



The Refractor

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

Volume 80
 Number 6
 February 2004

Subject of February 2004's talk: Video and digital imaging for the amateur astronomer



Saturday, February 7, 2004

7:30 pm – Speakers: Gert Gottschalk, Ph.D. and
 Ron Bissinger

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

In 1997 I first held a digital camera to the eyepiece of my telescope. Those cameras in those days were not even properly described in megapixel terms without a few leading zeroes after the decimal point. Since then the digital imaging revolution has taken off and today 2004 camera manufacturers offer a great variety of digital cameras already outperforming their classical film counterparts.

Digital imaging has started to take over amateur video as well as digital video is becoming more and more popular. With all things digital their great advantage is the ever increasing popularity, the performance and decreasing prices of the home PC. Processing of thousands of video frames on main stream PCs becomes viable today and opens the door to powerful image processing techniques.



Gert Gottschalk

The best of the digital revolution has to be the internet. With the exchange of tips, tricks and most amazingly free software the archives for use by the interested amateur are huge and growing at exponential pace.

The presentation will give some brief introduction into how the amateur astronomer today, with little effort, can make use of this digital revolution. We will

show video, digital still imaging, and processing and show results that have been achieved with this new technology.

About Gert: I got my first telescope (a 2" f10 achromat refractor) 1978 and that same year joined the Berlin Astronomy club at the ,Wilhelm Foerster Sternwarte and Planetarium'. Since then I was actively engaged in their observer's meetings, telescope making workshop and astro photography group. Through the telescope making workshop the size of my scopes increased slowly but continuously and currently sits at a 13" and 16" Newtonian mainly used for photography.

I chose to keep astronomy as a hobby and rather pursue a career in engineering and technology which yielded a PhD in Electrical Engineering and a hiring by a Silicon Valley company in 1997. Telescopes and I moved here and have been enjoying the California weather since.

I'm a currently board member of the Tri Valley Stargazers and member of the EAS's telescope maker workshop where I am helping others to make their first telescopes. ☆



*TV station vans flock to Chabot whenever space-based events occur. Such was the case when Spirit landed!
 Photo by Carter Roberts*

DINNER WITH THE SPEAKER

5:00 pm

Saturday, February 7

HUNAN YUAN

4100 Redwood Rd., #11
 (next to Safeway)

Oakland

(510) 531-1415

Contact Dave Rodrigues
 at 510/483-9191 or
 daverod@aol.com by Fri-
 day, Oct 3 to confirm

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Jan Oort -- Dutch Master Astronomer

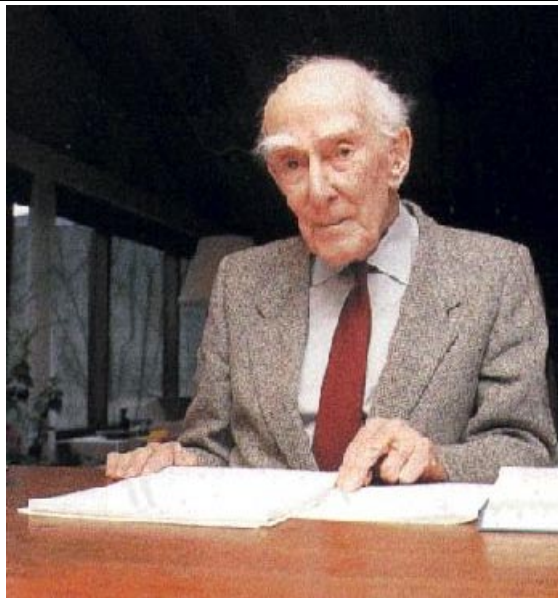
By Ellis Myers

Jan Hendrik Oort grew up in the Netherlands town of Oegstgeest (about 25 miles southwest of Amsterdam), where his father practiced medicine. He attended high school in nearby Leiden and graduated in 1917, a good scholar in mathematics and physics, less so in languages and other studies. He enrolled in Groningen University, in the north of the country, near the German border. Taking the usual courses in the physics curriculum, he added a class in popular astronomy, and his professor Jacobus Cornelius Kapteyn so impressed him that he changed his major from Physics to Astronomy.

Once Oort passed his final exams (but not having yet been awarded a degree) he was appointed as an Assistant at Groningen. He soon decided it would be judicious and foresighted to further his experience in the United States. He was accepted as an assistant to the eminent astronomer Frank Schlesinger at Yale. The work Oort was expected to do did not suit him well, and after two years, when he was offered a position of Research Assistant at Leiden University, the oldest university in the Netherlands with a long tradition in astronomy (in fact, Leiden is the oldest observatory in the world still in use), he quickly accepted.

He was 24 years old, and he climbed the academic ladder to Lecturer in 1930, and to Professor Extraordinary in 1935. At Leiden, he was interested in the properties of stars of high velocity, questioning why such stars all are moving in the same direction, while more slowly moving stars have a random orientation. This study formulated his doctoral thesis and his degree was granted by Groningen in 1926. A full explanation of the observations had not been reached. His work was a significant step, however, in support of the analysis by Bertil Lindblad that first suggested rotation of the Galaxy. Oort further deduced differential rotation, and he worked out the details, showing that the center of the Galaxy was 6000 parsecs distant in the direction of Sagittarius, and that the Sun would complete one rotation in 140 million years.

In 1934, Oort became second in command to Enjar Hertzprung as Director of the Leiden Observatory, a position requiring many administrative duties. The International Astronomical Union appointed Oort as General Secretary in 1935. In 1939 he came to the United States to attend the inauguration of the McDonald Observatory, to visit colleagues, and to do some personal observing. He did not return until the end of August, just weeks before the outbreak of World War II.



May 1940 saw the invasion of the Netherlands, and Oort took a stand of noncooperation with the Germans. He resigned his appointments and moved to a country cottage, attempting to lie low. He was able to avoid the conflict, but his professional work was necessarily delayed. He started writing a book on stellar dynamics, but much of his time was occupied with obtaining food for himself and his colleagues, and resisting the Nazis while staying out of danger.

It was during this period that he had a most significant insight. He asked one of his students to look for a radio-frequency spectral line that,

in principle, could be detected. He reasoned that absorption at radio frequencies would be negligible and "We should be able to derive the structure of the Galaxy. We might even be able to detect spiral arms, if they exist." The student, Hendrik van de Hulst, reported that the 21.1-centimeter line of Hydrogen would be ideal in this role.

On May 5, 1945, the War was ended in the Netherlands, and Oort was summoned back to Leiden to take over as Director of the Observatory, replacing Hertzprung, who had passed retirement age. This was an arduous time of food shortage, undernourishment among the staff, and general postwar hardship. Resuming teaching and research activities was paramount, and one of the steps Oort took to bolster morale was a daily coffee hour. He supplied real coffee, sent from the United States by friends, in place of the ersatz "coffee" available in Holland. The Observatory coffee break quickly was adopted as a tradition.

Through his contact with Nicholas Mayall at McDonald, Oort had become interested in the Crab Nebula, whose expansion velocity Mayall had been carefully measuring. This interest led to Oort's recognition that the origin of the Crab Nebula was from a supernova, rather than a nova, as previously assumed. *Continued on Page 5*

► *This photo of Saturn is possibly the sharpest view of the ring system ever achieved from a ground-based observatory. It was taken with the VLT-Yepun telescope of the European Southern Observatory at Paranal, Chile, using adaptive optics. Note that the image shows the South Pole to best advantage; this is opposite to the familiar Voyager image of 1982.*



Eastbay Astronomical Society

Eightieth Anniversary Dinner

Sunday, March 7, 2004

Astronomy Hall of Phabot Space & Science Center

10000 Skyline Boulevard, Oakland



The doors will open at 5:45 pm, with **Dinner at 6:45 pm**. Awards presentation, door prizes and lecture about 8:00 p.m.

Exploring Mars!

Dr. Jeff Moore

Find out the absolutely latest results on the two Mars landers, *Spirit* and *Opportunity* from someone who is intimately involved with virtually every aspect of Martian research, Dr. Jeff Moore. Dr. Moore will give us the inside story on what is happening to the two rovers on Mars. Have they found evidence that liquid water once existed on Mars? And if so, for how long? Long enough for life to arise?

Few people are as qualified to give such a talk as Dr. Moore. He was on the team that chose the landing sites for the two rovers, and is one of the scientists on the analysis team. He can tell us why these two spots were chosen among all the many possible landing sites. Was Gusev Crater, the landing site for *Spirit* on January 4, an ancient lake bed? Why are there the mysterious hematite deposits at Terra Meridiani, the *Opportunity* landing site? "We scrutinized those targets which had the greatest chance of having rocks or outcrops that were originally deposited in water," says Moore. What he is looking for is the Martian equivalent of limestone or sandstone. The main objective, says Moore, is to determine how water impacted the surface of Mars. If water existed on the Red Planet for an extended period of time, life is more likely to have formed.

Dr. Jeffrey M. Moore is a scientist at NASA Ames Research Center. His research has focused on a range of topics relating to the geologic evolution of planetary landscapes. He has conducted extensive laboratory simulations of Martian geologic processes. He has conducted research as to whether Europa has a subsurface ocean as part of his 8-year-long ongoing participation with the Galileo SSI (imaging team). He recently investigated the evolution of the Martian south polar deposits, and the nature of aqueous chemistry processes on Mars. He was a Participating Scientist on the MSP Mars '98 Polar Lander. Dr. Moore is Project Scientist of the Carl Sagan Center, located at Ames Research Center. He has recently been appointed Imaging Node Leader for NASA's New Horizons Pluto-Kuiper Belt Mission, and he will help design cameras, plan observation sequences, and analyze images after they are acquired. So we're definitely inviting Dr. Moore back in twelve years!

This year's **Helen Pillans Award** goes to **Mike Reynolds** for his strong support of amateur astronomy and insistence on having a place for the Telescope Makers Workshop at the Chabot Space & Science Center.



The dinner will be catered by **Harry's Hofbrau** featuring Roast Beef, Turkey, Ham and Spinach Lasagna.
This dinner received rave reviews the past eight years.

Cost per person will be \$33.00. Mail your checks, payable to the EAS, as soon as possible with the form below, or bring it with you to the next meeting, or give it to Carter Roberts at CSSC some Friday evening. Get your reservation in soon to guarantee a seat. We must give the caterer a final count by March 1st.

Questions?
Contact EAS Treasurer Don Stone at
(707) 938-1667
or email him at
ddcstone@earthlink.net

EAS Banquet — March 7, 2004
Reservation Form

Your name: _____

Address: _____

City/State/Zip: _____

Phone: _____ Email: _____

Number of guests: _____ x \$33.00 = \$ _____

Names of additional guests _____

Please make your check payable to the EAS and send it with this form to:

Don Stone — EAS Banquet
19047 Robinson Road
Sonoma, CA 95476-5517



*Lick Observatory atop Mt. Hamilton
Photo by Don Saito*

A Brief Jaunt to a Nearby Neighbor, 'Lick'

By Linda Lazzaretti

Visiting Lick Observatory in the winter can be a very brief affair. Such was the case for us one drizzly day this winter. By the time we'd wound our way up to the top, snowflakes were falling. The tour guide gave the few of us who'd managed up the mountain a rather worn look and said,

"Ok, just one tour only for you. Then it's down the mountain before they close the road."

So, in the brief span of 20 minutes we hustled into view the awesome 'lady' herself, all 36" of her refracting elegance set solidly in the beautifully crafted 1888 wooden floor with her steel curved dome above through which she first discovered Jupiter's 5th moon in 1892. The 'lady' is still moved by 'hand', no new computers in this antique space. Astronomers actually stand on a ladder and peer through her eye piece using the original finder scope to line up the lady with the stars peering through the 9 ft. slit in her graceful green tinged dome.

Further down the path from this dome sits the more 'used' one housing the 120" Shane reflector. This is the telescope made famous by those extra-solar planet hoppers Marci and Co., so famous that Time magazine dubbed the Shane the world's most prolific planet finder. The telescopes and equipment surrounding this operation are world class, so much in demand by the world that they are used nightly pioneering adaptive optics, high-resolution spectroscopy, infrared observing and, of course, planet finding.

Here in our own backyard we have an exciting and elegant array of activity from the lovely lady herself sitting quietly in her wooden world to the bustle of planet finders building a new world of immense possibilities for generations to come. So come up one day. Only make it a nice spring one where you'll not be shooed away before you can savor all the secrets of this nearby neighbor, Lick Observatory. ★

Oort – Continued from Page 2

Oort was one of the very first astronomers to realize the importance of radio astronomy. While he could not find money to build a radio telescope, he was able to scrounge enough to relocate one of the German radar antennas and build a 21-cm receiver. This project was delayed by technical difficulties, including a destructive fire, and was not completed until 1951, six weeks after a similar project at Harvard had been successful. Two months later a third project, in Australia, confirmed the validity of the procedure, and the three reports were published simultaneously.

When one of Oort's students wrote a thesis on comets, Oort wondered if more could be ascertained from the data. He looked at the distribution of the major axes of comets and inferred that most comets come from a reservoir of debris within the Solar System but far beyond the orbits of Neptune and Pluto, perhaps half way to the nearest star. (Voyager 2, launched in 1977, took 12 years to travel the distance to Neptune and is, as of January 2004, 90 astronomical units away. It will arrive at the Oort Cloud in 15,000 more years!) Oort theorized that those icy bodies are disturbed by passing stars into orbits around the Sun. Some may be further modified by the gravitational pull of major planets, sending them into periodic orbits—or they may even be captured, or kicked into hyperbolic orbits and sent out of the Solar System. Oort speculated that the comets originated in the asteroid belt, perhaps by the explosion of a primordial planet. This and other theories of the source of the cloud are still being deliberated.

In 1953, the renowned German-American astronomer Walter Baade was a visiting professor at Leiden. He and Oort remarked that Dutch astronomers needed guaranteed access to a large telescope in the southern hemisphere. They realized that the Netherlands could not erect such a facility by itself, but cooperation with other European countries might bring success. Diligent work over more than a decade finally brought the European Southern Observatory to reality, with Baade and Oort considered to be founding fathers.

At age 81, Jan Oort was skating on a lake when he took a fall that knocked him out, and he stopped this pleasurable activity, but he kept riding his bicycle to the Observatory. He continued to strengthen his theory about comets, but his health faded and in 1992, following a fall, he died.

Jan Hendrik Oort's name may be linked to the Oort Cloud of distant comets, but his name is linked also to a great number of discoveries and interpretations of astronomical data. In 1955, Life magazine published a list of the 100 most famous people. Along with Eisenhower, Churchill, Picasso and Stravinski, Oort was on that list. Surely, he must be counted among the most influential of all 20th-century astronomers.

The ESO was the brainchild of Jan Oort and Walter Baade. At Paranal, four identical 8.2-meter telescopes can combine their light gathering to equal that of a single 16-meter telescope. The telescopes were given names from the Mepuche Indians: Yepun, Evening Star; Antu, The Sun; Kueyen, The Moon; Melipal, The Southern Cross. ★



Editor's News 'n Views

Howdy Astro Fans!

By the time you get this, we will have just had our first EAS-Only View Night for the new year, up at Chabot's big telescopes! (Weather permitting, of course.)

Saturn is looking just beautiful this year. I can't really tell the difference between last year's views, which were supposedly with the rings at maximum tilt, and this year's views – they are still *very* tilted, and the Crepe Ring and Cassini Division are often easy to see. So, whether you make the next EAS Members-Only Night, go to a regular weekend public viewing, or drag out your own scope to take a peek, do make the effort. However you do it, though, be *sure* to dress warmly. It's been below 40 degrees F sometimes, up there, so thermal underwear, hat, gloves, scarf, and those little chemical heater pack thingys would not be unreasonable items to bring along.

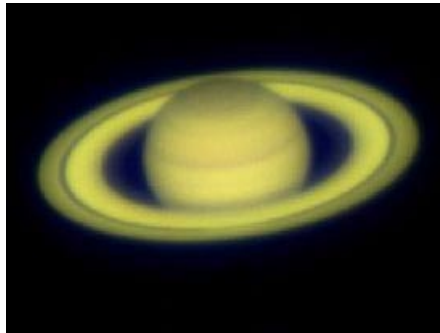


Photo by Paul Hoy, taken through Rachel on 1/3/2004

There was a bit of a PR disaster up at Chabot this month, when a potentially busy (and profitable) Saturday was wiped out with the fall of a tree across some power lines somewhere down the hill, which blacked-out the facility until 5:30pm, when the power was finally restored. Ouch! As a result of this, a new resolve to install their own backup power system has been brought up on the ol' priority list, so this kind of thing can be prevented in the future. It just reminds us that Chabot is still very much a work in progress, and they need our help and support when and however we can provide it. Remember, we are out to save the World, by inspiring and educating young and old in the sciences, and that is a worthy goal, indeed.

In other news: Paul Hoy has agreed to become EAS's NASA Night Sky Network Rep! This is a very cool program sponsored and supported by JPL's PlanetQuest public engagement program. PlanetQuest is a part of JPL's Navigator Program, which encompasses several of NASA's extra-solar planet-finding missions, including the Keck Interferometer, the Space Interferometry Mission (SIM), the Terrestrial Planet Finder (TPF), the Large Binocular Telescope Interferometer (LBTI), and the Michelson Science Center. Learn more about PlanetQuest: <http://planetquest.jpl.nasa.gov/>. The NSN essentially provides "toolkits" and training to enhance

and expand a club's ability to do astronomy and space science outreach to the public. The non-profit Astronomical Society of the Pacific (ASP), one of the nation's leading organizations devoted to astronomy and space science education, is developing and managing the Night Sky Network in cooperation with JPL. Learn more about the ASP: <http://www.astrosociety.org>.

President Bush has recently doomed the Hubble Space Telescope to a near-term demise in what appears to me to be an attempt to look "Kennedy-ish," (someone with vision) by cutting funds for other programs to start a vain-glorious "manned mission to Mars." I think it's something like a billion dollars to start. Gee, he threw away almost \$100 billion on a premediated, unnecessary war under false pretenses (the tab continues to grow); you'd think he could spare one B for the space science treasure trove we know as the Hubble.

Ryan Diduck, Asst Pgms Dir at CSSC, is now also head of the newly formed Telescope Task Force, and is to attend all EAS Board meetings. CSSC is in charge of telescope volunteer schedules, etc., and his very first priority will be to move the power boxes on Leah's pier from their current location to the south side of the pier. There's a "to do" list about as long as your arm of actions needed to fix/upgrade/correct/install and enhance all the existing and future telescopes at Chabot. These include Rachel, Leah, Nellie, the Transit, and the not-yet-installed solar telescopes. Plus, those amazing *Galaxy Explorers* (see picture, below) are working right now to fix every portable telescope on the premises (most being stored in the space below Rachel's dome). So, there's a lot of work going on. Thought you should know. ★

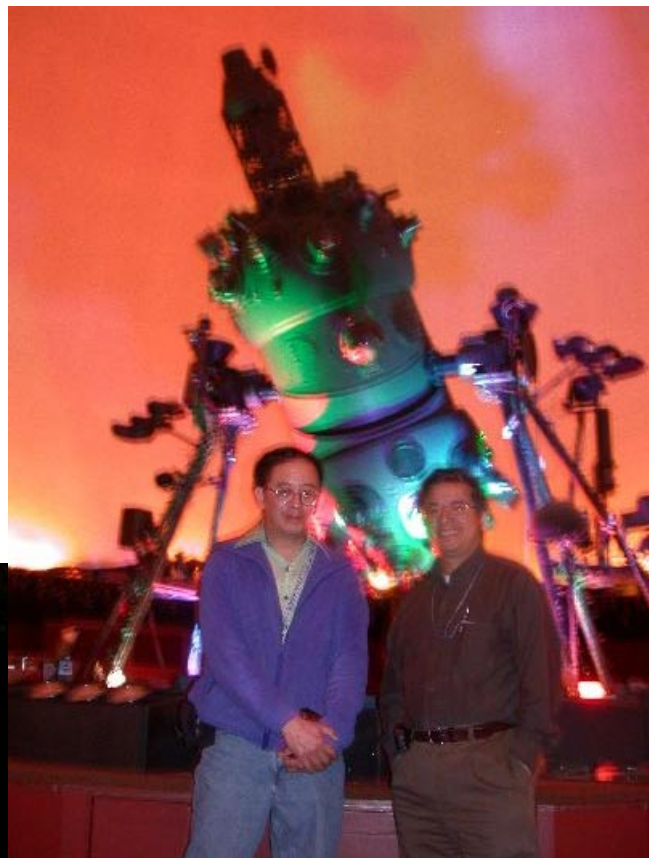


*Top row from left: Sophie Lee, Ho-Hin Choy, Sarah Frost, Jacob Siegel, Ning Lung, Andrew Chin and Austin Young
Bottom row from left: Kenny Oslund, Sullivan Lee, Sara Thomas, Stephan Armijo and Jessica Stanley
Camera Shy: Daniel Nowicki, Danniell Thomas, Nick Geiselman, Roger Fu and Zack Green*

Spare Shots



◀ *The custom-built star projector will be replaced by a state-of-the-art projector in the new Academy.*
 ▶ *Conrad Jung of CSSC, and Bing Quock of Morrison, say their farewells to an old friend.*



▶ *In April 2004, the Academy will open a temporary "satellite" museum at 875 Howard St in downtown SF. (They probably won't have crocodiles there, though.)*



◀ *The Foucault Pendulum swung its last swing on Dec 31, 2003.*

▶ *Ken Swagerty took this nifty picture of the Orion Nebula using his Nikon digital camera on Nellie. Like, wow! ☆*




In Memoriam: Walter C. Marion

Long-time EAS Life member Walter C. Marion died December 27, 2003. He joined the EAS in 1949, was President in 1951 and 1952 and as a Certified Master Watchmaker, was a critical portion of the team that performed major work on Rachel in 1952 and 1956. The funeral was held December 31st at the Chapel of the Chimes on Piedmont Ave, Oakland.

From The Oakland Tribune obituary:

WALTER C. MARION Certified Master watch maker, Astronomer and Senior Engineer for the University of California Seismology Stations, made his transition at his home in Oakland on Friday morning December 27th. He was the

devoted husband of Bertha Suronen Marion and father of Dr. Rodger Marion and his wife, Dianne of Friendswood Texas, and grandfather to Morgan Marion of Jacksonville, Florida and Jason Marion of Houston, Texas. He is also survived by his dear sisters, Josephine Marion of Castro Valley and Florence Marion Rennacker of Apache Junction, Arizona. He is also survived by many loving nieces, nephews and friends. The family wishes to especially thank his care givers Virginia Metlock, Susan Cooper and Dr. Forrest Beaty. In lieu of flowers memorials may be made in his name to the Eastbay Astronomical Society (Treasurer, Don Stone, 19047 Robinson Rd., Sonoma, CA 95476-5517)

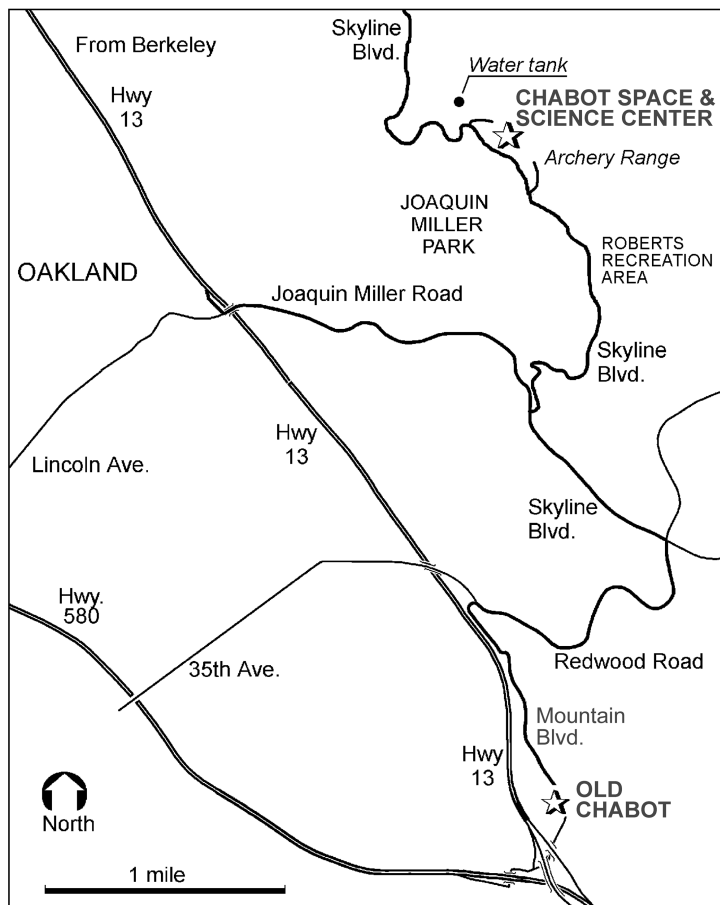


Eastbay Astronomical Society

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

February 2004

RETURN SERVICE REQUESTED



FUTURE CONJUNCTIONS

- Feb 7 EAS General Meeting, Chabot, Physics Lab, Spees Bldg 7:30pm
- 12 EAS Board Meeting, Chabot, Soda Board Rm, 7:30pm
- Mar 7 EAS Annual Awards Dinner at Chabot, Planetary Landscapes Hall, Dellums Bldg, 6:00pm, Dinner at 8:00pm
- 11 EAS Board Meeting, Chabot, Soda Board Rm, 7:30pm

Eastbay Astronomical Society

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 cwroberts@earthlink.net

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Treasurer, Membership: Don Stone (707) 938-1667
 ddcstone@earthlink.net

Articles and photos for *The Refractor* are encouraged. Deadline for the March 2004 issue is February 15, 2004. Items may be submitted by mail to the editor, Don Saito, 3514 Randolph Avenue, Oakland, CA 94602-1228. Internet email address: donsaito@pacbell.net Hm: (510) 482-2913.

Join the Eastbay Astronomical Society

- Regular, \$24/year
 - Family, \$36/year
 - Contributing, \$40/year
 - Student, \$15/year (digital)
 - Sustaining, \$60/year or more newsletter, only
- Contact: Don Stone, EAS Membership Registrar
 Telephone: (707) 938-1667 Email: ddcstone@earthlink.net
 Mail: 19047 Robinson Road, Sonoma, CA 95476-5517