



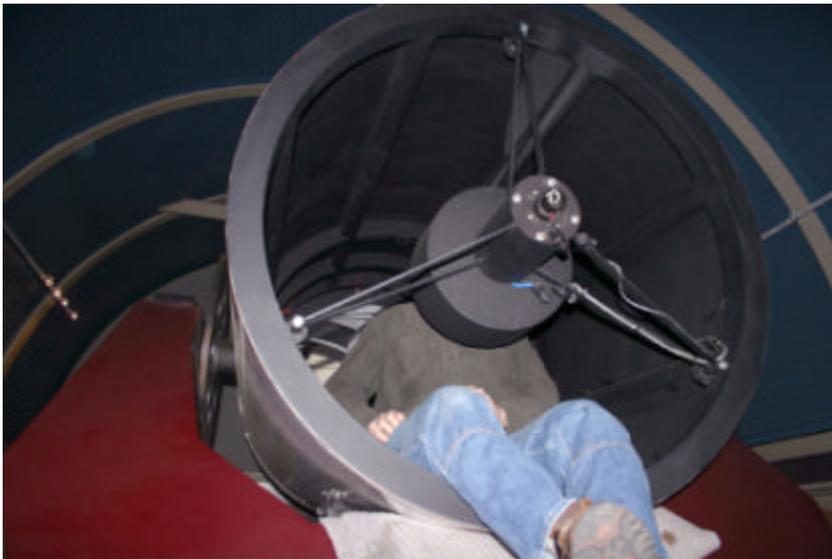
The Refractor

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

Volume 87
Number 02

December 2010

WHEN OPTICS GO BAD!!



Yet another curious center visitor becomes a quick snack for Nellie.....or not. Learn the biting truth.....

A Fortuitous Peek

By Gerald McKeegan

A relatively minor repair project on Chabot's 36-inch reflector ("Nellie") turned into a major event recently, revealing several problems that could have had disastrous results if left unchecked.

In early November, 2010, Nellie operators noticed that the focus position indicator on the telescope control software display was not registering. The readings on this indicator should correspond to the position of Nellie's secondary mirror, which can be moved to adjust focus when the rack and pinion focuser isn't being used.

We contacted Frank at DFM Engineering, the company that makes the control software and associated electronics. Frank gave a few suggestions for troubleshooting, but they involved partial disassembly of the secondary mirror motor housing. To help us with that, we contacted Nellie's designer, Kevin Medlock. He

EAS Holiday Party

Sunday, January 9th, 6:30 - 9:30pm

Kepler / Copernicus Rooms,
Chabot Space & Science Center

Food - Live Music - Games
Telescope Viewing!

had moved away from the Bay Area a few years ago, but was in the area for a few weeks on business and had been visiting the Friday night Telescope Makers Workshop sessions at Chabot. Kevin said, "No problem, I'll take a look at it and we can probably get it fixed in an hour or so."

But when Kevin climbed into Nellie's tube and took a look, he discovered a much worse situation than anybody expected. And over the course of three evenings, he found – and repaired – several

more problems!

Kevin's first observation was that Nellie's secondary mirror had been installed incorrectly. The mirror is normally installed on a moving shaft, and is held in place by a couple of flanges and a Teflon thrust washer. Sometime in the last few years, the mirror had been taken off, and when it was re-mounted, the flanges and thrust washer were installed in the wrong order. This meant that the secondary mirror was in the wrong location relative to the primary mirror, which meant the telescope's focal plane was about two inches farther back than it should have been. (continue on page 4)

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EAS Loaner Scope Program has telescopes available for rental by EAS members. Scopes include 60mm and 80mm refractors, a C-90, two 10 inch Dobsonians, and ; 4 and 8 inch Schmidt-Cassegrains. Scope rental is \$15 a month, with a \$50 deposit. For information, contact Ray Wong by E-mail at qm7@yahoo.com

EAS Membership Renewal Time

That time of year is upon us once more. Included in this newsletter is a snail-mail membership renewal form. A quicker and easier way to renew is visit the EAS membership renewal page on-line at:

<http://www.eastbayastro.org/index/application.htm>

Annual dues: \$24 regular membership \$10 students



WANTED: PHOTOS OF OLD CHABOT

Do you have photographs of the Mountain Boulevard Chabot Observatory? If you do, pick out the best of the best and send a scanned image to the Newsletter editor. A new image will be posted in the newsletter each month.



First Quarter Moon

Shot November 14th from Chabot by Richard Ozer
Canon T11 and Williams Optics Zenithstar 80

FUTURE CONJUNCTIONS—2011

Jan 09 EAS Holiday Party, Chabot, Kepler Rm, 6:30pm
13 Board Meeting, Chabot, Soda Board Rm, 7:30pm
14 EAS MOVN
Feb 10 Board Meeting, Chabot, Soda Board Rm, 7:30pm
19 EAS General Meeting, Chabot, Physics Lab, 7:30pm
06 EAS MOVN

For questions or if you are uncertain about the weather, call (925)926-0853 before 6pm, or check Chabot's weather page at <http://www.chabot.space.org/forms/weather.aspx>

EAS Library: Hours, 3:00pm - 7:00pm every Friday, and immediately after monthly EAS lecture meetings. The library is located on the second floor of the Del-lums Building, down the hall next to the interactive lunar lander exhibit.

Volunteer librarians are needed to expand library hours. **We are particularly interested in any member having experience with book cataloging software.** If you'd like to help contact EAS president Barry Leska at b.leska@comcast.net

Chabot Space & Science Center Invites EAS Members to Volunteer with Us!

- Share your knowledge of and passion for astronomy with thousands of CSSC visitors
- Experience the unique opportunity to operate Chabot's historical telescopes
- Share your own telescope at Chabot*
- Inspire young astronomers and future scientists by assisting students in our astronomy education programs

Explore these opportunities at our next **Volunteer Orientation on January 29th!**
For orientation time and RSVP, please visit volunteers@chabot.space.org
or, call our Volunteer Manager Megan Gray at (510) 336-7414

**EAS members who are only interested in sharing their own telescope at Chabot are required to attend a volunteer orientation and service training to be a qualified representative. After completion, you may join us on deck and share your own telescope any Friday or Saturday night!*

***Full Chabot Volunteers must make the regular volunteer commitment and pursue official placement through the Volunteer Manager.*

News & Views



Howdy Astro Fans!

The holiday season is in full swing (yeee-hawww!) I hope you're handling it okay - something I aspire to do someday in the far distant future, when technology has advanced enough. In his books, "A Brief History of Time," and "The Grand Design," Stephen Hawking has never really addressed that hyper-strange phenomenon known as "time collapse" which occurs annually, right after Thanksgiving. It starts slowly at first: the first of December, then the second, and then...whoosh! It's the 15th, and you still haven't sent out Christmas cards or gotten many (or any presents, and the first little tinglings of panic set in. It gets worse, but, YOU know.

Speaking of the holidays: our club's Holiday Party is *tentatively* set at 6:30pm-9:30pm, Sunday, Jan 9. It's a little late, I know, but we should always be willing to have a great time, any time, dontchathink? This year, we'll have the wonderful USGS musical group, Duckweed, perform live for us while we eat. If any of you are musically inclined, you can join them in three of their pieces! To get the sheet music, login to our Yahoogroups group files page (<http://tech.groups.yahoo.com/group/EastbayAstro/files/>), and open the file, "simple_red_washer.pdf" and run a "Save As" action to your computer. You can then open it up whenever you want to practice, and come Jan 9th, you can play along - how cool is that?

In addition to live music, the club will buy turkey and ham, and the rest of you will provide the trimmings ala pot luck, in the following order: Last name A-F: Finger Food, G-L: Drinks, M-R: Dessert, S-Z: Salads/Veggies. Anyone interested in helping with set ups please contact me, Don Saito, at (510) 301-2570 or send email to donsaito@comcast.net. One activity will include the Wacky Gift Exchange. These are not necessarily gifts that are wacky, but rather, it's the process of giving/getting the gifts that's wacky. If you wish to participate, simply bring a wrapped gift. It could be new or used, but must be something someone would actually want (no poo-pets, scented soap, whoopee cushions, non-working devices, etc., please). It should have a value of between \$5 and \$10 (or more, if you can afford it). Participants draw num-

bers from a hat, the first person picks a present, and opens it. The second person can choose to steal the first person's gift, or open a new gift. If the first person's gift is stolen, s/he gets to pick a new gift, and opens it, and so on and so forth. After the last gift is opened, the first person has the option to steal someone else's gift, however, each gift can only be stolen twice; after that, it is un-steal-able. It can be pretty hilarious - try it, you'll like it! We'll start setting up around 5:30pm, and if you're so inclined, we could use an extra hand or two.

In a related item, we have just activated our online Club Calendar in the Night Sky Network! This is a very cool utility which allows you to check for club events in a nice, full-month view format, which also shows astronomical events, such as lunar phases eclipses, meteor showers, and other events of interest. At the moment, we only have the holiday party listed, but will add more events such as general, board, and MOVN meetings, and more. Check it out: from our club's home page (www.eastbayastro.org/), click the "Schedule" link near the top, and you'll see it in all its high-tech glory!

Earlier this month, EAS Board Member Gerald McKeegan worked long and hard with the designer of Chabot's 36" reflector, Kevin Medlock, to correct several mechanical, software, and electronic problems/adjustments to get it closer to being more fully and optimally functional than it has probably ever been. Unfortunately, an important accessory was designed and built before the adjustments were made, so now that accessory needs to be re-tooled (it's the tailstock - the thing that holds and focuses the eyepieces). This kind of puts the Exo-Planet group out of commission for a while, but hopefully, not for long.

Short note: Chabot's Starry Nights Gift Shop is under new management, and they've got tons of great gift ideas for everyone on your list. Check 'em out, you'll be impressed.

And that's it for now! May you and your families have an ultra-wonderful holiday season, and we'll see you on the 9th! Unless that date changes (but it shouldn't).

;~Don

(Continue : **A Fortuitous Peek**) Furthermore, some of the hardware was missing. There are supposed to be six spring loaded plunger screws in the outer flange, which provide constant pressure on the mirror as the metal hardware undergoes thermal expansion and contraction. But Kevin found that the plunger screws were gone! Because of this, the outer flange, which is a threaded hand-nut that holds the weight of the mirror, was loose. In fact, it was so loose that it needed only one turn to come off. A few more months of telescope movement and vibration, and the separation between the primary and secondary mirrors would have suddenly gone to zero!

Kevin removed the secondary mirror, and then removed the secondary motor housing for bench testing. For the focus indicator problem, Frank at DFM engineering had suggested testing the linear potentiometer in the motor housing, but we found it to be working properly. Eventually Kevin found that the mirror motor, which incorporates an optical encoder, was not working properly. He had a spare with him, so he replaced the motor. But that didn't solve the indicator problem.

During the motor bench testing, Kevin found a wire harness with two wires having stripped insulation. Apparently this was caused by tool abrasion during collimation of the secondary. Fortunately it appeared that no actual short circuiting had yet occurred because of the missing insulation, so Kevin repaired and re-wrapped the wire harness.

Although it was now possible to get the mirror motor to work properly

when bench tested, we could not make it work properly when connected back to the telescope control system. Several long cables carry power and



signals between the telescope and the control system chassis, so it was time to trace the cable wires to see where the position sensor signal was being lost. This was especially hard to do because there are intermediate connectors in the long cables, and because we had no wiring diagrams to tell us what pins on the connectors corresponded to which function in the motor housing.

Eventually Kevin had traced all the way back to the motor control chassis itself. After tracing more circuitry on the motor control motherboard, he finally found the problem: corrosion. On the back side of the motherboard, Kevin found corrosion and built up gunk at several locations. When he cleaned some of this away, he found that corrosion had dissolved



away a small gap in one of the circuit traces -- the one carrying the signal from that potentiometer Frank told us to check.

Kevin repaired the broken circuit trace, plus some other damage caused by the corrosion buildup. After cleaning the motherboard, he installed it back in the control chassis, plugged in the secondary motor cable and... success! The focus position indicator is once again working. Kevin purchased a new set of plunger screws, and re-installed the secondary mirror with all the parts in the correct sequence.

The one-hour job ended up taking three evenings, but Nellie is working once again. Unfortunately, because the secondary mirror had been installed incorrectly, the new tailpieces we had installed in 2009 were made to the wrong dimensions. So we'll have to shorten them to match the new, correct focal plane position. We'll also need to re-collimate the mirrors and retune the telescope control system pointing model.

But thanks to Kevin Medlock's expertise and willingness to donate some much needed engineering time, we'll have a working telescope, and won't have to worry about mirrors going "crash" in the night!

Thank you Kevin.



NGC 7000, North American Nebula & Pelican Nebula in Cygnus, narrow band, by Billy Liang

EAS member **Billy Liang** got his start in amateur astronomy while in the 3rd grade. His first telescope, which he still has today, was a 60mm f/15 refractor. With it he spent “countless hours observing Mars, Saturn and Jupiter from my balcony.”

More recently, 2008, Billy began to do deep sky imaging with the now very popular DSLR camera. Before seriously investing in imaging equipment, Billy says he read and re-read Michael A. Covington’s book **Astrophotography for the Amateur**, to learn the basics. With the purchase of a used Stellarvue 105mm f/6 APO refractor and CG5 equatorial mount, Billy again began to spend countless hours, this time learning the complex art and science of astrophotography. As his technique improved, along with his images, he invested in more sophisticated equipment; specifically, a Takahashi FSQ 106 APO refractor and an Astrophysic’s AP900 equatorial mount.

Billy is a regular imager up at the very popular Henry Coe State Park. He comments that he likes the relatively high elevation and suitably dark skies north and east of site, but also complains about the ever

growing dome of light over Gilroy to the south. The best time for imaging at Henry Coe, according to Billy, is when the summer marine layer moves in covering the valley below, producing beautiful pitch black skies in all directions.

When asked if Billy has any tips for those just starting out in astrophotography, his recommendations are: 1) read and research before investing your hobby money, 2) buy second hand equipment, and 3) be inspired and learn.

Billy was inspired by and learned from many excellent astrophotographers including Dr. James Dire, Conrad Jung, Richard Crisp and Rogelio Andreo, to name a few.



The Summer Horsehead in Scorpio by Billy Liang

2011 EAS Activity Schedule

Jan 09 Holiday Party, Kepler/Copernicus rooms, 6:00-10:00pm
 Mar 20 EAS Annual Banquet, Kepler room, 6:00-10:00pm

General Meeting	Board Meeting	MOVN
Jan 15	Jan 13	Jan 09
Feb 19	Feb 10	Feb 06
Mar 19	Mar 10	Mar 13
Apr 16	Apr 14	Apr 10
May 14	May 12	May 08
Jun 11	Jun 09	Jun 05
Jul 16	Jul 14	Jul 03
Aug 13	Aug 11	Aug 07
Sep 10	Sep 15	Sep 18
Oct 08	Oct 13	Oct 02
Nov 08	Nov 10	Nov 13
Dec 10	Dec 08	Dec 04

EASTBAY ASTRONOMICAL SOCIETY MEMBERSHIP APPLICATION FORM

New Renewal (Just print this page, fill it out, and mail it in!)

NAME: (please print) _____

ADDRESS: _____

CITY, STATE, ZIP _____

DAY PHONE: (____) _____

EVE PHONE: (____) _____

EMAIL ADDRESS: (please print very legibly!) _____

MEMBERSHIP CATEGORIES:

Regular \$24 Family \$36 Contributing \$40

Sustaining \$60 or more \$ _____ Student \$10 (digital newsletter only)

Optional discounted 12-month magazine subscriptions:

Note: Discounted magazine subscriptions are now handled directly with the publishers. You will need to be entered into our database as a current member before you can claim such discounts.

To take advantage of your discount, log into your EAS Night Sky Network account (new members should wait up to two weeks for their email invitation), click on "Links", and then select "New and Renewal subscriptions." From there you can choose the magazine of your choice.

Optional, tax deductible donation(s) to any of the projects of the Eastbay Astronomical Society:
Burns Library \$ _____ Betty Neall Youth Award Fund \$ _____ General \$ _____ Other: _____ \$ _____

EAS Lapel Pin \$3.00 +\$1.00 per pin for shipping and handling. # of pins _____

Total Amount for # of pins \$ _____

(Tip: If you buy them at a club meeting or event, you can avoid the S&H fee.)

Total Enclosed: \$ _____

Please mail this form and your check or money order payable to:

Eastbay Astronomical Society

PO Box 18635

Oakland, CA 94619-0635

For more information, please contact club Treasurer Richard Ozer at (510) 406-1914, rozer@pacbell.net, or write him at the address, above.

By default, (if you have an email address) you will be notified by email that the digital (.pdf) version of the club newsletter is ready to download off the club website. If you prefer to get the B&W hard copy, please check the box below:

I prefer the hard copy mailed to the address entered above.

And,

Are you interested in volunteering your time/equipment for public stargazing at Chabot?

Are you interested in doing other volunteer work for Chabot and/or the Eastbay Astronomical Society?

THANK YOU FOR JOINING US!



Eastbay Astronomical Society

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

November 2010
RETURN SERVICE REQUESTED

Eastbay Astronomical Society

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Treas: Richard Ozer (510) 532-5477 rozer@pacbell.net

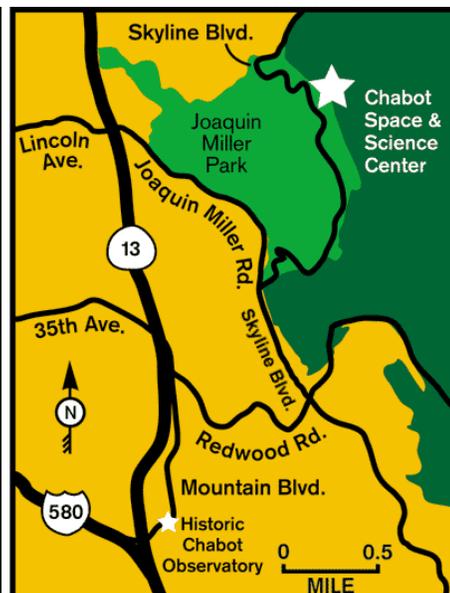
Secretary: Linda Lazzaretti (510) 633-2488

Articles and photos for *The Refractor* are encouraged. Deadline for the Dec. 2010 issue is Dec. 10, 2010. Items may be submitted by snail-mail or E-mail to: Editor - Jim Ferreira, 753 Oriole Avenue, Livermore CA 94551 bakerst@comcast.net (925) 449-0107

Vice President: Ray Wong qm7@yahoo.com

Membership Reg: Bruce Skelly EastbayAstro@gmail.com

Events Coord: Gene Weber (925) 963-1165 gene.weber@gmail.com



FUTURE CONJUNCTIONS

- Jan 09** Holiday Party, Chabot, Kepler Room, 6:30pm
13 Board Meeting, Chabot, Soda Room, 7:30pm
14 EAS MOVN*, 7pm-10pm, Wightman Plaza
Feb 19 General Meeting, Chabot, Physics Lab, 7:30pm
10 Board Meeting, Chabot, Soda Room, 7:30pm
06 EAS MOVN*, 7pm-10pm, Wightman Plaza

Join the Eastbay Astronomical Society

- Regular, \$24/year
- Family, \$36/year
- Contributing, \$40/year
- Student, \$15/year (digital news-letter, only)
- Sustaining, \$60/year or more

Contact: Gerald McKeegan, EAS Treasurer
 Tele: (925) 926-0853 Email: geraldspace@earthlink.net
 Mail: 1760 1st Ave, Walnut Creek, CA 94597-2561

Sign up online at <http://www.eastbayastro.org/>