

The Refractor

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

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Amateur Spectroheliscopes By Fredrick Veio

Saturday, March 2, 2002

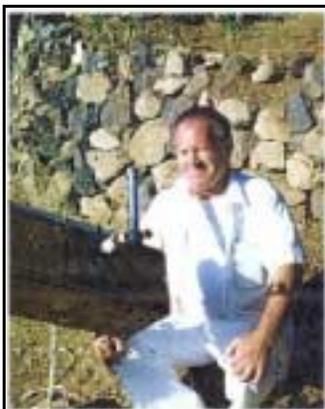
Physics Lab, 2nd Floor, Spees Bldg
Chabot Space & Science Center, Oakland

- Presentation – 7:30 pm
- Club Business afterwards

My interest in astronomy began at the age of 16 after observing through a friend's ten inch Newtonian. I later bought my own 3.5 inch Sky-scope. Years later, after reading the book "Skys shooting" by Mayall and Mayall in the astronomy library, I got hooked on astrophotography and built an astrograph in about 1955. The lens was 12 inch f.l. at F:4.5, Kodak 4x5 glass plates, and was featured in the June 1957 Sky & Telescope. Looking for something different, I read in ATM Volume One about the spectroheliroscope by Dr. G. E. Hale. I proceeded to construct a compact, portable, low cost instrument in about 1964, which Sky & Tel also did an article on (January 1969). I've been a die-hard solar nut ever since. A store-bought SHS costs about \$600 these days, includes the grating.

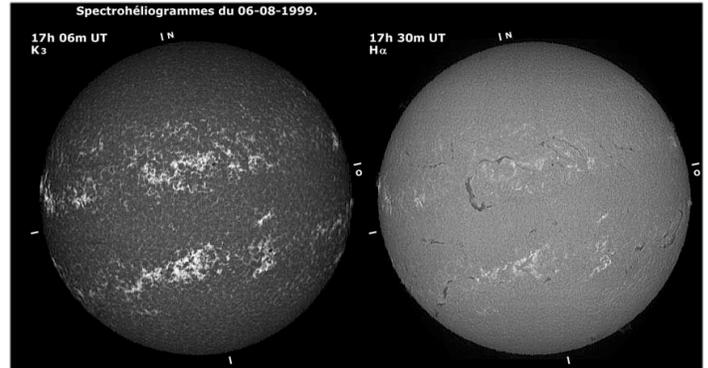
In the past 30 years I have assisted about 25 amateurs around the world to make their own SHSs. (For a new and excellent web site on amateur SHSs, go to <http://imz064.ust.hk> hosted by Dr. Chris Westerland of Hong Kong.)

I wrote and published a small book on the SHS in 1972, and it's free to download at sunmil1.uml.edu/eyes/veio (note: That's a numeral 'one' (1) after sunmil).



Born in Oakland, Calif., July 24, 1930, graduated from UC, Berkeley 1957 with a B. A. degree in bacteriology. Veteran of the Korean War, U.S. Army, **Fred will be demonstrating his hi-res spectrohelioscope up at Chabot the Saturday afternoon of the meeting.**

Fred's friends Mike Rushford and Leonard Higgins will also each give short, 5-minute talks about the main topic. ★



Solar images taken by Phil Rousselle
(rousselle@sciences.univ-metz.fr)



**YES on
Measure G
March 5th!**

Measure G is an Oakland City bond measure for \$59 million to make capital improvements to Chabot, the Oakland Zoo, and the Oakland Museum, that will cost each homeowner in Oakland a piddling \$9 per \$100,000 assessed value (not market value, which is usually much higher) per year in taxes. This money will help Chabot get on a solid financial level by paying off the COPS Loan, getting our new Building under the Wightman Courtyard underway with its 4 new classrooms, small gift shop, small cafe for star-gazing during our cold nights, more rental space, large decks for special events, and a large elevator to bring telescopes up from a prep./storage area right on the the triple size

DINNER WITH THE SPEAKER

5:30 pm

Saturday, Mar 2, 2002
HUNAN YUAN
4100 Redwood Rd., #11
(next to Safeway)

Oakland
(510) 531-1415

Please call Betty Neall at
510/533-2394 by Friday,
February 8th to confirm
your place.

observing deck. We're down to the wire, and we need your support! **Call Karen Powers to find out what you can do to help make this happen at (510) 339-6211. ★★ And VOTE! ★★**

Inside This Issue:

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The Hunter's Belt and Sword

By Ellis Myers

The stars of Orion form one of the best known of all the constellations as they are designated today. The three stars of Orion's belt, apart from the significance to the Greeks as the belt of the great Hunter, are prominent in the mythology of a number of cultures. The Chumash Indians of California called them simply *Three In a Row*, and their location in the sky served as a calendar to mark ritual events.

Another hunter is remembered in the lore of the Tachi Yokuts, also of California. This was Wolf, and although he was a successful hunter, he was also self-centered, and he shared little of his prize with his wife, Crane, and their two sons. The family only managed to get enough to eat by gathering berries and acorns. Without Wolf's help, Crane grew increasingly discouraged, and one day, while Wolf was away on a hunt, she ran off with the two boys, hoping to find a better place for them and for herself. When Wolf returned and found his family gone, he became furious and vowed to track them down and kill them. A good hunter, he soon found their trail; and a fast runner, he caught up with them. But Wolf's arrows were of no avail, as Crane was flying just above their range. Wolf followed the group until they began to come down to rest and then he shot her to the ground. He went to her and poked her with his paw to see if she was alive. Crane had enough strength left to surprise him and stab him with her long, piercing bill. Repeatedly she jabbed him until he was dead. Then, without looking back, Crane led her boys and flew high into the sky, ever higher until they became stars. We see them as the three stars of Orion's belt; and remember that it's more prudent to share than to be selfish.

Orion's belt is a canoe to the Wasco Indians of the Pacific

Northwest. To the Australian Aborigines the three stars represent three young men in one of their stories.

A mural painted about the year 800 a.d. at the Mayan ruins of Bonampak in Chiapas, Mexico, depicts a turtle adorned to represent the three stars of Orion's belt. With later Spanish influence, however, the natives of this area knew these stars as the *Three Kings* or the *Three Marys*.

It was Johannes Bayer who assigned the terminology of the stars of Orion. After Betelgeuse, Rigel and Bellatrix, he designated the three belt stars as Delta, Epsilon, and Zeta from right to left. Alnitak, the classical name of the left-hand star, Zeta Orionis, could apply to all three, for it comes from an Arabic phrase that means "the belt of the central one."

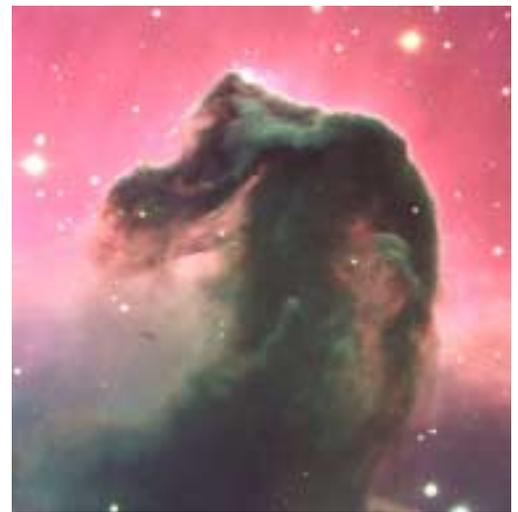
Alnilam, Epsilon Orionis, the central of the three stars marking the belt of Orion the Hunter is also aptly named. Alnilam comes from an Arabic word that means "the String of Pearls." The star ranks fourth in the whole constellation, shining at second magnitude, 1.70. Though all three stars have similar colors, classes, and temperatures, Alnilam, a hot bright supergiant, is the most luminous and the brightest even though farthest away. It is at a distance of more than 1300 light years, compared to about 900 light years for the other two.

To us, the westernmost of the three stars, Mintaka, Delta Orionis, finds note as having a declination of almost exactly zero; its rising marks the east on the horizon, its setting the west.

This star is complex. A triple star, it consists of an eclipsing binary pair with a distant star about a minute of arc away. Over a period of 5.7 days the visual magnitude ranges from 1.94 to 2.13.

The easternmost belt star Alnitak, designated Zeta Orionis, is a double star, of magnitudes 1.7 and 4.2. Alnitak is the brightest class O star in the sky, a hot blue supergiant. About three seconds of arc away is a companion, the pair orbiting each other with a period estimated to be thousands of years long.

Immediately to the east of Alnitak is a cloud of hot interstellar gas that is illuminated by the star. This is the neb-



The Horsehead Nebula

This image, released last month, is based on three exposures in the visual part of the spectrum with the 8.2-m KUEYEN telescope at Paranal, Chile. Photo: European Southern Observatory

(Continued on page 5)



Eastbay Astronomical Society

Seventy Eighth Anniversary Dinner

Saturday, April 6, 2002

Astronomy Hall

Chabot Space & Science Center

10000 Skyline Boulevard, Oakland, California



We will again be in the Dellums (west) building of CSSC, where the "Planetary Landscapes" exhibits are normally displayed. The doors will open at 6:30pm, and the dinner will begin at 7:30pm. Award presentations, door prizes, and lecture will commence at 8:30pm. Please enter Chabot by the MAIN ENTRANCE.

Our speaker this year will be **Charlie Petit**, and his talk will be:
On the Edge: A Writer's Attempt to Keep Up With the Scientific Frontier

What's it like to a science writer? To be at ringside for all the major scientific discoveries of the late twentieth and now the twenty-first centuries? EAS has the great privilege of having a science writer of international renown, Charlie Petit of U.S. NEWS and WORLD REPORT.

Charlie, formerly the science writer of the San Francisco Chronicle, has been writing about science for more than twenty years. He has been witness and chronicler not only to some of the last century's most important astronomical discoveries, but also to many of the scientific discoveries that have changed our lives.

Charlie will describe for us what his life is like, what it takes to be a good science writer, some of his most important stories, and some humorous anecdotes about the science info biz (like the time he wrote for the South Pole's newspaper). He'll describe how hard it is to keep up with the accelerating rate of discovery and to translate it into terms that the layman can understand and appreciate. He'll give us a behind-the-scenes view of those remarkable stories we've read about. Go to www.usnews.com/ and do a search for Charlie Petit; you'll be amazed at the level of his productivity!

So come to the Seventy Eighth Eastbay Astronomical Society annual dinner for what should be a fun and informative overview of the past twenty years in science!

This year's recipient of the **Helen Pillans Award** is **Dave Rodrigues**, our very own *Wizard of Astronomy* and *EAS Programs Director*, in recognition of his tremendous contributions towards the dissemination and promotion of astronomy to the public, and his hard work for our Society.

The dinner will be catered once again by Harry's Hofbrau, and will feature Roast Beef, Turkey, Ham, and Spinach Lasagne. This dinner has received rave reviews for the past six years! Cost per person is \$30. Please use the form below and send it in **no later than April 1st** to ensure your reservation. For more information, call Don Stone at (707) 938-1667 or email him at ddcstone@earthlink.net.

(Volunteers before the dinner starts to help set up will be greatly appreciated!)

EAS BANQUET SIGNUP FORM

(cut along dotted line)

Saturday, April 6, 2002

Number of guests: _____ x \$30.00 = \$ _____

Names of guests: _____

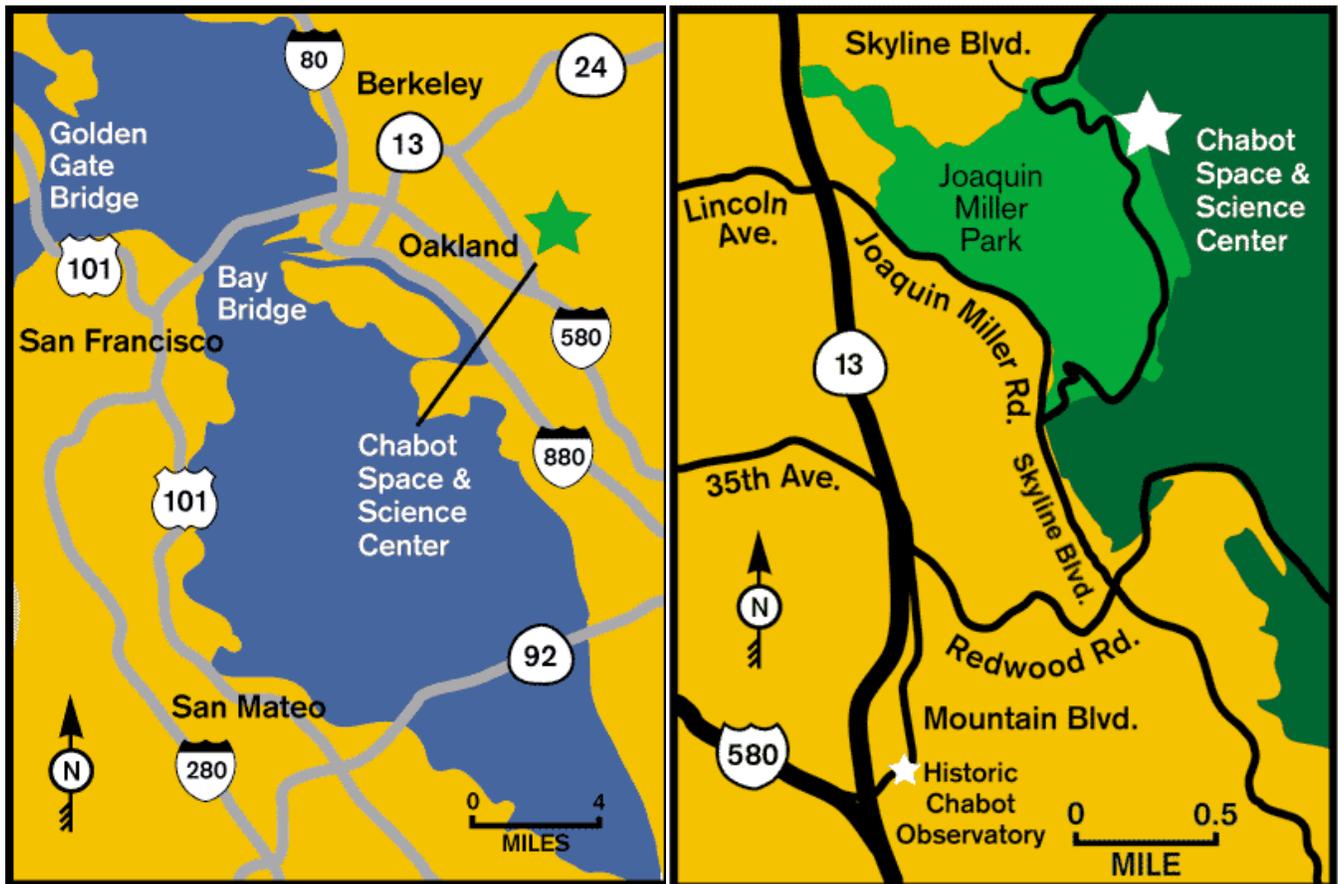
Phone: _____ Email: _____

Please make your check payable to **EAS** and mail with this form *before April 1st* to:

EAS Banquet – c/o Don Stone, 19047 Robinson Rd., Sonoma, CA 95476-5517

Eastbay Astronomical Society Annual Dinner

Chabot Space & Science Center
10000 Skyline Boulevard
Oakland, California
Saturday, April 6, 2002
6:30pm



Send in your banquet sign-up form in before April 1st!

Editor's News 'n Views

This last month the EAS had its first official *Members Only View Night* since Chabot moved to its current location, and we used *Rachel*, the 20" antique refractor to get some nice views of Jupiter, in spite of the partial cloud cover. Carter also gave some of the newcomers and guests the \$0.25 tour of the facility, including a close-up look at the 8" antique refractor, *Leah*, and the Transit Telescope. They were all *very* much impressed, and they've got all the signs of catching the "astronomy bug." One EAS member, Darlene Fung, brought a group of guests up, and they all had a great time! It's really nice, being able to look through the telescope without having to stand in line for anywhere between 10 – 45 minutes. If you've got any friends or family you think might enjoy getting into astronomy, or even just getting a peek through a ten ton, 35 foot long telescope, *Members Only View Nights* can make a hugely favorable impression!



We had the biggest wig in the State of California show up at Chabot this month! That's right, Governor Gray Davis held a campaign fundraising event on the 11th, and the place was thick with wealthy and/or ardent political supporters and, of course, security agents. In the midst of all that, the Governor did get a moment to experience the awe and beauty of a close-up view of Jupiter through *Rachel*. You could tell by the way he told his companions,

"Hey! You've GOT to see this!" that he was duly impressed.

Astronomy Day is coming up (April 20th), and the EAS will certainly be doing something in celebration of that event. We usually have members out at Jack London Square and/or Lake Meritt during the day to do solar observation for the

public to promote astronomy, the EAS, and Chabot. Be sure to let Carter Roberts or Phil Crabbe know if you'd like to help pitch in for these fun public outreach events.

Lewis Carroll Epstein gave a lecture for this month's *Distinguished Lecturer Series* at Chabot on the subject of relativity. After his lecture, he sold copies of his book, *Relativity*, and then donated the proceeds to the EAS to help cover the cost of the recently acquired 31mm Nagler purchased for *Rachel*. That was a very nice thing to do, and we would like to thank Mr. Epstein for being such a very steller feller!

Oh yes, and in closing – Oakland residents, do remember: **March 5th, Vote YES for Measure G!** ☆



← *Jupiter, 2002*
Feb. 2, 08:00UT,
20" refractor,
Canon G1, aver-
age of 5 exposures
by Gert Gott-
schalk

→ *EAS President Carter Roberts, inspecting the 20" refractor, Rachel. She's getting a tad bit dusty and could use a cleaning, not to mention a few paint touchups, as well.*



(Continued from page 2)

ula NGC 2024 and it can be seen with a small telescope, with a dark lane of dust in front. South from Alnitak extends an emission nebulosity against which is silhouetted the famous dark Horsehead Nebula. In 1918 it was determined from this structure that dark nebulae were not just the absence of stars, but interstellar dust lying in the foreground.

The three belt stars of Orion serve as a guide; a line through them points southeast to the brightest of all stars, Sirius, and northwest to Aldebaran, the bull's-eye of Taurus.

From Orion's belt hangs his sword, a trio of points of light of great interest. Above lies NGC 1977, a bright nebula that

is eclipsed in preeminence by the Great Orion Nebula (M42) just a half degree to the south. This bright nebula is one of the finest of all celestial objects for study, and it can even be enjoyed with the naked eye or binoculars. Four stars within this nebulosity form a distinctive quadrangle known as the Trapezium. The first three of these stars were noted by Christian Huygens as early as 1656, while now over 300 stars are known to be in this area, one of relatively recent star formation. Close by is a tiny companion nebula, M43.

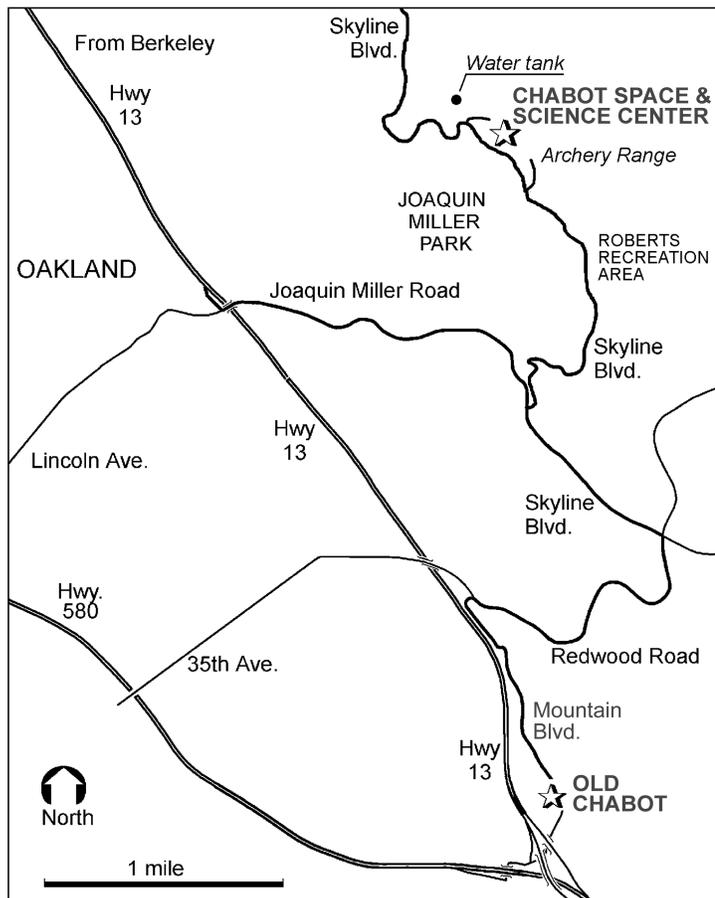
The central area of Orion, with the Belt and Sword, holds a lifetime's worth of material for awe and pleasureable observation. ☆



Eastbay Astronomical Society

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

March 2002
RETURN SERVICE REQUESTED



FUTURE CONJUNCTIONS

March 2002

- 2 EAS General Meeting, Chabot
- 7 7:30pm EAS Board Meeting, Chabot

April 2002

- 6 6:30pm EAS Annual Dinner, Chabot
- 11 7:30pm EAS Board Meeting, Chabot

Eastbay Astronomical Society

President:	Carter Roberts	(510) 524-2146
		cwroberts@earthlink.net
Vice President:	Phil Crabbe II	(510) 655-4772
Treasurer, Membership:	Don Stone	(707) 938-1667
		ddcstone@earthlink.net

Articles and photos for *The Refractor* are encouraged. Deadline for the April issue is March 15, 2002. 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

Contact: Don Stone, EAS Membership Registrar
Telephone: (707) 938-1667 Email: ddcstone@earthlink.net
Mail: 19047 Robinson Road, Sonoma, CA 95476-5517