

From the President

By Chris Angelos

Fremont Peak Observatory has been the passion of many Northern California amateurs for over three decades. The results have brought enjoyment and insight to many in the public and the amateur astronomy community.

Maintaining and promoting this legacy involves many activities and many volunteers. The FPOA Board of Directors is one such group of volunteers who—well in advance of the start of public programs—have already begun planning for the 29th season of FPOA programs. You, too, can contribute even if you can only volunteer a small amount of time. For example, opportunities to contribute with highly visible results include: keeping the telescopes in operating condition, maintaining the observatory building, giving public programs, Star-B-Que operations, and clearing the vegetation around the observatory to keep it fire safe. You can easily contribute by joining the spring work party on April 26, 2014 to help maintain the facility.

Some of the less visible opportunities include: paying the bills; preparing required reports to DPR, IRS, AG, Franchise Tax Board, and others; coordinating 20 public programs each year; planning the Star-B-Que; answering technical questions about taxes, GAAP, or points of law; and coordinating with the Department of Parks and Recreation.

All FPOA members are welcome to participate and reap the satisfaction of contributing to a worthy cause. So, please think about how you can contribute, contact a board member, and offer to help keep the observatory a resource we can all enjoy.

Chasing the Moon's Shadow Past West Africa

By Rob Hawley

Eclipses happen at all because the apparent size of the moon and the sun are *approximately* the same. The sun's apparent size varies between [31.6' – 32.7'](#). The moon's orbit is more elliptical and varies between 29.3' – 34.1'. When the moon's apparent size is at its largest relative to the sun's then

FPOA Programs 2014

Saturday Evening Programs

Apr 5, 26 May 3, 23, 31
Jun 7, 21, 28 Jul 5, 19, 26
Aug 2, 16, 23, 30 Sept 13, 20, 27
Oct 18, 25

Solar Programs

Mar 29 Apr 26 May 31 Jun 26
Jul 28 Aug 23 Sept 20 Oct 25

Board Meetings

Jan 25 Feb 22 Mar 29 Apr 25
May 31 Jun 28 Jul 26 Aug 23
Sept 20 Oct 25 Nov 15

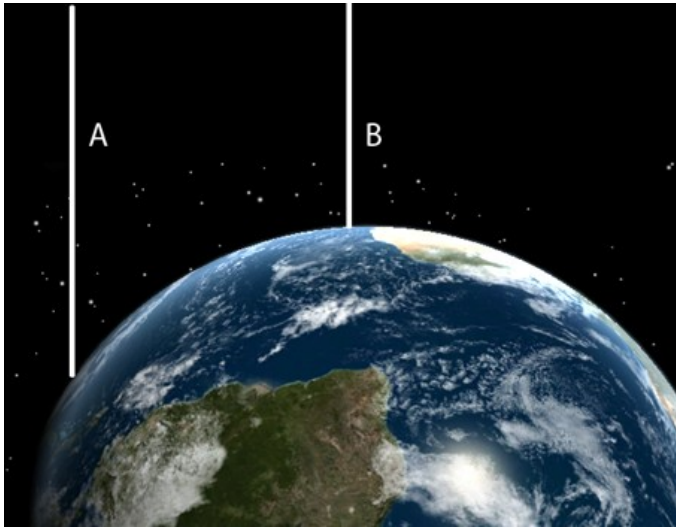
Special Events

Star-B-Que Aug 23
Member Appreciation Night Sept 20

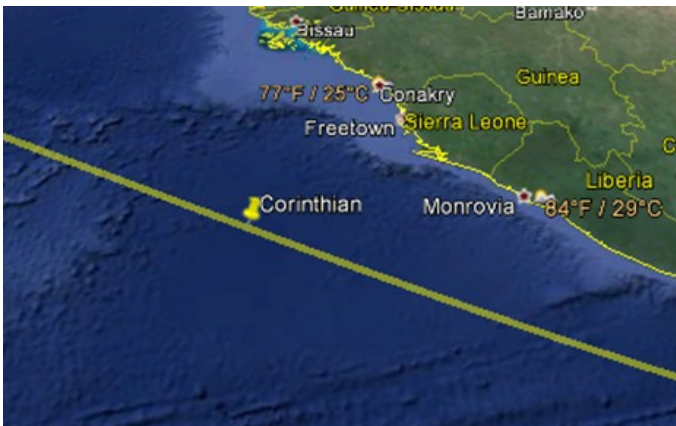
Please check <http://www.fpoa.net/schedule.html> for changes or updates to this schedule.

a long total eclipse occurs. When the size is smaller, like in [May 2012](#), then an annular eclipse occurs. When the ratio is right on the tipping point of 1:1 then an interesting affect occurs called a Hybrid Eclipse.

The moon's apparent size changes when the earth is further away. The size is always greatest at the noon location because the earth is curving toward the moon. Normally this just changes the length of totality, but during a hybrid eclipse the distance is so critical that even this small amount is enough to reduce the apparent size below 1:1. In the farthest location the moon no longer covers the sun which results in an annular eclipse. Near B the apparent size of the moon is larger so a short total eclipse occurs.



The eclipse of November 3, 2013 was just such a hybrid eclipse. The shadow first touched the earth near Bermuda. At that location the apparent size of the moon was too small to form a total eclipse as described above. As the shadow moved east to its noon (and closest) location then the eclipse became a short (1m 40s) total eclipse. That point occurred south of Liberia in the Atlantic.



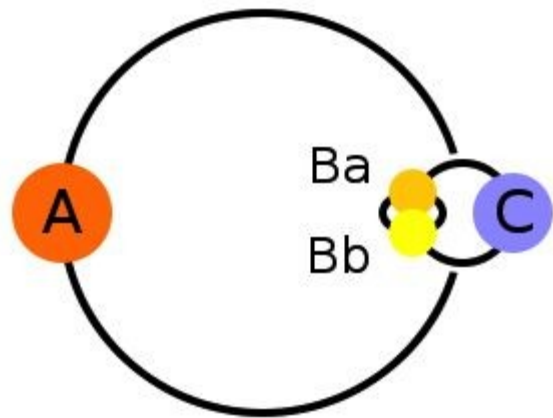
Due to the physics of this eclipse picking a good location was challenging. The serious imagers headed to Uganda where the eclipse would be short and late

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By Patrick Donnelly

During the winter evenings, when it is very cold outside, one should not stay inside and watch old "Mister Ed" reruns. There are many reasons to brave the cold and observe some truly interesting astronomical objects. One of these objects is Gamma Andromedae (γ -And), which is also known as Almach or $\Sigma 205$.

Gamma Andromedae is the third brightest star in Andromeda with a visual magnitude of +2.26. If this was all there is to this star, one might say "so what?" However, that is just the start to this object. γ -And is actually a quadruple star. In 1778 J. T. Mayer discovered that γ -And was a double star with a magnitude +5.5 companion about 9.6" from the primary



star (A Star). Later in 1842 Otto Struve discovered that the dimmer component (B star) was in fact a close binary system with a separation of 0.4", and an orbital period of approximately 64 years. Subsequent spectroscopic observations showed that the brighter of the B components was a spectroscopic double star. Thus, γ -And is a quadruple star.

Gamma Andromedae is about 350 ± 30 light years from the earth. The system consists of four (4) components, A, Ba, Bb, and C. The A star is a giant orange star similar to Arcturus of spectral type K3IIb. It has a luminosity that is 2,000 times brighter than the Sun, and it has a radius that is 80 times that of the Sun. If the A star were placed, where the Sun is, both Mercury and Venus would be engulfed by the A star. The B and C components are Main Sequence stars with the B components both blue-white giants of spectral class B9.5V. The C component is a star similar to Sirius with a spectral type of A0V. The two (2) B components orbit each other in approximately 2.67 days, and the B & C components orbit each other in approximately 64 years. I could not find a value of the A-BC period.

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Chasing the Shadow *from Page 2*

in the day, but where at least the entire eclipse would be visible. Others chose to try for a sunset eclipse at the end of the track in Ethiopia. I picked the [TravelQuest](#) trip aboard the cruise ship Corinthian which was the only ship to attempt the eclipse near its max point.

Half the Fun is getting there

Of course a trip like this does not mean just flying (or sailing) to some site and then heading for home (at least for me). In my case I had been traveling for 3 weeks before the eclipse occurred.



In my mind that is one of the side benefits of this hobby. You get to see some places in the world you would likely never go on your own. Freetown, Sierra Leone was certainly interesting, but I would not have gone there otherwise. On the other hand Morocco and Spain were incredible. The Canary Islands are definitely on my bucket list to return. Past trips afforded me an opportunity to see Papua New Guinea, Siberia, Libya, and other interesting destinations.

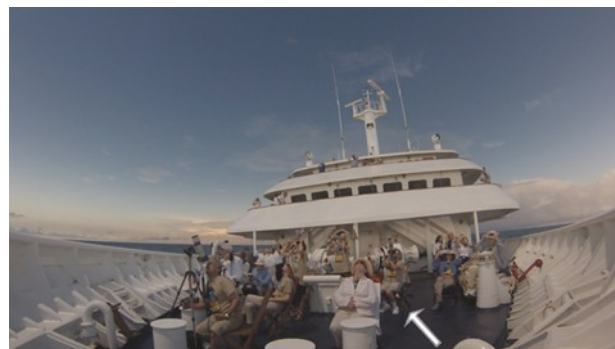
Aside from visiting interesting places the eclipse chasers are a community. Several of the travelers on this trip have been on past trips. I changed my 2015 plans so I can be with people I met on this trip.

Eclipse Day

Of course as an eclipse chaser the meat of the trip comes down to Eclipse day. Unfortunately a rather large weather system had settled at our target site. That is why we were glad we were on a ship. The principal advantage of viewing on a ship is that you have (some) ability to change your location. In this case the tea leaves said “go southeast”. We raced

south from Dakar, Senegal to a point in the ocean further down the track where we hoped there would be clear skies.

A ship is not an ideal platform for imaging. That is why the APOD for the eclipse was taken from Uganda. But with modern image stabilized lens and a high ISO you can at least capture the bright stuff (the diamond ring, prominences, and the chromosphere). Since I have a Canon 20Da which is more sensitive to Hydrogen Alpha than most commercial cameras I was in a good position to catch something as long as I did not overreach.



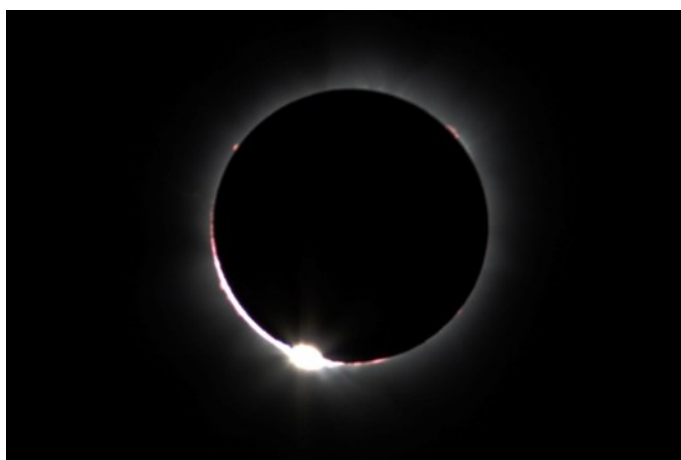
The serious imagers in our group chose a location on the front of the boat. This is a screen capture from my YouTube video. Those that have watched the video said they got queasy. For me after more than a week on the boat (and a patch behind the ear) it just made the imaging more challenging. I marked myself with the white arrow.

Some Photos

Reproduction here is going to necessarily reduce the quality. If anyone wants to see the originals I suggest you visit:

<http://robhawley.net/africa13/Nov03-Eclipse/index.html>

<http://goo.gl/M0BP1a>



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2nd Contact

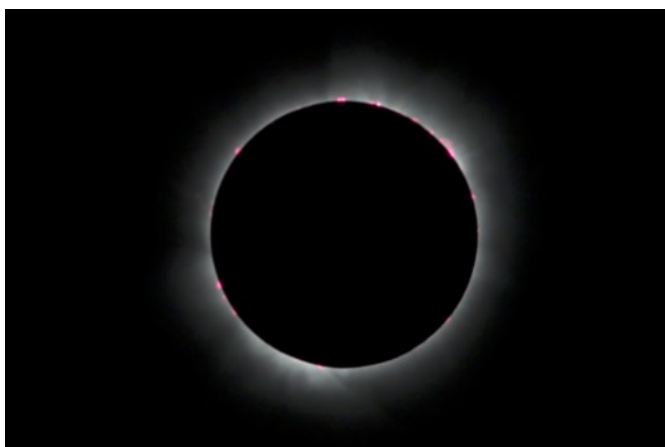
This was the point that the last bit of the surface of the sun slipped behind the mountains of the moon. The picture from the ship above was taken about at this point.

Corona and Prominences



This image is a couple of seconds later. The bright surface of the sun is now fully covered. A different exposure and processing shows some features of the inner corona.

Fire around the sun



One of the unique features of this eclipse was that prominences were visible during the entire event. Normally these disappear shortly after totality begins. Their reappearance signals the end. In this case the combination of a small moon and active sun gave quite a show. The view in Uganda was even more incredible since the moon was inching back toward annularity so less of the sun was blocked (and totality much, much shorter).

Inner Corona



One final shot. This hints at the detailed structure of the inner corona. All of the bright features above are lost as overexposed areas.

Of course this only represents the brightest portions of the corona. The outer corona fills the corners of this image, but was too faint to show in this exposure.

Rob Hawley

FPOA Board Activities

To better keep our members informed of items of interest concerning the observatory association, the January Board Meeting minutes highlights are listed below.

- A donation to FPOA was made by a member in memory of her husband. A Memorial Bench design was selected by the Member and the Board and is awaiting Park approval. The bench will be of plastic wood material with a brass plaque, anchored with cement footings and located at the East end of the telescope pads in front of the observatory.
- Treasurer, Rob Hawley, reported that income from Memberships and Donations is meeting expenses from insurance, maintenance, etc. this year.
- The 2014 schedule was developed and approved; the Star-B-Que and Annual meeting will be held on August 23rd this year.
- Andy Newton reviewed the Hartnell College/FPOA Intern Program with the Board. He is in the process of selecting six interns from Hartnell to assist FPOA volunteers with Public Programs this year. Funding will be provided by STEM (science, technology, engineering and mathematics) grants from NASA.

In a small telescope the two components appear orange and blue. If you could separate the B & C components, the B component would appear blue, and the C component would appear green. Gamma Andromedae is located on the celestial sphere at RA 2^h 03^m 54^s and DEC +42° 19' 47". To find this star begin at Algol, travel over to M34, and then travel an equal distance in the same direction. The A and BC components of γ -And are separable in almost any amateur telescope using at least 60x. However, resolving the B & C components is much more difficult. A 10" telescope at high power should resolve the B & C components, but the sky conditions seldom allow the split to be made. I have partially resolved the B & C components with the 30" Challenger Telescope a couple of times. After observing γ -And don't forget to observe M34, NGC 752 (a bright binocular open cluster), and NGC 891 (a beautiful edge on spiral galaxy) that are nearby.

Pat Donnelly

2014 Membership Renewal

Renewals are easy. You can use the forms on the membership page <http://www.fpoa.net/membership.html> to pay with either PayPal or via a credit card. For those preferring paper you can just send a check (that has your current correct address) to : FPOA Membership, c/o Rob Hawley, 1233 Hillcrest Dr, San Jose CA 95120

If your email has changed then please be sure to include that in either the PayPal payment as a comment or a note with your check.

EMAIL DELIVERY OF THE OBSERVER

Dear FPOA Members,

We have been delivering the Observer via email for the past several years. This obviously saves the Association postal expenses, and assures the quickest delivery to you. However, several of you no longer have valid email addresses, due to ISP changes, moves, etc. If you would like to continue to receive, or begin to receive, notification of the Observer via email, please send your current email address to membership at fpoa.net

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The Fremont Peak Observer is published four times a year (Winter, Spring, Summer, Fall). Articles from members are encouraged and should be emailed to <schedule at fpoa.net > Articles should be in plain text or MS Word format. Deadlines are Feb. 1, May 1, Aug. 1 and Nov 1, respectively.

FPOA on the Internet

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