Telescope has also been devoted to a comprehensive study of proper motion of stars. Comparing plate pairs made at intervals of from 23 to 47 years, astronomers have measured the motions of more than 11,700 stars. During this study, more than 1500 minor planets and five comets were also discovered.

If you go, you will find the Steele Visitor Center ready to welcome you, as it does 70,000 visitors each year. Tours are given at different times, depending on time of year. Tours include visiting the Rotunda, an exquisite room built as a personal library for Lowell. Here, you can look through the Zeiss blink comparator and experience the Pluto discovery moment. Other significant instruments are on exhibit here, too. Night-time tours include viewing through the historic 24-inch Clark refractor, weather permitting. The Observatory's largest research telescopes are not included, as they are housed at the Anderson Mesa site, twelve miles from Flagstaff.

To expand the outreach programs even further, Lowell staff are presently creating a public Internet observatory. When the facility opens, visitors will be able to take astronomical images with a research-grade telescope and study them in much the same way that professional astronomers do. The facility is scheduled to open in late October 2001 in the Lowell Visitor Center and to be available to the Internet at large by April 2002.

Lowell Observatory, founded in 1894, is currently the largest independent astronomical institution in the world. It has had a prestigious history in scientific discovery, and it continues its scientific program with research into questions of cometary and asteroid physics, stellar and galaxy evolution, planetary atmospheres, and other topics. Lowell maintains a forward position in the quest for advanced knowledge in astronomy. ★

The 32-foot long telescope is housed in its original dome which is made entirely of native ponderosa pine. It was built in ten days by ten men—in a time without power tools! Ellis Myers photo.



The Leonids as seen from the Armpit(?) of Australia

By Don Saito

Short Version:

We went. We saw. We came back. We slept.

Much Longer Version:

Had a great time in the Land Down Under! Carter and I had planned this trip since August, and we had several variables to consider in choosing exactly where to go. The same Asher-McNaught team which predicted the last Leonid meteor storm so successfully, predicted Australia would see the highest rates. But, the radiant (Leo) would be down close to the horizon in western Australia (not good) where Jay Anderson said the weather prospects were best. The radiant's highest position (while still in darkness) was the western Pacific, like China, Japan, or Guam, but being above the equator, China and Japan were heading into their winter months, and Guam, being an island surrounded by water, made them all too risky for weather reasons. Australia's coasts were also rejected as possible view sites, again due to proximity to water and poor weather prospects. That left Australia's interior—the Outback, in local parlance. Two sites were considered—Alice Springs, and Mount Isa. Alice Springs is practically smack dab in the middle of the Australian continent, and the weather prospects there were great, *but*, the radiant would be a bit further down in the sky as compared to Mount Isa, which was further north and east, yet still several hundred miles inland. It seemed to us, that Mount Isa was the ideal location. It had the highest possible radiant combined with good weather prospects, and there was even a local astronomy group organizing a viewing party at a nice, dark-sky site. What more could an amateur astronomer looking for a good place to see the 2001 Leonids, ask?

That being settled, I was then set with the task of getting us there and back. Armed only with my Net-capable computer and a grim determination to find the lowest possible fares, I plunged into the dark and steamy underworld of the travel websites. Actually, I'm just being colorful,

here. It was really pretty easy, and after checking fares for only a few days, I managed to get an excellent price for a round-trip flight from L.A. to Sydney, and also found and booked the flights necessary to get us from Sydney to Mount Isa (through Brisbane). I even arranged hotels and rental cars as needed, all from the comfort of my computer desk. Then 9/11 happened.

The effect 9/11 had on the airlines was staggering. I won't go into the gory details, but 7 of the 8 flights I had arranged disappeared (!), and had to be re-scheduled. The airline that was to get us from Sydney to Mount Isa went belly-up(!), and those flights had to be re-booked, entirely. We *may* get some of our money back on those lost flights, but there's no guarantee. Life is like that, sometimes.

Suffice it to say, we got through the flight changes, through the increased security checks, and through the 14.5 hour flight into the future (we crossed the International Date Line from east to west, and went straight from Wednesday the 14th, to Friday the 16th skipping Thursday completely! That was a first for me!) My first view of Australia was the world port City of Sydney through a layer of puffy clouds down below. Very cool.

Getting through international customs wasn't nearly as long as we were led to believe, and we were soon out and about in this rather large metropolitan area with a population of 4.5 million. We spent the first day there visiting the local zoo (Taronga Zoo, to be exact), and had dinner atop the thousand-foot-high AMP Tower in downtown. *Great* views! The next morning, we boarded a Qantas puddle-jumper to Brisbane, and from there



(Continued on page 4)

Upcoming Events at Chabot

By Denni Medlock

The Distinguished Lecturer Series is proud to present Dr. Jeff Bennett's talk, "On the Cosmic Horizon: Ten Mysteries for the Third millennium" on Thursday, December 13, 2001 at 7:30 pm in the Tien MegaDome Theater. Dr. Bennett, from the University of Colorado, will help untangle the astronomical headlines of modern astronomy and put it all into context with his personal "top 10" list of the biggest mysteries in astronomy today, from missing mass to gamma ray bursters, and beyond.

Jeff Bennett holds a Ph.D. in astrophysics and currently works primarily as a writer, speaker and educational consultant. In addition to "On the Cosmic Horizon," he is an author of introductory college-level text books in astronomy, mathematics, and statistics. At present, he is looking forward to the opening of a project that he first began working on over 20 years ago: putting a scale model of our solar system on the National Mall in Washington, D.C. This was developed jointly by the Challenger Center for Space Science Education, the Smithsonian Institution, and NASA.

There will be a reception with refreshments following the talk. Tickets are \$5 and can be purchased through TicketWeb.com, calling 510-336-7373, or at the door. ★

(Continued from page 3)

to Mount Isa. Funny thing about Mount Isa (and how this article got its title); the woman I spoke with for reservations to go there asked me *why* I was going to Mount Isa. In her own words, she called it “the Armpit of Australia!” Mount Isa is an industrial mining town, complete with a couple of gigantic smokestacks dominating the landscape, and not your usual touristy hotspot. I explained my reasoning, and thus satisfied, she gladly booked my flight.

Saturday in Mount Isa! I stepped off the plane and said, “Agh!” The air was hot (106° F), somewhat humid (what hap-



pened to that *dry* heat?), and not altogether very pleasant. We picked up our luggage, picked up our rental car, and drove to our hotel. Man, is driving on the *left* side of the road weird, or what? Thankfully,

Carter was there to remind me and warn me *every single time* I erred, or was *about* to err, or *might* have erred. Good ol', Carter! We drove out to the Lake Moondarra view site to log in with Len and Sandra Fulham, the ones who reserved that Lion's Club campsite-with-observatory, for the night of the event. They had a nice setup with a triangle of lawn that had 4 permanently placed telescope piers and a rolling-roof observatory with a 7-inch refractor and an 11-inch Meade very nice indeed! We then spent the rest of that day and the next day visiting the local tourist spots, including the town “lookout” (very nice), the Riversleigh Fossil Center (*very cool!*), and the Underground Museum (also *very cool!*) So it was turning out that even this “armpit” had some definite redeeming features for out-of-town visitors after all. How nice!



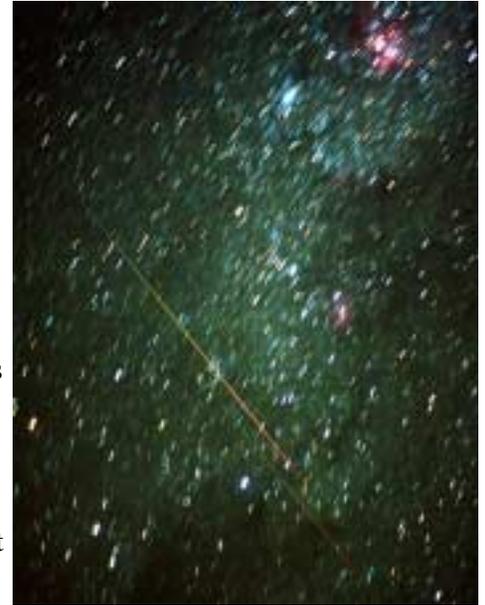
From left to right: Len and Sandra Fulham, Kevin Dixon, Carter, and Tim Davies

Then came the night of the Big Event: The 2001 Leonids! The sky that afternoon and evening was partly cloudy, but I wasn't worried. The weather in Mount Isa is very similar to the Reno/Carson area of Nevada, and in dry, hot regions, there's a regular pattern of partly cloudy skies with a chance of afternoon thundershowers, clearing by night. I saw it there the previous day, and we were seeing it again this day. No

worries, mate! We slept a few hours that evening to help ensure we would be able to keep our eyes open between midnight and dawn, and then headed out to the view site. Driving at night in the outback carries a certain degree of risk due to the nocturnal movements of large marsupials (i.e., kangaroos), but we never saw a one as we made our way to the Lake Moondarra campsite without incident. Once there, we picked our spots on the lawn, and set up our camera gear. Carter had two SLRs, and I had my digital still and digital video cameras. There were about 30 other people there, and we were all more than ready for the show to begin.

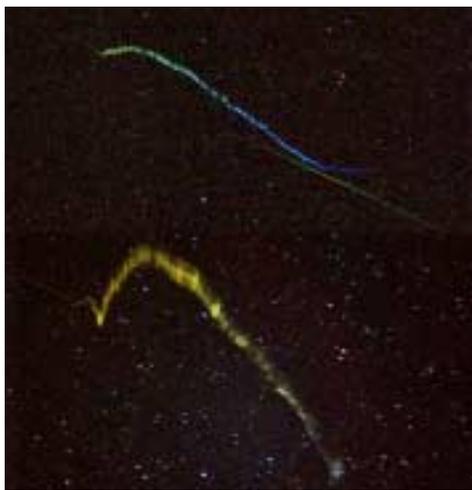
The night sky in the southern hemisphere is *extremely* cool. A lot of the stars are very bright, they get a much nicer view of the Milky Way, and they can see the two galaxies that orbit the Milky Way Galaxy (otherwise known as the Large and Small Magellanic Clouds). They've got some of the largest and brightest deep-sky objects out of either hemisphere, too. Still, we've got the Andromeda Galaxy, and most importantly, the North Star. There is no “South Star,” so you just have to guess about where it is and hope for the best.

Carter, keeping a close eye on the time, stated loudly that the predicted time of the radiant rise had arrived when almost immediately, a bright fireball issued forth from the sickle of Leo and soared straight overhead, arcing across the star-studded dome of the night sky all the way down to the opposite horizon, with two smaller, shorter-lived meteors flashing behind and to either side of the first one's path like twin fighter-jet escorts to the President's plane. I don't remember which was louder: the oohs! and ahhs! of the audience, or the clicking of the forest of opening camera shutters around me in the dark. Whoa! Just who does that Carter think he is, anyway?? From that point on, we began to see meteors in dribs and drabs every few minutes, the majority of them being pretty large and bright. The crowd had gotten into a game of calling out the general region of the sky (left, right, above, behind) whenever someone spotted one, and as the morning progressed, these calls became faster with shorter time periods between. I noticed the well-known effect that those meteors close to the radiant were of short length and duration, some of which were so short they seemed to pop, like a flash-



Two bright Leonids cross the Milky Way
Photo by Carter Roberts

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Two trains. Photo by Carter Roberts

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bulb, while those starting further from the radiant were longer. Some of the really bright ones left momentary, greenish ionized trails, while a few others were big enough to leave "trains," (smoke trails) that hung in the upper atmosphere for many minutes!

About 20 minutes before the peak 32

meteors were called in one minute. At the peak, which was about 04:10 (18:10 UTC), the callers were going crazy calling out sightings every few seconds, and very often with several simultaneous calls per second! It was simply amazing. Around this time, we began to notice small clouds starting to form above the horizon, and as the minutes progressed, they became a bit larger and a bit closer. Just after the peak, as astronomical dawn arrived, the cloud cover had crossed overhead, but yet there were still gaps between the clouds through which the meteors continued to flash, some still bright enough to be visible *through* the clouds.

All too soon it seemed, the birds began to chirp as the pale stars winked out against the brightening silver-blue skies of dawn. It was over. We all packed up our gear while excitedly (if somewhat tiredly) exchanged notes and congratula-

tions for a highly successful viewing of this once-in-a-lifetime astronomical event. An interesting side-note: there was a veritable team of Japanese observers there, who rented a satellite uplink equipped van that transmitted real-time video to Japan. They seemed like pretty happy campers, too.

Going back to Brisbane that evening, and then back to Sydney early the next morning, we learned that they had suffered severe wind and rain; enough to destroy homes and down power lines. Getting away from the coast and going inland turned out to *really* be the correct course of action. We spent a few more blustery, rainy days in Sydney visiting more touristy stuff (the Powerhouse Museum [the Australian equivalent to the Smithsonian in Washington DC], the Russian Space Shuttle [the VKK Buran 002], the Sydney Opera House [we saw a very good ballet there *Requiem, and Carmina Burana*], the Sydney Observatory, and the Sydney Aquarium. Between Carter and I, we've got pictures and video to cover all the things we've seen, and will be showing them at the next EAS Holiday Potluck meeting on Dec 22nd.

All in all, a very fine trip. It lays to rest the Rao/Saito/Roberts Leonids Curse (where in 1999, Carter and I traveled to the Canary Island of Lanzarote off the coast of Africa to see the then predicted Leonid storm, and were clouded out by the first rainstorm that region had seen in 8 months!) Quite a satisfying feeling, I must say! ★

This might be a display at Taronga Zoo, or it might be an accurate representation of how we felt after our flight. You decide.



THE LAS CUMBRES AMATEUR OUTREACH AWARD

Established by Wayne Rosing and Dorothy Largay, this new award seeks to honor outstanding educational outreach by an amateur astronomer to K-12 students or teachers, and to the interested lay public. "Amateur" is understood to mean someone who does not receive compensation (other than expenses) for such activity and does not receive the majority of his or her income from a profession in astronomy. The award is \$500 and a plaque; it is presented at the Society's Annual Meeting.

Nominations for this award may be made by any member of the astronomical community. Nomination forms can be found at: <http://www.astrosociety.org/membership/awards/cumbresform.html>

At least one, but preferably three, letters of support (from someone other than the nominator) are required. These should be requested by the nominator and should be sent with the nomination if possible. E-mailed letters are acceptable, but should include the full name, mailing address, and e-mail of the sender.

All materials must be received in the office of the Astro-

nomical Society of the Pacific (see below) on or before December 15, 2001. For more information, or to send complete nominations, please contact Marilyn Delgado, the Society's awards coordinator, at: mdelgado@astrosociety.org, or at the following address:

Las Cumbres Award
Astronomical Society of the Pacific
390 Ashton Ave., SF CA 94112, USA ★

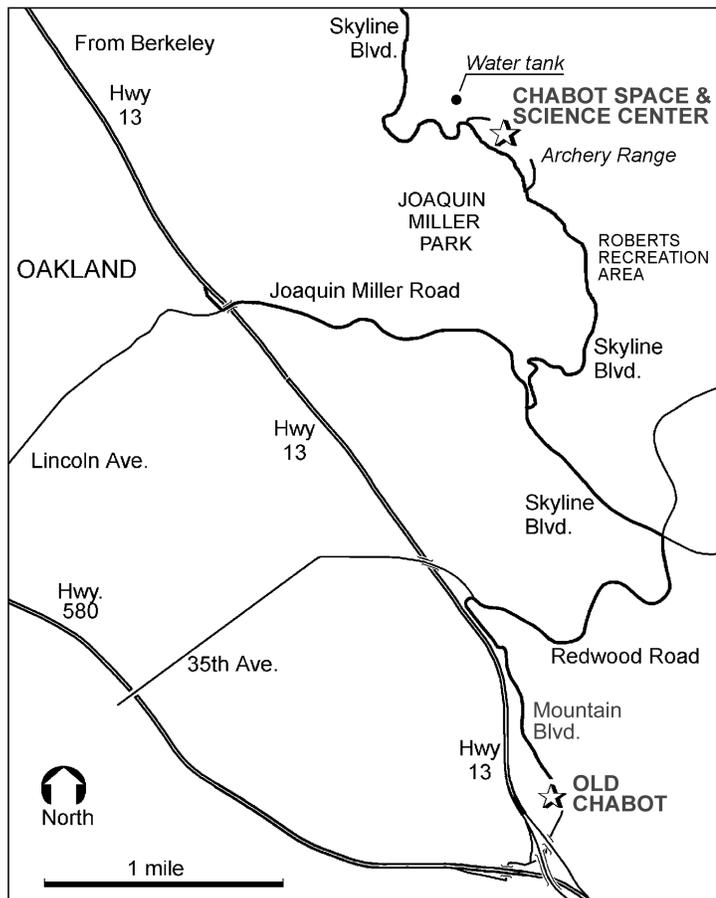
Points of Light

In the November Astronomy magazine, there's a story of (former) EAS member Alex Mellinger's magnificent panorama of the Milky Way. It is a foldout in the magazine, and shown with many deep-sky objects identified (such as the Pleiades). Many of the views that make up this unique mosaic were taken at the EAS star party at the Barcroft Lab on White Mtn Southern hemisphere views were taken at Cederberg Obs in So. Africa. A poster (48 by 16 1/4") is sold by Sky & Telescope for \$17.95, less a 10% EAS member discount, and also from the Astronomical Society of the Pacific. Also listed in the 2002 catalog from Sky & Telescope is the book "Atlas of the Lunar Terminator," by EAS member John Westfall. This is an important reference for observers of the Moon. ★

Eastbay Astronomical Society

At Chabot Space & Science Center
10000 Skyline Boulevard ● Oakland, CA 94619

December 2001
RETURN SERVICE REQUESTED



FUTURE CONJUNCTIONS

December 2001

- 13 7:30pm EAS Board Meeting, Chabot
- 22 7:30pm EAS Holiday Pot Luck Meeting, Chabot

January 2002

- 5 7:30pm EAS General Meeting, Chabot
- 10 7:30pm EAS Board Meeting, Chabot

Eastbay Astronomical Society

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Articles and photos for *The Refractor* are encouraged. Deadline for the January issue is December 15, 2001. Items may be submitted by mail to the editor, Don Saito, 3514 Randolph Avenue, Oakland, CA 94602-1228. Internet email address: donsaito@pacbell.net. Day: (510) 587-6052 Eve: (510) 482-2913.

Join the Eastbay Astronomical Society

- Regular, \$24/year
- Family, \$36/year
- Contributing, \$40/year
- Sustaining, \$60/year or more

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