

# The Refractor

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

Volume 78  
 Number 9  
 May 2002

## Guest Speaker: Richard Campbell

“LUMICON AND THE AMATEUR REVOLUTION”

Saturday, May 4, 2002

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

- Presentation – 7:30 pm
- Club Business afterwards

Did you know you were part of a revolution? Amateur astronomers today have more power to view and photograph deep-sky objects than at any time in history. Much of this power is due to the advent of key innovations in optics, filters and films pioneered by Jack Marling at Lumicon.

Jack realized that with the emergence of big Dobsonian telescopes and large-aperture SCT's, filtration of incoming light would radically improve the view and make faint objects visible to the average observer. Thus, the Lumicon O-III filter was born. He then applied the same concept to photographic filters

by cutting out the bad light and accentuating the good to spectacular effect.

These are just two of the many innovative tools available to today's amateur. Which ones are practical for your scope? What can you see with them? Is there anything truly \*new\* in amateur equipment?

I hope to answer all these questions in our talk. I'm Rich Campbell of Lumicon, a local telescope company. I'm also a dedicated astronomy junkie, EAS member, and enthusiastic Project ASTRO partner. My love of astronomy was born with the Mars Viking landings, grew with coursework at



*The Joy of discovering the Very Large Array in New Mexico.*



*The Lumicon showroom floor, located at 6242 Preston Ave., Livermore CA 94550 (800) 767-9576 9-6 M-F, 10-3 Sat*

UCLA, and flourished with travels to Japan, Chile, New Mexico, and Oakland, California! It has been a thrill to enjoy the Cosmos on several continents, in multiple languages, with all ages.

Currently I observe with a turbocharged Wide-View refractor, 6" Newt, and as many friends as possible. On New Moon weekend, you may see my shuttle craft zooming to the Sierra Foothills for a glimpse of my fave celestial sights: 1) Southern Scorpius 2) Hints of Omega Centauri 3) Kemble's Cascade and 4) you guessed it, Saturn. You may also hear me gathering people to view Iridium Flares, counting down to their massive burst of light. It's still magical after all these years.

Look forward to seeing you @ Chabot! ★

### DINNER WITH THE SPEAKER

5:30 pm

Saturday, May 4, 2002

**HUNAN YUAN**

4100 Redwood Rd., #11

(next to Safeway)

Oakland

(510) 531-1415

Please call Betty Neall at

510/533-2394 by Friday,

May 3rd to confirm your

place.

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## Corvus, the Crow

By Ellis Myers

Corvus is a lesser, but ancient, constellation that is found ten to twenty degrees west of the bright star Spica, where it forms a trapezoidal shape of six naked-eye stars in a lonely part of the sky. There are some interesting things to look for here, however, whether you have just binoculars or whether you have a Hubble Space Telescope.

The star designated Alpha is not the brightest, nor does it take its place as one of the corners of the quadrangle. It may be presumed that it once was brighter than its current magnitude of 4.2 to have earned its first-place name. The brightest star is Gamma Corvi, also called Gienah in reference to the wing of the crow, using the Arabic term for wing. Algorab (Delta Corvi) is also from the Arabic, and means The Raven. It is a fine double star, with components of magnitudes 3.0 and 9.2 separated by 24.2 arcseconds. Corvus has two triple stars, too, S1604 and S1669. Both of these stars are about sixth magnitude.

Two variable stars are of note. R Corvi is a Mira-type star which varies in brightness from magnitude 6.7 to 14.4 over a period of about ten months. A very faint cataclysmic variable star, TV Corvi, was found by Clyde Tombaugh in 1931. This star can be monitored with a medium-sized telescope.

Certainly the most curious object in Corvus is the pair of colliding galaxies called the Antennae. An object for a medium-sized telescope, it shines with light equivalent to that of an 11th-magnitude star. Long-exposure photographs reveal evidence that the turmoil of the collision of the two galaxies has spun off some of the component stars to form lengthy tails.

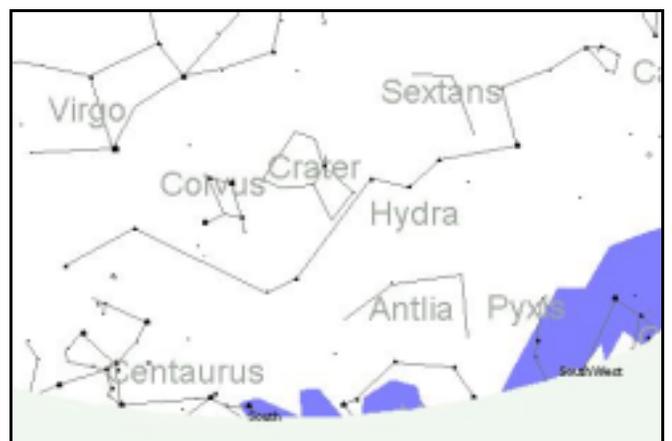
It is these tails, which give the appearance of the graceful antennae of insects, that led to the name. The tails are also the scene of new star formation engendered by the increased density of gas and dust in these regions of interaction. Recent studies using ultraprecise measurements of pulsar timings are expected to give further insight into theories of galaxy mergers. See the article in the May 2002 issue of *Sky & Telescope* for more on this subject.

There are two ancient legends concerning Corvus and Apollo. It is said that Apollo, god of the Sun who rode daily across the sky in his chariot, sent a beautiful silver-white crow to watch over his lover, Coronis, during his absence. But the bird was inattentive to its duty and Coronis was tempted and became unfaithful. When Apollo learned of this, he became so angry that he turned the crow black forever.

The other story is of the time Apollo grew thirsty from the heat of his journey carrying the Sun, and he asked Corvus to fill his cup with cool water. The crow flew at once to the fountain, but saw a fig tree nearby and it stopped to rest among the shady leaves. The fruit of the tree was not yet ripe, and Corvus, who always managed to get in some kind of trouble, lingered, waiting for a chance at the luscious figs. But then, Corvus had a guilty conscience and on his way back to Apollo caught a water snake and carried it in its talons. The crow then claimed that the snake had attacked it and caused the long delay. But Apollo easily saw through the deception and placed the bird, Corvus, the cup, Crater, and the water snake, Hydra, all among the stars. ★



*NGC 4038/4039 from ground-based telescope: shows the tenuous wisps of the antennae. The area of the HST image is indicated. The Antennae: Galaxies in Collision – HST image. Credit Bradley C. Whitmore, STScI*

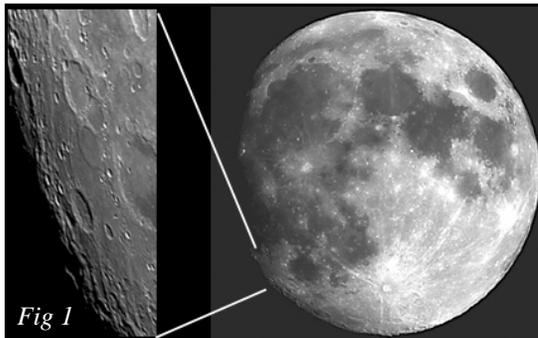


# Wargentin: The Only Lunar Plateau?

By Jim Scala

Wargentin can only be observed when the moon is within a few days of being full and alternatively, within a few days of being a new moon. The former is not easy because of the overwhelming light (use a filter), and the latter is equally difficult because the 25-day-old moon never gets very high in the dark sky, above atmospheric turbulence or the low moisture haze that often plagues the Bay Area. However, anyone willing to take the time will find that Wargentin is a very rewarding object; it's certainly one of the top ten unusual lunar objects within easy reach of small telescopes. Indeed, Wargentin is rife with unusual easy features; for example, study Crüger sometime when you are looking over this lunar plateau.

Figure one is the moon just three days from full. Wargentin's location is shown by a guided insert leading you to this unusual plateau. Most recent lunar atlases list Wargentin as a raised crater, 84 km in diameter

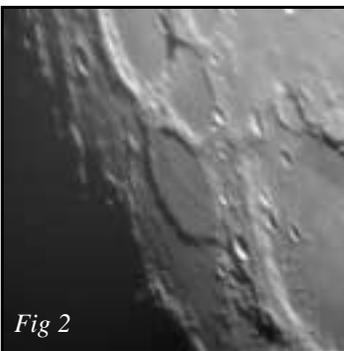


*Fig 1*  
A composite showing the moon 3 days from full with 2 lines drawing attention to the area where Wargentin is located. Wargentin can be seen in the center of the enlarged image as the plateau.

and named after the Swedish astronomer Pehr V. Wargentin. In several of the most recent post NASA books it is listed with five inundated craters. I'll come back to that shortly, but first become familiar with this extraordinary lunar feature that

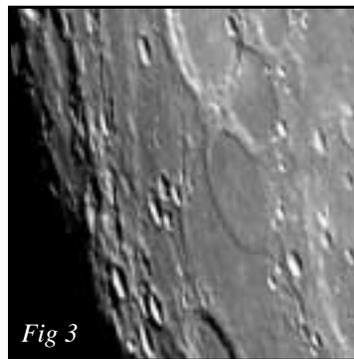
clearly started as a crater and became a plateau. Perhaps your interest will be piqued to observe it and reach your own conclusions about its origins. A good three-inch refractor will do just fine.

Figure two shows Wargentin on 2/25/02, shortly after lunar sunrise on this area. It shows that it is clearly a plateau and its surface has a forked wrinkle rill covering much of it. Notice how it appears that there is still some rim rising above the plane at the northern end of Wargentin, and the southern rim appears to have been slightly overflowed.



*Fig 2*  
The Wargentin area on Feb 25 at 3:30 minutes UT. Notice it's a completely filled crater, the north rim protruding above the plain and the south rim fully covered. Can

Figure three is 24 hours later, on 2/26, when it is bathed in sunlight. For perspective, there are two small craters just barely visible on its northern section on either side of the rill system. Each small unnamed crater is 1.3 kilometers in diameter or about a mile.



*Fig 3*  
The Wargentin area on Feb 26 at 3:30 mins UT, exactly 24 hours after Fig 2. Can you make out the two small craters that straddle the rill at the north end of the crater?

like many craters, the liquefied material underneath didn't erupt in a single blob thus forming an inner mountain as it did in many craters. Rather, the underlying material appears to have slowly filled the entire crater before it cooled. Since the impact that formed Wargentin apparently wasn't completely perpendicular, the northern rim is a little higher than the southern rim, so the liquefied material simply overflowed the southern rim slightly. Was it formed by inundation?

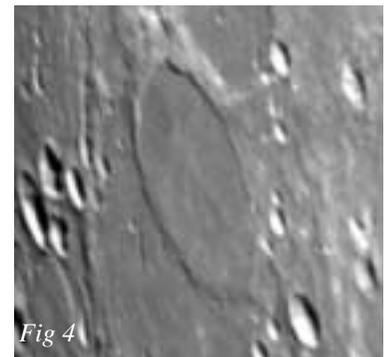
An inundated crater is one that was fully formed and then partially filled by ejecta when a nearby crater was formed. A good example is to study Spörer (formerly Hershel A) where you can see that the crater floor is somewhat raised by material that was thrown into it by a nearby impact. Other examples are mentioned but are very difficult to find, and then you must use lots of imagination to be convinced they are inundated. None come close to resembling Wargentin in the slightest. I have a hard time warming up to the "inundated" concept for Wargentin's formation.

Why not observe for yourself?

I claim that Wargentin is a plateau; indeed, the only lunar plateau. It began as an impact crater after which it was filled by molten basalt. Since the crater is easily observed in my three-inch refractor, it's within easy reach of most observers; in fact, a good alt-azimuth mount will do just fine, but a six inch telescope is required to see the two small craters. A good lunar (neutral density) filter to handle the excessive light near full moon is essential. Wargentin is best studied from four-to-two days before the full moon. Similarly, try for about three-to-five days before new moon when you don't need a filter. After you observe Wargentin, I'd like to hear your own thoughts on its formation. ☆

Figure four is an enlarged section of Fig 3 showing Wargentin as it would appear at about 200X in a telescope. Can you see that the north rim protrudes above the plain and, in contrast, the south rim has been covered? Can you see the two small craters that straddle the rill system at its northern end? Was it formed by impact?

It's not difficult to visualize that Wargentin was formed in the early bombardment (about 3.5 billion years ago) that created most lunar features, but un-



*Fig 4*  
An enlarged view of Fig 3. Look for the small craters, the protruding north rim and the craters at the north end.

# Editor's News 'n Views

The saying may go, "April showers bring May flowers," but for us astronomer types, April showers are a pain in the asterisms. Despite a bad weekend or two, though, we've been having some very nice viewing up at Chabot. Jupiter and Saturn are still observable for part of the night, but they're starting out past the zenith on their way to the western horizon, and their window for decent observation is getting narrower and narrower. Bring on the faint fuzzies! One weekend, we even had one of those wonderful but rare conditions where the fog covered the Bay Area lights, and the temperatures were in the "shirt-sleeve" range. I love it when that happens!



US News and World Report. **Dave Rodrigues** accepted his Helen Pillans award for his undying devotion and tireless work towards the promotion of astronomy and science; **Terry**



**Galloway** and **Ken Swagerty** each received Lifetime Memberships to the Eastbay Astronomical Society for their incredible donations of time, expertise, and resources over the years (Ken is also our new Director of Instruments), and **Kingsley Wightman** was in attendance, and got a standing ovation from the crowd. All in all, a night to remember.

As seen in the picture below, a momentous occasion was captured for posterity: the signing of the Memorandum of Understanding between Chabot Space & Science Center and



the Eastbay Astronomical Society. CSSC Director **Dr. Mike Reynolds** and EAS President Carter Roberts were the signers. This document outlines the commitments and structure of our relationship with CSSC, and makes clear just who is responsi-



ble for what, and has been in the making since September 2000.

This just in: **Nancy and George Kahumoku** of Santa Cruz just donated a 4" Unitron refractor, and accessories, to the EAS, worth in excess of \$6,000 (1960's dollars!) They could have just sold it, but wanted to find it a good home in memory of

Nancy's father, **George Winston**, who was an enthusiastic amateur astronomer (he even built an observatory for it), and would have wanted it put to a worthy cause. They chose the EAS to donate this *really* nice telescope to, which we can use for our telescope loaner program, and/or for public viewing up at Chabot. Thank you Kaumokus!

As a reward for our work on helping to get it passed, I and 43 other Measure G volunteers were invited to participate in a free simulated Challenger space shuttle mission on April 6th, and I can say with complete authority, now: it's a blast!



*Challenger mission briefing (Karen Powers 2nd from left)*

Our "mission" was to fly out to comet Halley and send a probe into it to get readings and make measurements. Everybody had different functions (I was navigator) and we all had to perform specific functions and were assigned various tasks, and we all had to communicate with others where necessary, including Mission Control down on "earth." Halfway through, we switched sides and the shuttle crew and mission control cross-transported so we could get a feel of how things go on both sides of the comm-link. We managed to be successful in our mission with about 2 minutes to spare(!) Not *all* missions are successful. It was fun, educational, and exciting, and I'd recommend it to anyone! ★



*Mark Gingrich tries on a space capsule for size at Chabot's newest exhibit on spaceflight*

# You, and the MOU

Here is the text of the long-awaited agreement between the Chabot Space & Science Center and the EAS.

## MEMORANDUM OF UNDERSTANDING

Between Eastbay Astronomical Society and Chabot Space & Science Center

Since 1924 the Eastbay Astronomical Society (EAS) has had an intimate cooperative relationship with the Chabot Observatory / Chabot Science Center and now the new Chabot Space & Science Center (CSSC). EAS has over the decades provided on-going telescope maintenance support, a public lecture program, special public off-site events, supplied large numbers of volunteers and has been the steady supporter and "patron saint" for CSSC and its predecessors.

With the move to the new facility on Skyline Boulevard, EAS and CSSC will work together as follows:

1. EAS will continue to assist CSSC staff in maintaining the telescopes (Transit, 8-inch, 9.5-inch, 20-inch, 36-inch, Chabot Vacuum Solar Telescope, and the variety of portable telescopes that are set up in the Wightman plaza, the front entrance, or other locations for special events), support instruments, and any future telescopes. Keys / card access to necessary areas as determined appropriate by Chabot staff will be provided by CSSC to designated EAS volunteers to enable these activities to occur.
2. IN exchange for EAS's telescope maintenance assistance, CSSC will allow EAS members to use the CSSC telescopes after hours at times that will not interfere with the public programs involving the telescopes. EAS will conduct and maintain a training program for its members in order to qualify them for the proper and safe use of the telescope instruments and accessories. This training and qualification program will be reviewed and mutually accepted by EAS and CSSC. CSSC accordingly will provide card / key access to the necessary facilities for these activities and will provide EAS any feedback that might be needed from time to time to insure that this EAS / CSSC volunteer program is mutually acceptable and productive.
3. EAS volunteers shall also be formal volunteers (e.g. Explorers, Presenters, etc.) under the CSSC Volunteer Program and shall at all times remain in active and full compliance with the requirements as administrated by the CSSC volunteer coordinator. They can be allowed to have special nametags approved by CSSC and EAS indicating they are EAS members and CSSC volunteers.
4. EAS will conduct the regular monthly public lecture programs (EAS business) where professional or well-known astronomical lecturers will provide programs. At times there may also be a "Members Lecture Program" where EAS members can present their work. CSSC will provide free access to an appropriate space to conduct the lecture programs at a time which will not interfere with the ongoing regular CSSC public or rental activities.
5. EAS will conduct the regular monthly Board of Directors Meeting at a time and location at CSSC that is mutually arranged and acceptable to both parties.
6. EAS will conduct the Telescope Makers Workshop (TMW ) weekly. At the time of this agreement, the TMW will be located on the second floor of the Spees Building, at the optical testing room behind it and the Chemistry / Physics Lab (or other space deemed mutually acceptable by both parties). This regularly scheduled TMW will be a component of the regular CSSC public programs. TMW instructors will also be CSSC volunteers and operate within the CSSC requirements.
7. EAS will provide volunteers to assist CSSC staffing of the CSSC Libraries (open shelving, secured rare book room, and archival documents and objects locked cabinets) located on the second floor of the Dellums Bldg. The library will be open at a minimum 1 hour after the EAS monthly Lecture Program and also during additional hours during the regular CSSC public program as well as some day class programs as will be coordinated from time to time by the CSSC Director of Astronomy.
8. EAS will complete the historical restoration of the 20-inch Refractor (Rachel), 8-inch Refractor (Leah), and Transit Telescope, including installation and work with CSSC in helping to build any other astronomically related equipment as well as making the telescopes fully operational for public viewing and after-hours use.
9. EAS is the owner of the painting and marble bust of Anthony Chabot loaned to CSSC for public display at locations of CSSC choosing. The condition of the loan is that if CSSC closes, EAS would have the right to donate it to Bancroft Library, Oakland Museum, or Oakland City Library, or, failing to place the items at these locations, to any other acceptable 501(c)(3) organization that meets our requirements for displaying and preserving said artifacts.
10. EAS and CSSC have agreed to a loan of books from EAS's Burns Memorial Library (see *Agreement* (attached) between the Eastbay Astronomical Society (EAS) and the Chabot Space & Science Center (CSSC) regarding the books of the Burns Memorial Library (Burns)).

This *Memorandum of Understanding* is considered to be a "living document" that can be amended in writing, so that it will continue to accurately describe the relationship between EAS and CSSC.

(Signed by Dr. Mike Reynolds, Dir CSSC, and Carter Roberts, Pres EAS, 3/29/2002)

►Longtime EAS member Betty Neal attends every EAS Board meeting, and every EAS Annual Awards Dinner. She's amazing!



▼Father/daughter combination working on a really thin telescope mirror in the TMW



►Harry's Hofbrau does it again at the EAS Annual Awards Dinner. GREAT food, people!



►Beware the extra-smelly cats that hang out around the dumpsters by Chabot's loading docks

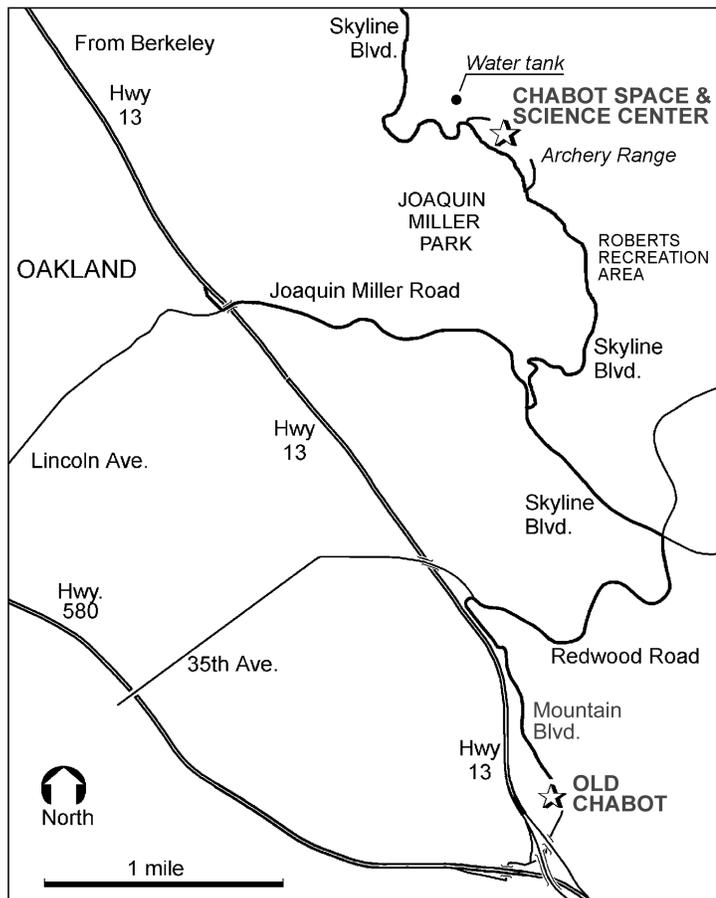




# Eastbay Astronomical Society

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

May 2002  
*RETURN SERVICE REQUESTED*



## FUTURE CONJUNCTIONS

### May 2002

- 4 7:30 pm EAS General Meeting, Chabot
- 9 7:30 pm EAS Board Meeting, Chabot
- 13 Members Only Observing Night at Chabot

### June 2002

- 1 7:30 pm EAS General Meeting, Chabot
- 13 7:30 pm EAS Board Meeting, Chabot
- 16 Members Only Observing Night at Chabot

## Eastbay Astronomical Society

President:	Carter Roberts	(510) 524-2146 cwr Roberts@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 June issue is May 18, 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